# User Manual
# GST Desktop
# 3.11

2023

GiGa infosystems GmbH

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# 1 DB Config

To get to the DB config menu, first connect to the database with your user credentials. Within the **Connect** tab the database configuration can be found when the ☐ **DB config** is checked.

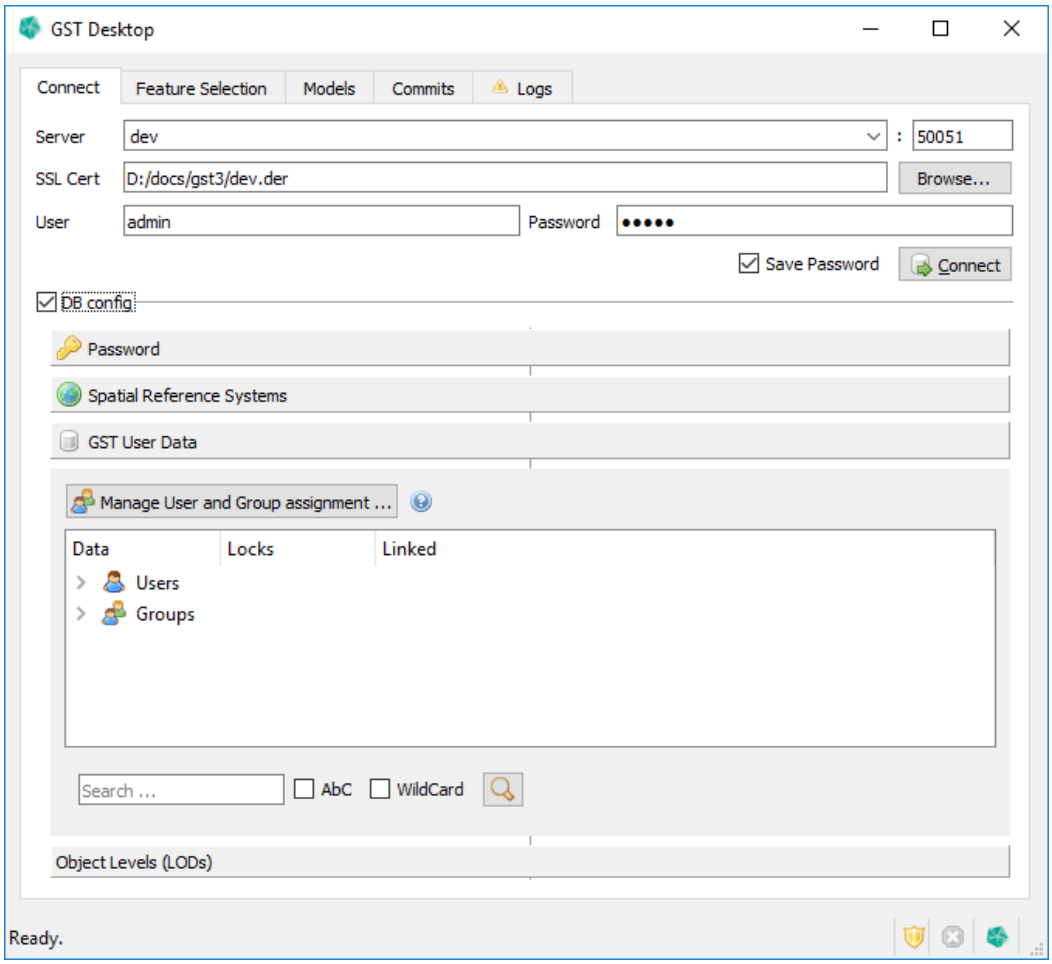



Figure 1.1 Within the **Connect** tab the database configuration can be found when the ☐ **DB config** is checked.

The database configuration panel is separated in the following panels.

**Password** . . . . . page 4

* Change the password of the currently connected user

**Spatial Reference** . . . . . page 5

* Create SRS: enter a new Spatial Reference System.
* Delete selected SRS: delete the selected Spatial Reference System.

**GST User Data**

* Add, delete users and groups and manage the user assignment to groups page 8
* Show data of all users . . . . . page 15

## 1.1 Change Password

Click the Password field to get to the **Change Password** dialog seen below.

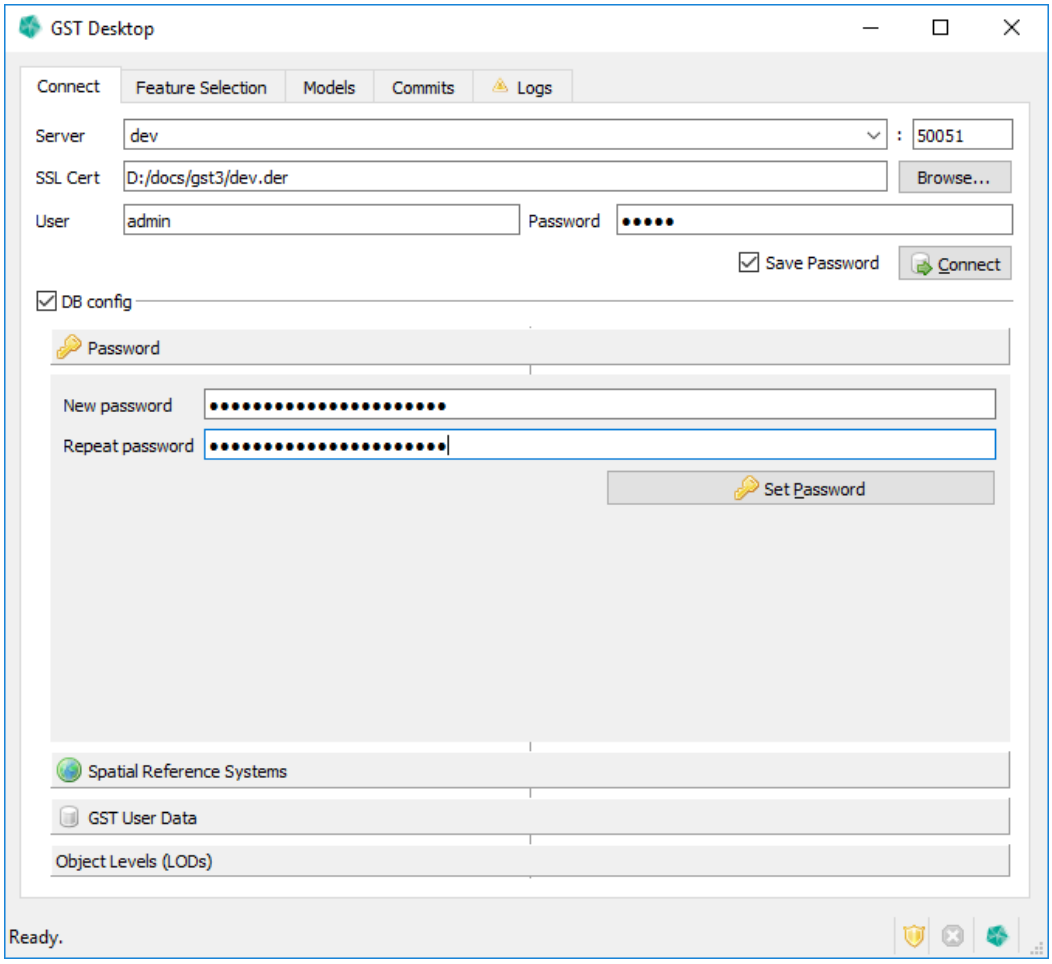



Figure 1.2 "Change Password" dialog

1. Type in the new password in the first field.
2. Repeat it in the second field.
3. Press the **Set Password** button

**Note**

Changing the password requires you to login again with your new user credentials.

## 1.2 Spatial Reference Systems

Click the Spatial Reference Systems field to get to the **Spatial Reference Systems** panel.

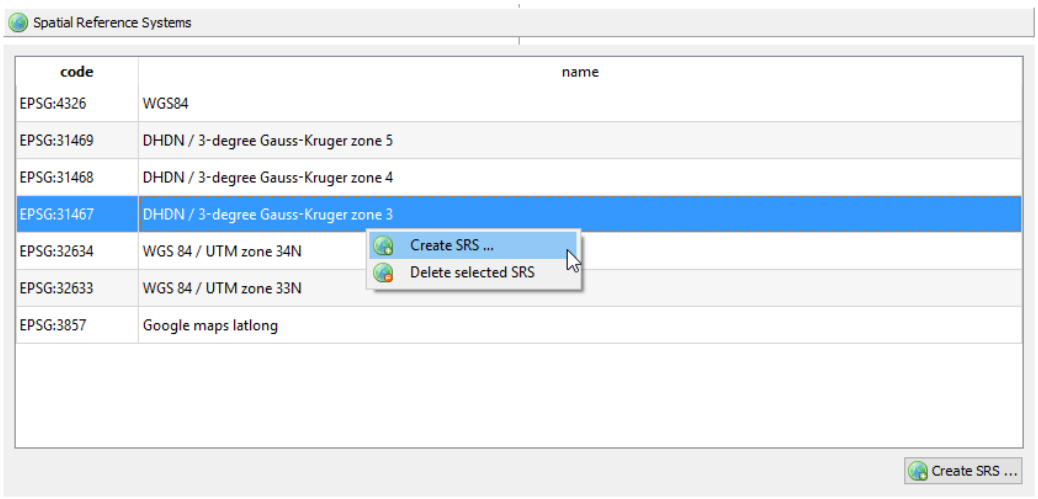



Figure 1.3
The context menu offers functions to manage the SRS in the GST Storage instance.

Now you can see a list of all available SRS in the database. Click on the list with the RMB to open the context menu with the SRS functions (see Figure 1.3 ).

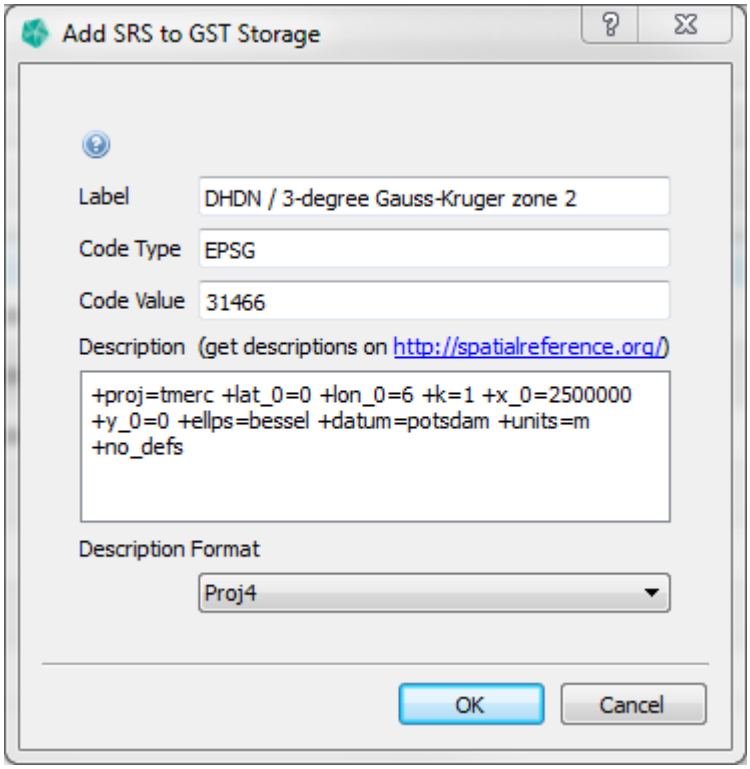
You can

* Create SRS . . . . . page 6
* Delete SRS . . . . . page 7

## Create SRS

In the context menu select Create SRS to open the **Create SRS** dialog.

Figure 1.4
"Create SRS" dialog




1. **Label**: Enter a descriptive identifier for the new SRS.
2. **Code Type**: Enter the system from where the code is from. Most of the time this will be EPSG.
3. **Code Value**: The value of the SRS code from the system mentioned before.
4. **Description**: Enter the description of the SRS in the format you selected in the **Description Format** dropdown list.
5. **Description Format**: Select the format of the description entered above. You can choose between Proj4 and OGC-WKT.

**Note**

You can get the description and code value from a website like `http://epsg.io`. Prefer the Proj4 format, if you have the option.

6. After you are done, press

a) **OK** to add the new SRS.
b) **Cancel** to abort.

## Delete SRS

1. Right click the SRS you want to delete.
2. Choose **Delete selected SRS** from the context menu.
3. The **Confirm SRS deleting** dialog will appear.

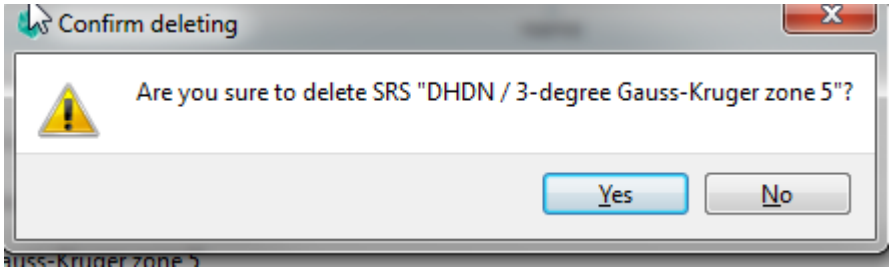



Figure 1.5
Confirm deleting dialog

4. Press

a) **Yes** to confirm the deletion of the selected element.
b) **No** to abort the deletion.

**Note**

You can only delete a SRS if it is not referenced by any feature classes anymore. Trying to delete a still referenced SRS will cause an error.

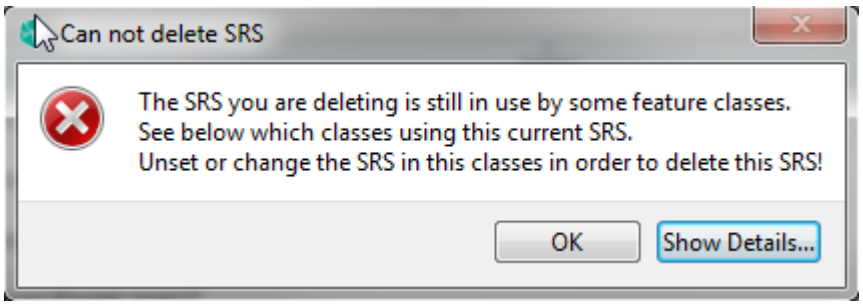



Figure 1.6
SRS still referenced dialog

Click **Show Details...** to see which feature classes reference the SRS you wanted to delete.

## 1.3 User Management

The user management in GST consists of users and groups. One user can be a member of multiple groups. A member of a group can see all published data of that group. Uploaded objects that are not specifically made public for a group are set to private and are only visible for the user that uploaded the objects.

**Example:**
User Gabi, member of group Reviewers uploads the feature Keuper publicly to group Reviewers. User Heinz, also member of group Reviewers, can now see and use the feature Keuper with his account. User Bernd, not member of group Reviewers, however, cannot see or use the feature Keuper with his account.

**Note**

Please note that User and Group management is an administrator task. In order to manage Users and Groups login as GST database administrator to enabled the functions. (They are disabled and non-functional for regular GST users.)

### Quick User/Group creation

Creating users is very simple. Right click on User to display the GST Data Tree context menu and choose Create New User (see figure 1.7).

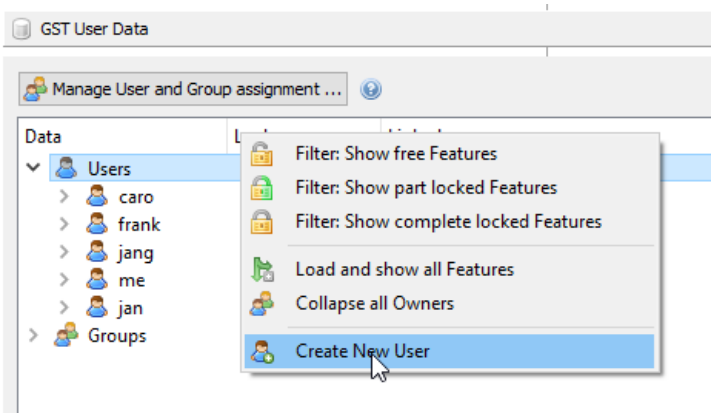
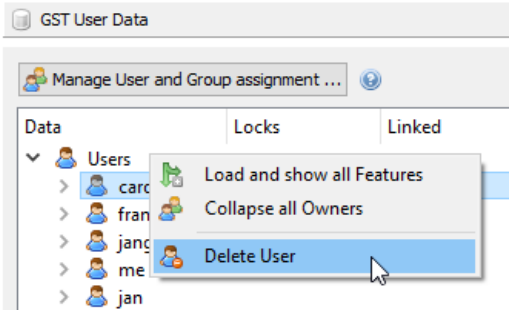



Figure 1.7
Use the context menu to quick create users

To delete users right click on the user that should be deleted. In the GST Data Tree context menu choose Delete User (see figure 1.8).

Creating and Removing groups works in the same way. As an alternative users and groups can be created in the **Assign Groups to Users** Dialog. See section User Management on page 9.

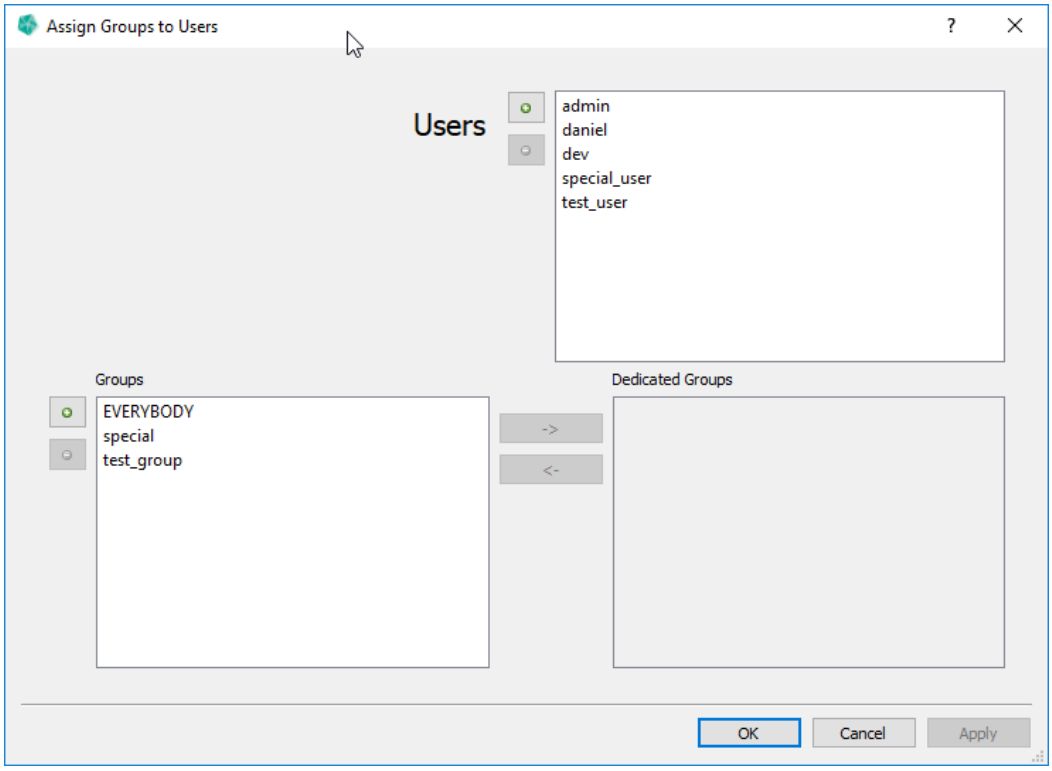
Figure 1.8
Assign Groups to Users dialog




## Manage Users and Groups

To manage the User and Group assignment (referring the example above), click on the button **Manage User and Group assignment** in the **GST User Data** panel (see figure 1.1). Then the **Assign Groups to Users** Dialog will be shown (see figure 1.9)

Figure 1.9
Assign Groups to Users dialog



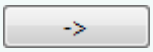

In this dialog you can

* Add and Delete users . . . . . page 11
* Add and Delete groups . . . . . page 12
* Assign groups to specific users. . . . . page 14

## Dialog Setup

In the top right corner you can see **Users**, a list of all GST users. In the bottom left corner is the **Groups** list where all GST groups are shown. Selecting a user from **Users** will show their assigned groups in the **Dedicated Group** list.

**Create** button



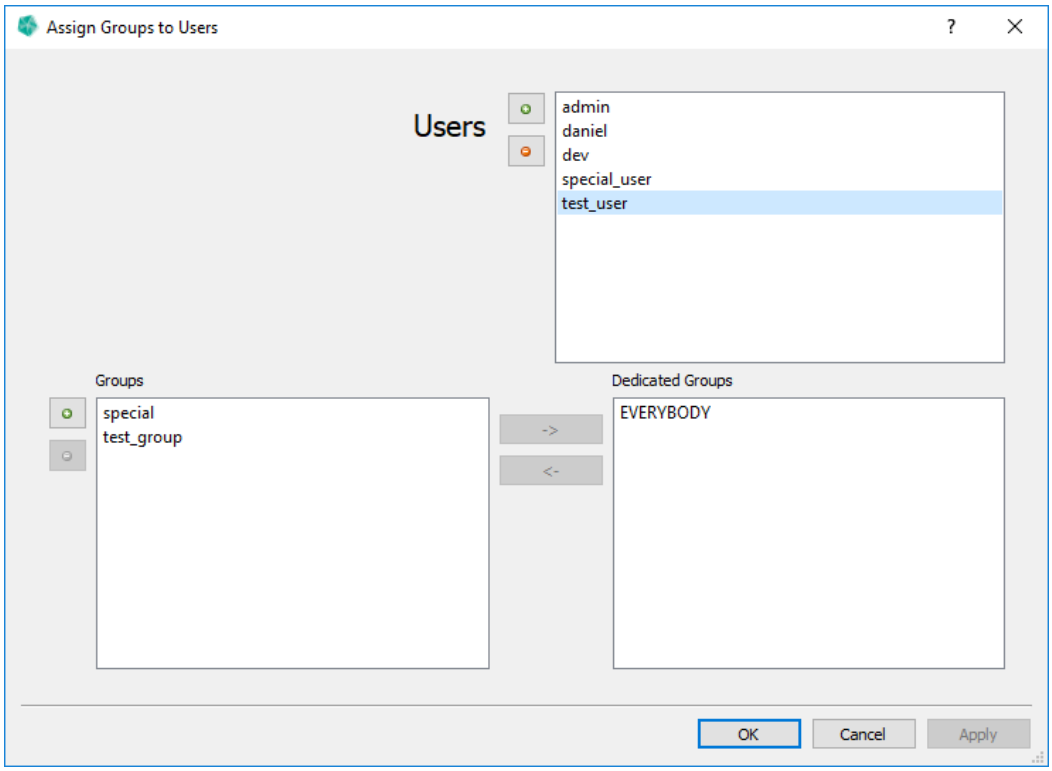

**Assign** button

**Delete** button

**Unassign** button

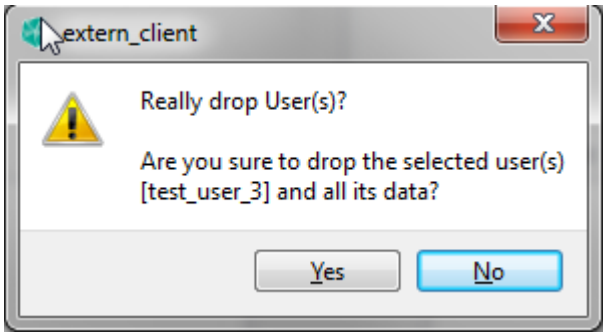
## Add / Delete User

Figure 1.10
Assign Groups to Users dialog




1. Select the user to delete in the **Users** list.
2. Use the **add** and **delete** buttons to Add / Delete user.
3. Deleting a user has to be confirmed.

Figure 1.11
Confirmation dialog



## Add / Delete Group

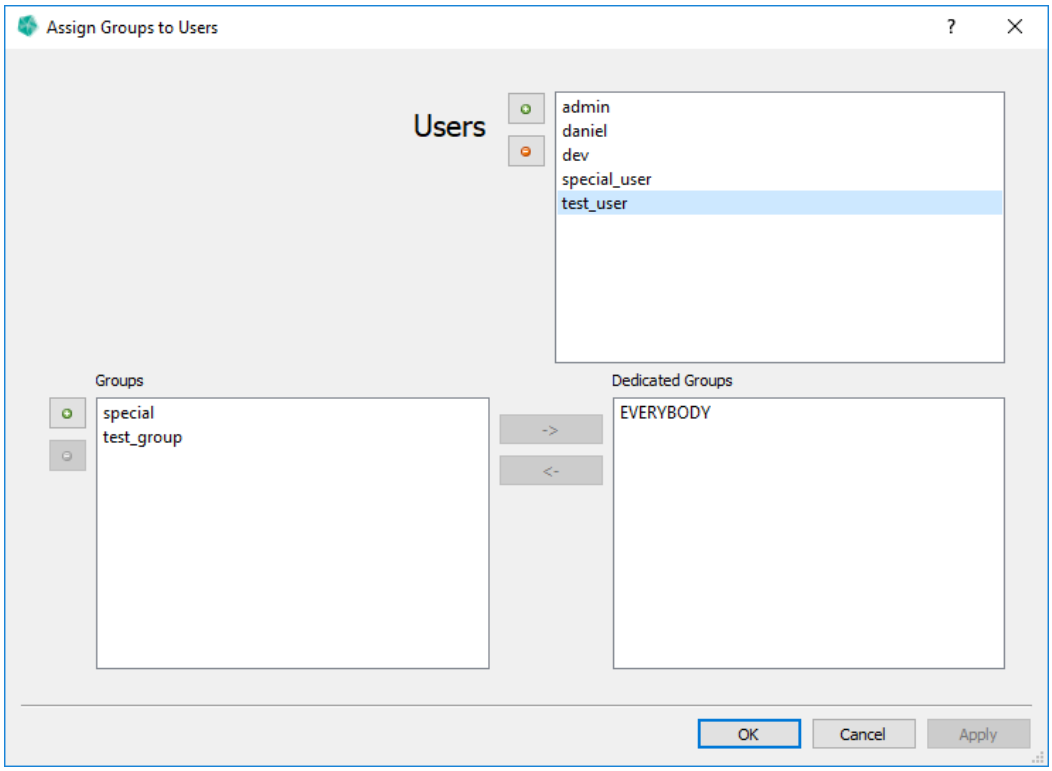



Figure 1.12
Assign Groups to Users dialog

1. Select any user from the **Users** list.
2. Select the group to delete in the **Groups** list
3. Press the button.

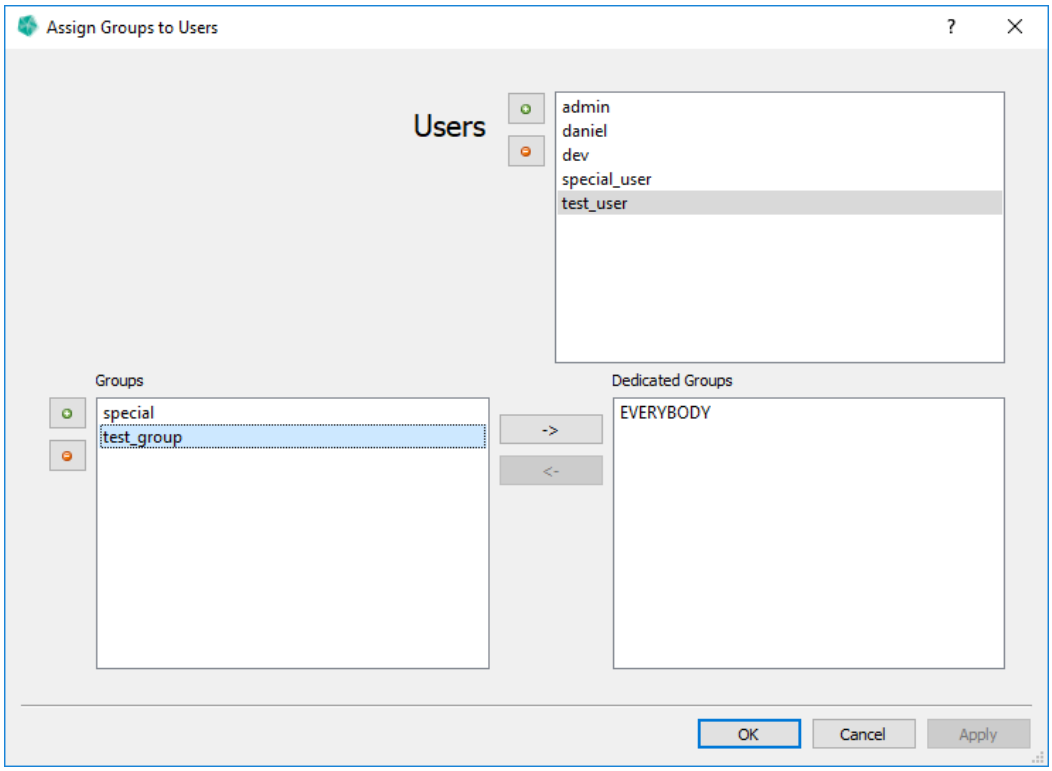
For creating a group use the create button and specify the group name in the Dialog that pops up. Continue with assiging users to the created group (see next section).

### Note when deleting groups

To delete a group, it has to be unassigned from the currently selected user first. If the group to delete is listed on the right **Dedicated Group** list unassign it by clicking the <- **unassign** button.
All users being assigned to the group will be automatically unassigned when the group is deleted.

## Assign User to Group

Figure 1.13
Assign Groups to Users dialog



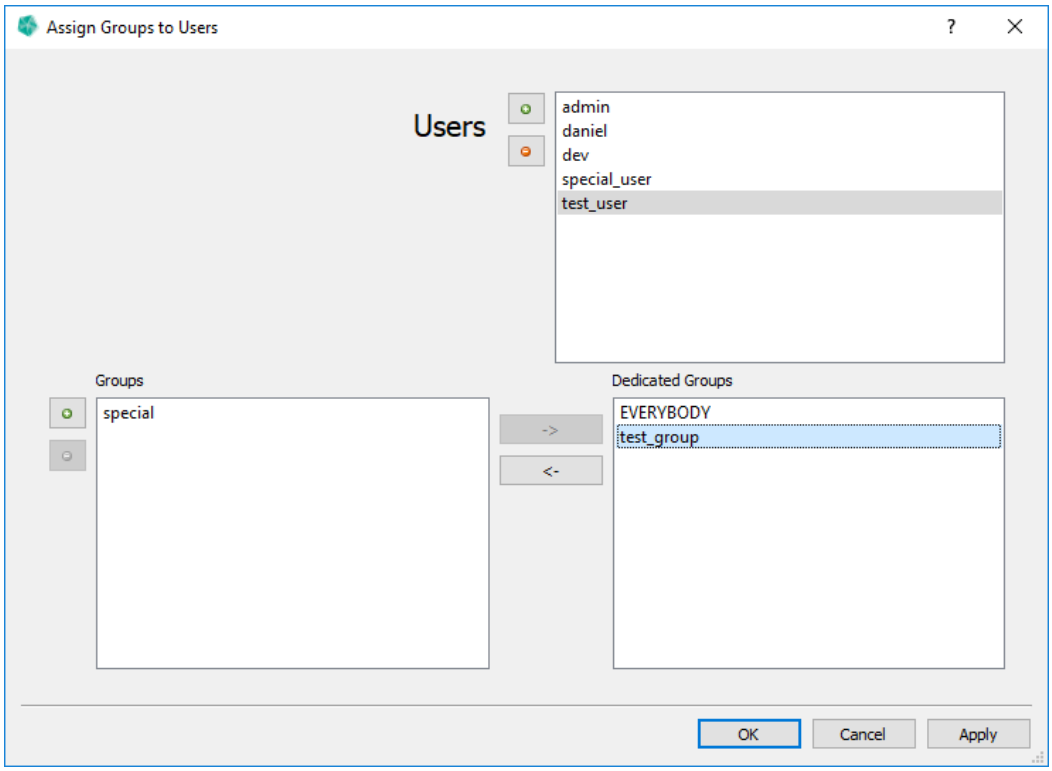

1. Select a user from the **Users** list.
2. Select the group you want to assign to the user from the **Groups** list.
3. Press the -> button.
4. Now you should see the selected group in the **Dedicated Groups** list.
5. Press
   a) **Apply** to confirm your assignment.
   b) **Cancel** to abort your assignment.

**Note**

Do not forget to press the dialog's **Apply** button in order to apply changes in assignment! Selecting a different user will notify you about unapplied changes and ask you to confirm or discard them.

## Unassign Group from User

Figure 1.14
Assign Groups to Users dialog




1. Select a user from the **Users** lists.
2. Select the group you want to unassign from the user from the **Dedicated Groups** list.
3. Press the <- button.
4. Now you should see the selected group in the **Groups** list.
5. Press
   a) **Apply** to confirm your assignment.
   b) **Cancel** to abort your assignment.

**Note**

Do not forget to press the dialog's **Apply** button in order to apply changes in assignment! Selecting a different user will notify you about unapplied changes and ask you to confirm or discard them.

## 1.4 User Data Overview

**Note**

If you login as GST database admin the GST User Data tree displays all data, all users and all groups. (Also it allows user and group management controls.) If you login as regular GST user the GST User Data tree displays only the data of groups the current user is assigned.

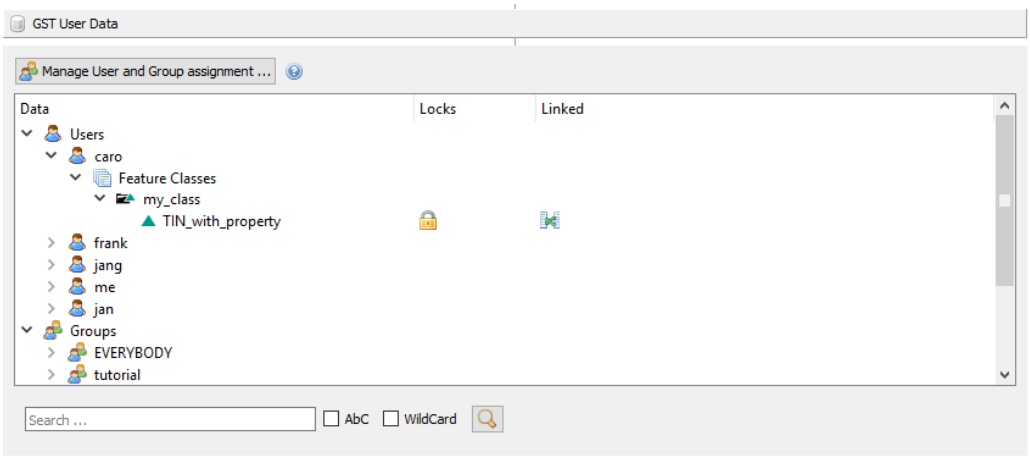



Figure 1.15
The GST User Data tree is located in the GST User Data panel in the Connect tab.

The GST User Data tree (or short GST Data tree) is located in the GST User Data panel in the Connect tab. Use this widget to browse the data that is assigned to each user. The column Locks shows icons for Features that are locked or partly locked. The column Linked shows icons for Features that are linked in the Model Management.

### Context Menu

Use right click on a Feature to open the context menu to reach the **main actions** in the GST Data tree (figure 1.16).

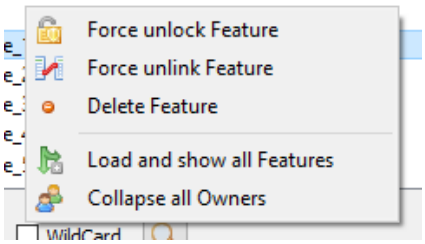



Figure 1.16
GST Data tree context menu

**Force unlock Feature** Returns the lock from a Feature without a key file. Only an GST database admin can do this.

1. DB Config

**Force unlink Feature** Removes all Model Management links to that Feature.

**Delete Feature** If a Feature is not locked and not linked it can be removed with this action. ATTENTION: This operation is not available on GST for Oracle for technical reasons.

**Load and show all Features** Pre-load all Feature Classes in order to easily browse or to use the search function.

**Collapse all Owners** Minimize all nodes of the tree and keep only Users and Groups open.

There are more actions supported by the GST Data tree context menu.

By right clicking on the column **Locks** a **filter action** can be activated displaying only items with the given index (see figure 1.17).

A filter icon on the column header indicates that a filter is active. Filters can be combined.

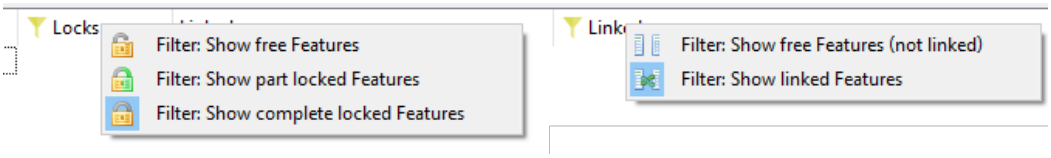



Figure 1.17
GST Data tree lock filter context menu

By right clicking on a User or a Group **user management actions** become available in the context menu. (see section User Management on page 8).

## Search Bar

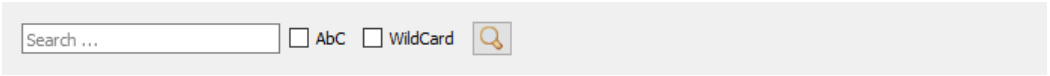



Figure 1.18
Below the GST Data tree a search bar can be used to search content by text.

Below the GST Data tree a search bar can be used to search content by text. The search will be done down from the selected item in the tree until the end. If no item matches the search string a message box will pop up. The following options are available.

**AbC** If activated the search will be case sensitive

**WildCard** If activated the search string can include the wild card characters *****, **?** or **[]** a sets of character, e.g. **[0-9] for a number between 0 and 9**

# 2 Tab: Feature Selection

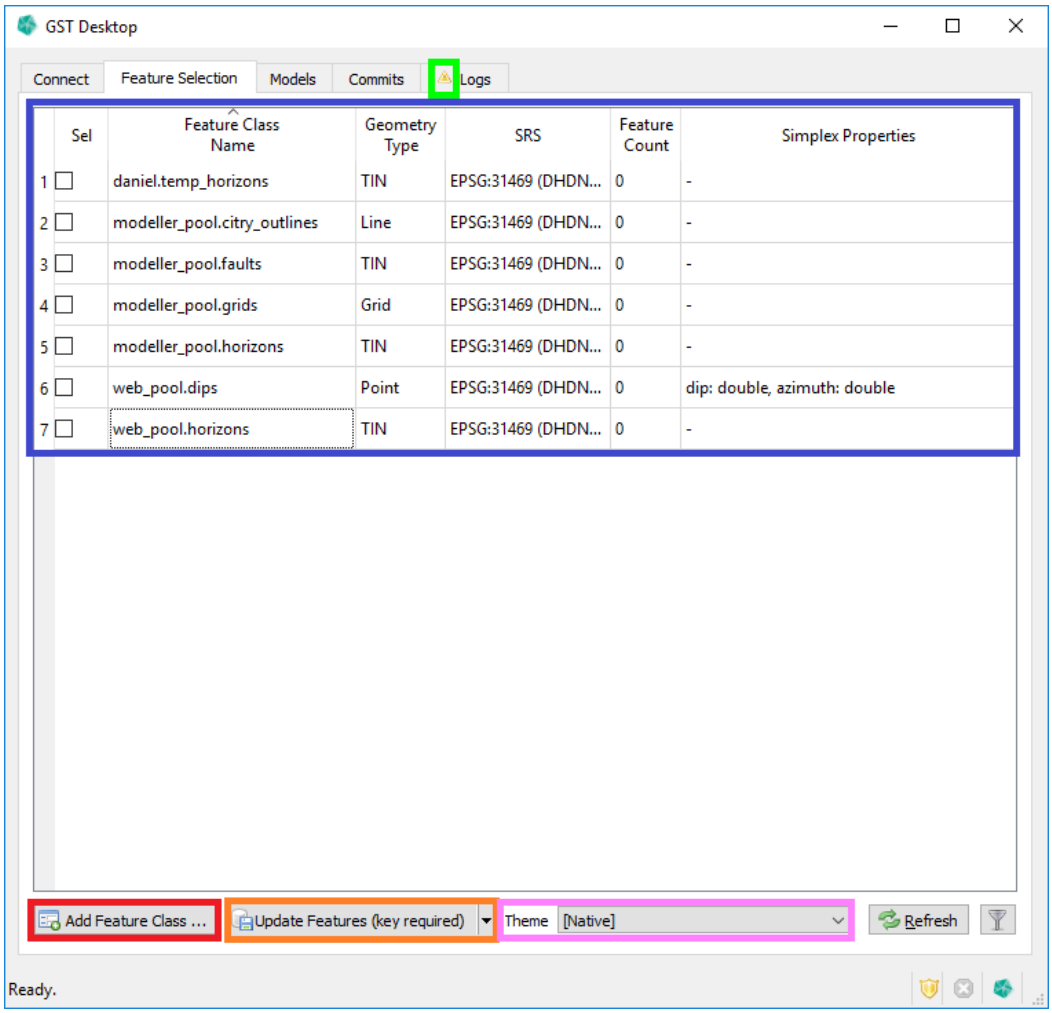


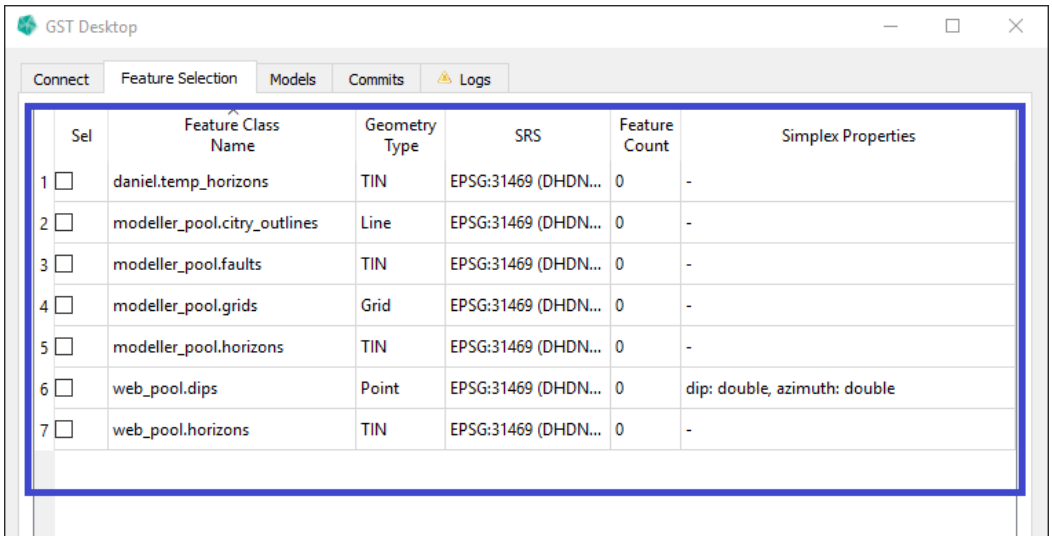

Figure 2.1 "Feature Selection" tab

In the **Feature Selection** tab all feature classes are listed (blue). In this tab you have a set of functionalities listed below. Each item in the following list refers to a paragraph for more information about the function.


* Manage the Features and Feature Classes . . . . . page 18
* Open context menu for feature classes (RMB on blue Feature Class list) . page 20
* Add new Feature Classes (red) . . . . . page 29
* Upload data (orange) . . . . . page 52
* Manage Themes (pink) . . . . . page 151

## 2.1 Managing of Features and Feature Classes

Figure 2.2
Feature Class list




The Feature Class list (blue) shows all classes that are available for the currently logged on user. The available classes can be distinguished by name in

* Private classes – (<user>.<classname>)
* Public classes – (<grouname>_pool.<classname>)

Private classes are visible for the currently logged on user only. Public classes are visible for all users that are assigned to the current group. (See section User Management on page 9 how to setup users and groups).

**Note**

The checkboxes in the Feature Class list (blue) allow to define a selection.

☑ Indicates a selection of the whole class (all features of the class are selected)

■ Indicates a selection of a subset of the class (some features of the class are selected))

### Filter Feature Class List

You can filter the Feature Class list by clicking the filter button . This will open the **Feature Class Filter** pane in the **Query** dialog, where you can set one or more filters.

A green background indicates that there currently is an active filter.

See section Feature Class Filter on page 106 for the available options.

## 2.2 Context Menu in Feature Class list

The Feature Class list has a context menu that provides a central list of commands.

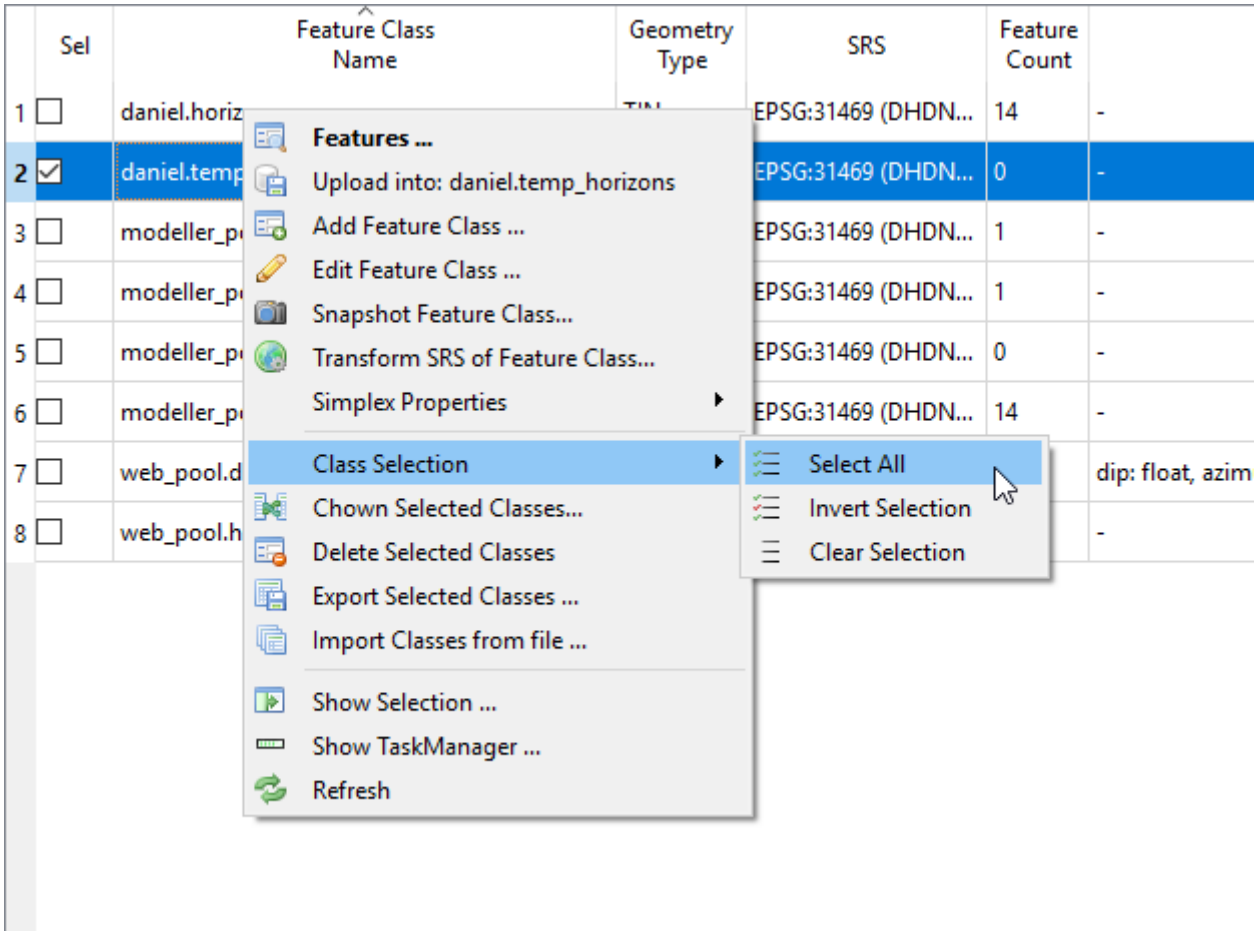



Figure 2.3 Context menu in Feature Class list

**Features ...** Show the Features within this class to edit Object Properties, delete Features and more. page 22

**Upload into: <classname>** Upload data into the current class. page 52

**Add Feature Class ...** Add a new Feature Class page 29

**Edit Feature Class ...** Edit the current Feature Class. Editing operations can be changing Feature Class name, adding new Properties, Rename Properties, changing the Spatial Reference System of the Class and more. page 38

**Snapshot Feature Class ...** Create a Snapshot of the current Feature Class. page 42

**Transform SRS of Feature Class ...** Transform the Spatial Reference System of the current Feature Class. page 41

Submenu: **Simplex Properties** Change appearance of Simplex Properties and control visibility for GST Web . . . . . page 165

Submenu: **Class Selection**

**Select All** Selects all Feature Classes and their Features. (Select all data that is available for the current user.)

**Invert Selection** Selects all Feature Classes (and their Features), that were unselected, and unselect all Feauture Classes (and their Features) that were selected before.

**Clear Selection** Unselect every Feature Class.

**Chown Selected Classes...** Change the owner of all selected classes. (Activates when at least one Feature Class is **selected**.)

**Delete Selected Classes** Delete all selected classes. (Activates when at least one Feature Class is **selected**.)

> **Remark when deleting Feature Classes**
>
> Deleting Features Classes will delete all Features within this class.

**Export Selected Classes ...** Write all checked classes into a fcdxml files. (Activates when at least one Feature Class is **selected**.) . . . . . page 45

**Import Classes from file ...** Restore Feature Classes from fcdxml files. . . . . . page 45

**Show Selection ...** Open the Selection Widget showing all the selected Features that will be processed, e.g. selected for Download . . . . . page 85

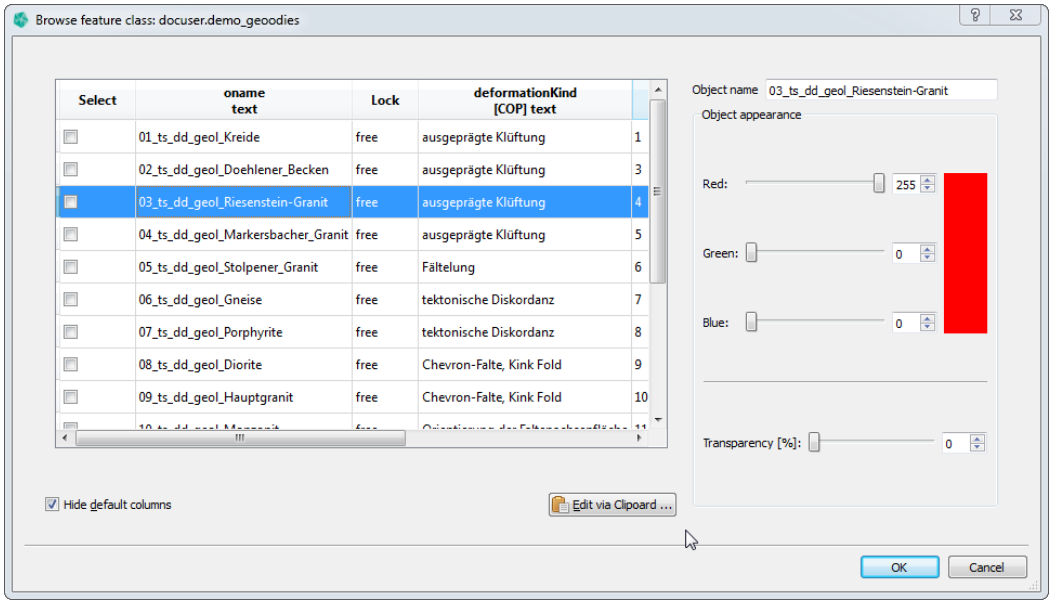
**Show TaskManager** Shows/Hides the TaskManager. The TaskManager lists all active threaded tasks that are running in the background. Within the TaskManager tasks can be supervised or even canceled.

**Refresh** Reloads the Feature Classes.
This can be useful if changes in the database were done by an other instance and the current instance of GST Desktop is not up to date.

## 2.3 Browsing Features and changing Object Property Values

You can browse the features of the class by double clicking on the Feature Class or simply choose the context menu item Features ....

Figure 2.4
"Browsing features of the class" dialog

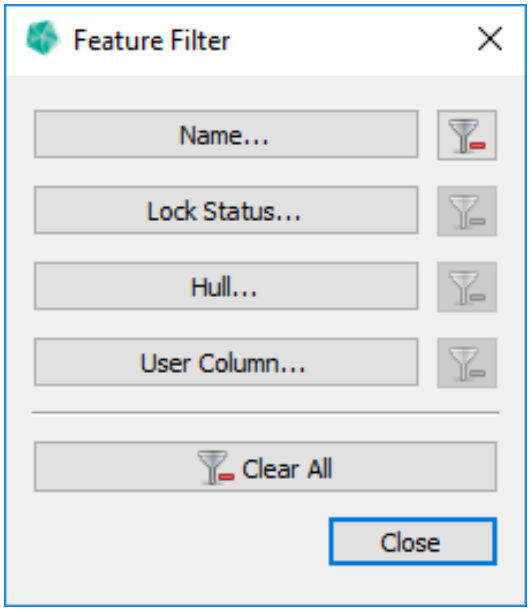



### Filter Feature List

You can filter the Feature list by clicking the filter button . This will open the **Feature Filter** dialog, where you can set one or more filters.

A green background indicates that there currently is an active filter.

Figure 2.5
Feature Filter dialog

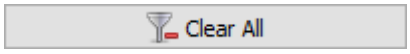


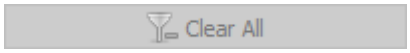

### Available Filters

Show only Features that...

* **Name...** match the Name query.
* **Lock Status...** have the selected Lock status (full, partial, free).
* **Hull...** have the selected Hull status (yes or no).
* **User Column...** match the User Column query.

### Filter Dialog buttons

* Indicates this filter is active. Click to clear this filter.
* Indicates this filter is inactive.
* 

Indicates at least one filter is active. Click to clear all filters.
* 

Indicates no filter is active.

## Change Object Property Values

1. To edit a property double click onto the value

   a) Regular object properties can be edited in free text.

b) Constrained properties will show a dropdown element with possible values (see Figure 2.6)

Figure 2.6
Edit Constrained Property

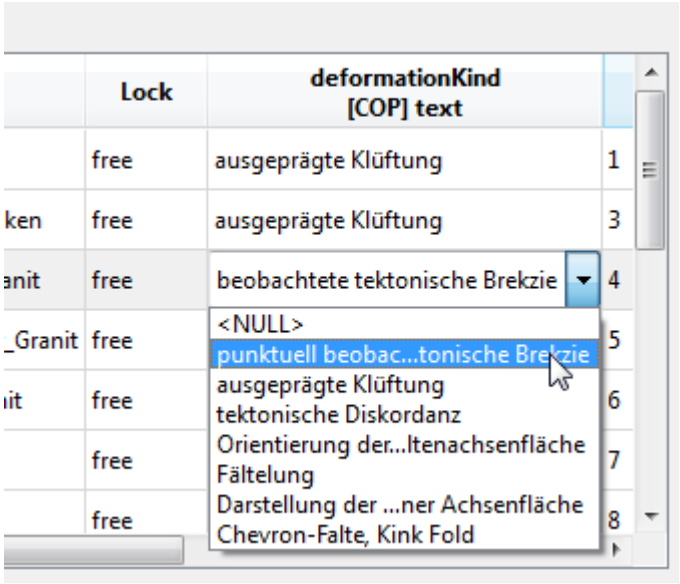


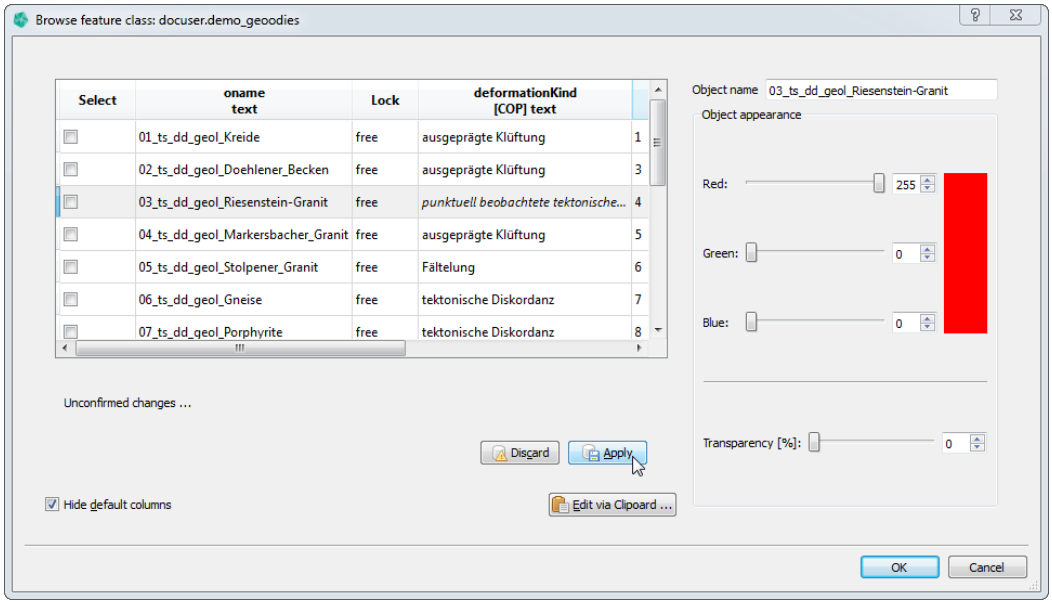

Figure 2.7
Edit Constrained Color

| netry Hull | id [PK] integer | m_coc text | m_coc_c [COP] | m_subfeature_kind text |
|---|---|---|---|---|
| cted | 6618 | 0000 | 0 0 0 1 | Fault |
| cted | 6609 | 0001 | 1 0 0 1 | Fault |
| cted | 6605 | 0002 | 0 1 0 1 | Fault |
| cted | 6600 | 0003 | 0 0 1 1 | Fault |
| cted | 6593 | *(NULL)* | <NULL> | ult |
| cted | 6587 | *(NULL)* | | ult |
| cted | 6585 | *(NULL)* | | ult |
| cted | 6583 | *(NULL)* | | ult |
| cted | 6580 | *(NULL)* | *(NULL)* | Fault |



3. Unsaved changes are marked in italic text. Press the Apply button to write changes to the GST Storage instance.

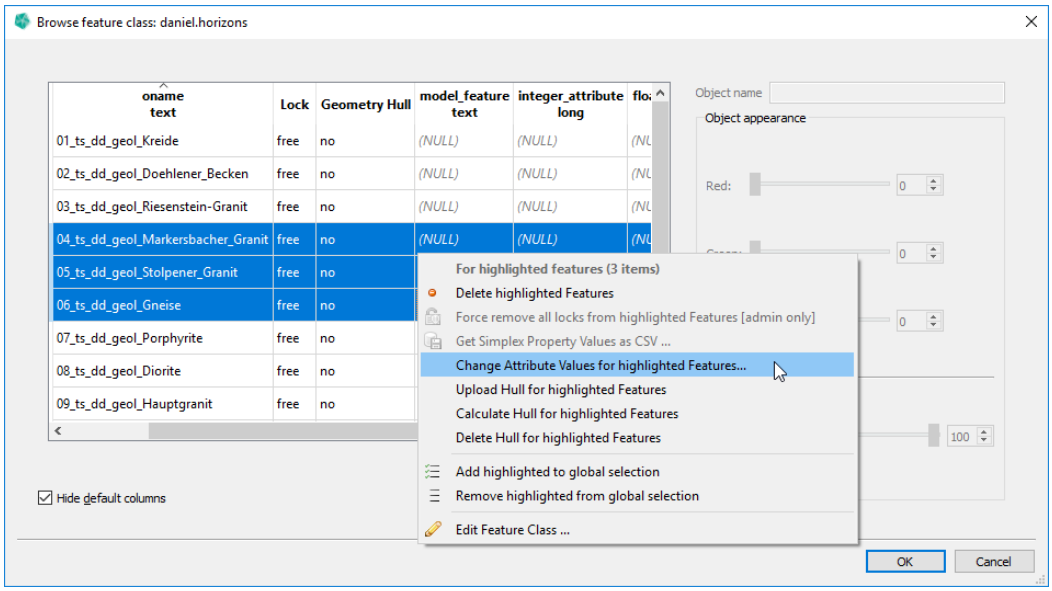
Figure 2.8
Unsaved changes are italic.




## Change Object Property Values of multiple Features

You can set Object Property Values of multiple Features to the **same value** by highlighting the desired Features and then selecting Change Attribute Values for highlighted Features... from the context menu. This opens the Change Attribute Values of multiple Features dialog.

Figure 2.9
Change Attribute Values for highlighted Features



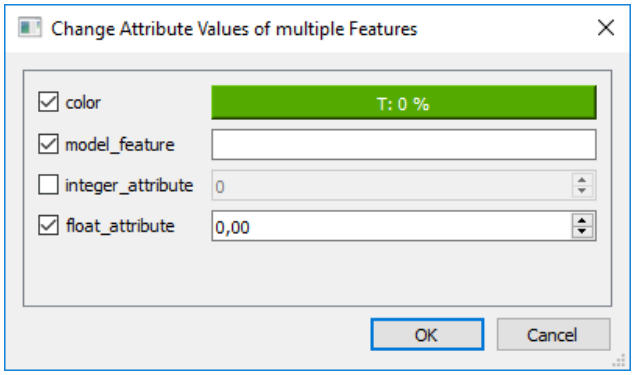



Figure 2.10
Change Attribute Values of multiple Features dialog

The dialog presents to you the Object Properties of the Feature Class with corresponding input fields to set their values.

Activate the Object Properties you want to change and input their new values in the corresponding input fields.

Confirm your changes with **Ok**.

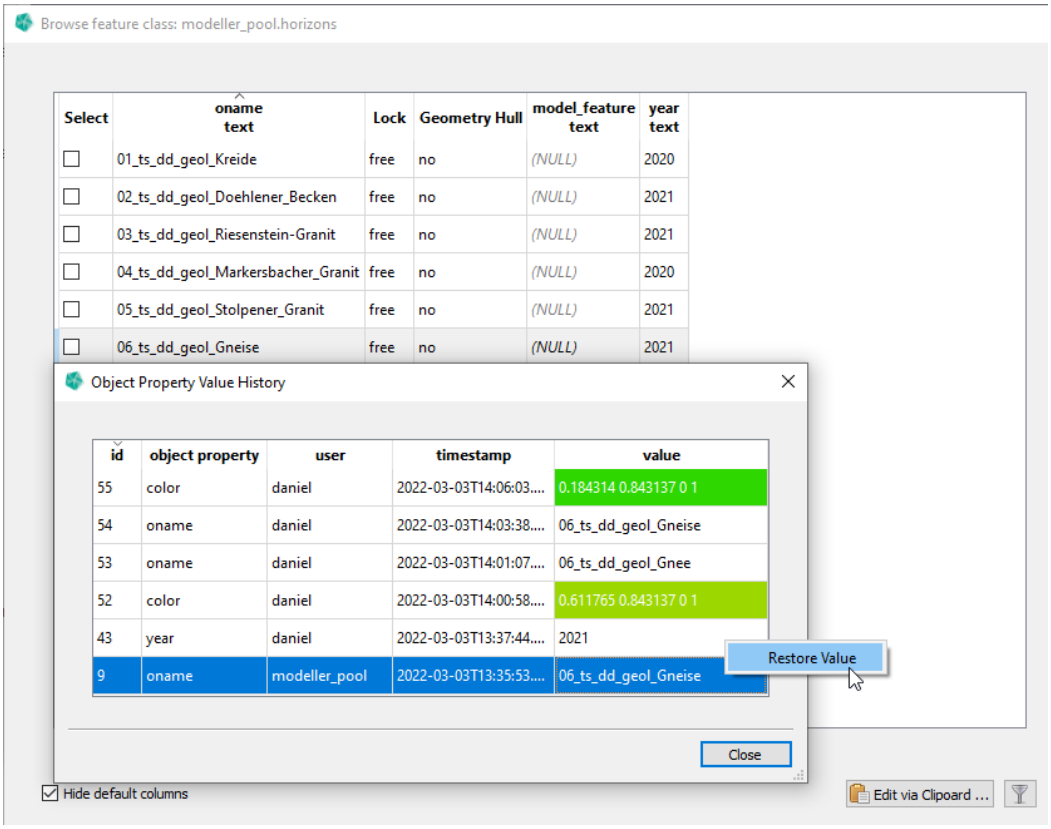
**Note**

Only activated Object Properties will change, inactive ones will keep their current value.

## Object Property Value History

Show all changes to Object Property values for a particular Feature or Object Property and restore previous values.

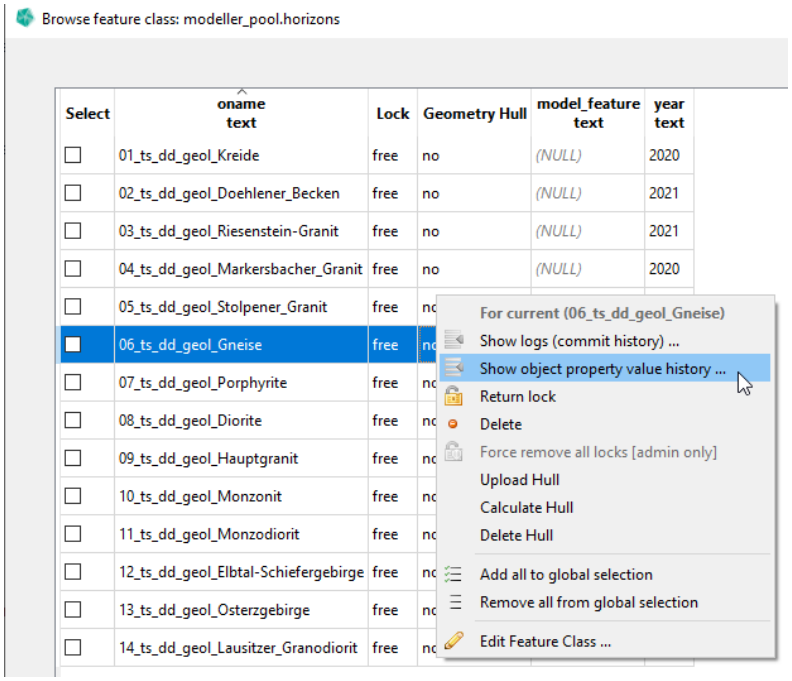
Figure 2.11
Object Property Value History dialog




## Object Property Value History of a Feature

Shows you all changes made for a particular Feature. To open the dialog, select**Show Object Property Value History ...** in the context menu of a feature.

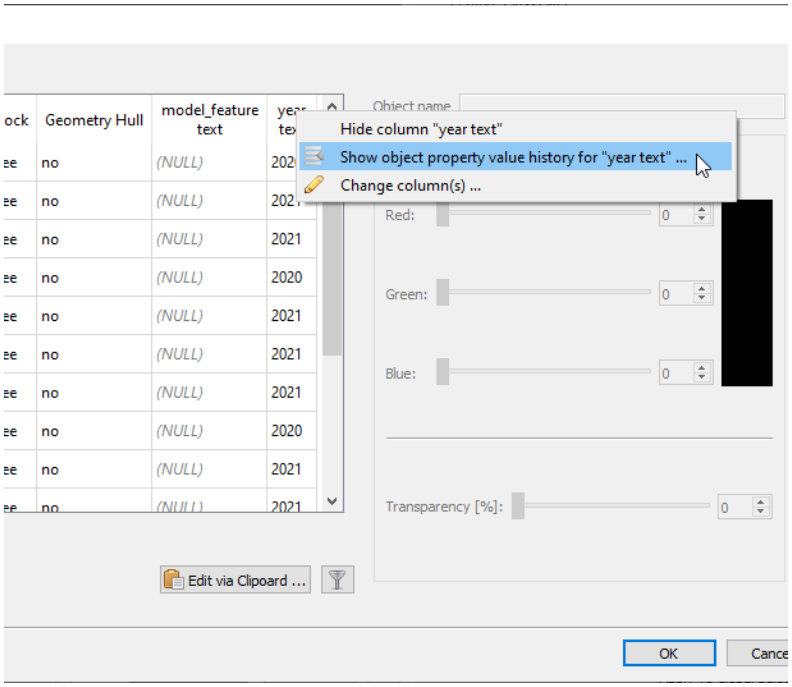
Figure 2.12
Object Property Value History of a Feature




## Object Property Value History of a Object Property

Shows you all changes made for a particular Object Property. To open the dialog, select **Show Object Property Value History ...** in the context menu of a Object Property column header.

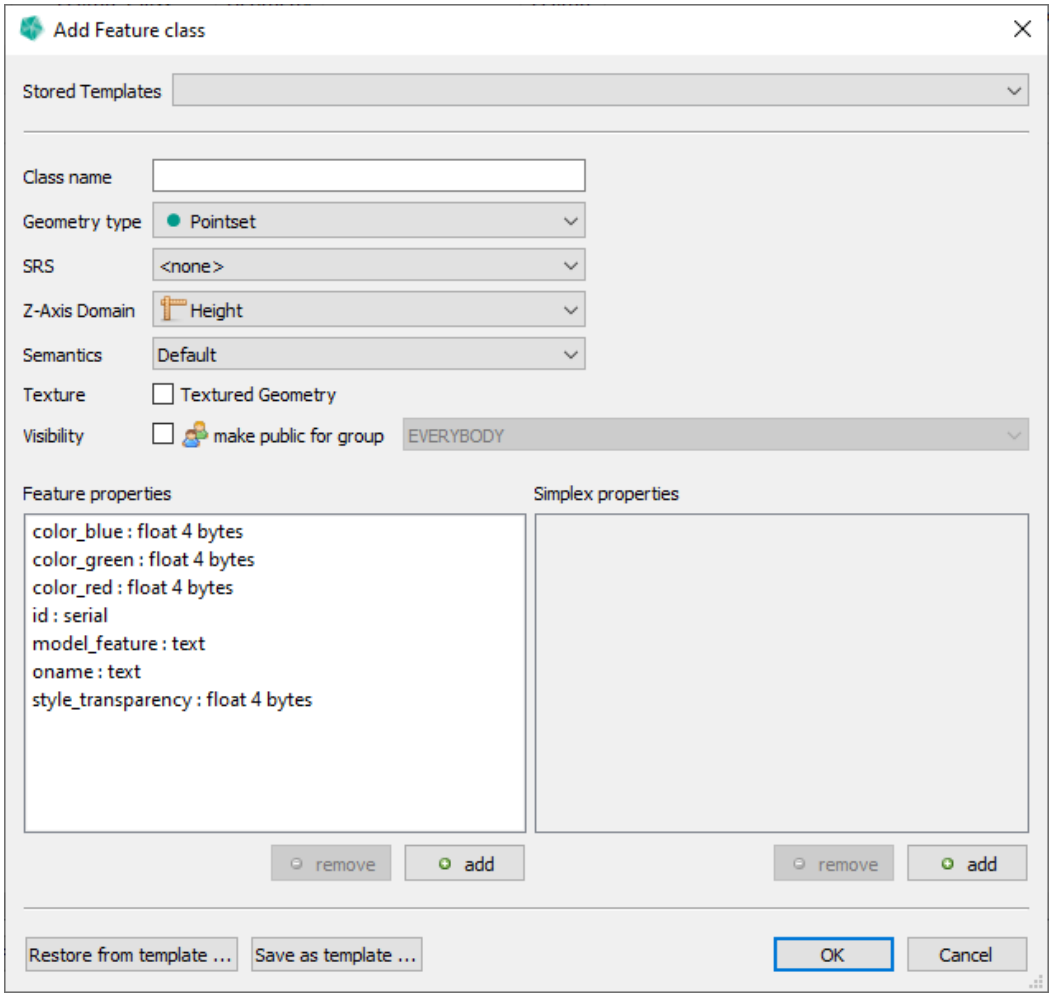
Figure 2.13
Object Property Value History of a Object Property



## 2.4 Add a new Feature Class

When you click on the button Add Feature Class (using the button or the context menu in the Feature Class List see Figure 2.3 on page 20) the **Add Feature Class** dialog appears.

Figure 2.14
Add Feature Class dialog




Within this dialog you can define a new Feature Class.

**Examples: What is the difference of Feature Properties and Simplex Properties?:**

* **Feature Properties** (often also called Object Properties) are properties with **one value per object**. Thus an "object name", a "color", an editor etc. are some examples.
* **Simplex Properties** are properties with **multiple values per object** that are stored in the geometry internally (e.g. per triangle or per vertex). Thus "temperature", "copper content", "rock property" etc. are some examples.

A Feature Class is a named database table that can store geometries. A Feature Class resides in a user schema (either a group schema or the current user schema) and stores geometries of a given type and within a specified Spatial Reference System (SRS). For geometries stored in a Feature Class a set of Properties can be defined. Each geometry that is later uploaded to that Feature Class shall provide these Properties. If a property is not provided a **No Data** or a **NULL** indicates a missing or not assigned value. The **Add Feature Class** dialog shows on the left side the defined Feature Property and on the right side the Simplex Properties. A set of default (Feature) properties are available for every Feature Class.

* oname ... Object name of the Feature
* color_red, ..., style_transparency ... Object (native) color representation
* id ... Tables primary key
* model_feature ... Free text object assignment (see Infobox)

**Infobox: Property Model_Feature**

With GST 2.11 Themes have gotten a more prominent role. One Theme called **Geology** will be pre installed matching on property model_feature. This property is used to control the assignment of a Feature to a geological setting via a property value. The property value can be matched by a Theme value to change the Feature's appearance (name and color represented in the legend) in GST Web. For more information about Themes please consult chapter Manage Themes on page 151!

* Reading data from Gocad ASCII files the **Gocad Geological_Feature** will be stored into that Property.

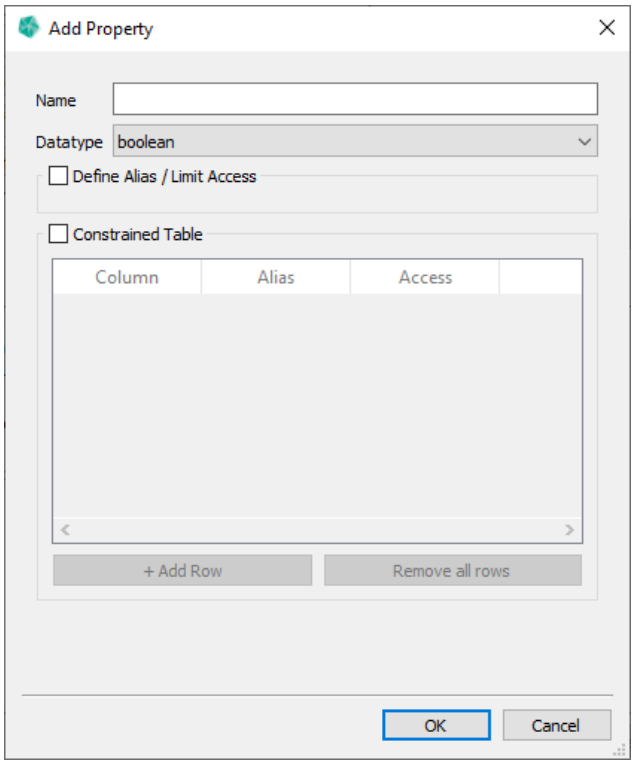
Often used property definitions can be stored in Feature Class template files (fcdxml file extension) using the buttons Save as template ... resp. Restore from template .... Template files that are stored in the GST Desktop Setup dir are called Stored Templates. They are pre installed with GST Desktop installer. By adding fcdxml files into the templates folder of your GST Desktop setup directory you can extent the list of stored templates.

Use the buttons add and remove to define custom Feature and Simplex Properties for your Feature Class.

## Add custom Feature Properties to a Feature Class

Feature Classes can be extended with custom properties via the **Add Feature Class** Dialog (shown in the chapter above) or via Edit a Feature Class on page 38.

Figure 2.15
The Add Property Dialog




The following options are supported by the Add Property Dialog.

* Add a normal Property . . . . . page 32
* Add a constrained Property . . . . . page 33
* Define an Alias with an Access Level restriction . . . . . page 35

**Definition**

**Normal Properties** are free text or numerical. The user is allowed to set them to any appropriate value.

**Constrained Properties** are foreign key controlled properties. This allows to link values from a column of a third party table to a Property of the Feature Class. The user has the choice to select a value from the list of values of the third party table's column.

## Add a Property

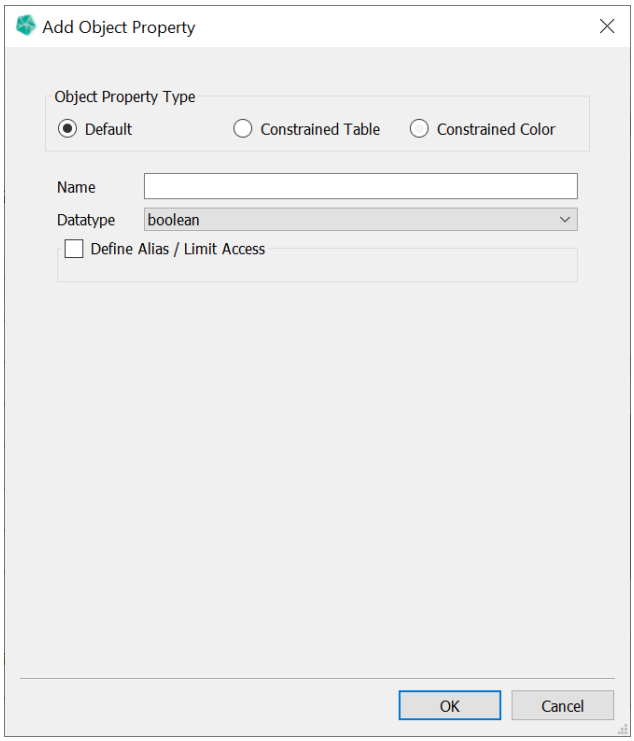



Figure 2.16
Add Object Property Dialog - Default

Specify **Name** and **Datatype** to generate a normal property.

### Add a Constrained Property

#### Concept for Constrained Properties

**Constrained Properties** allow you to link data from external tables or views to GST. This is useful if you have information in your own schema and you want to reference this in GST. In addition, any changes to the external data will be reflected in GST. A constrained column is one column in the linked table that is used to label the values. The values can later be set in the Browse Feature dialog (see Figure 2.6).

**Requirements for Constrained Properties:**

- The GST database user must have read access for the table or view.
- The table must have a primary key.
- The primary key type is integer or text.
- The linked column(s) type is bool, integer, floating point or text.

To create a constrained property, check the ☑ Constrained Table check box in the **Add Property** dialog. The dialog will change to the **Add Constrained Property** dialog like below.

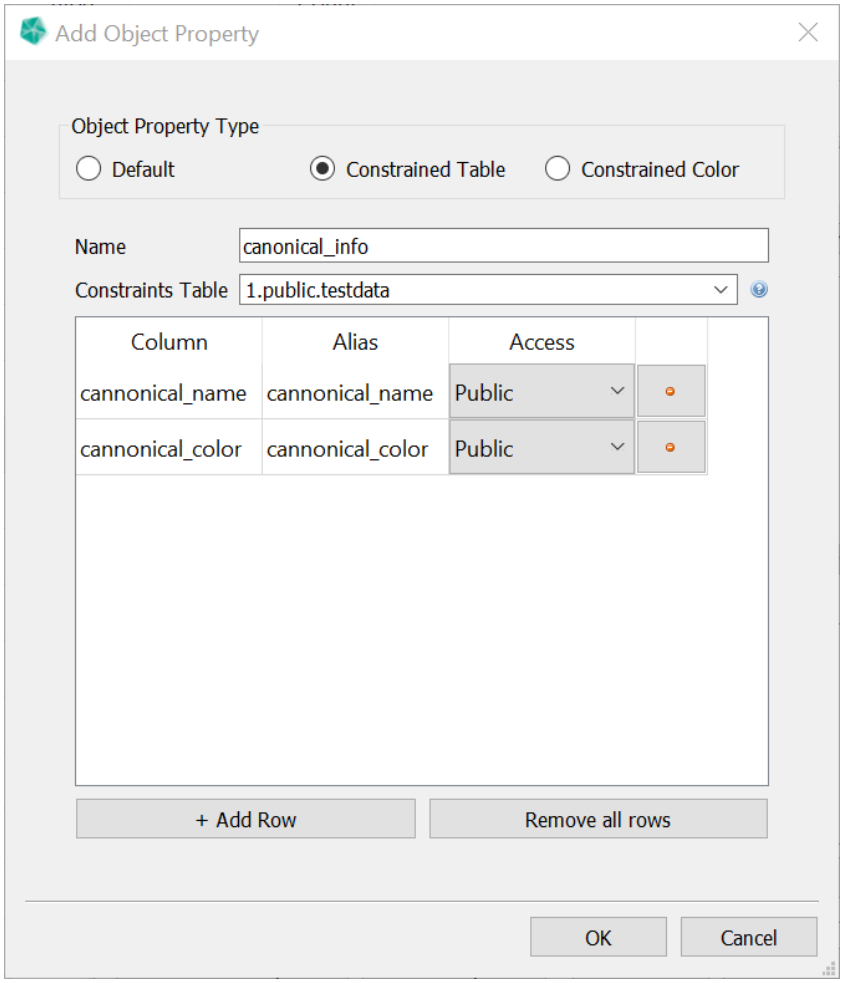



Figure 2.17
Add Object Property Dialog - Constrained Table

A Constrained Property connects a Feature Class with one ore more columns of an external table or view. This makes it possible to link values that are stored in third party tables in the database, with Features of a Feature Class.

By default all columns are added, but you can change this by removing the ones you do not want or **Remove all rows** and **+ Add Row** the one you want manually.

**Name** The name for this Constrained Table operation.

**Constraints Table Name** Choose the constraints table from the drop down box or by typing in the name in the text field. Typing will be assisted by narrowing autocomplete suggestions.

**Column** The column name in the external table.

**Alias** An optional alias for the column name. Same as **Column** if not set.

**Access** The access level for this column. See Motivation and concept of Themes on page 152.

### Property Aliases

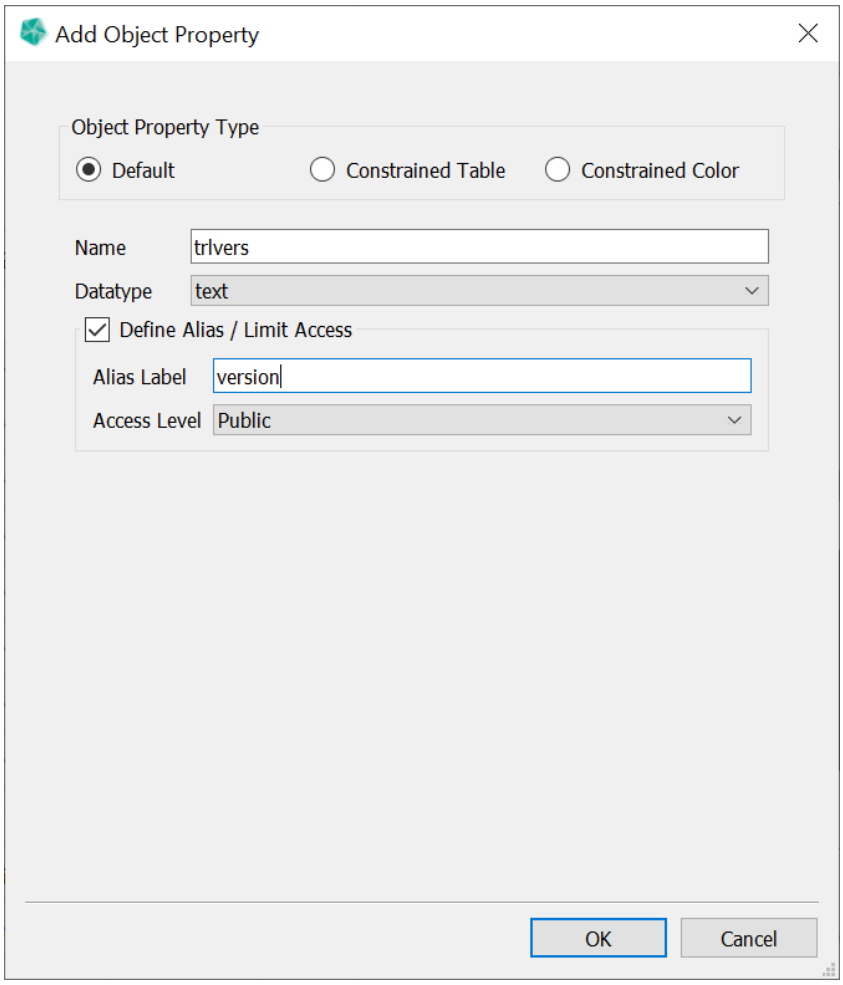



Figure 2.18
Define an alias

By activating the checkbox ☑ **Define Alias / Limit Access** in the **Add Property** Dialog (see figure 2.18) a Property Alias can be attached to a property.

**Property Aliases** are used to

* change the way properties are represented in GST Web.
* hide and replace the (maybe technical) property names with ones which are more meaningful for users that are not involved in the modeling process.
* limit the visibility of properties.

By defining an **Access Level** the visibility of a curtain property can be restricted for groups of Web users. Please refer to chapter Motivation and concept of Themes on page 152 for an explanation about Access Levels.

## Add a Constrained Color

A Constrained Color allows you to set the feature color from an external source. If this is set, the Constrained Color is used instead of the default feature color for features that are downloaded or displayed in GST Web.

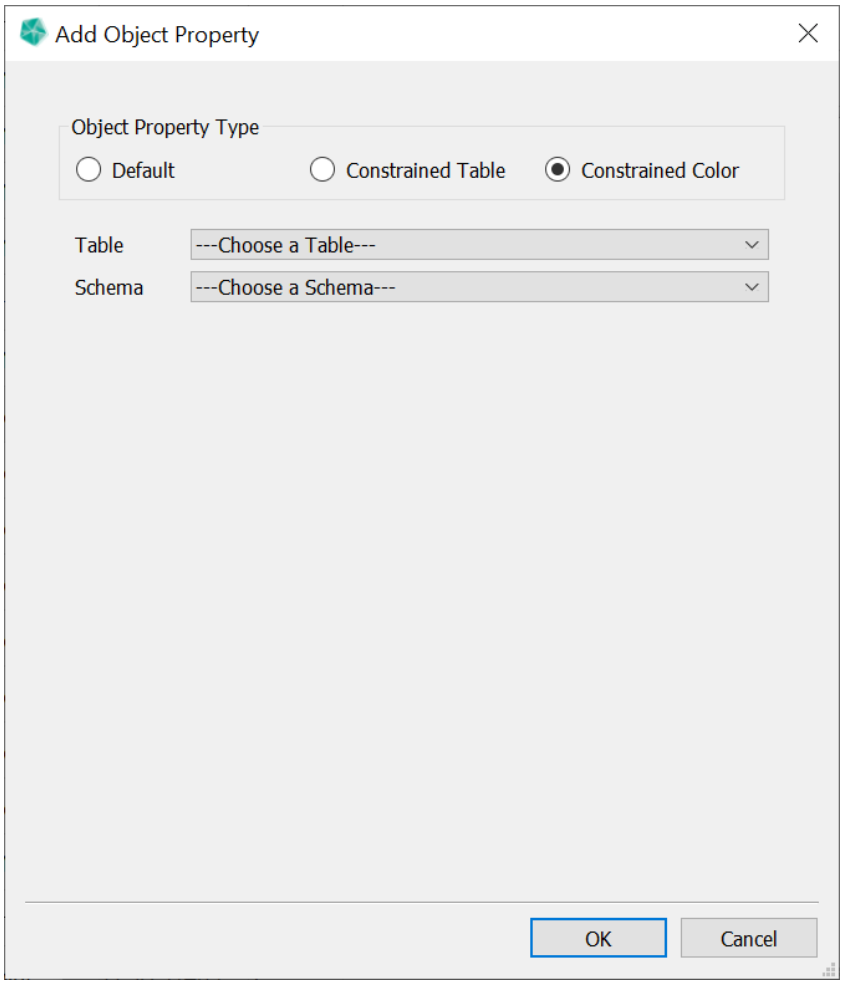
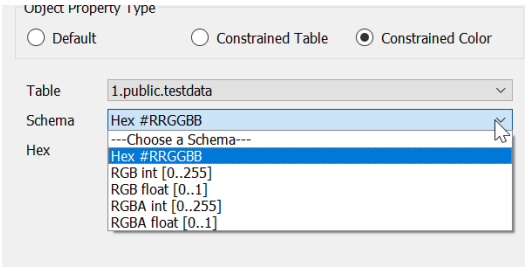



Figure 2.19
Add Object Property Dialog - Constrained Color

Choose the table from one of the available external tables. Afterwards choose the column schema for the color. Then select the column(s) for the selected schema.

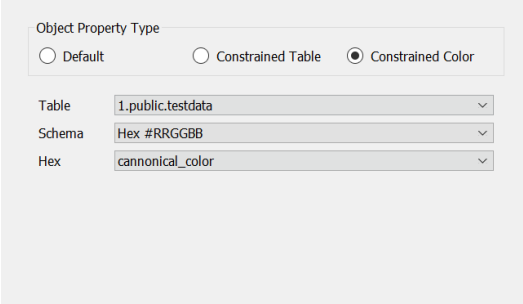



We currently support the following color column schemas:

**Hex** color is read from a text column. The text values must have the form "#RRGGBB" where each letter is a hex number [0-9A-Fa-f].

**RGB[A] int** color is read from 3 [4] integer columns. Values must be between 0 and 255.

**RGB[A] float** color is read from 3 [4] float columns. Values must be between 0 and 1.



## 2.5 Edit a Feature Class

To open the **Edit Feature Class Dialog** use the context menu of the Feature Class list (see Figure 2.3 on page 20).

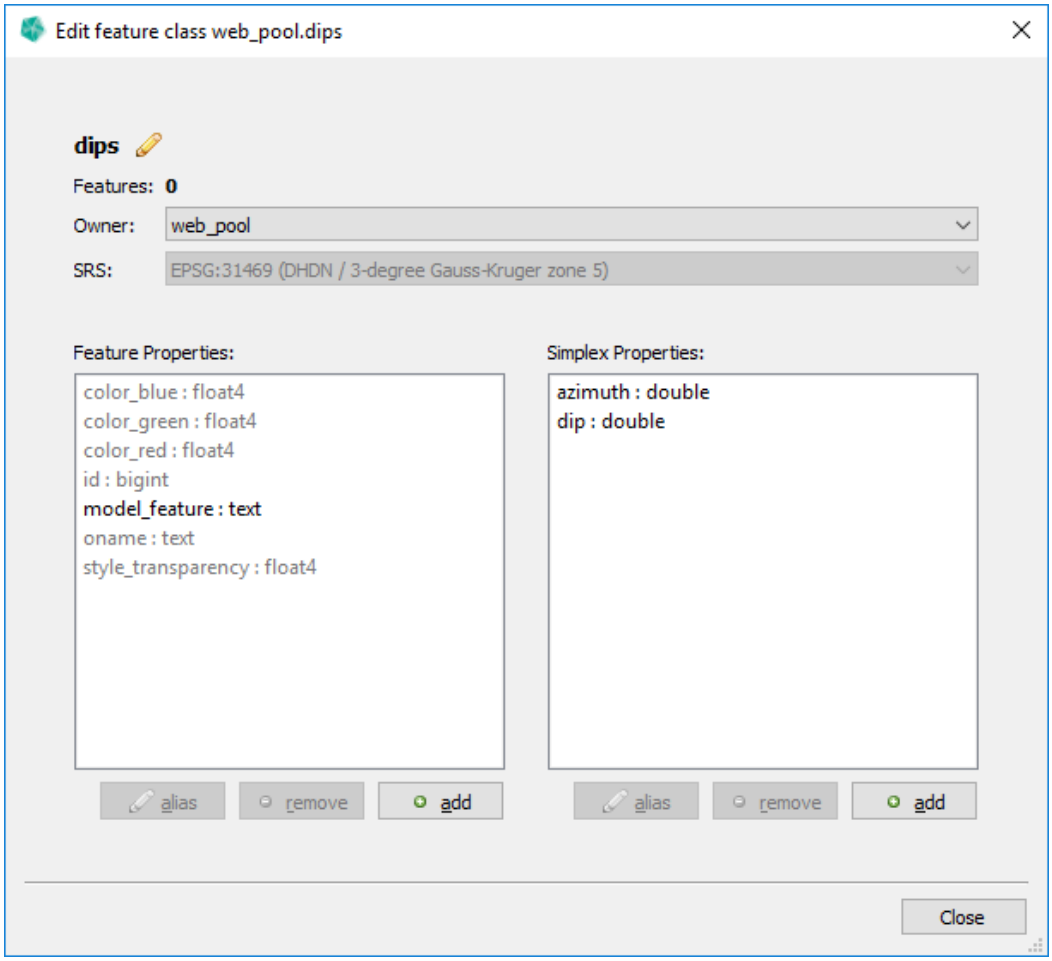


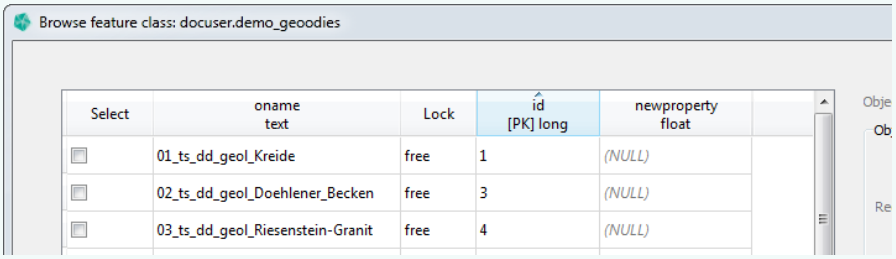

Figure 2.20
The Edit Feature Class dialog

This dialog has the capability to

* Change Feature Class name . . . . . page 39
* Change Feature Class owner . . . . . page 39
* Transform Class SRS . . . . . page 41
* Add/Remove Object and Simplex Properties or Alias definitions (see previous chapter) . . . . . page 31

**Note**

When adding Properties to a Feature Class that already is filled with Features, the created Property Values will be assigned with **NULL** values.




## Rename a Feature Class

Renaming a Feature Class is very simple. In the **Edit Feature Class Dialog** use the edit button to start the editing process.

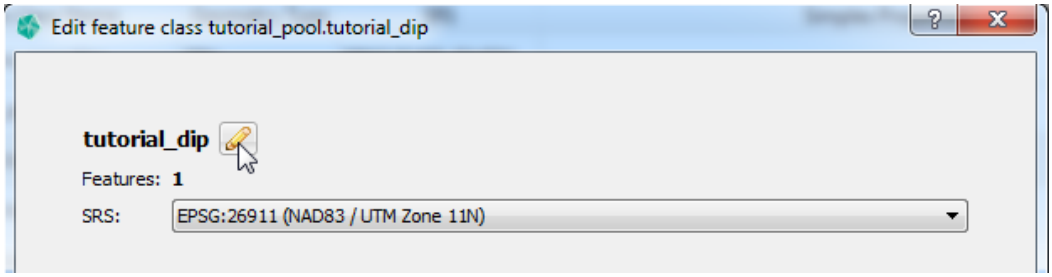



Figure 2.21
The edit button is right behind the Feature Class Name

You can make your changes and confirm your changes. This will make the changes persistent. cancel your changes (or simply press ESC key) to discard the edit process.

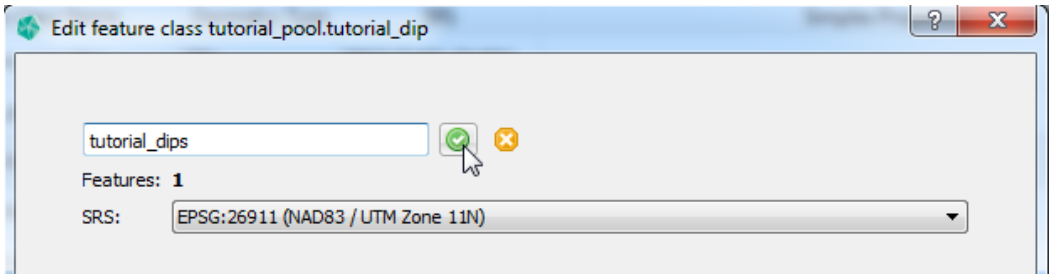



Figure 2.22
Confirming your changes will write the new name persistent to the database

## Change owner of a Feature Class

In the **Edit Feature Class Dialog** use the Owner combo box to select the new owner of the Feature Class.

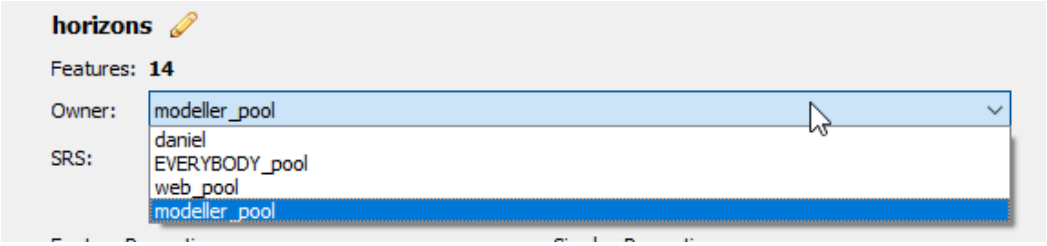



Figure 2.23
Change owner of Feature Class

**Note**

The owner change is executed immediately, there is no extra confirmation step.

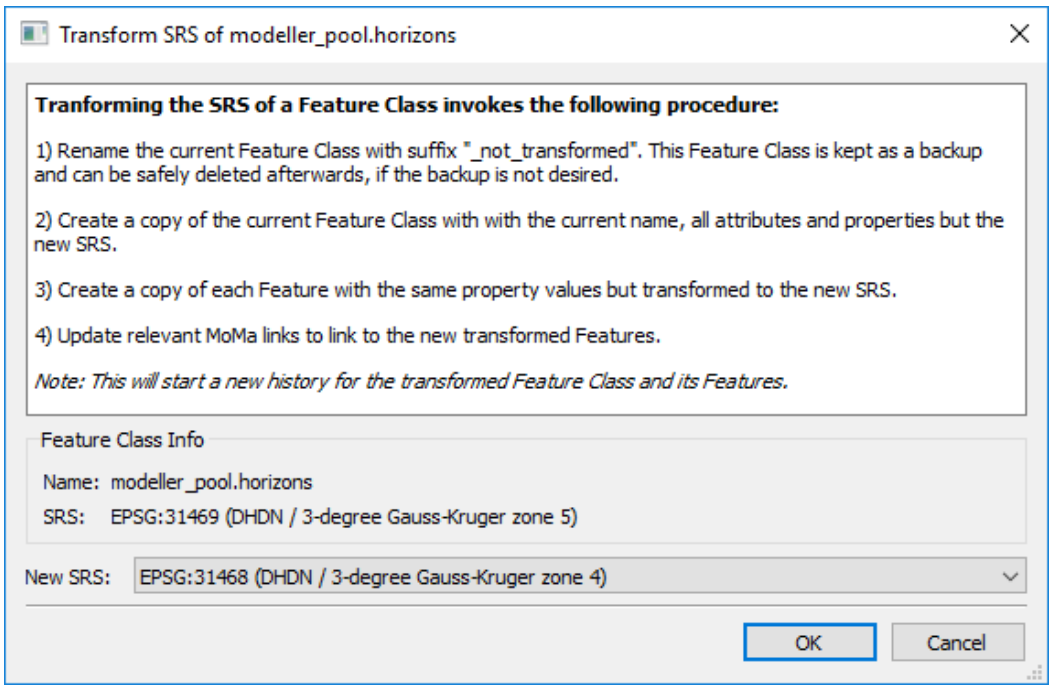
**Note**

The Feature Class name must be unique for a given owner.

## 2.6 Transform Spatial Reference System of Feature Class

To transform the Spatial Reference System (abbr. SRS henceforth) of a Feature Class, select it in the Feature Class List and choose **Transform SRS of Feature Class ...** from the context menu. This will open the **Transform SRS of Feature Class** dialog.

Figure 2.24
Transform SRS of Feature Class dialog




This dialog presents you with information about the **Name** of the selected Features Class together with its current **SRS**. It also outlines the procedure for SRS Transformation.

To start transformation procedure, choose a new srs from the **New SRS** combobox and confirm with **OK**.

**SRS Transformation procedure**

1. Renames the current Feature Class with suffix "_not_transformed". This Feature Class is kept as a backup and can be safely deleted afterwards, if the backup is not desired.
2. Creates a copy of the current Feature Class with with the current name, all attributes and properties but the new SRS.
3. Creates a copy of each Feature with the same property values but transformed to the new SRS.
4. Updates relevant MoMa links to link to the new transformed Features.

**Note: This will start a new version history for the transformed Feature Class and its Features.**

## 2.7 Snapshot Feature Class

You can create a Snapshot of a Feature Class. A Snapshot creates a copy with all attributes and properties copied from the original Feature Class and Features.

The Snapshot Feature Class has the following properties:

* has the chosen name
* is owned by the chosen owner
* has the same SRS as the original
* has the same Feature Attributes and Feature Properties as the original
* has a member attribute "m_captured_version" to store the Versions of the original Features
* has a Feature copy for each Feature of the original Feature Class

A Feature of the Snapshot Features Class has the following properties:

* has the same Feature Attribute values as the original one
* has the same Feature Property values as the original one.
* has exactly one Version, the one from its creation.
* has the correct Version in "m_captured_version"[= Version from the original Feature that was copied].

The Snapshot Feature Class is an independent instance. Changes to the Snapshot won't affect the original Feature Class in any way. The same holds for the other direction.

### Create a Snapshot

1. Select **Snapshot Feature Class ...** in the context menu of a Feature Class. This will open the **Snapshot Owner and Name** dialog.

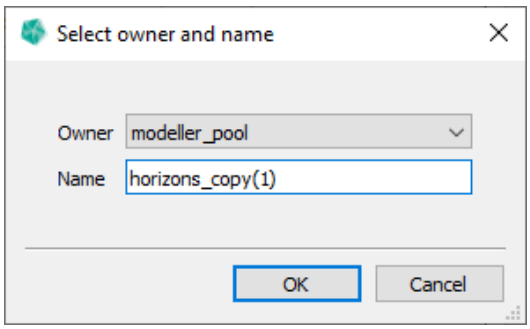



Figure 2.25
Snapshot Owner and Name dialog

2. Select the owner in the **Owner** combo box.
3. Input the name in the **Name** text box.
4. Press **Ok** to accept or **Cancel** to abort.

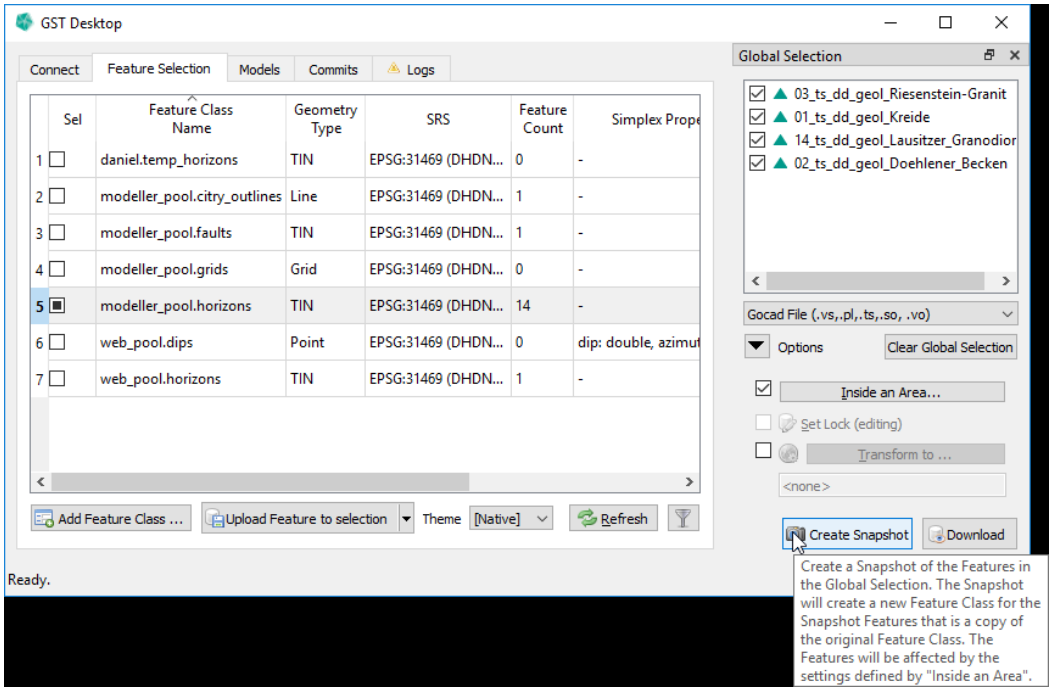
**Note**

The Feature Class name must be unique for a given owner.

## Snapshot of Feature Selection

There is also the possibility to create a Snapshot of a subset of Features and limit their spatial extent.

Figure 2.26
Snapshot Feature Selection




1. Select the subset of Features (see Browsing Features and changing Object Property Values on page 22).
2. If you want to limit the spatial extent of the Features, use **Inside an Area...** (see Download inside an Area on page 88). Depending on the settings, some Features might not be accepted by the Selection Area. In this case, a warning with the list of rejected Features will be displayed.

3. Press **Create Snapshot**. This will open the **Snapshot Owner and Name** dialog.

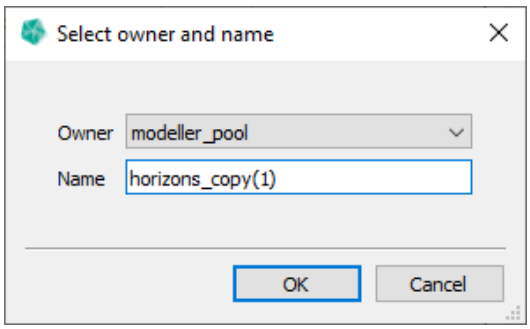



Figure 2.27
Snapshot owner and name

4. Select the owner in the **Owner** combo box.
5. Input the name in the **Name** text box.
6. Press **Ok** to accept or **Cancel** to abort.

The Snapshot created from a Feature Selection has the same properties as specified in Snapshot Feature Class on page 42.

## 2.8 Import and export Feature Classes (fcdxml files)

GST Desktop offers the possibility to export Feature Classes into files. The Feature Class Detailed Descriptions (metadata about the Feature Class but not geometry data) are packed into an xml file and are written to a **fcdxml** file.

There might be several reasons to export Feature Classes. They typically are ...

* ... simply to backup a custom base frame of Feature Classes. Backups are recommended especially if you have an enormous set of Properties and the Feature Class Creation Dialog requires many clicks to reproduce them. This is the main reason why the **Add Feature Class Dialog** offers a button to Restore from Template and allows to Setup Stored Template Feature Classes (see Add a new Feature Class on page 29).
* ... when moving Feature Classes. This can be either used to copy Feature Classes from one User Space into another, or to restore Feature Classes on a different instance of GST Storage (e.g. from an intern platform to a presentation platform).

**Note**

An **fcdxml contains** no geometry information besides the geometry type. The information in a fcdxml is a list of Feature Class Detailed Descriptions that are

* The Name of the Feature Class
* The Owner (User or Group)
* The Spatial Reference System
* The Geometry Type
* The Object Properties (Constrained and Regular)
* The Simplex Properties (Constrained and Regular)
* (For Constrained Properties the table name of the Foreign Key target table and the name of the mapped column is stored. Take care that these tables exist when restoring a Feature Class on a different Instance.)

To export a complete Feature Class (including the geometry data) export the Geometries as well, see Tab: Feature Selection - Downloading data on page 85.

### Export Feature Classes

Feature classes can be easily exported.

1. Select the Feature Classes to export in the Feature Class Table List (in Figure 2.1 on page 17 the blue box).
2. Use the Context Menu (RMB) in Feature Class Table List and choose the Action Export selected Classes

3. Select a file location where you want to store the fcdxml file.

**Tip**

Feature Classes can be exported from **Add Feature Class Dialog** as well via the button Save as template, see Add a new Feature Class on page 29.

### Import Feature Classes

Use the context menu item Import Classes from file to import from fcdxml (see Figure 2.3 on page 20). Alternatively, the fcdxml can directly be imported via drag'n'drop to GST Desktop.

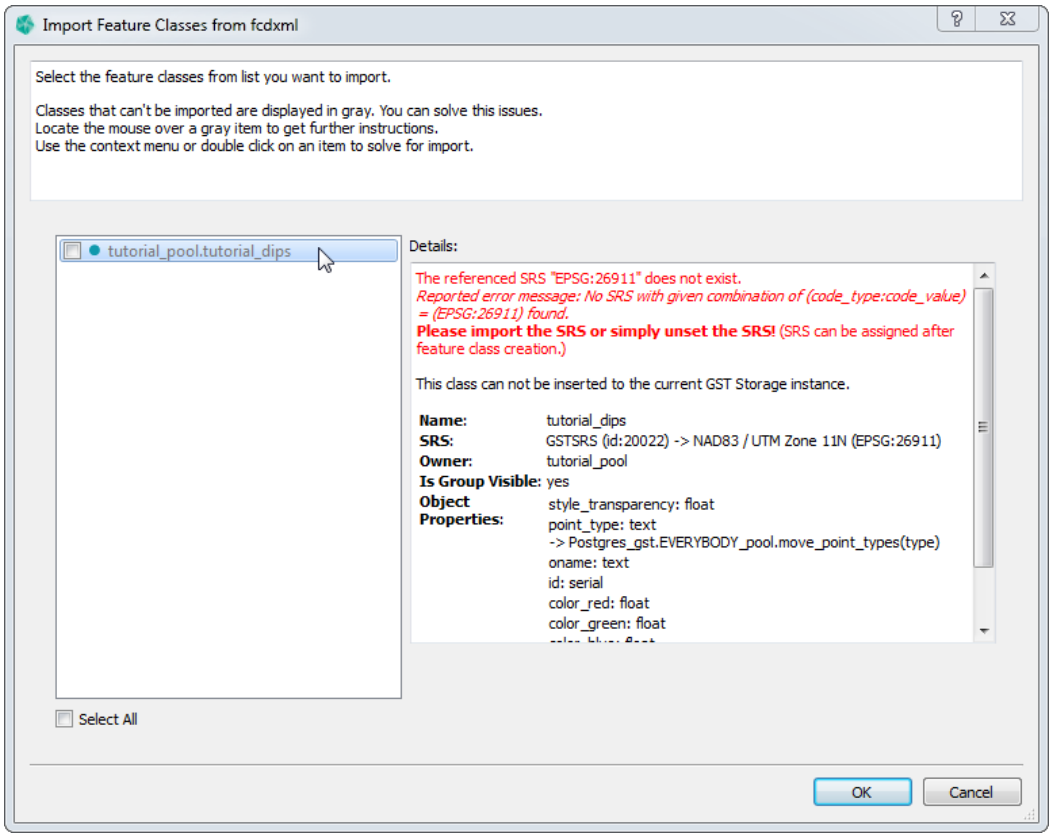



Figure 2.28
The content of the fcdxml is presented in the **Feauture Classes Dialog**.

Select a Feature Class to get detailed information about it. **Inactive or grey items** indicate that conflicts occurred during the import of the Feature Class. The details about the conflict are shown in the textbox on the right side colored in red. The bold text gives a possible resolution. The resolution can be applied within this Dialog. Therefore use the context menu (RMB) on the item to show the resolutions. The bold text suggests a possible solution, which can be applied within this dialog. All suggestions will be shown as bold options in the context menu of the item. (You can also reach the suggested solutions by double clicking in a item.)

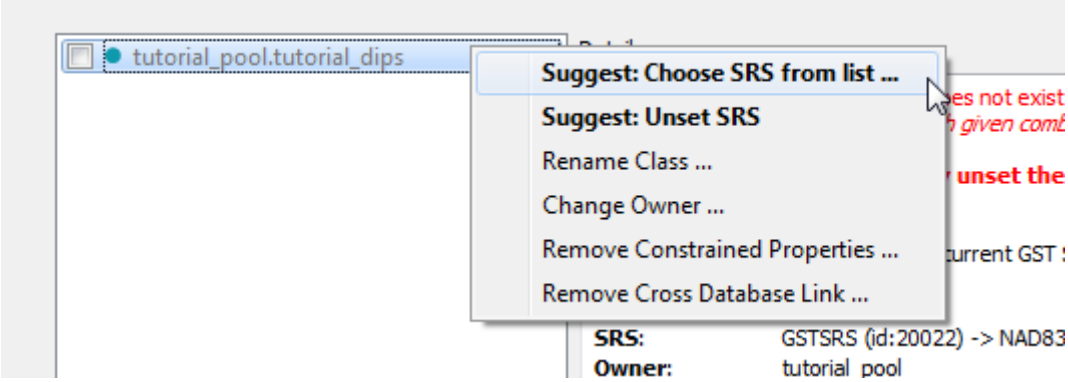



Figure 2.29
The context menu of each item gives resolution. The suggested resolution is highlighted in bold.

The resolution options are

**Choose SRS from list** If the SRS specified by the fcdxml could not be matched automatically (see note box) with an SRS of the current GST Storage, specify one manually.

**Unset SRS** Sets the SRS to <None>.

Suggestion to recover the SRS: Create the required SRS (see section Spatial Reference Systems on page 6) and specify the newly created SRS for the Feature Class via editing the Feature Class (see section Transform Spatial Reference System of Feature Class on page 41)

**Note**

When importing Feature Classes from a different instance, the SRS identification can differ. Thus an **SRS automatch** tries to find an SRS with the same code_type:code_value pair (e.g. EPSG:4326) and will fail if no such SRS exists in the current instance.

**Rename Class** Changes the Feature Class name by user input to prevent name duplicates.

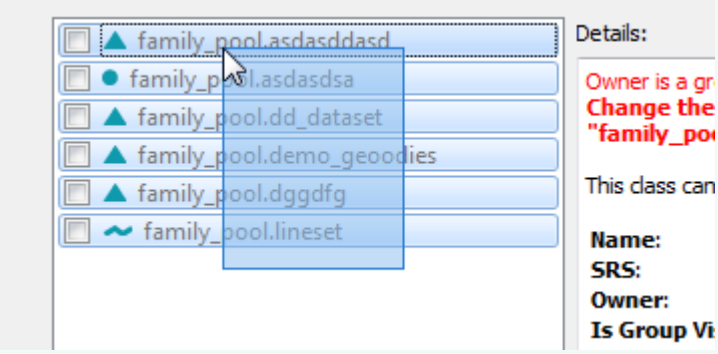
**Change Owner** Sets a different owner from drop down list.

**Remove Constrained Properties** Removes all Constrained Object and Simplex Properties. (useful if e.g. target tables are not available)

**Remove Cross Database Link** Remove the database label from the target table identifiers. (useful when importing fcdxml files that have been exported on a different GST Storage Instance)

## Useful

When importing a **large fcdxml** file it can be useful to apply actions to more than one item. To apply a resolution to many items simply select the items to change (press Select All or drag with the mouse a selection rect).




An active item with a green info text informs about an importable Feature Class without conflicts. Select the required Feature Classes by clicking on the item checkbox and confirm the Dialog with the Ok button.

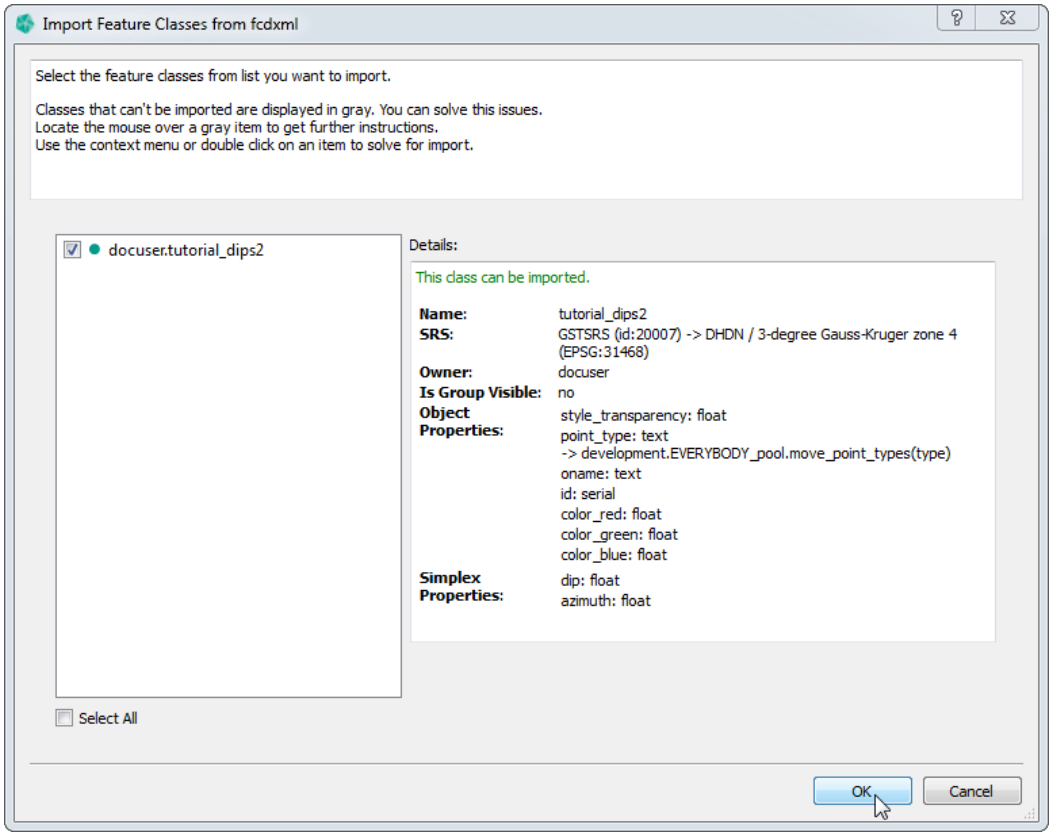



Figure 2.30
An active item with a green info text informs about an importable Feature Class without conflicts.

## 2.9 Sub Feature Kind

With the introduction of profile and shape collection, we added the concept of parent and child features. Each child feature belongs to a specific category called sub feature kind. Each sub feature kind can have a different set of feature attributes specific to this category.

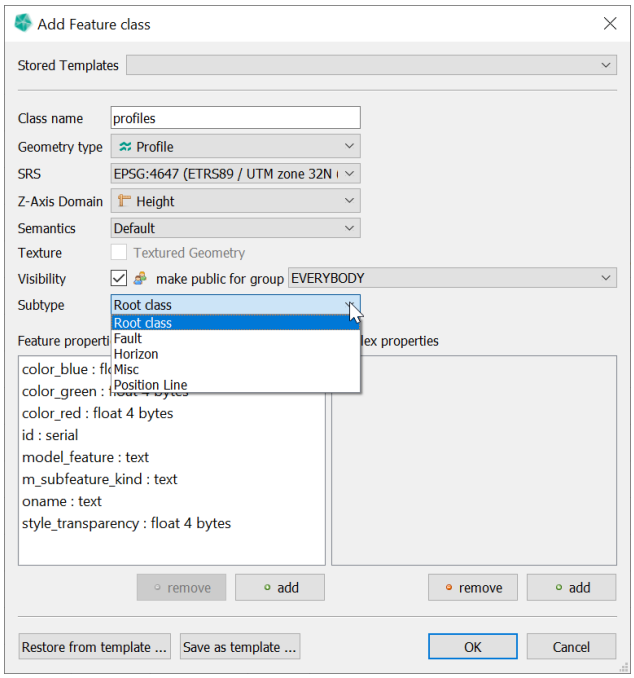
Currently, for profile there are the following sub feature kinds: Position Line, Horizon, Fault and Misc.

For shape collection there is only on sub feature kind: shp-subfeature.

### Sub Feature Kind - Add Feature Class

You can choose and switch between the sub feature kinds with the combobox next to **Subtype**. The attributes in the list are from the selected sub feature kind.

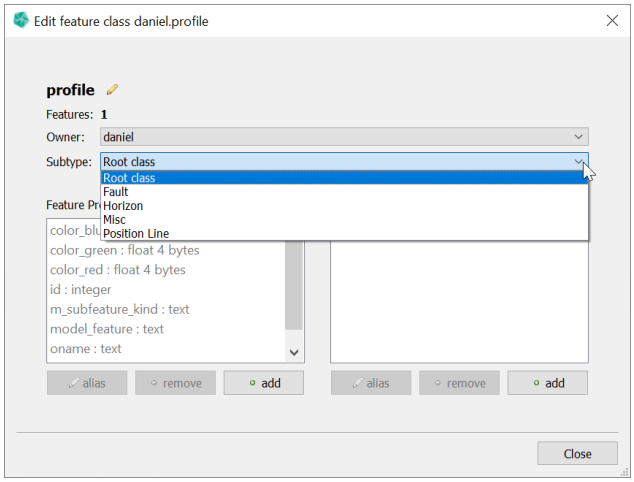
Figure 2.31
Add Profile Feature Class - Subtype




### Sub Feature Kind - Edit Feature Class

You can choose and switch between the sub feature kinds with the **Subtype** combobox. The feature properties list is then set for the selected sub feature kind.

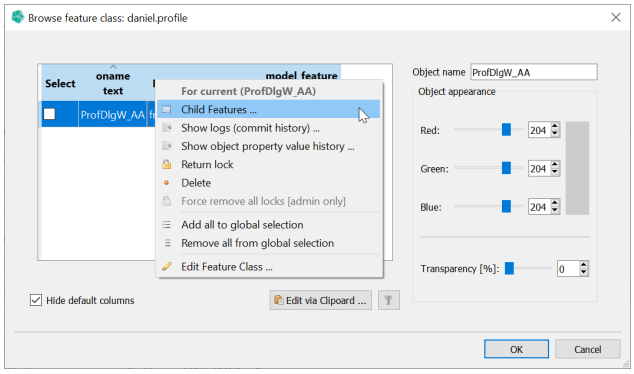
Figure 2.32
Edit Profile Feature Class - Subtype




## Sub Feature Kind - Browse Features

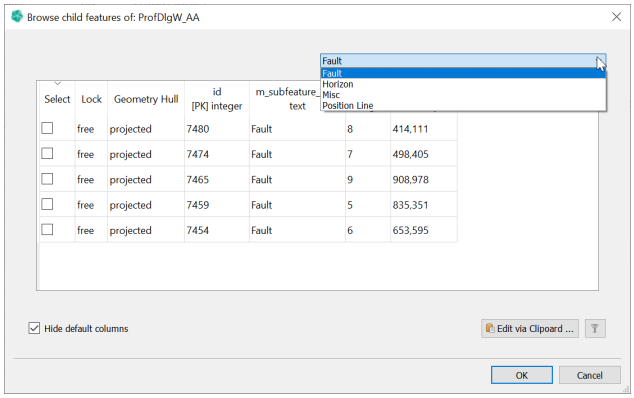
You can choose and switch between the sub feature kinds with the **Subtype** combobox. The feature properties list is then set for the selected sub feature kind.

Figure 2.33
Browse Profile Features - Browse Child Features




This will open a new dialog with all child features. You can choose and switch between the sub feature kinds with the combobox at the top right. The features shown are from that particular sub feature kind.

Figure 2.34
Browse Child Features - Subtype



2. Tab: Feature Selection

# 3 Tab: Feature Selection - Uploading data

The term **Uploading** has the meaning of adding data to the instance of **GST Storage**. This can be either a simple **upload** (adding new data) or can be an **update** (adding data as a new version of existing data. An update requires a **lock key** in order to validate the data changes.) To start an upload/update you have two ways:

1. Upload data via browsing files (This allows for upload in several Feature Classes in one step.) . . . . . page 52
2. Upload data via Drag'n'Drop . . . . . page 53

## 3.1 Upload data (browse files)

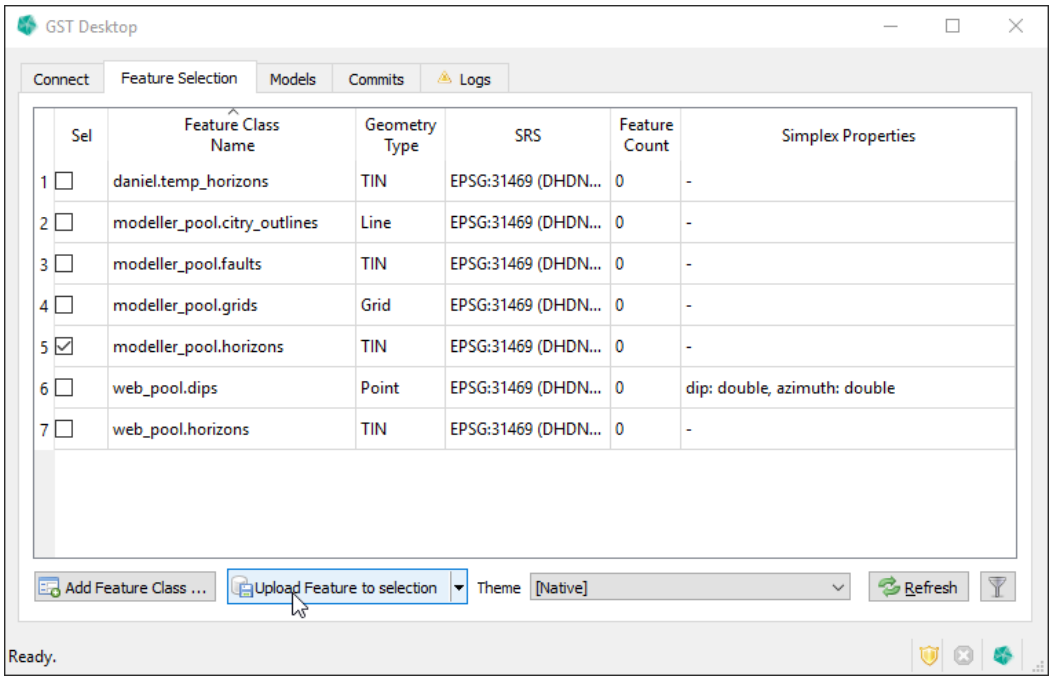



Figure 3.1
Feature selection dialog

1. Select a target Feature Class. When you have selected a Feature Class in the Feature Class list, the button **Upload Feature to selection** becomes active.
2. Click the **Upload Feature to selection** button to start the upload into the target class.

**Tip: Uploading same data into several Feature Classes**

If you want to upload the same data into several classes, select more than one class in the list.

**Tip: Uploading with context menu**

Alternatively you can use the context menu to upload data. For this, click with the RMB on the target Feature Class and choose Upload into: ...

3. Select files for uploading in the **Open File dialog** [Figure 3.2]

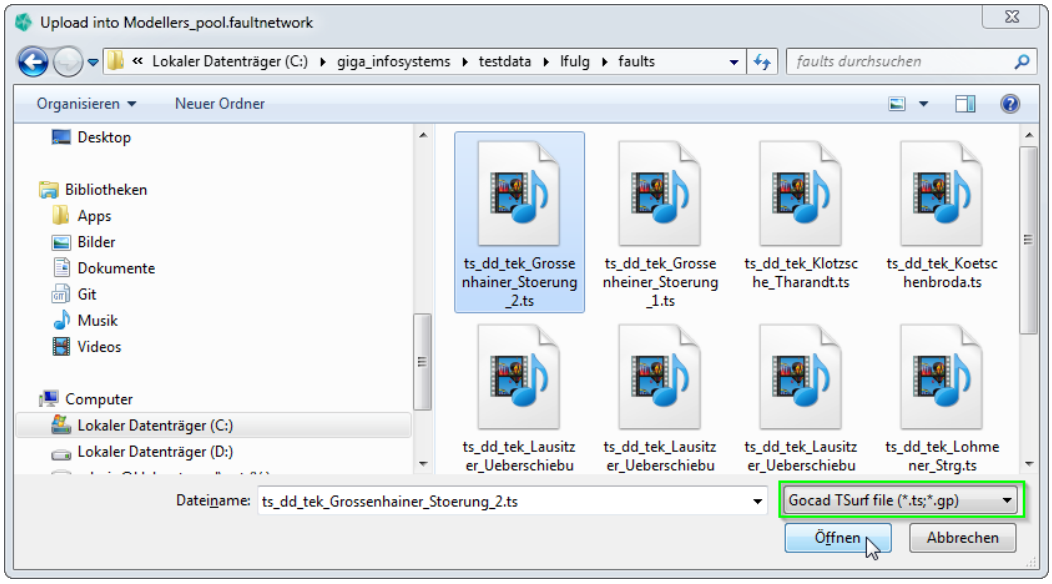



Figure 3.2
Open File Dialog: Browse and select the files to upload. Please remark the file extension filter [green box] on the bottom right to control the displayed file types.

After the Open File Dialog is confirmed the files are parsed and the **Upload Wizard** [Upload Wizard on page 55] will guide through the upload.

## 3.2 Upload data (Drag'n'Drop)

As an alternative to the browse files method, you can drag'n'drop files you want to upload from your file manager onto **GST Desktop**. The following file types are accepted:

* **geometry files** [like Gocad ASCII files, Surpac STR/DTM files etc.]
* **session** or **object archive files**. This allows to easy start updates when the archive files are containing a **lock key**. On the other hand this method can be used to return a **lock key**.
* **fcdxml files** [Feature Class Description files]. See Import and export Feature Classes [fcdxml files] on page 45 for more information about recreating Feature Class on other instances of **GST Storage**.

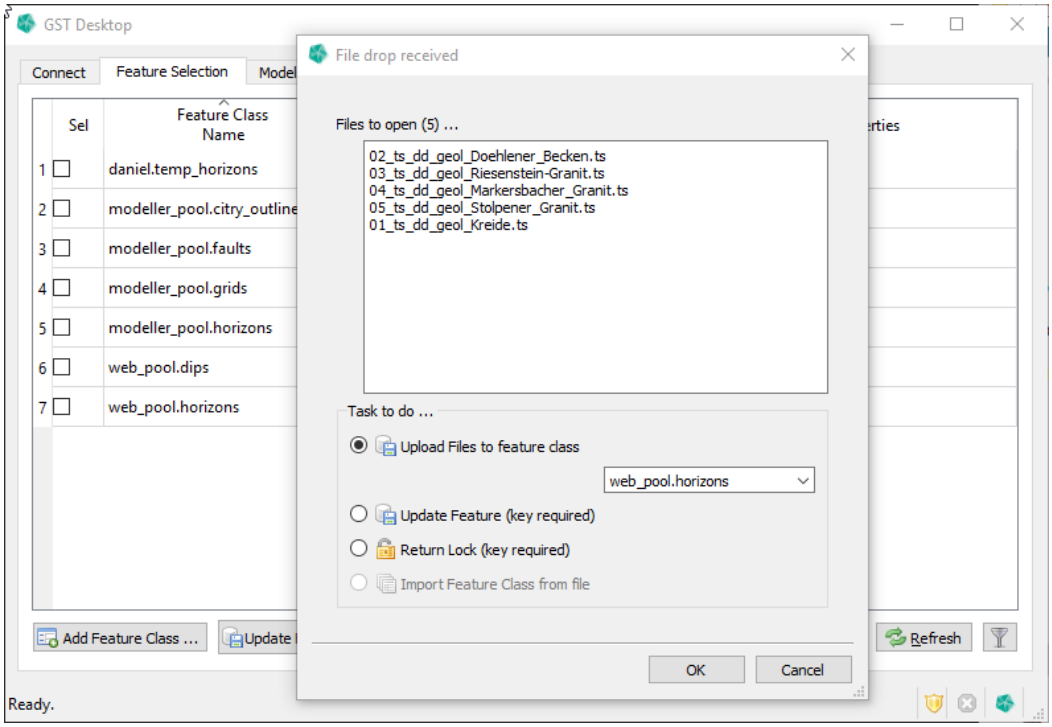



Figure 3.3
After you drop files on GST Desktop a dialog asks for what action to perform with the files.

After the action was specified a process starts to read the files. The file contents will be presented in the **Upload Wizard**, where the Target Feature Class, Feature Properties, Simplex Properties, SRS definition and more can be applied for inserting the data into **GST Storage**.

# 4 Upload Wizard

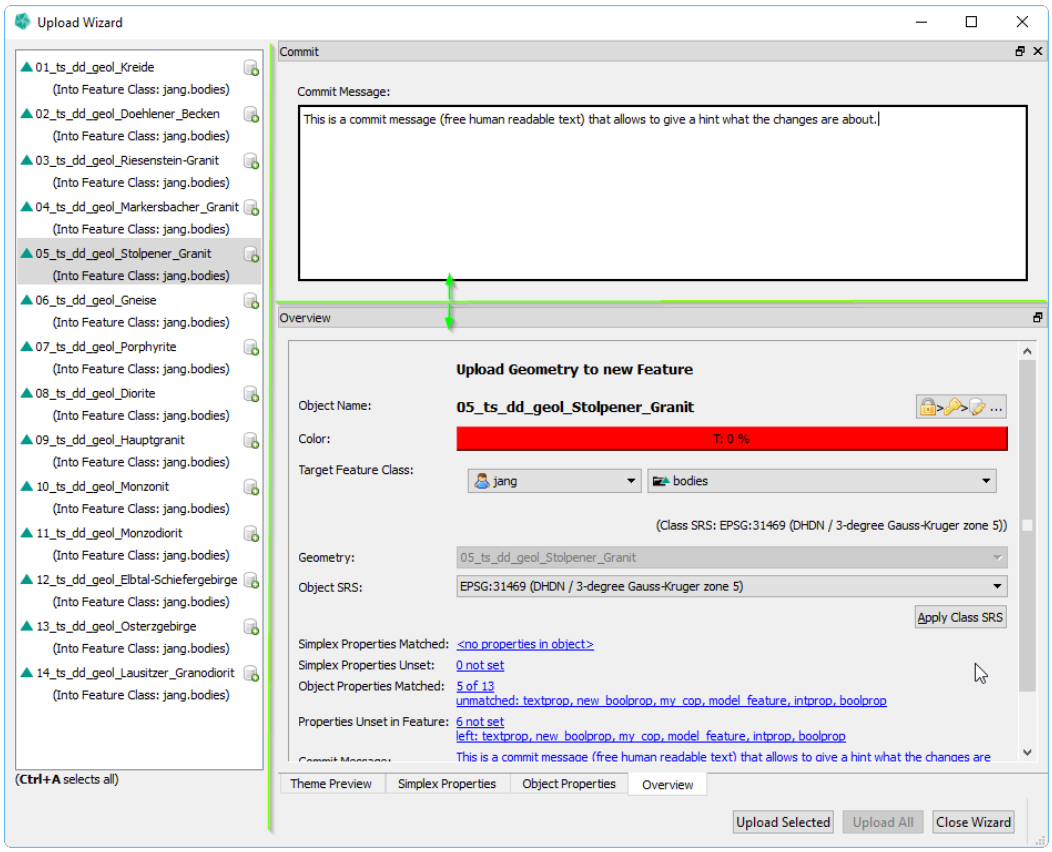



Figure 4.1
The UploadWizard. Remark the realizability (green lines in this screenshot)

The **Upload Wizard** guides you through the upload process. This Dialog shows the content of the opened and parsed files in the list on the left side. Select one or more items on the left side to show details about the selection on the right side. Remark the tabs (**Simplex Properties**, **Object Properties** and **Overview**) on the bottom. You can perform changes on the selected objects (e.g. change or set object properties, set SRS, etc as explained in the following section).

When all configurations and changes are correct (use the **Overview** section to show all information in one place), use one of the buttons on the bottom of the wizard to start the upload.

* **Upload Selected** Uploads the selected object(s). (No more changes can be applied to these objects afterwards.)
* **Upload All** Uploads **all** objects. Please verify that the settings for all objects are correct.
* **Close Wizard** Closes the Wizard (discards all remaining objects within this Upload

Session).

The tabs as well as the box **Commit** are dockable widgets (see tip below). Their function will be explained in the following pages:


* **Commit** . . . . . page 57
* **Overview** . . . . . page 58
* **Object Properties** (for Single Selection on left list) . . . . . page 72
* **Object Properties** (for Multi Selection on left list) . . . . . page 74
* **Simplex Properties** . . . . . page 75
* **Theme Preview** . . . . . page 77


### Tip: Customize the Upload Wizard

The sections are placed in so called "dockable widgets". These widgets allow resizing, moving and rearranging in order to customize the upload wizard's appearance. You can drag them by clicking on titlebar and place, move or resize the widgets (as known from other applications).

### Tip: Links in overview

A click on a blue highlighted link at the bottom of the **Overview** section brings the corresponding section to the front.

### Tip: Drag'n'Drop

You can add additional archive or geometry files to the active upload sessions by drag'n'dropping them onto the Upload Wizard window.
This can be useful when you have added an updated object file but forgot to add the corresponding session archive file (containing the 🔑 **lock key**). Geometries from drag'n'dropped files will be added to the list on the left side.

## 4.1 Section: Commit Message

This text field is mandatory. Give a brief but meaningful hint about what data will be uploaded or are going to be changed and why.

The commit message text is valid for the whole upload process. The commit will be finalized as soon as the first object is transfered to the database. No further changes to the commit message will be possible after that. From this moment the commit message textbox is no longer required and can be ✕ closed.

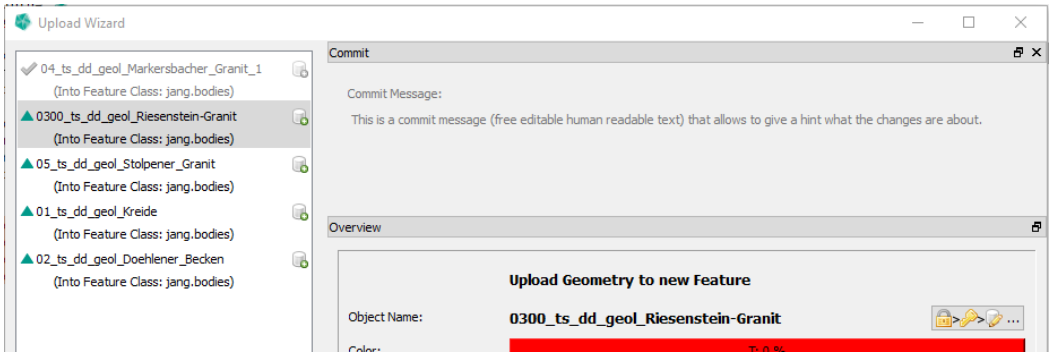



Figure 4.2
The commit message text box becomes unavailable when the first object is committed.

**Note**

The commit message and all assigned Feature changes can be seen by any user in the Commit Tab in the **GST Desktop** main tab list, see Tab: Commits on page 114.

## 4.2 Section: Overview

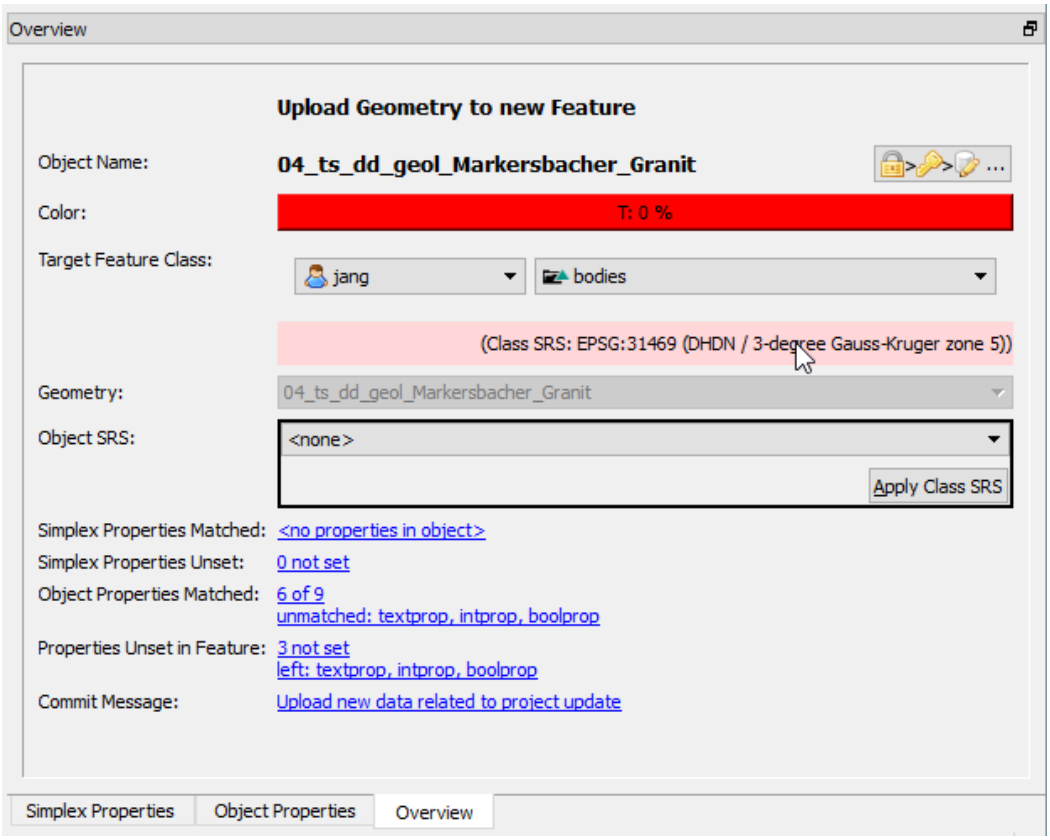



Figure 4.3
The overview section shows all relevant information in one place and highlights missing input.

The overview section shows all relevant information in one place and highlights missing input (like in figure 4.3 it highlights the missing SRS information for the current object **04_ts_dd_geol_Markersbacher_Granit**.)

From top to bottom the information and controls are:

**Headline** A text about what will be done (Upload or Updating)

**Object Name** The geometry name as parsed from its file

**Lock a Feature** Connect a geometry with a Feature in order to update it. (Instantly a lock key will be received.) . . . . . page 60

**Color** The color of the geometry as parsed from its file. You can click on the color button **T: 0 %** (the label is indicating the transparency channel of the color) to change the color of the Feature.

**Target Feature Class** Shows the target Feature Class for the selected geometry. The target class can be changed by first selecting the owner (left dropdown box) and second the Feature class within the owner's pool (right dropdown box). Below the two dropdown boxes

is the Feature class SRS.

**Geometry** Shows which geometry will be uploaded. This dropdown box will be enabled for **Unresolved Items**. Use this box to connect a unresolved item with a geometry. A unresolved item can occur when specifying an archive file for the upload/update but the corresponding geometry file could not be resolved from that archive. This can happen when the filename of the geometry was changed from a third party software or the geometry name has been changed since it was locked. . . page 61

**Object SRS** Use the drop down box to specify the Spatial Reference System of your object's coordinates. The button **Apply Class SRS** sets the SRS to the one set on the target Feature Class. **Please be aware that coordinate transformations due to different SRS can possible cause shifts in the coordinates.** . . . . . page 64

**Simplex Properties Matched** Shows the number of matched simplex properties from the object. A mouse click highlights the **Simplex Properties** section.

**Simplex Properties Unset** Shows the number of simplex properties defined in the Feature Class that are not present or could not be matched in the current object. Those properties will obtain a NULL value after uploading (indicating a "value is missing"). A mouse click highlights the **Simplex Properties** section.

**Object Properties Matched** Shows the number of matched object properties from the object. A mouse click highlights the **Objects Properties** section.

**Properties Unset in Feature** Shows the number of object properties defined in the Feature Class that are not present or could not be matched in the current object. Those properties will obtain a NULL value. Object properties can be later set or changed in the Feature dialog (see Browsing Features and changing Object Property Values on page 22). A mouse click highlights the **Objects Properties** section.

**Commit Message** Displays the commit message. When the **Commit** section has been **closed**, a mouse click will reopen the **Commit** section.

## Lock a Feature in the Upload Wizard

**Important Note**

**Locking a Feature in the Upload Wizard is not the suggested workflow. Use it as exception!** It is possible that a user in the meantime starts modeling. To prevent the loss of updates please lock Features before you start to model!

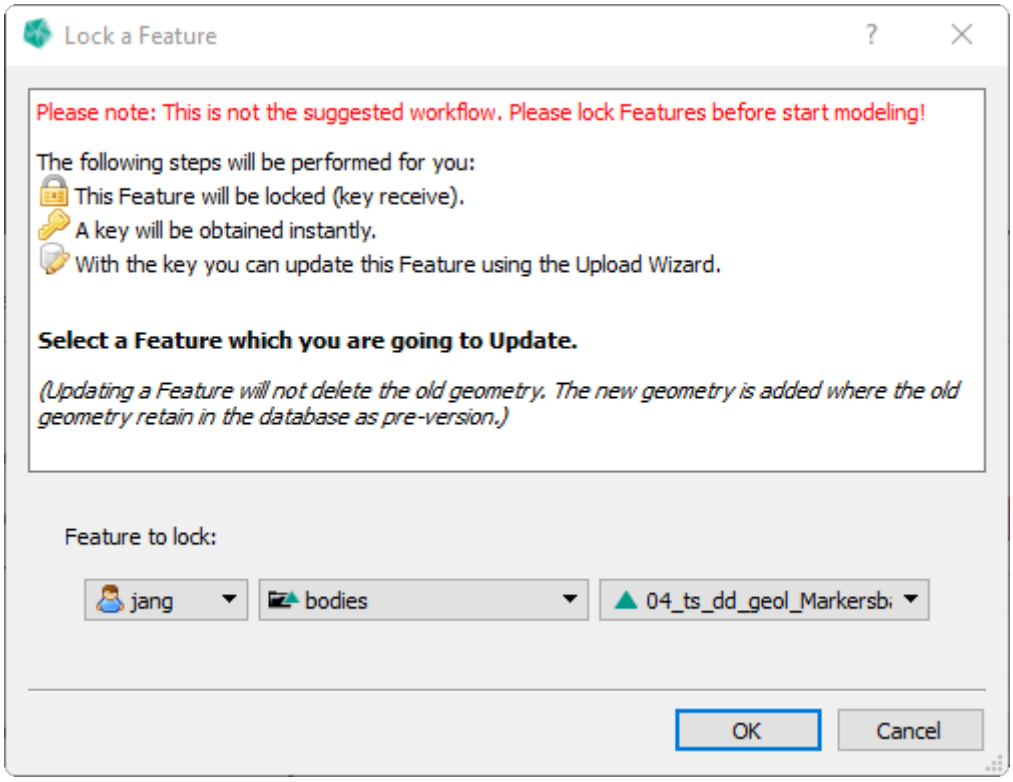



Figure 4.4
Select a Feature to instantly request a lock

Locking a feature is only active for items to upload (see figure 4.5 left side).

When pressing the button Lock a Feature a dialog pops up asking for a Feature to lock. In the three drop down elements first select the owner pool your Feature Class is in. Second select a Feature Class and third select the Feature to lock. When confirming this dialog with the Ok button the selected Feature will be requested for a lock. As long as no other user is still locking this Feature a valid lock key will be returned from the database and assigned to the current selected geometry. Remark the changed symbol from upload to update in figure 4.5.

**Important: Disk Space**

Updating a Feature will not delete the old geometry. The new geometry will be added with the old geometry retained in the database as pre-version. Extensive usage requires more disk space for your GST Storage instance.

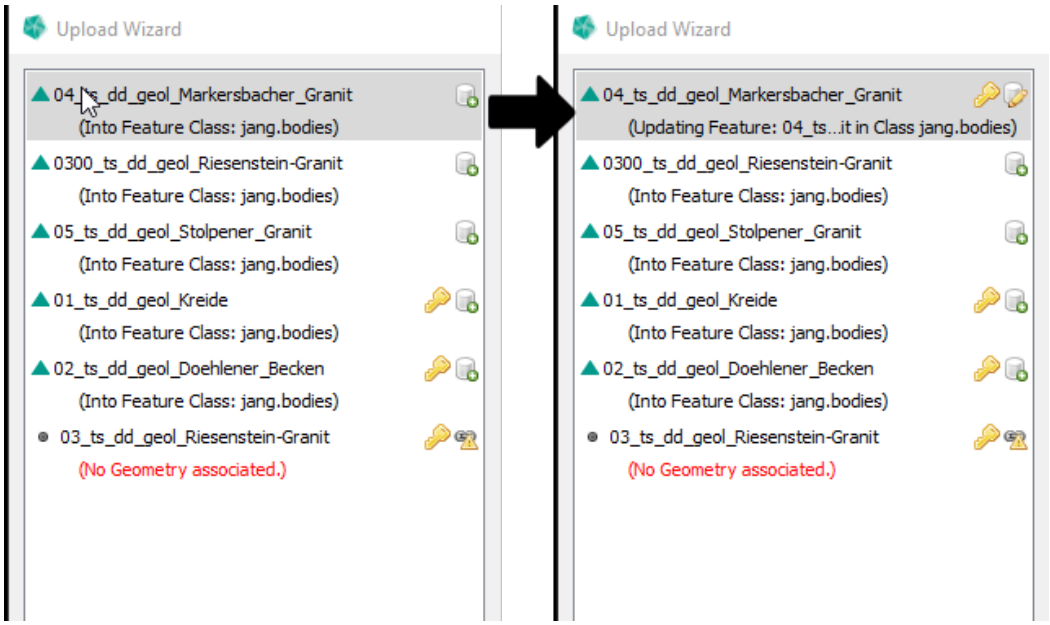



Figure 4.5
Lock a Feature is available for new and unassigned geometries. These are indicated as items to upload. After locking the item is marked as item to update

## Link a Geometry to a Unresolved Item

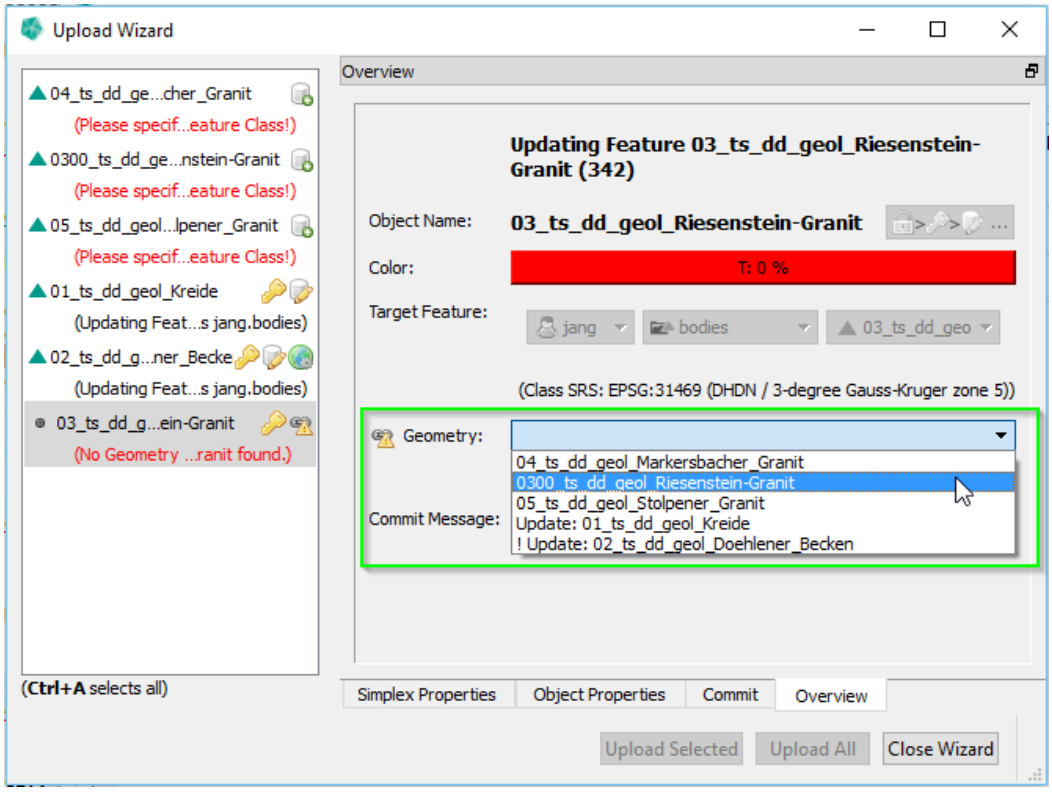



Figure 4.6
For a Unresolved Item select a Geometry from the drop down list in the Overview section.

**Given is the following situation:** A user downloaded data from GST in the Gocad file format with a lock in order to edit the data. (See Locking – Download data for modification on page 89 on how to download data with a lock.) On the hard disk several Gocad object files were written plus a session archive file (containing the lock keys). The user imported said data into Gocad and started modeling. During this process the user renamed an object and also created some new objects. After the modeling process, the data (the edited objects and the new objects) was loaded back into GST Desktop for a upload/update back into GST. (This can be simply done by drag'n'drop the Gocad files and the archive file onto **GST Desktop**, like stated earlier in this chapter see page 52.)

In situations like the one explained above an object was renamed or the object file name was changed and no longer matches the one referenced by a session archive. As a result the connection from the session archive (containing the lock key) and the object file (containing the Gocad modeling result) is broken. The updated geometry is represented wrongly as a new item to upload in the Upload Wizard list. The entry of the session archive with a broken connection to a geometry file is represented as Unresolved Item in the left list (see figure 4.6). In order to connect the Unresolved Item with a geometry select the Unresolved Item in the list and choose the geometry in the Geometry drop down box (in figure 4.6 highlighted by a green box).

**Important**

It is required that the geometry to be linked is within this upload wizard session. (This means it should be selected or drag'n'dropped together with the session archive.)

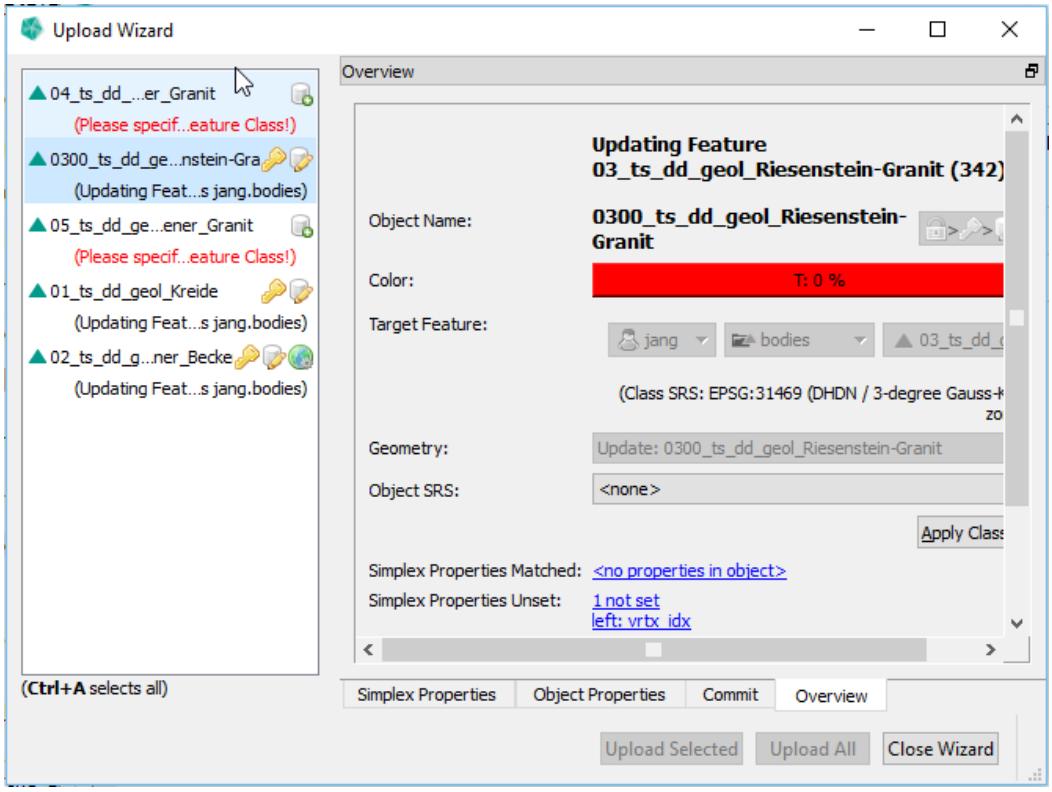



Figure 4.7
After the link operation is performed the Unresolved Item and the geometry to upload have been merged.

## Specify an Object SRS

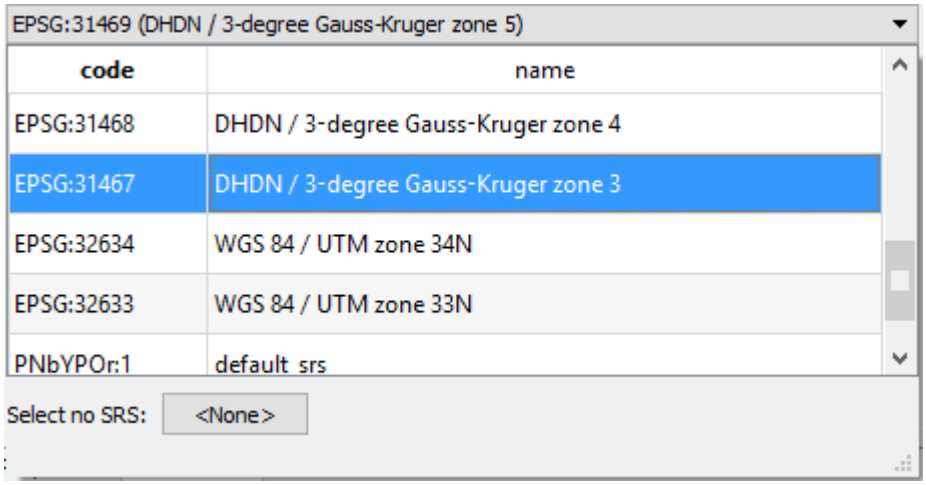
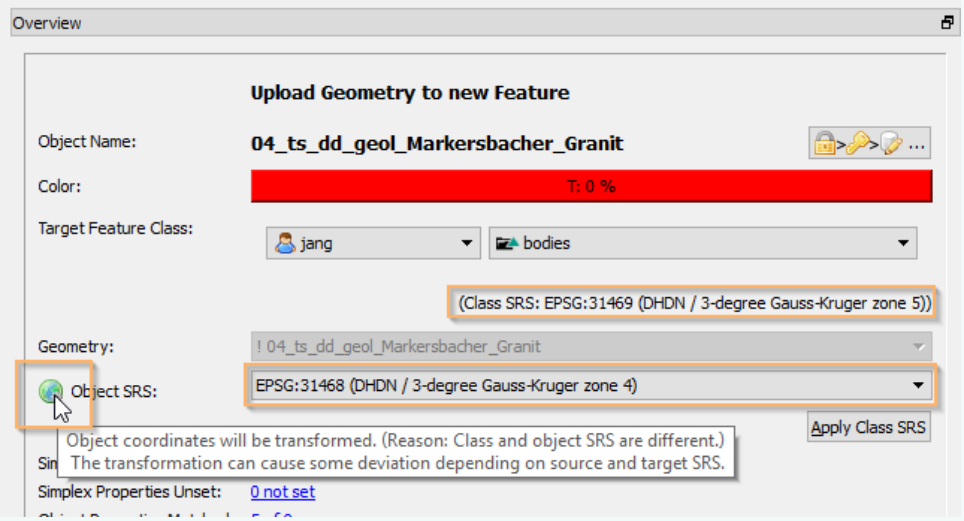



Figure 4.8
SRS drop down box

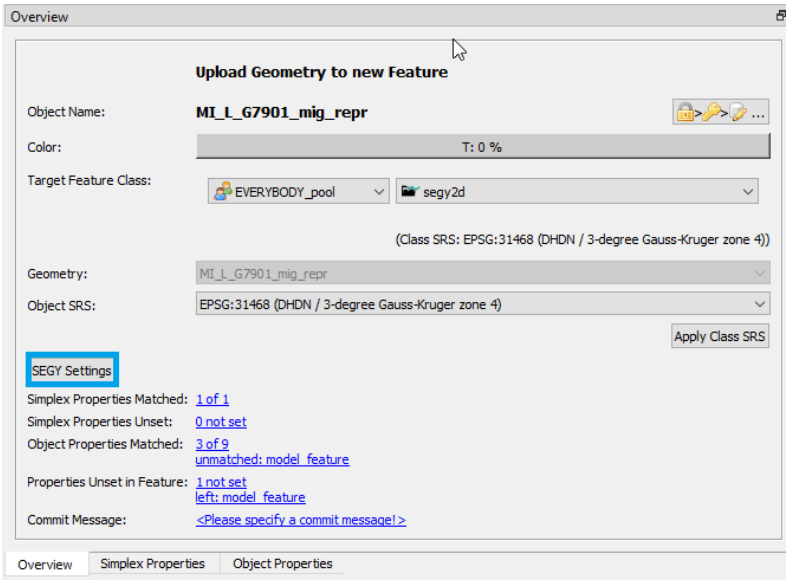
To specify a Spatial Reference System for an object simply select an SRS from the list. You can type the SRS name or the EPSG code to filter the table.

## Important information about SRS transformations



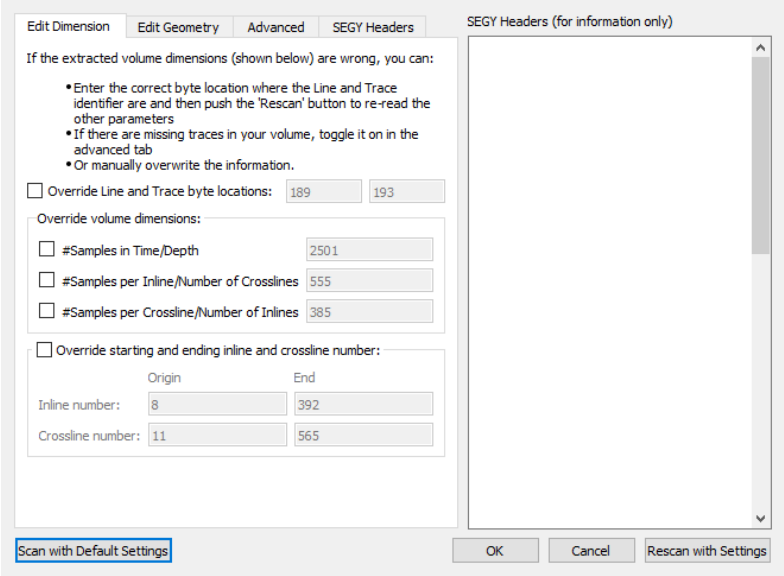

If the chosen object SRS differs from that of the target Feature Class, a coordinate transformation will be performed. An **transformation icon** in front of **Object SRS** indicates this. Depending on the source SRS (SRS of the object) and the target SRS (SRS of the Feature class) shifts or inaccuracies may occur. These differences may be not constant, depended on the source and target SRS and on the location of the points to be transformed. To minimize this error, take care that your points are inside the valid boundaries of your source SRS and that the target SRS is valid for the expected point location.

## SEG-Y Upload




When uploading a SEG-Y file, you get a new button to open the SEG-Y Settings.

## General Information




Files that are based on the SEG-Y standard come in many forms. Nor is it immediately clear from the headers which "flavor" of SEG-Y one is dealing with. More importantly, the headers do not always accurately convey the correct information about how a given file should be decoded. Therefore a separate dialog is provided to allow the user to manually set the settings to be used when parsing and uploading a SEG-Y file.

If the user wishes to attempt upload the whole SEG-Y file with the default interpretation of the headers then they do not need to edit the SEG-Y settings. It should be noted, however, that many SEG-Y files are not recorded with the default interpretation of the standard and may either fail to parse, or parse incorrectly if the default settings are used.

Due to the variability of SEG-Y encodings, regardless of whether default upload settings are used for SEG-Y files or whether custom settings are specified, it is recommended that the user confirm that the SEG-Y is correctly uploaded.

### Scan with Default Settings

Restores the default settings to the dialog and rescans the SEG-Y file with default settings.

### Rescan with Settings

Scans the SEG-Y file with the currently input settings and saves them for use.

### Cancel

This will close the dialog, dropping all selected settings and use the default settings.

OK

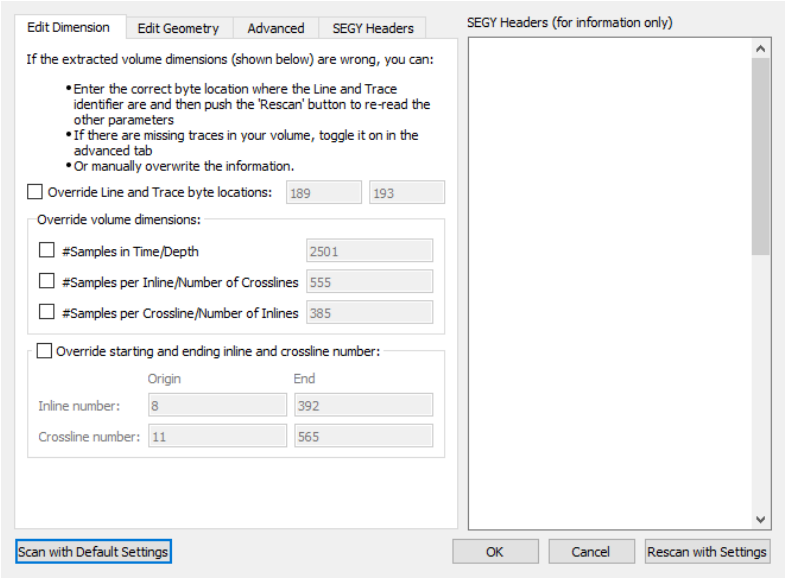
This will accept the last settings requested with the **Rescan with Settings** button and close the dialog.

> **Note**
>
> **Rescan with Settings** must be done before clicking **OK** or the last selected settings will not be applied. If this button is never pressed, default settings will be used, even if different settings have been input.

SEGY Headers (for information only)

Shows the text header as written in the SEG-Y file. This header is displayed only as information for the user. It is not parsed or interpreted by GST.

## Edit Dimension




The **Edit Dimension** tab contains instruction on how the parser should interpret the structure of the SEG-Y, how much of a trace it should read, and how many of the contained traces it should include in the upload. There are several overrides here. Each one can be selected by ticking the appropriate checkbox and editing the values in the text box. This might not reflect its exact physical XY coordinate.

Importantly, in a 3D SEG-Y the inline and crossline number determine where, in the XY grid of the survey, a particular trace is located. **Note:** This reflects the grid co-ordinates, and not necessarily the exact physical XY coordinates, of a trace.

Override Line and Trace byte locations

This override consists of two textboxes that display the inline byte location on the left (default is 189) and the crossline byte location on the right (default is 193). These settings determine where, in the binary trace header, the parser looks for the inline and crossline number of the trace. Each one should be a value between 1 and 237.

Samples in Time/Depth

By default the parser will read the whole of a trace and the textbox displays the expected number of data points in a data trace. However, it is possible to limit the number of datapoints read to a lower limit using this override.

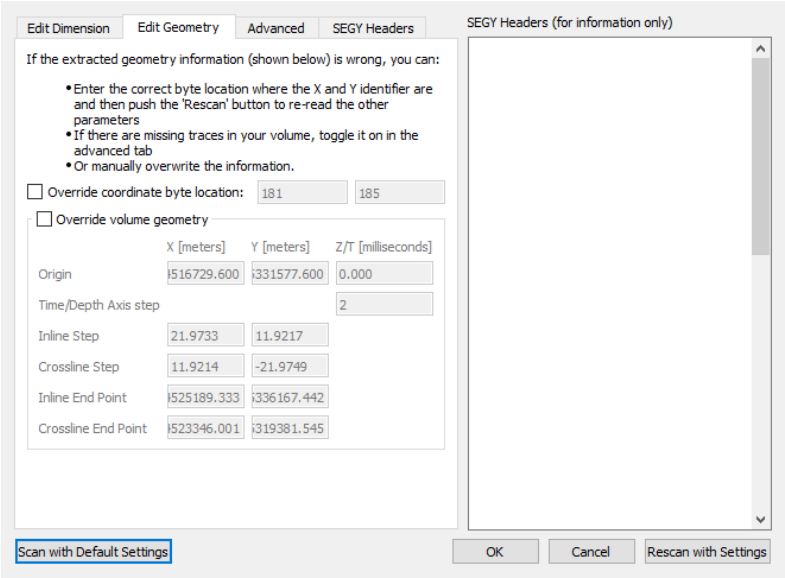
Samples per Inline/Number of Crosslines and Samples per Crossline/Number of Inlines

A 3D SEG-Y is arranged into a grid of crosslines and inlines. By default all the inlines and crosslines are read. Sometimes, however, the inline and crossline numbers are not provided, in which case these values can be changed to specify how to arrange the SEG-Y into a rectangular survey.

Override starting and ending inlines crosslines numbers

There are four textboxes here, for inline origin, crossline origin, inline end and crossline end values. By default the parser tries to interpret a 3D SEGY file in order to make the biggest possible rectangular grid. Sometimes it may be desirable to upload only a part of the whole grid, and this can be achieved by editing these values.

## Edit Geometry




The Edit Geometry tab contains options that allow the user to change the position and dimensions of the geometry in space, relative to default options. There are only two over-

rides here.

Override coordinate byte location

By default the parser gets the coordinates of the trace from bytes 181 and 185 of the trace header which represents the "X Ensemble" and "Y Ensemble" of the trace. Different software can, however, encode these coordinates in other locations in the trace headers, which necessitates an override to be able to read SEG-Y files written by that kind of software. That is the purpose of this override. Thus, the box on the left displays and overrides the "X Ensemble" byte location, while the box on the right displays and overrides the "Y Ensemble" byte location.

Override volume geometry

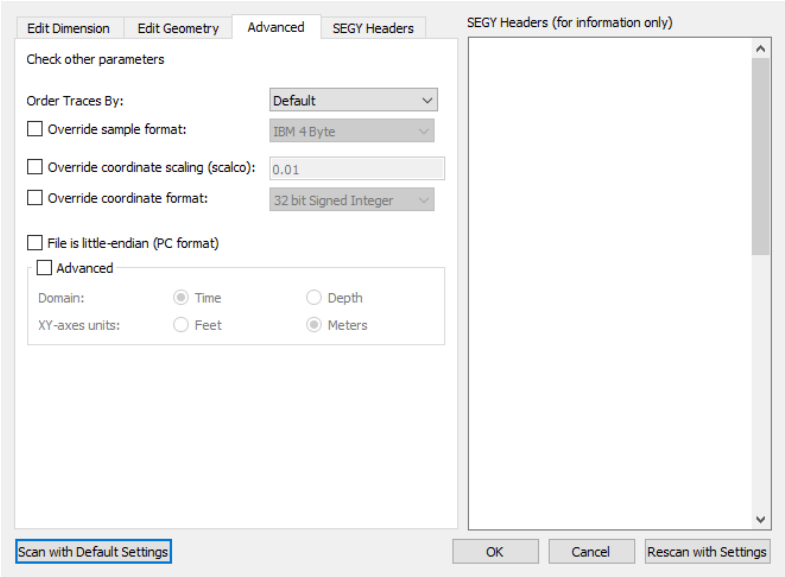
By default, the parser uses the inline/crossline locations and the X/Y Ensembles of the traces to calculate the grid structure of 3D SEG-Y files. These, however, are not necessarily correct for a number of reasons, including imprecision in the method used by the parser to calculate coordinates, incorrect or custom units, incorrectly recorded coordinates, or something else entirely. As such this set of overrides can be very useful and include X and Y coordinates for:

* Origin.
* Inline Step.
* Crossline Step.
* Inline End Point. (Readonly)
* Crossline End Point. (Readonly)

The user can change the coordinates of the origin and the inline/crossline step, which will lead to the recalculation of the dimensions of the resulting grid. Inline/Crossline End Point should then be recalculated.

There is also a textbox to override the Z/T origin, which corresponds to the initial time point, or depth, of the trace measurement. There is another textbox for overriding the Time/Depth interval of the measurements.

## Advanced




The **Advanced** tab has some overrides for technical settings that mostly change how encodings are interpreted by the parser. If the SEG-Y file is written by unknown software and completely fails to parse, changing these settings may help. The **Domain** and **ZY-axes units** overrides, on the other hand, will not cause the file to mis-parse, but may be useful if the coordinates found in the **Edit Geometry** tab give unexpected values.

### Order Traces By

This is mostly useful for 2D SEG-Y files upon a line, to determine the order of traces upon that line.

### Override sample format

Trace data can be encoded in a number of ways in a SEG-Y binary file. By default the parser uses the trace header to determine which format to use when decoding the data. If it is thought that the encoding indicated in the header is not correct, or if the trace data looks incorrect on upload, then this setting may be used to manually indicate the desired encoding.

### Override coordinate scaling (scalco)

By default, the coordinate scaling is encoded in the trace header and read from the file. However, if the coordinate measurement unit is non-standard, or the scaling is incorrect, it can be overridden here.

### Override coordinate format

Much like sample format, the coordinate format can be encoded in a number of ways. Unlike data encoding, coordinate encoding always uses 4 byte units. In addition, this parser will use the same format override for both elevation and X/Y ensemble data.

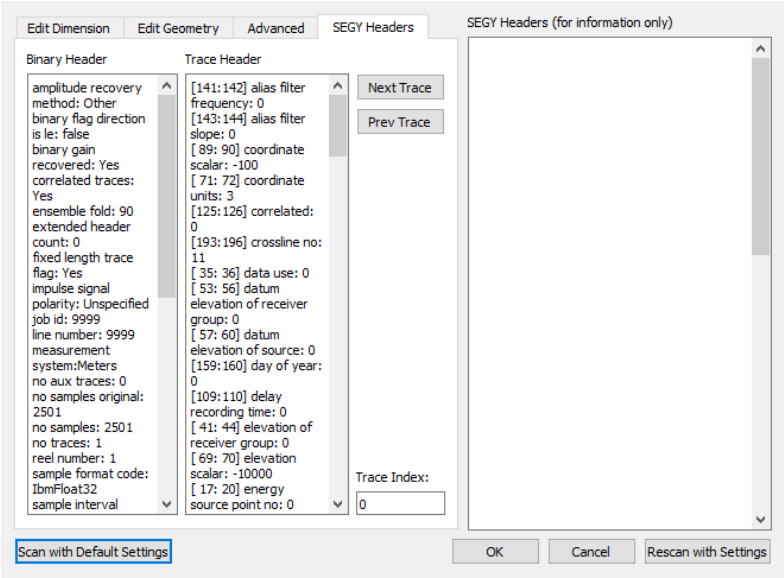
File is little-endian

By default, SEG-Y data is encoded as big-endian (BE) binary data. It can also use little-endian (LE) and a few more exotic encoding options. This parser supports only BE and LE encoding, and not the more exotic models. Regardless, the parser can use the binary header to automatically determine byte order. However, if there is reason to believe that the endianness of the data (all aspects of the file) has not been determined correctly, this override can be used to switch to LE encoding.

Advanced

The advanced override can be used to override both the XY Ensemble measurement unit, toggling it between meters and feet, and to override the trace domain, toggling it between time (temporal Z axis) and depth (spatial Z axis). GST will automatically convert all spatial units to meters when the file is uploaded.

## SEG-Y Headers




The **SEG-Y Headers** tab allows the user to view the binary headers in a human readable format, and hence inform their choice as to how to parse the SEG-Y file. There are no options here to change how a file is parsed, however there is a display for the Binary Header on the left and a display that shows the Trace Header on the right. In addition there are two buttons (the **Next Trace** and the **Prev Trace** buttons) and a text box labeled **Trace Index** to allow the user to navigate between the trace headers.

Fields in the headers are ordered alphabetically. In addition, the byte locations of the trace header fields are displayed.

## 4.3 Section: Object Properties

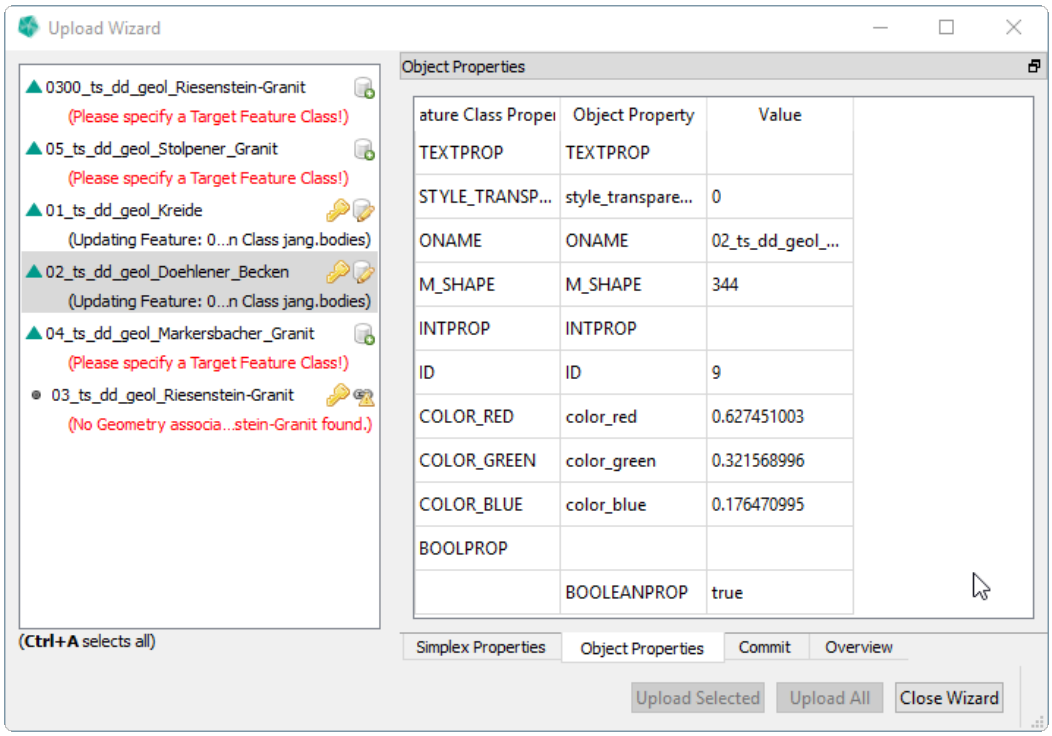



Figure 4.9
Table listing the object properties and values found from the file next to the object properties present in the Feature Class.

In the section **Object Properties** all parsed properties (from the object file being selected in the left list) are represented in column **Object Property**. The **Feature Class Properties** are under the column with the same name. If the names of the properties matches between both, they have values next to each other in one row (see **ONAME** in figure 4.9). If a property from the file could not be matched with one of the target Feature Class **Feature Class Property** will be blank. Accordingly, if a property of the Feature Class was not found in the file, **Object Property** will be blank. (see property **BOOLEANPROP** resp. **BOOLPROP** in figure 4.9). In order to match the properties simply rename the object property to be equal to the Feature Class Property. (Editing of the table cell depends on your OS. Typically this is done via a double click into the cell.) Change the name and press enter. When the names are matching the two columns will be merged (see figure 4.10).

You can also edit the **Value**s or add missing ones before the upload. In order to change a **Value** for several objects, select them in the left list (see the next section 4.3).

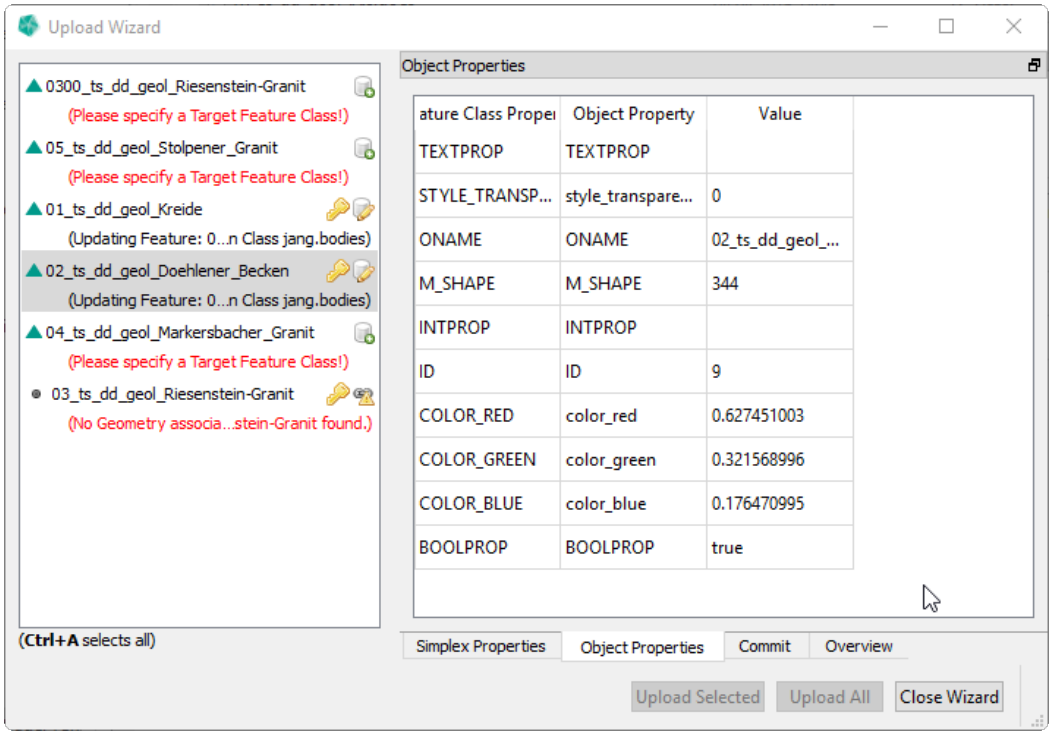
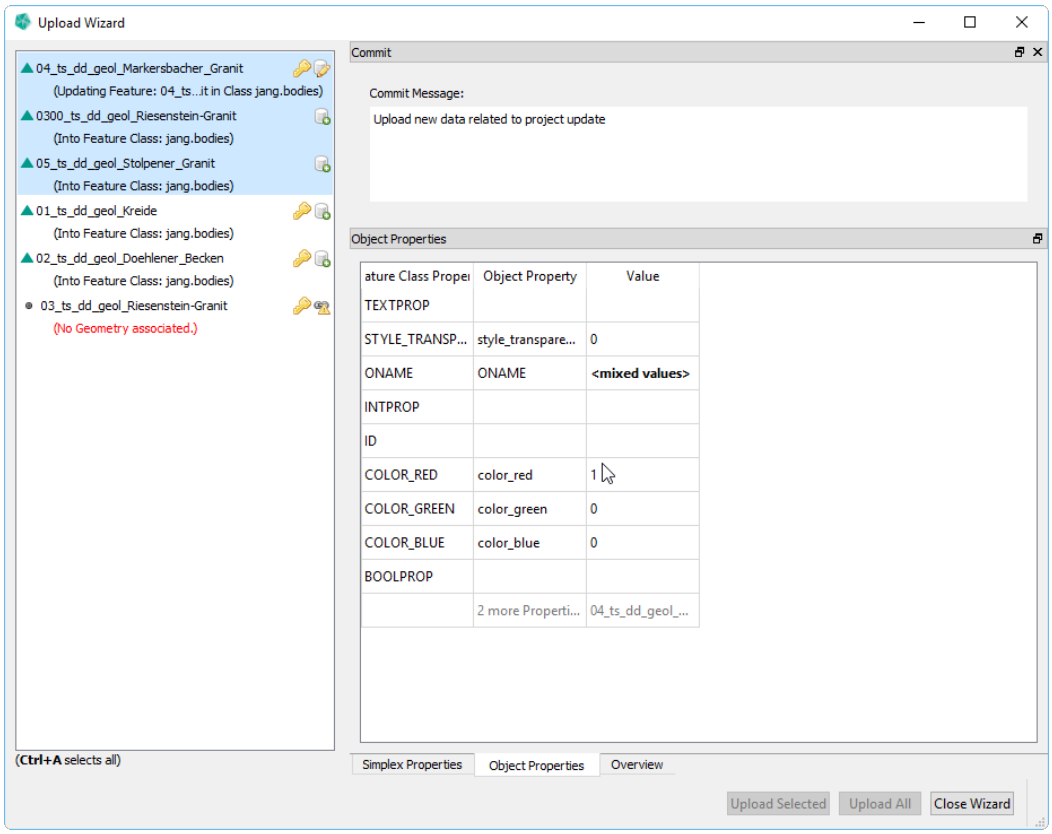



Figure 4.10
To match properties rename the object property. Compare Property **BOOLPROP** with figure 4.9

## Multi Selection / Set Property Values in bulk

Figure 4.11
Multiselection of object items in the Upload Wizzard




In order to set property values for several object, simply select multiple objects in the left list. (For this, drag a selection box over the list or use the Ctrl-key + mouse click.) The table in section **Object Properties** will list all common properties and indicates unique ones in the last column. To change object values for several objects edit the value in column **Value**.

## 4.4 Section: Simplex Properties

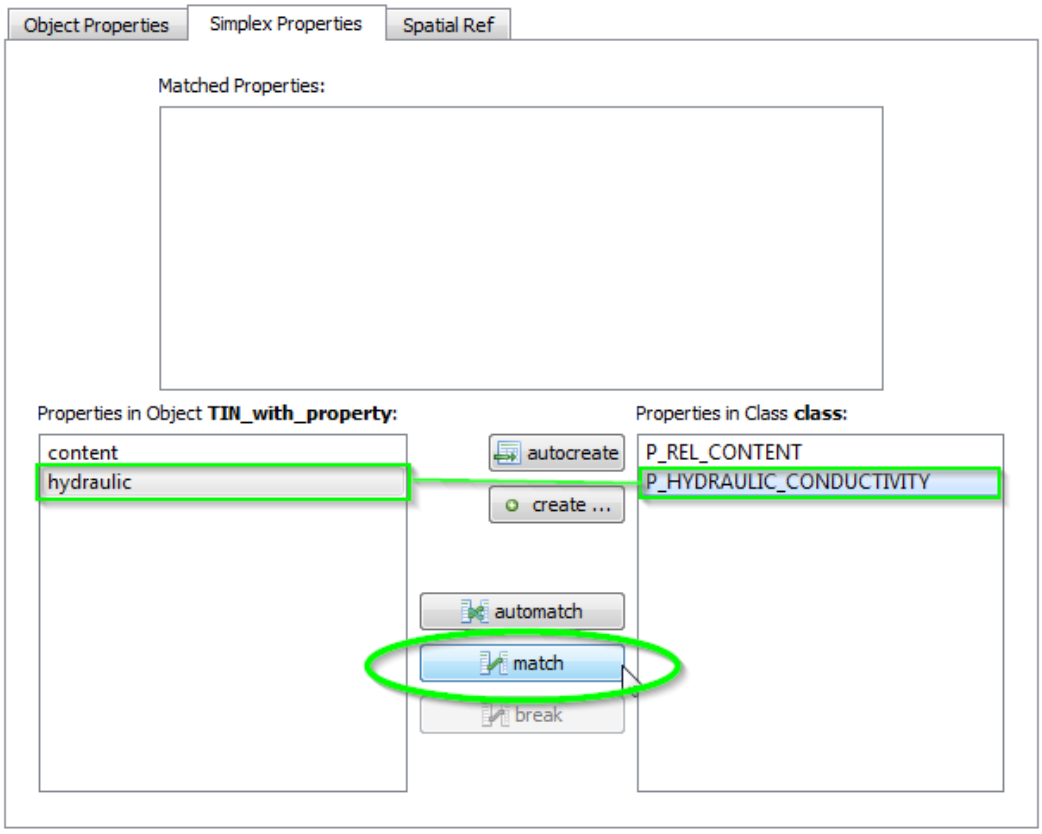



Figure 4.12
**Simplex Properties** section after a file was parsed.

The **Simplex Properties** section shows the simplex properties found in the file on the left and the ones of the Feature Class on the right. If the names of the properties are equal GST tries to match them automatically. You can force this by clicking on the **automatch** button.

If properties are not matched automatically you can do it manually. To do so, select the simplex property from the file in the left list and the corresponding simplex property of the Feature Class on the right and click the **match** button (see green circle).

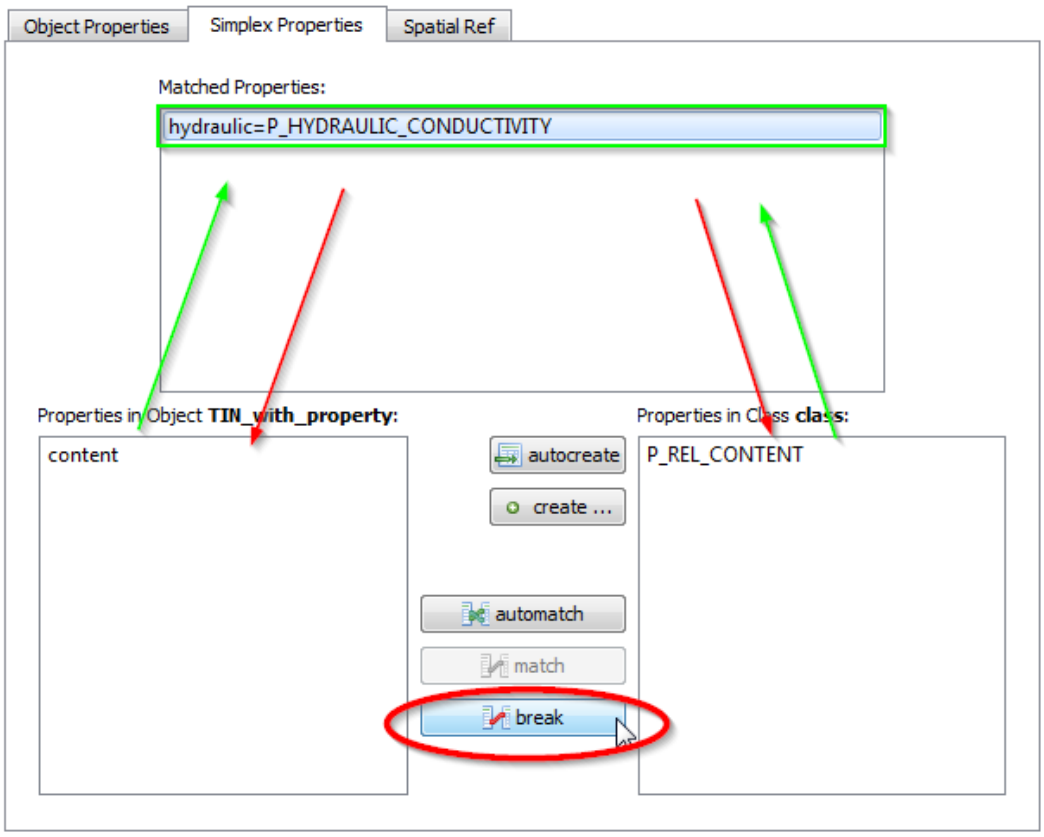



Figure 4.13
**Simplex Properties** section after a manual match.

The match is symbolized in the list on top of the screen, where the two properties are connected with an equal sign (''='). You can undo the match by clicking the **break** button (red circle).

To store simplex properties of the file that are not present in the Feature Class, you have to add them to the Feature Class first.

1. The **autocreate** button automatically creates a simplex property in the Feature Class on the database for each simplex property from the list on the left.
2. The **create ...** button allows you to create a new simplex property in the Feature Class on the database. You will be asked for its name and type.

**Note**

Creating a new simplex property in a Feature Classes will also create it for every existing Feature of that class. This also means that, for existing Features, the value for this property will be set to NULL (meaning value is missing).

## 4.5 Section: Theme Preview

The dockable section **Theme Preview** shows how the current selected object will be represented in the different Themes that are available on the current GST instance.

**Note**

This chapter requires some basic knowledge about Themes. If you are not familiar with them, please consult the chapter Manage Themes on page 151 and then continue reading!

If no Object Properties are supplied all Themes will interpret the Feature within the No Data case -- see figure 4.14. (In this example the Theme "Geology" will display the no data case with the native color.) In order to change the Theme definition you can use the quick link button to open the **Theme Editor** for that Theme. (The Editor will be explained in chapter Manage Themes on page 151).

The object value causing the match is displayed as blue link. (In this case NULL matches the no data case).

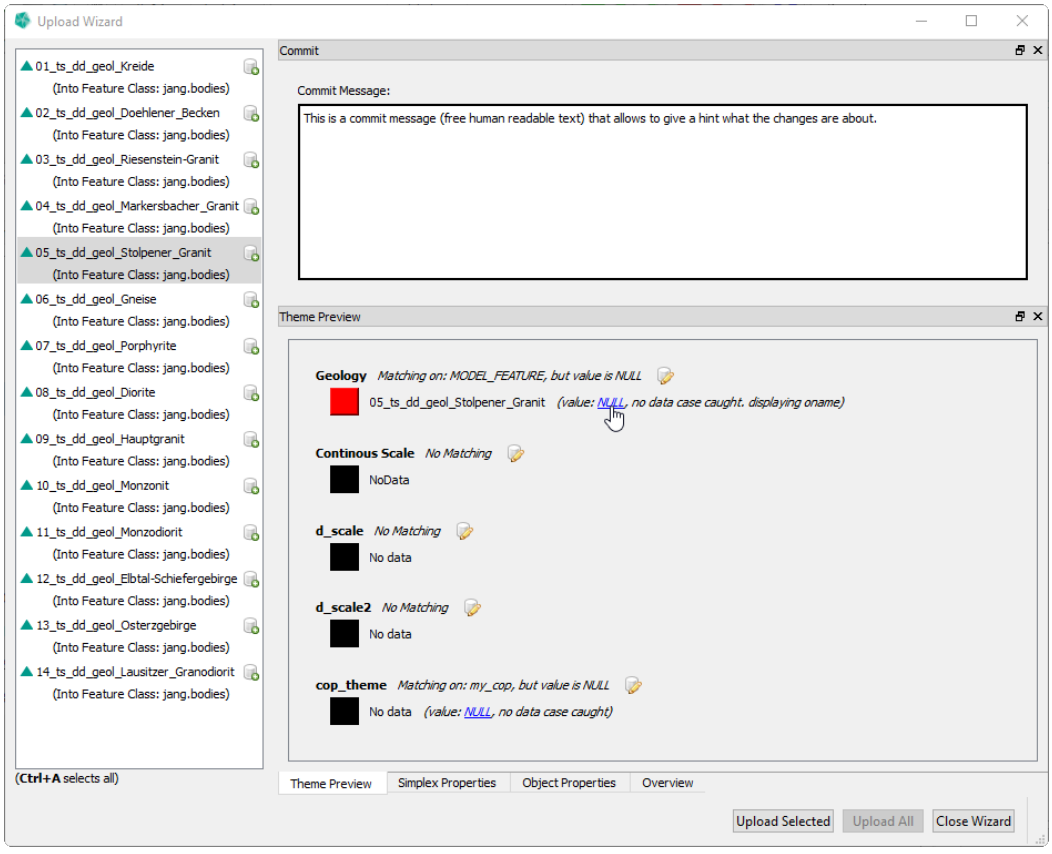



Figure 4.14
If no Object Properties are supplied all Themes will interpret the Feature within the No Data case.

Clicking on the link will forward to the **Object Properties** section and will highlight the matched

property. While typing, the values that are available in the Theme, will be suggested in a list (please refer to figure 4.15).

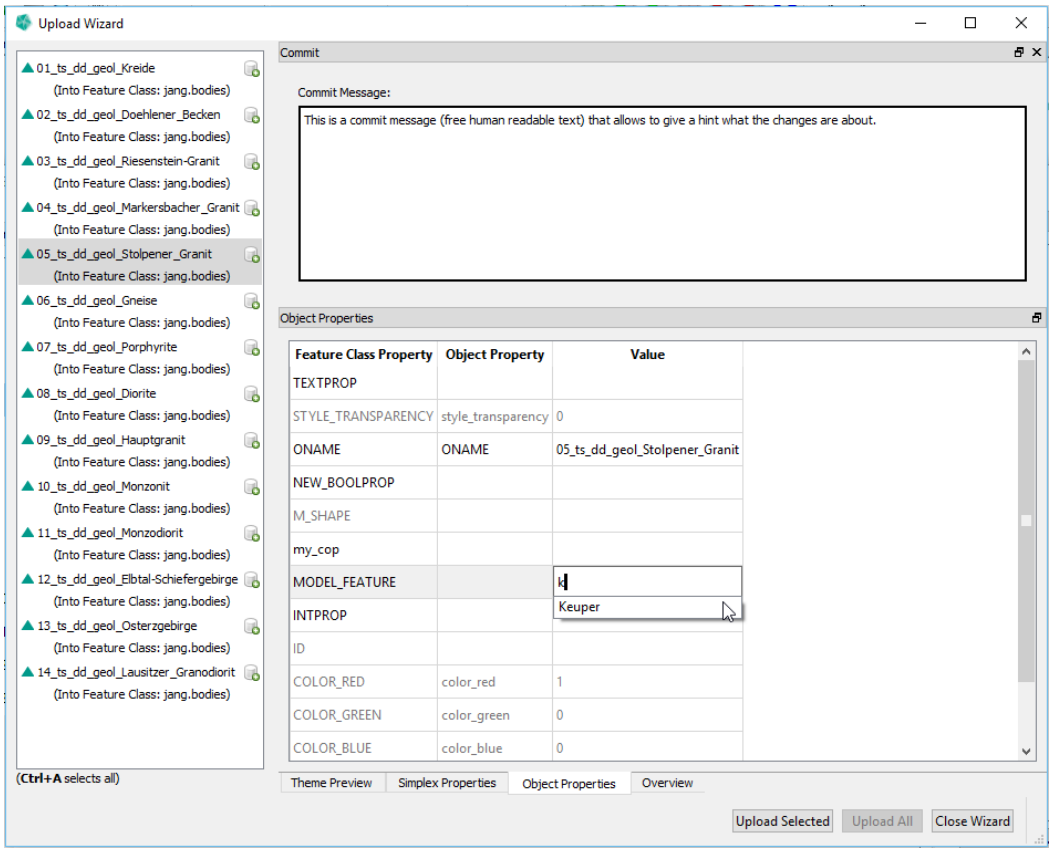



Figure 4.15
While typing, the values that are available in the Theme will be suggested in a list

If you enter a property value that is covered by a Theme the **Theme Preview** section shows the object interpreted (and gives a hint which value causes that).

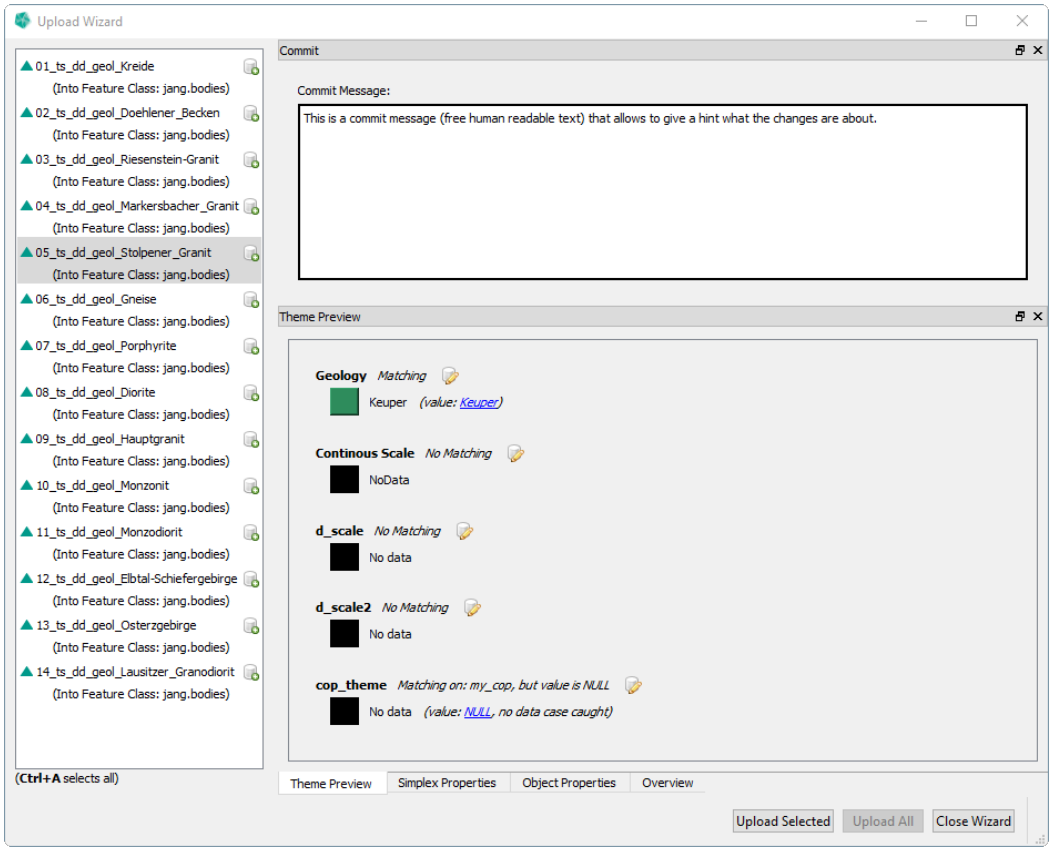
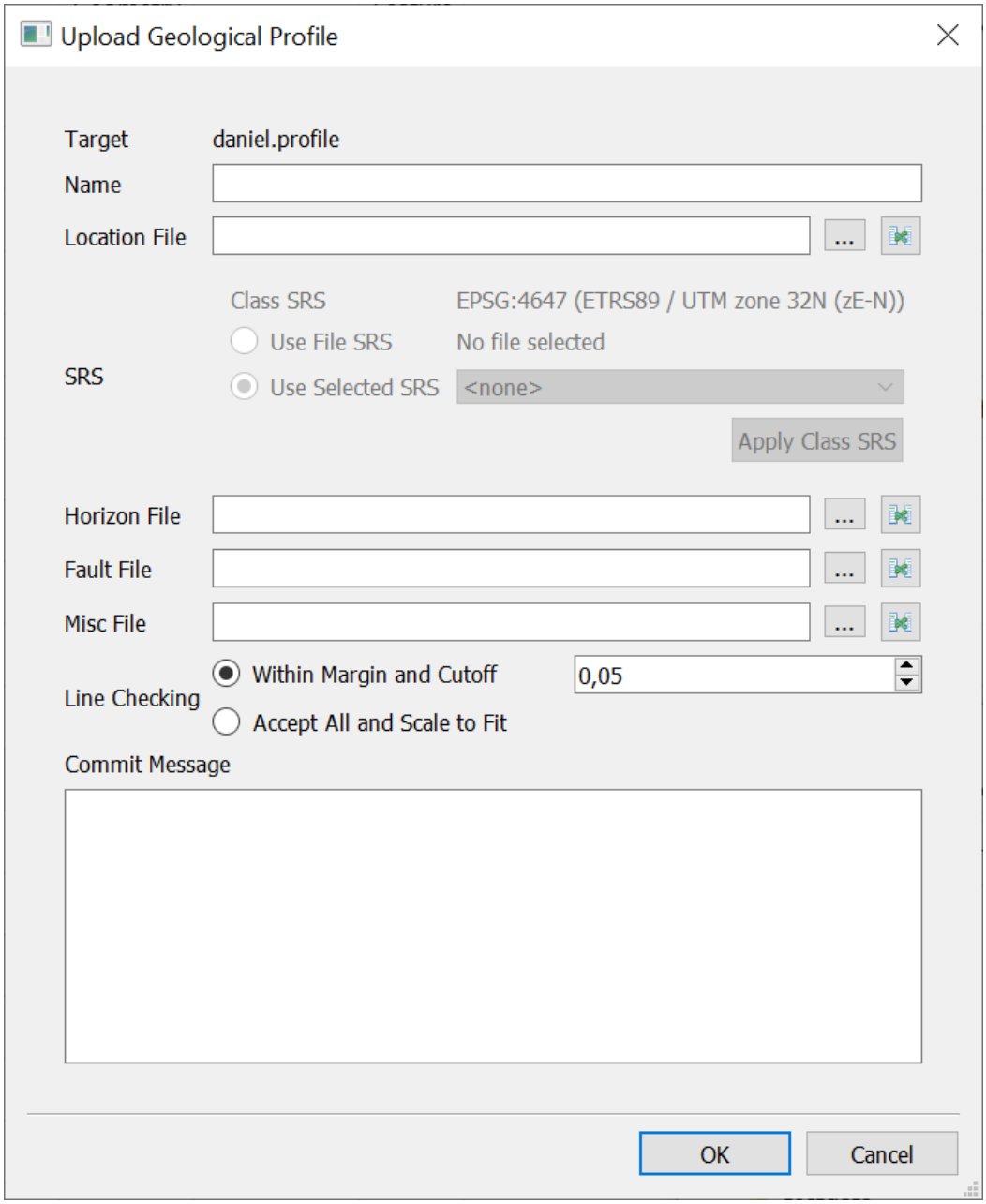



Figure 4.16
If you enter a property value that is covered by a Theme the **Theme Preview** section shows the object interpreted.

## 4.6 Profile Upload

When uploading of profiles, you will see a new **Profile Upload** dialog.

Figure 4.17
Profile Upload Dialog

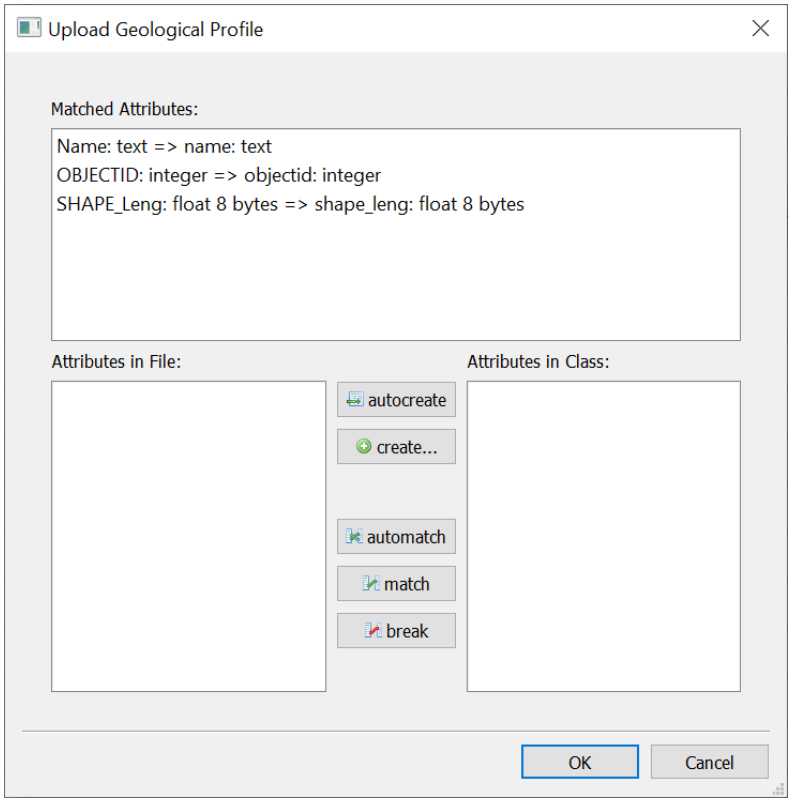



### Dialog Settings

* **Target** The name of the target feature class.
* **Name** The name of the profile.

* **Location File** The shapefile for the location line. Mandatory.
* **SRS** Set the SRS of the location line.
    * **Class SRS** Shows information about the SRS of the target class.
    * **Use File SRS** Shows information about the file SRS, if present. Use this option to use this as SRS information.
    * **Use Selected SRS** Select one of the SRS available in GST.
* **Horizon, Fault, Misc** Additional shapefiles for these sub feature kinds. Optional.
* **Line Checking** Define how to handle (potential) lines with coordinates outside of the location line extent.
    * **Within Margin and Cutoff** If any coordinate is outside the location line extent + margin (as percentage of the location line extent) nothing will be imported and an error will be returned. Otherwise all lines will be imported, coordinates outside the location line extent will be cut off."
    * **Accept All and Scale to Fit** All lines will be accepted. Lines with coordinates outside the location line extent will be scaled to fit the location line extent.
* **Commit Message** Free form text to describe the changes included.
* Select a file for this sub feature kind.
* Map attributes for this sub feature kind. See 4.18.

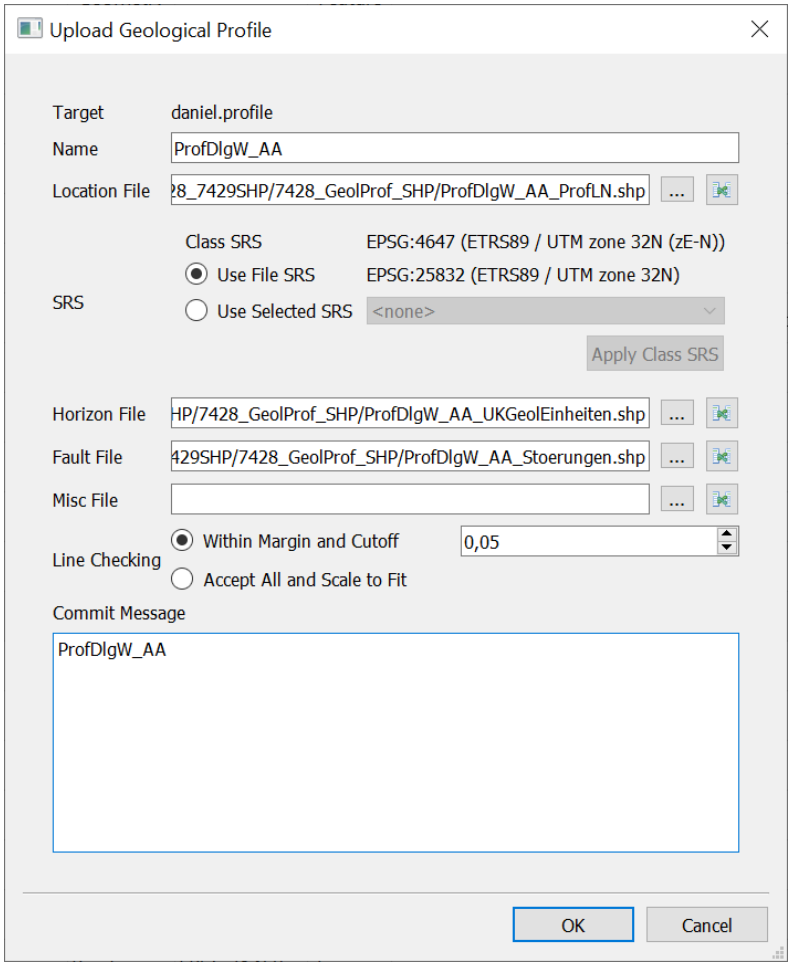
Figure 4.18
Attribute Mapping Dialog




Here you can map the attributes present in the file to attributes in the feature class.

* **autocreate** Create all missing file attributes in the feature class and automatch.
* **create...** Create a custom attribute. Open **Add Attribute** dialog.
* **automatch** Matches all attributes with the same name and type.
* **match** Matches the selected entries in **File** and **Class**. Types have to match, otherwise the match is not possible.
* **break** Break the selected matching in **Matched Attributes**.

Figure 4.19
Profile Upload Dialog
- Example Settings



## 4.7 Shapefile - Point Cloud Handling

An alternative mode for interpreting **Point** shapefiles with GST **Multipoint** feature classes. In this mode, all **Point** features will be loaded into one GST feature and the attributes of the shapefile will be mapped to properties of the feature class.

When uploading a shapefile to a point feature class, you can either specifically use the "Pointcloud Shapefile" filter in the **File Chooser** dialog or select the "Pointcloud Feature" option in the **Select Shapefile Interpretation** dialog. The option "(Multi-)Point Feature" uses the default interpretation.

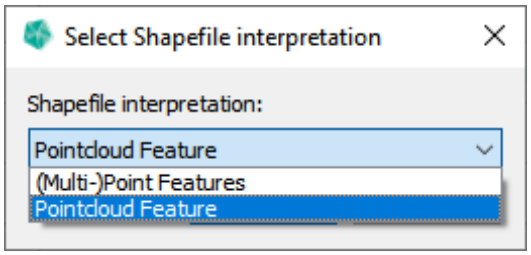
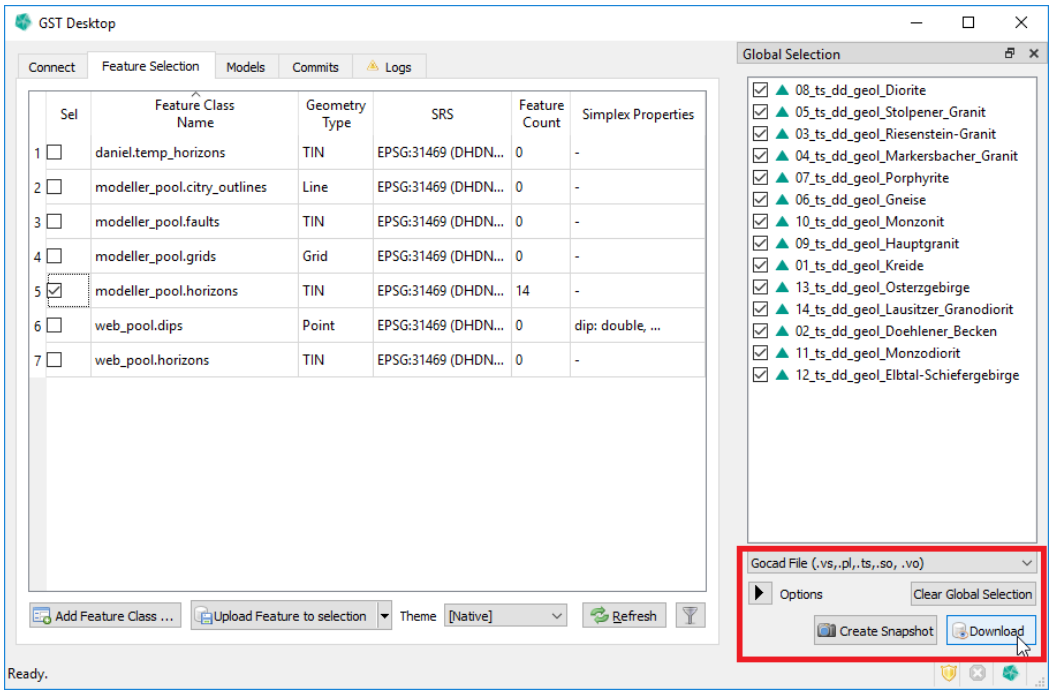



Figure 4.20
Select Shapefile Interpretation

When downloading a shapefile from a point feature class, select the "Pointcloud shapefile" as file type to reverse this process. Each point of the GST **Multipoint** feature will be one shapefile **Point** feature and the properties of the GST feature class will be mapped to attributes of the shapefile.

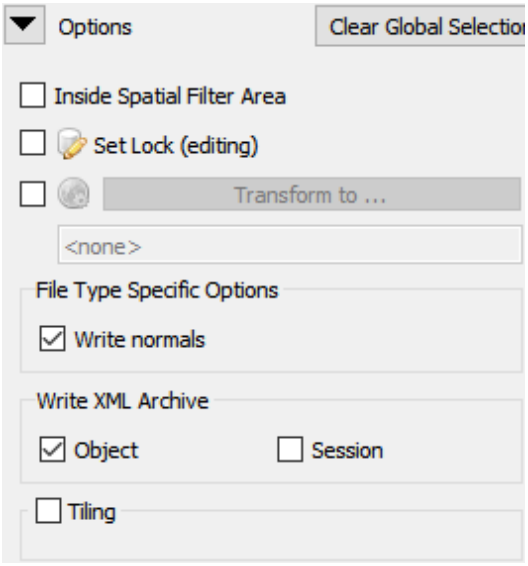
# 5 Tab: Feature Selection - Downloading data

Figure 5.1
Global Selection dialog




* **Clear Glocal Selection** Empties the Global Selection.
* **Create Snapshot** Create a Snapshot of the Features in the Global Selection. See Snapshot Feature Class on page 43.
* **Download** Download the Features in the Global Selection. The following sections go into more detail.

Figure 5.2
Download Options



* Inside Spatial Filter Area . . . . . page 88.
* Set Lock (editing) . . . . . page 89.
* Transform to... . . . . page 94.
* Write XML Archive . . . . . page 92.
* Tiling . . . . . page 95.


## 5.1 Simple Download

1. In order to download data, select features or feature classes in the Tab **Feature Selection** that you want to download. (The **Selection** widget is shown, listing all data that will be downloaded.)
2. Choose a file format
3. Press the button **Download** in order to download all selected features from feature classes.
4. In the following GST Desktop asks for a location where downloaded content shall be written to.

## 5.2 Download Property Selection

You have the option to set which properties will be downloaded per feature. To do so, right click a feature in the **Global Selection**, select **Simplex Property Selection for Download** from the context menu and then select the properties in the **Simplex Property Selection For Download** dialog.

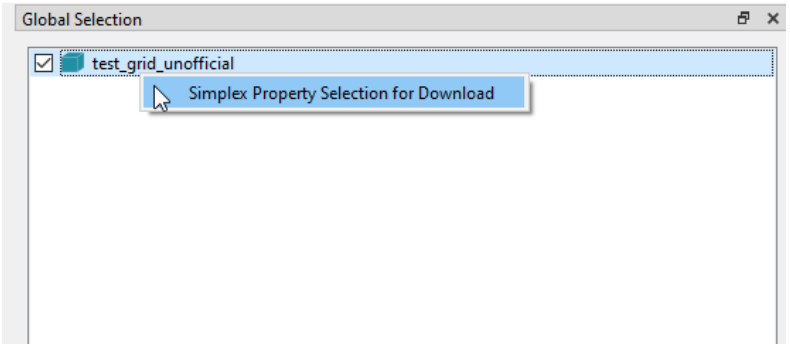



Figure 5.3 Simplex Property Selection For Download context menu

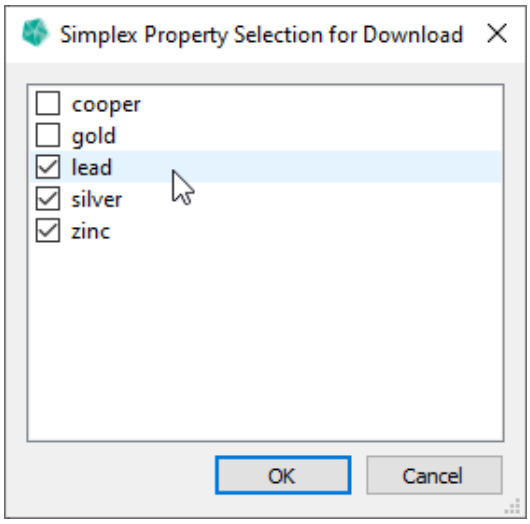



Figure 5.4
Simplex Property Selection For Download dialog

## 5.3 Download inside an Area

You can restrict the spatial extent of Features you want to download. GST supports an axis aligned Box or a Polygon.

To enter the required data, activate the **Inside Spatial Filter** option in Download Options. This opens the **Spatial Filter** pane in the **Query** dialog where you can set the extent and border size of the save area. If this option is set and a spatial filter is active, the extent defined there will be used for the download of features.

For the options of the **Spatial Filter** pane, see section Spatial Filter on page 108.

## 5.4 Locking – Download data for modification

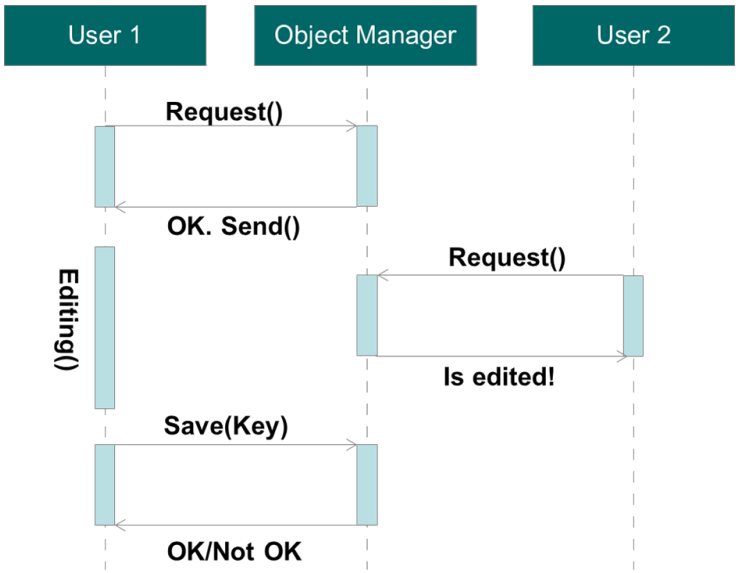



Figure 5.5
Changing data requires a lock key

If you want to modify data it is recommended to request the geometry together with a lock key (check out). Thus no other user can modify the data until you finished your modification and update the geometry later (check in).

1. To request a lock key for a download use the **Options** list in the **Selection** Widget (see green box).

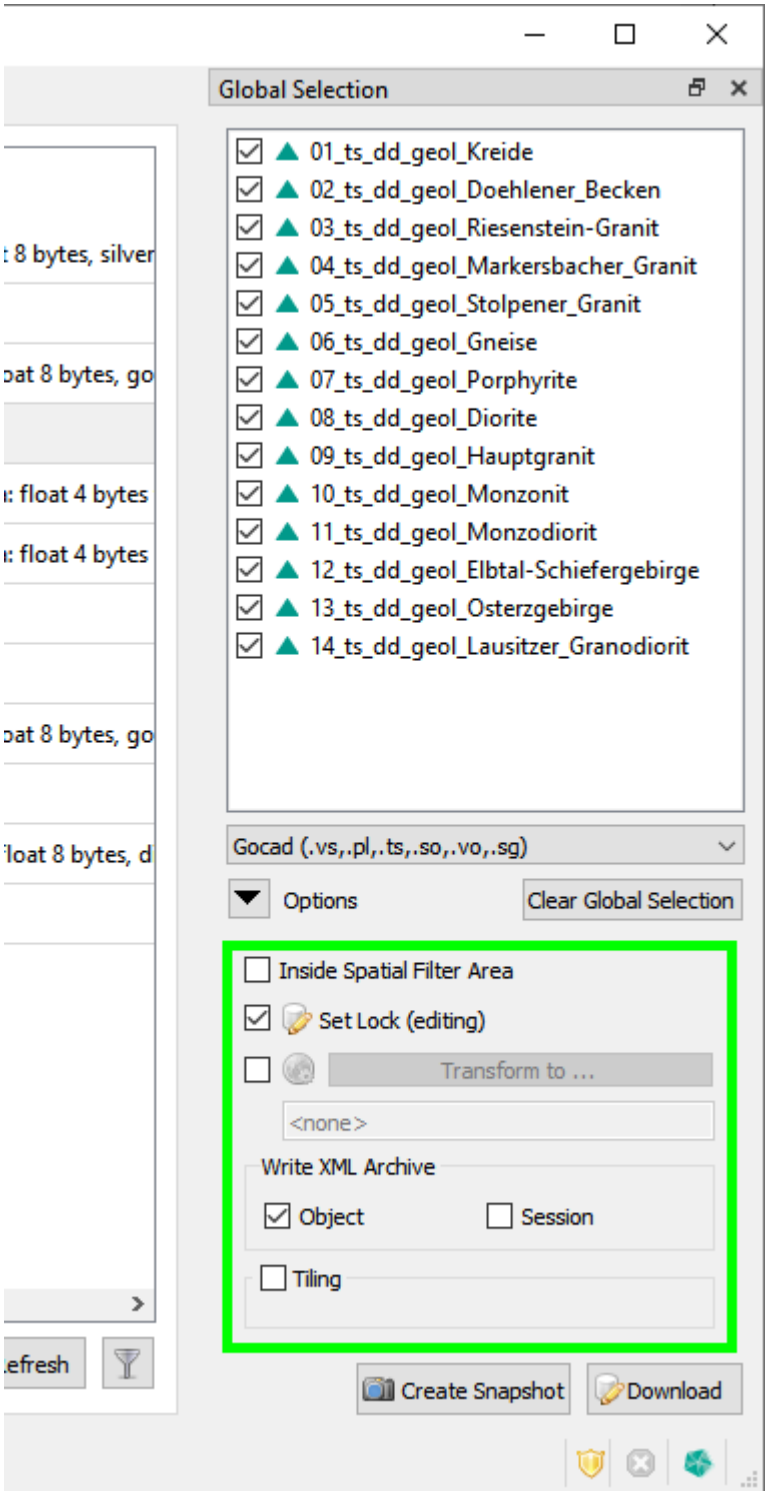



Figure 5.6
Activation of the checkbox "Set Lock (editing)"

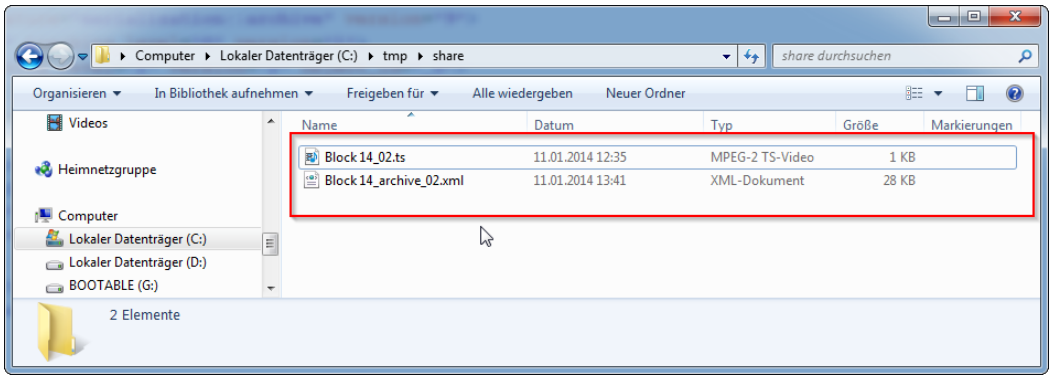
2. Activate the checkbox **Set Lock (editing)** in the menu. In order to verify the download type (with/without lock), the button icon changes to the database symbol with a pen if you are requesting a lock.

3. Choose a file format and press the **Download** button to start!

4. In the following GST Desktop asks for a location where downloaded content shall be written to.

## Downloaded files

Figure 5.7
Downloaded files




When navigating to the download folder you had selected for the download you will see your requested file (in this example Block14_02.ts) and an additional file with the xml extension. This file is the GST archive file. It includes diverse information about the download e.g. all associated files, object name, SRS, lock id etc. Object properties are also stored in order to reconstruct them if the specified file format does not support object properties. If you downloaded the geometry with a lock request the GST archive file stores the lock id, which will be needed if you are going to check in your data again.

You can open the xml file with any text editor.

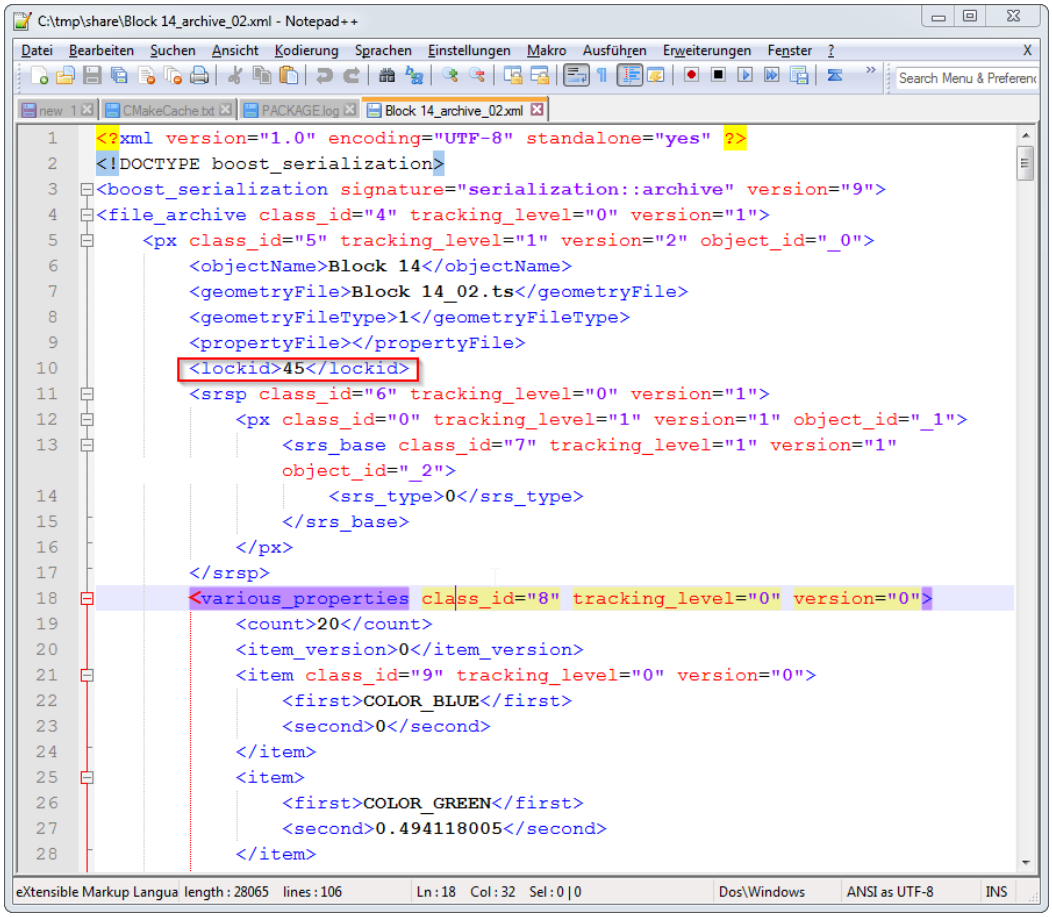
**Note**

**Session** vs. **Object** Archive

An **Object** Archive contains information about a single feature.

A **Session** Archives contains information from multiple features of one download operation. It represents a list of **Object** Archives.

Figure 5.8
Opened XML file




In this sample request we got the lock id 45.

In the XML tag **<various_properties>** all object properties and their values are stored.

You can modify the property values (text inside the tag <second>...</second>) if your modelling software does support you with a GUI for this. **But never change the structure of the GST archive file!** This may corrupts the serialization process and disable the possibility to check in your data again.

**Note**

When checking in data (upload data with GST Desktop) the object properties are being read from GST archive with a lower priority then the object file exported by your software. If a property value was not found in the object file, GST Desktop uses the value of the archive file.

## 5.5 Spatial Reference System Transformation

When downloading Features you have the option to set the Spatial Reference System (SRS henceforth) of the output. If you leave the **Transform to...** option disabled or set to **<none>**, all Features will be downloaded in their current SRS. If you enable this option and set a specific SRS, all downloaded Features will be transformed (if required) into that SRS.

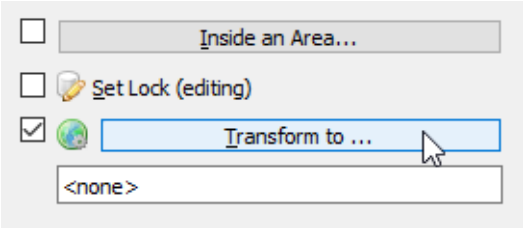



Figure 5.9
Set the output SRS for download

To select an output SRS, enable the **Transform to...** and click on the button. This will open a dialog with a list of available SRS.

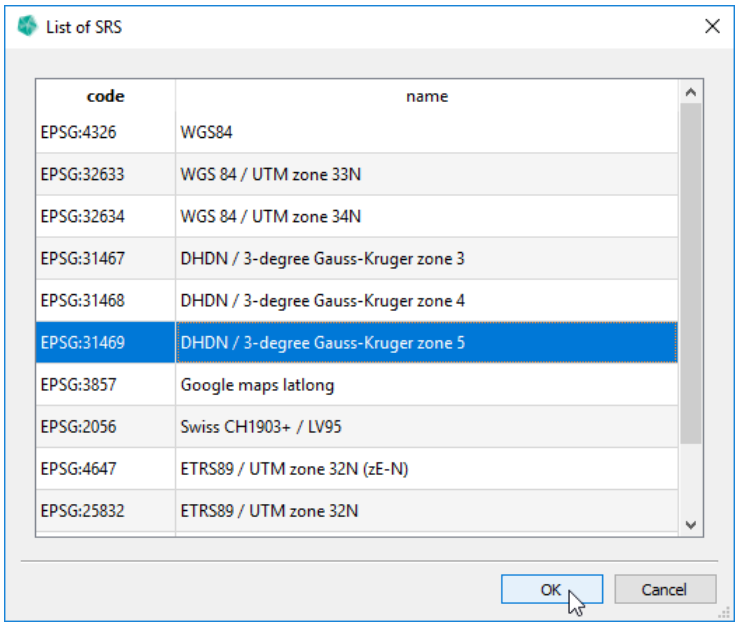



Figure 5.10
Select SRS Dialog

Select the desired SRS from the list by double-clicking the entry or by selecting the entry and confirming with **Ok**.

## 5.6 Tiling Download

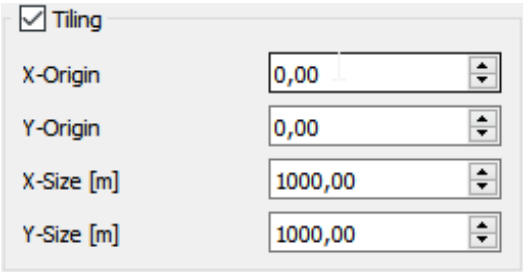



Figure 5.11
Download Options - Tiling

- **X-Origin** The x-coordinate of the origin.
- **Y-Origin** The y-coordinate of the origin.
- **X-Size** The size of a tile in the x-direction.
- **Y-Size** The size of a tile in the y-direction.

Enabling this options downloads the selected features divided into tiles as defined with the tiling settings.

The settings specify an infinite regular, axis aligned 2D-grid where each cell of this grid is a potential feature tile. Features are then split into one file per tile that has actually geometry data in it.

The feature tile files are enumerated with a consecutive tile number. The enumeration starts at 0 at the bottom left tile of the feature, then moves to up and then to the right, increasing by 1 for each non-empty tile. See **??** for an illustrative example of the enumeration.

[fig:tiled-feature-example]

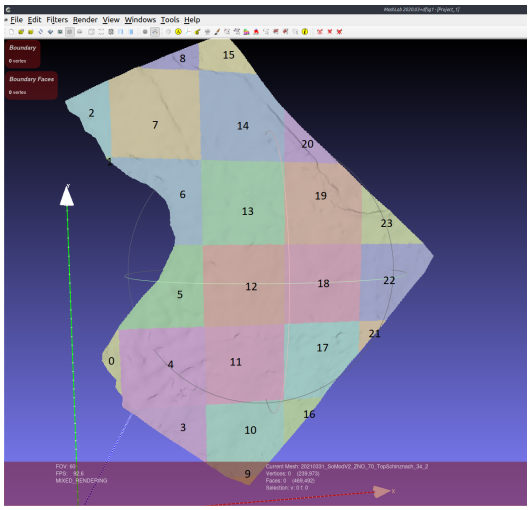



Figure 5.12
Example of a tiled features with tile numbering

# 6 Tab: Feature Selection - Unlocking

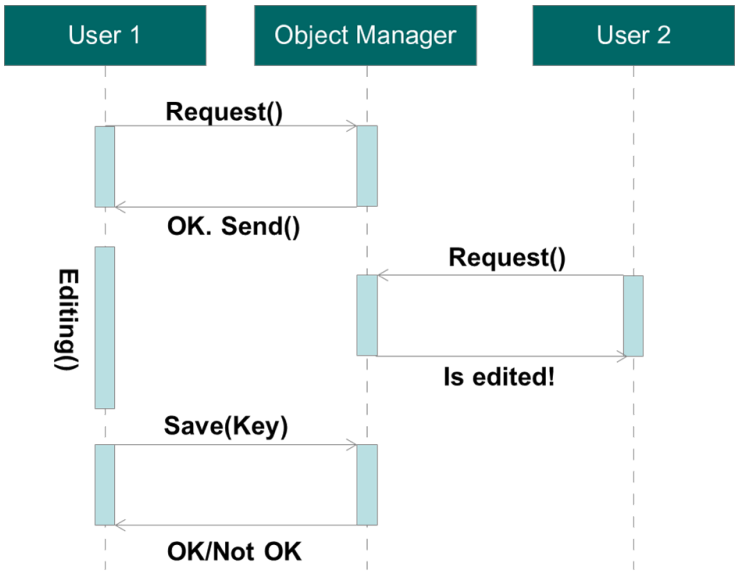



Figure 6.1
Changing data requires a lock key

When you are modifying data, the data is locked for other users. They can view the data, but are not allowed to request a lock, unless you unlock the data. Unlocking can be done:

* When updating features. (Normal update. Therefore select the GST archive when uploading the modified geometry.) . . . . . page 96
* Unlock a feature without updating them. (E.g. if you stopped modelling work and do not want to save.) . . . . . page 98
* Force to remove all locks from a geometry. (E.g. if the lock id is getting lost or the person who gains the lock has forgotten to check in) . . . . . page 102

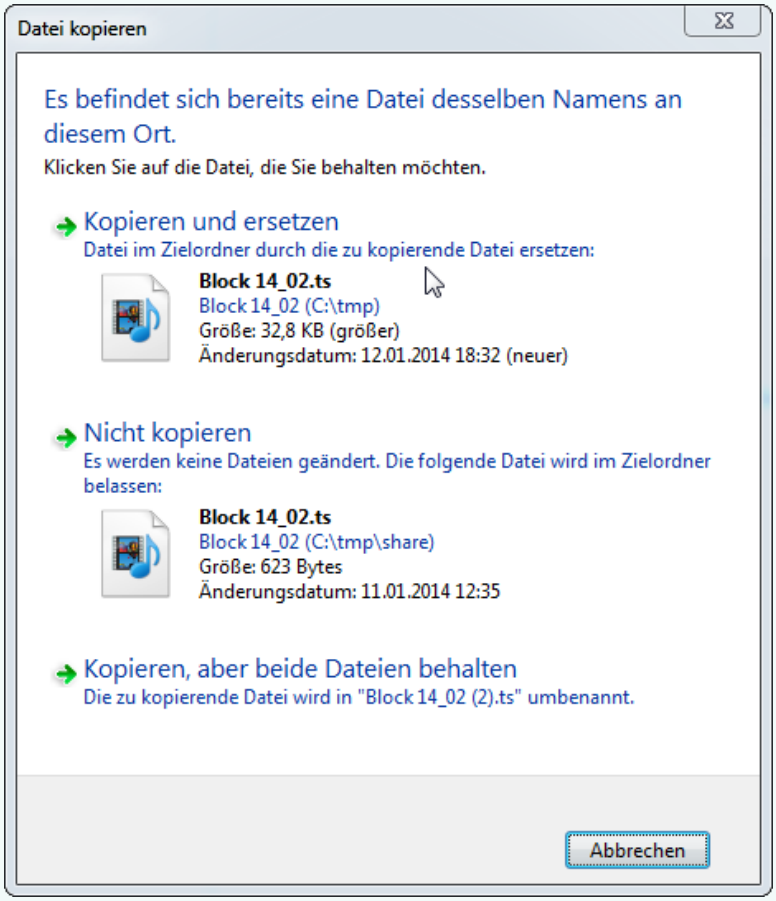
## 6.1 Unlock: Updating a Feature

If you have done your modelling work using a downloaded file, please export the model from your modelling environment. (Consult the manual of your modelling software on how to do this.)

1. Copy the file into the folder where you originally downloaded the file to. The GST archive file should be in this folder
2. Replace the old download object file.

**Note**

Alternatively you can copy the GST archive file to the location where you exported your updated model.




Take care that the new file has the same name as the old downloaded file. (Of course with new content).

3. Do a normal update process by selecting a target class and pressing the **Upload Feature to selection** button.

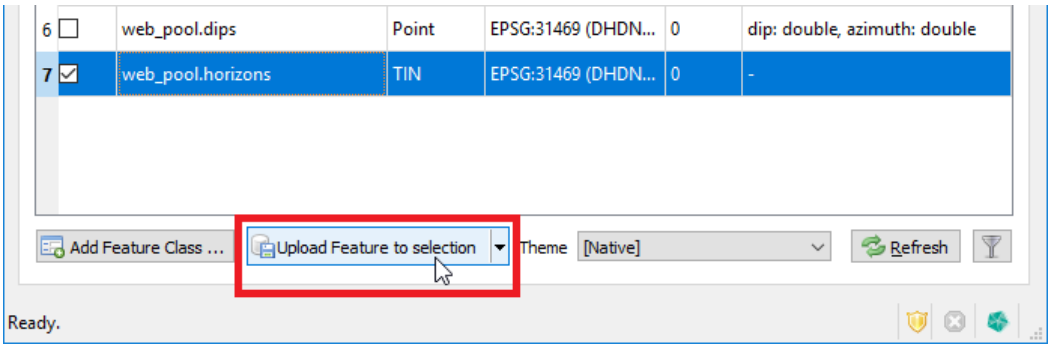



Figure 6.2
Pressing the Upload Feature to selection button

3. When selecting a file to upload select the GST archive file! [Remark to set the extension filter to **GST file archive (*.xml)**]

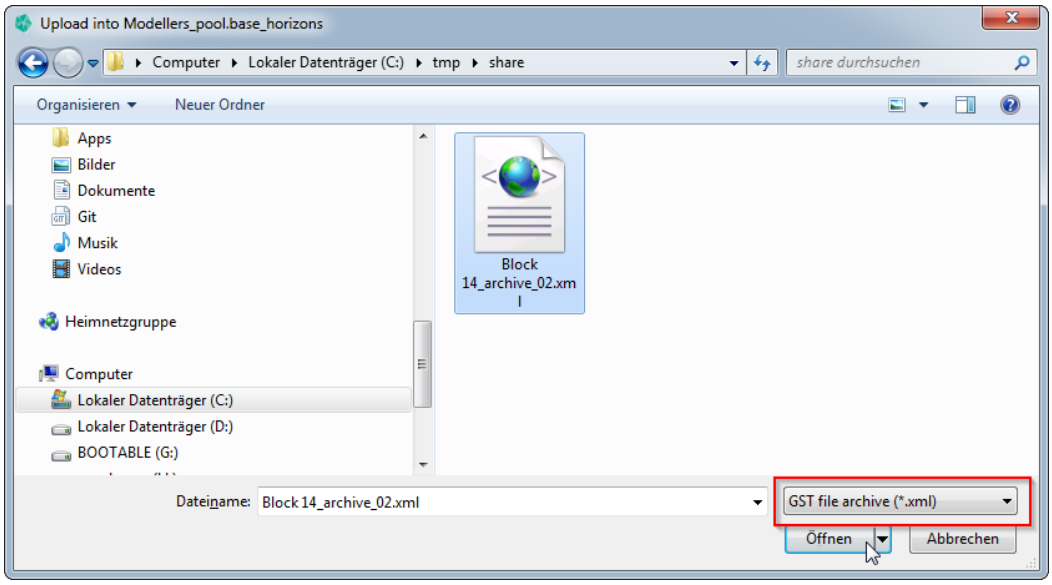



Figure 6.3
Setting extension filter to "GST file archive (*.xml) "

Continue as known with the upload process setting a commit message, property matching etc. [How to upload: see section Tab: Feature Selection - Uploading data on page 52]

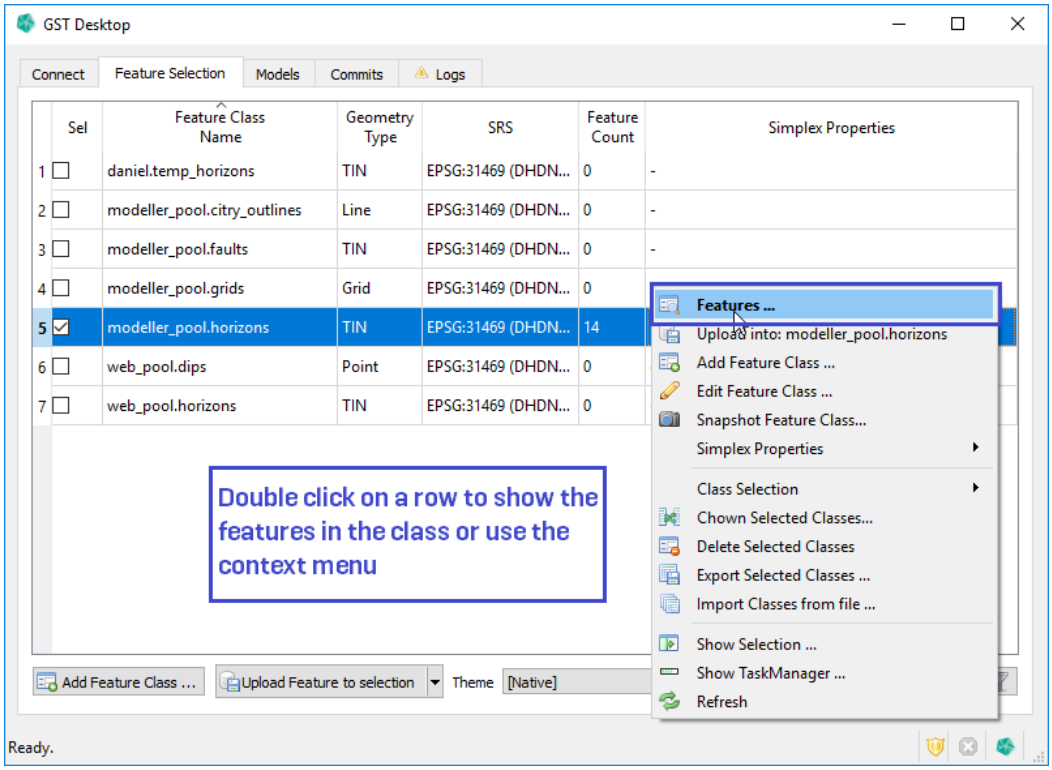
## 6.2 Unlock a Feature without Updating

If you lost your GST archive file, you have also lost your lock id. The lock id is required to unlock a geometry. Only an administrator can unlock a geometry without a key / without the GST archive file [This is shown later in this section.]

If you do not have lost your GST archive but want to unlock the geometry [e.g. you didn't have changed the geometry and it is time to go home for today ;-) ]:

1. Browse to the feature class for the geometry to unlock.
2. Therefore double click on a row in the Tab **Feature Selection** or use the context menu item **Features ...**].

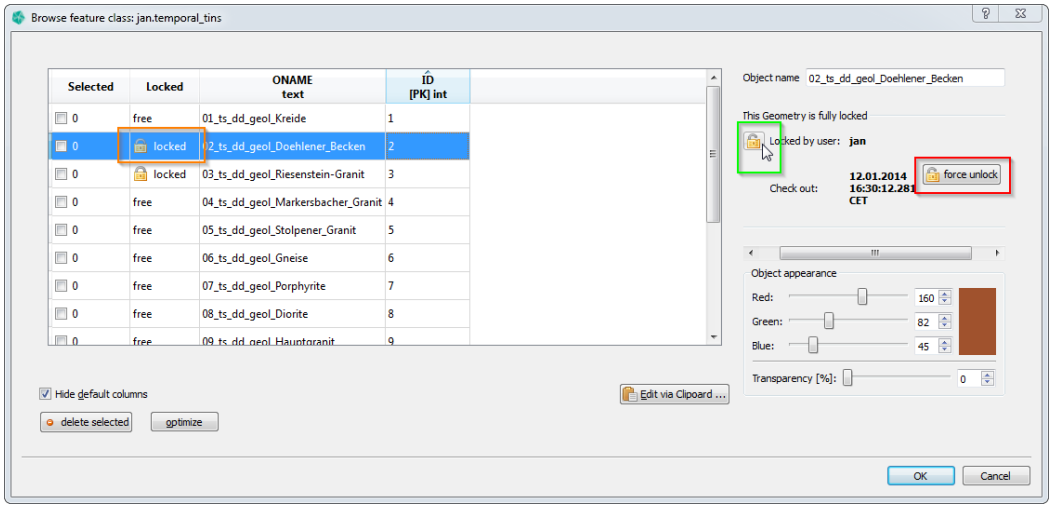
Figure 6.4
Showing the features in the class




In the list of the features for the current class the locked features are indicated by a lock symbol (orange). If you select a feature additional information about the lock are displayed on the right, e.g.

* What kind of lock is it?
* Who has locked it?
* When was it locked?

Figure 6.5
Unlocking a feature

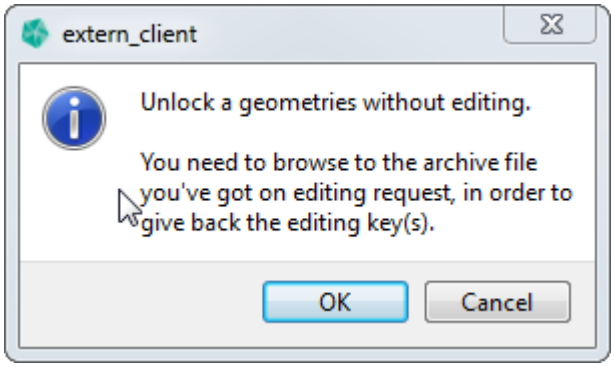


For unlocking you have two possibilities:

1. Unlock with the archive file [green]
2. Force the unlock [red] – only an administrator can do this

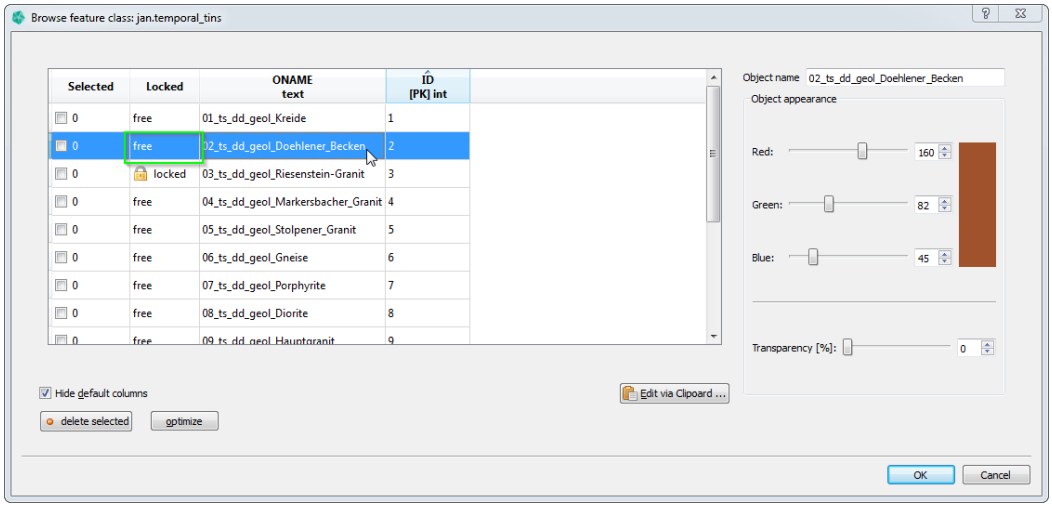
If you click on the lock symbol in front of your user name [green], you are asked to browse to the GST archive file which you have obtained when locking the geometry [see section Locking – Download data for modification on page 89].

Figure 6.6
Unlocking a Feature dialog



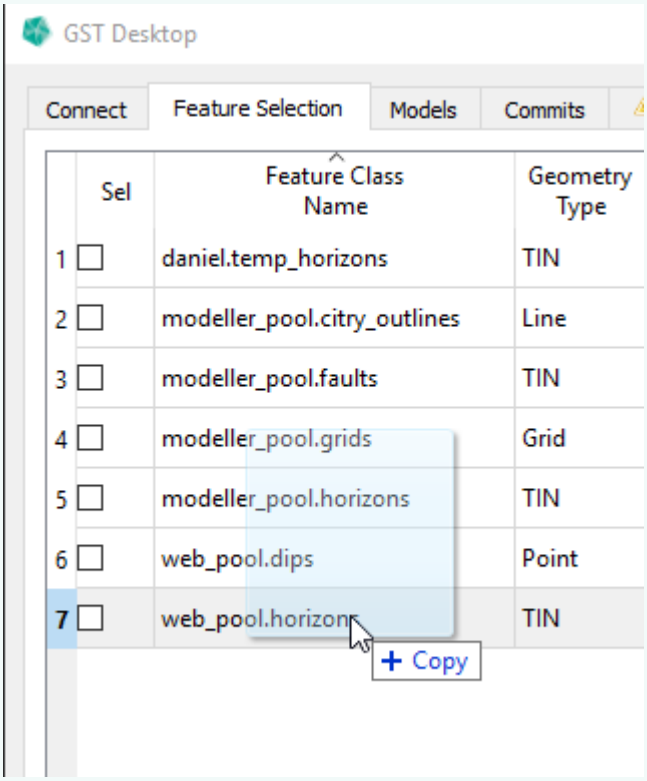

When you have selected the archive file and the lock id is valid for this lock, the geometry will be unlocked/is free for editing by others.

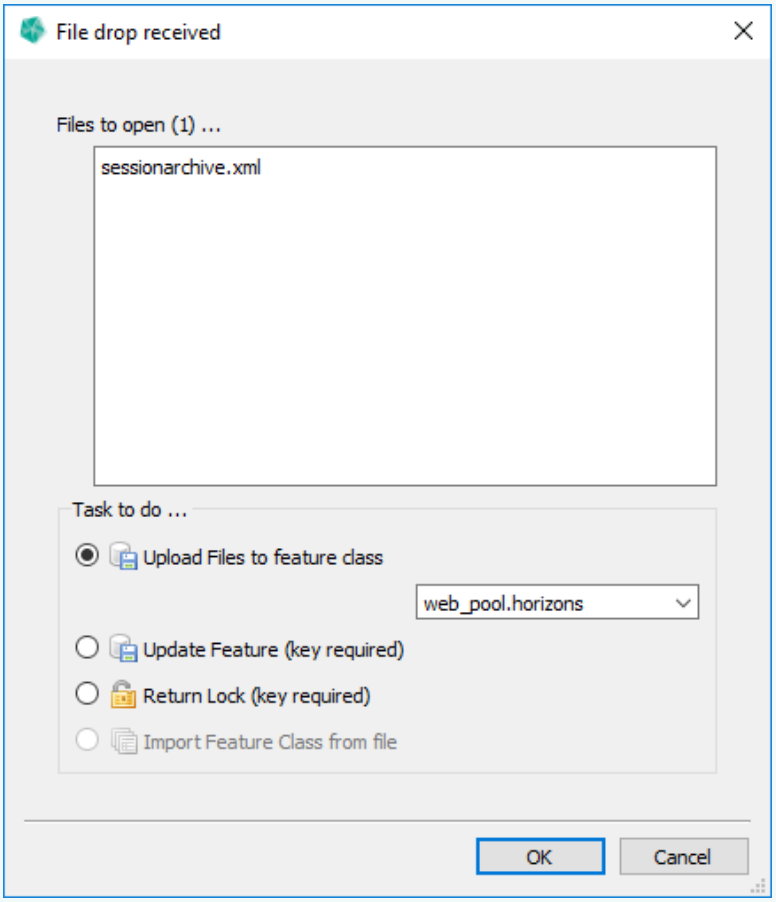
Figure 6.7
Unlocked feature



## Note

You can also return a lock by drag'n'drop the GST archive file from your file browser into GST Desktop.



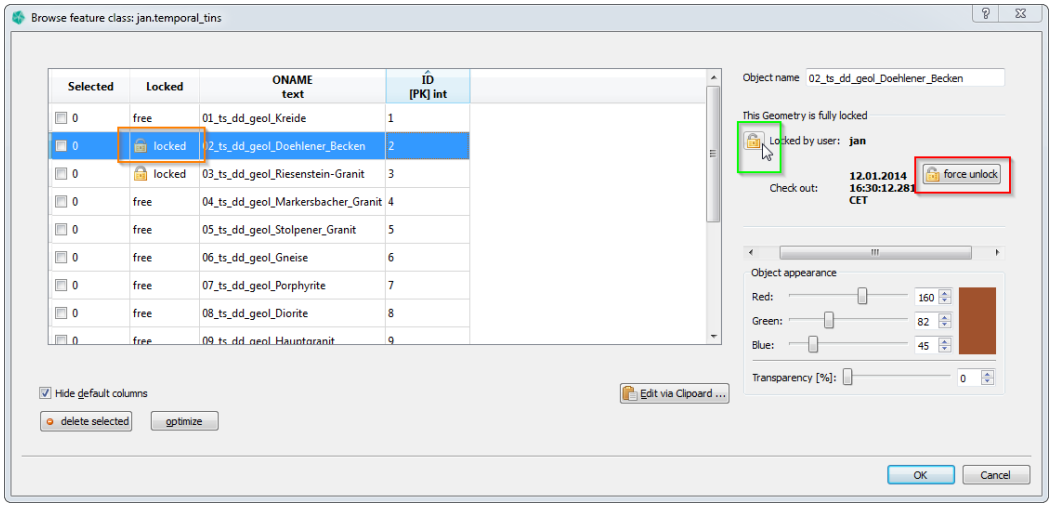



## 6.3 Unlock a Feature without a GST archive file

If you have lost the archive file or the user who has locked it is not present (and you are sure he is not working on the locked geometry) you can unlock the geometry. For this you will need the account details of a privileged user (administrator account).

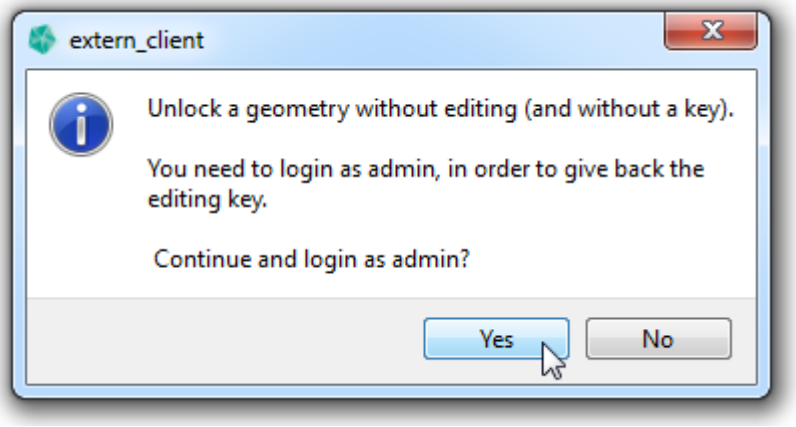
1. Browse to the Feature class where the geometry which you want to unlock resides.

Figure 6.8
Browsing to the feature class



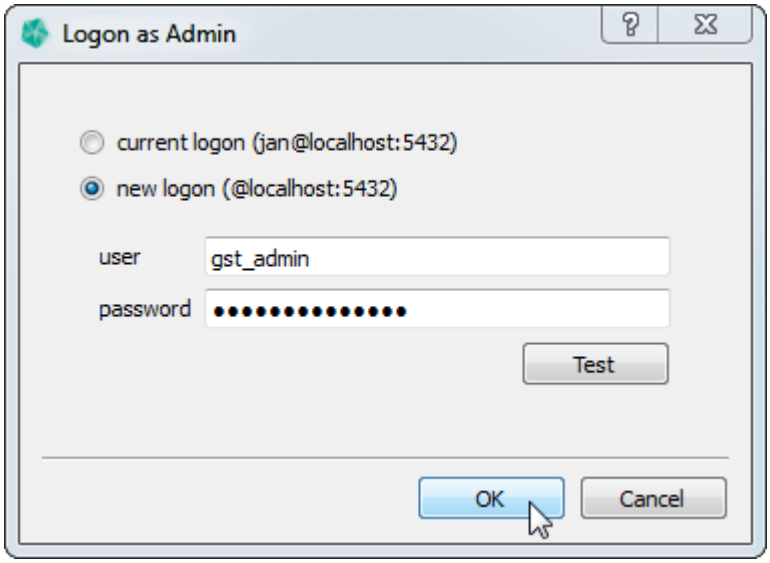

2. Click on the force unlock button (red)

Figure 6.9
Confirmation dialog



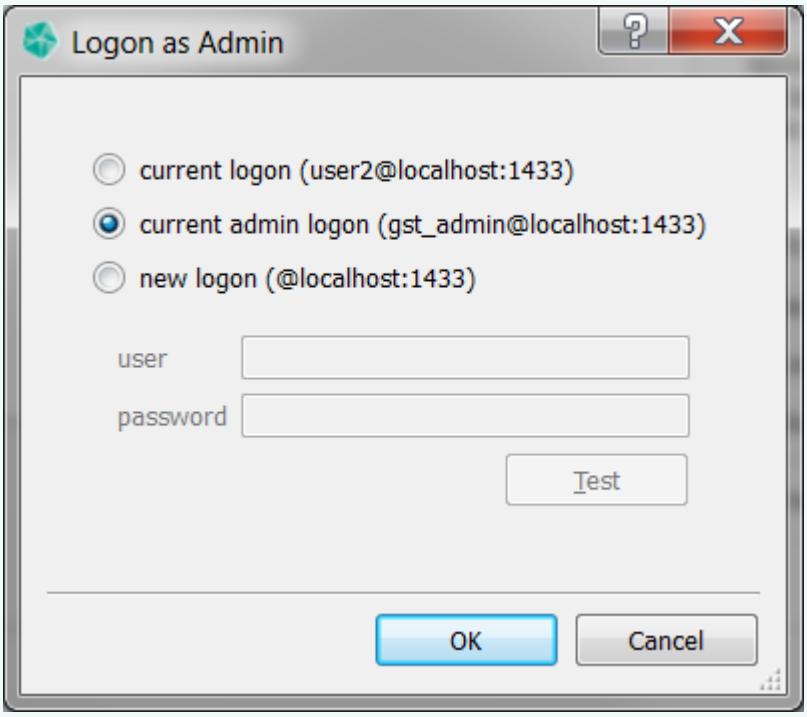

3. Enter the administrator account details. (If you do not know this information, tell your project administrator about your plan. He may help you.)

Figure 6.10
Logon as admin




**Note**

If you already are logged on as an administrator in this session, you can use the existing admin account to force unlock:

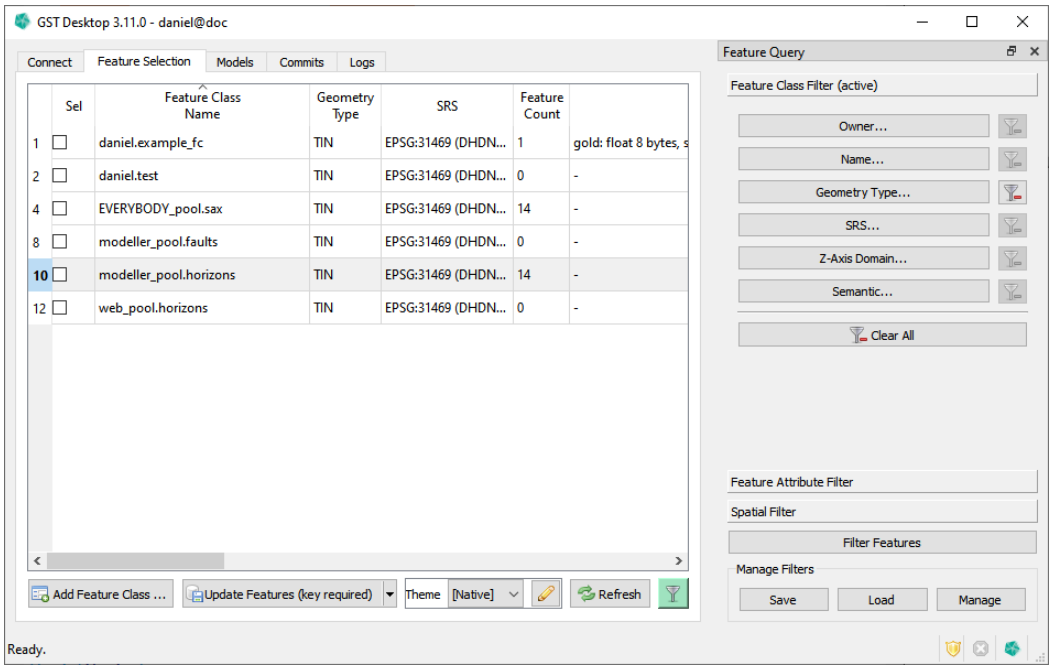



You are done and the geometry is unlocked.

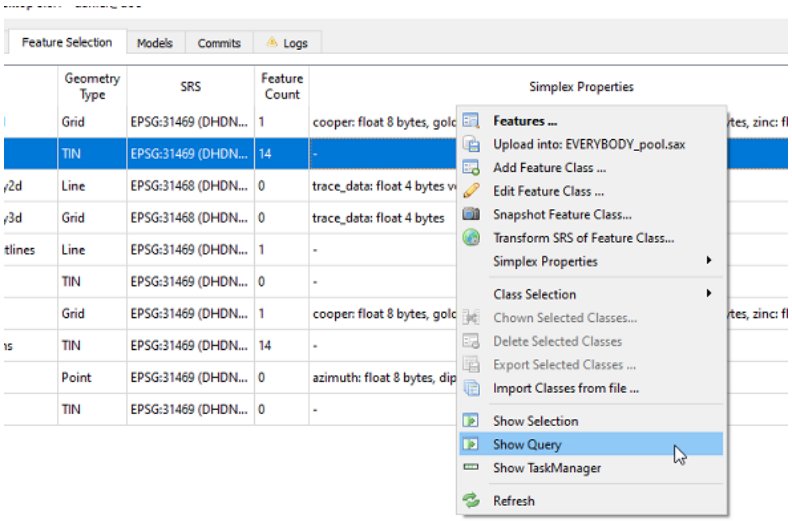
# 7 Query Dialog

Query all available features with different kind of filters. The resulting feature selection can be added to the **Global Selection**. Filters can be saved for later use and shared via the GST user and group system.

Figure 7.1
Query dialog




This dialog can be opened with the **Show Query** context menu entry in the **Feature Selection** tab.




Currently there are three different filters available.

* Feature Class Filter . . . . . page 106
* Feature Attribute Filter . . . . . page 107
* Spatial Filter . . . . . page 108

Pressing **Filter Features** will apply all active filters to the features in the **Feature Selection**. The filters are applied in order, starting with the **Feature Class Filter**, then going to the **Feature Attribute Filter** and finally the **Spatial Filter**. Features that are accepted by all filters will then be added to the **Global Selection**.

**Note**

An **(active)** in the tab title indicates the active filters.

For more information about loading, saving and managing filters, see Manage on page 112.

## 7.1 Feature Class Filter

Settings made here will filter the list of Feature Classes shown in the **Feature Selection** tab and subsequent filters will only look at Features from active Feature Classes.

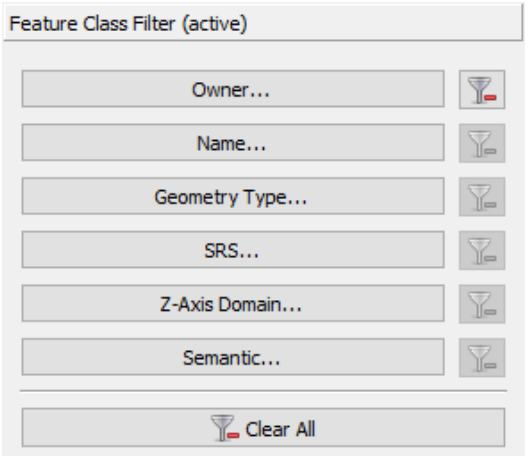



Figure 7.2
Feature Class Filter pane

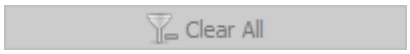
### Available Filters

Show only Feature Classes that...

* **Owner...** belong to the selected Owners.
* **Name...** match the specified Name query.
* **Geometry Type...** have the selected Geometry Types.
* **SRS...** have the selected SRS.
* **Z-Axis Domain...** have the selected Z-Axis Domain.
* **Semantic...** have the selected Semantic.

### Filter Dialog buttons

* Indicates this filter is active. Click to clear this filter.
* Indicates this filter is inactive.
*

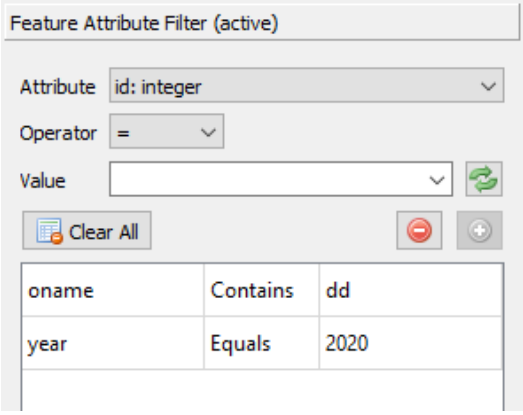
Indicates at least one filter is active. Click to clear all filters.
* 

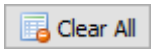
Indicates no filter is active.

## 7.2 Feature Attribute Filter

Filter Features by their attributes. The rules are **AND** connected, this means a Feature is only accepted if it is so by all rules. Note: A Feature without the selected rule attribute is always rejected and thus filtered out.

Figure 7.3
Feature Attribute Filter pane




* **Attribute** Select the attribute to filter by. This contains the attributes of all active Feature Classes.
* **Operator** Select the operator to use.
* **Value** Input the value to use.
* Load available values for the selected attribute from the database.
*  Remove all rules from the list and set the filter as inactive.
* Remove the highlighted rules from the list. Note: multi-selection is active, you can use Ctrl and Shift to select multiple items.
* Add rule from the given input to the list. Note: button is inactive, if input is incomplete.

**Note**

The available attributes and values are affected by the **Feature Class Filter**. Only the attributes and values of the currently active Feature Classes will be shown.

## 7.3 Spatial Filter

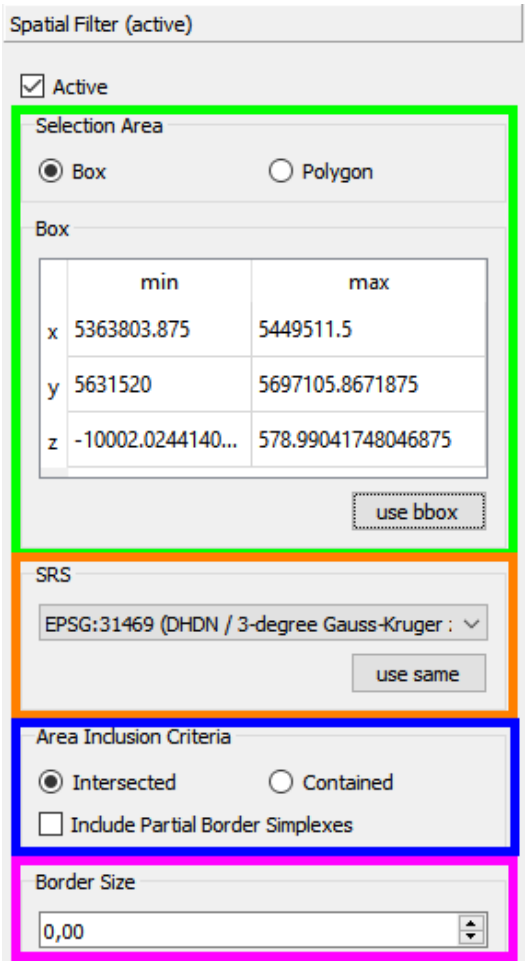
Filter Features by a spatial extent. Currently an axis-aligned Box or a Polygon is available as spatial extent.

If this filter is active, only Features intersected by or contained in the spatial extent will be accepted.

**Note**

Activate or deactivate the filter with ☑ Active.

Figure 7.4
Spatial Filter pane





* Selection Area (green box) . . . . . page 109
* SRS (orange box) . . . . . page 110
* Load Threshold and Load Mode (blue box) . . . . . page 111
* Border Size (purple box) . . . . . page 111

## Selection Area

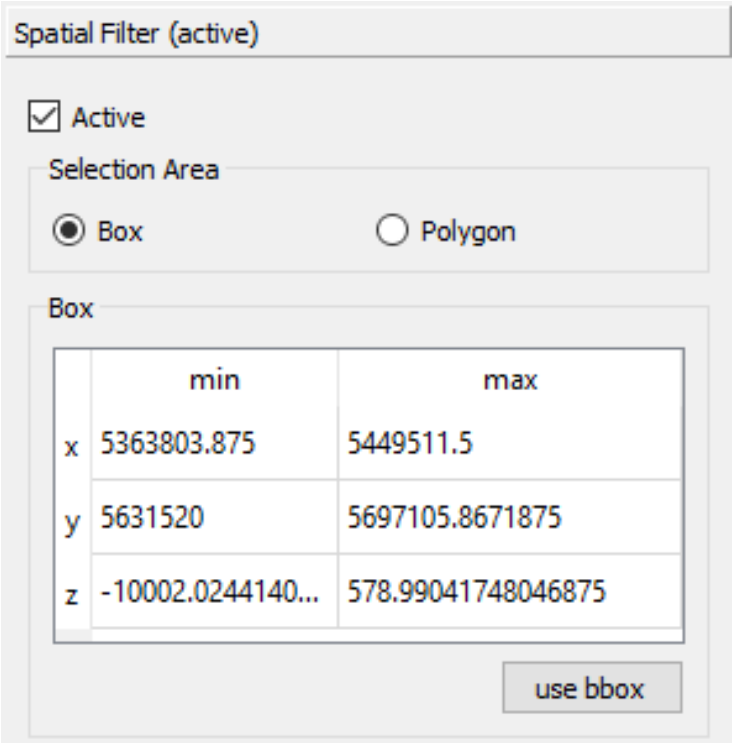
The Selection Area can be defined as axis aligned Box or as Polygon.

### Box

A Box can be specified by entering the minimum and maximum coordinate of the x, y and z axis of the Box.

The use bbox button will calculate the Box of the features in the Global Selection.

Figure 7.5
Selection Area - Box




### Polygon

A Polygon can be specified from a file or from an existing Line Feature in GST.

* From File. Use the Browse... button to select the file. GST currently supports the file formats Gocad pline (*.pl) and ESRI Shapefile (*.shp).
* From Feature. Select the desired Line Feature from the combo box.
* Load. This option is only active when a saved filter was loaded that uses a polygon selection area. In this case the polygon is loaded from storage and not from a file or an existing feature.

Figure 7.6
Selection Area - Polygon from File

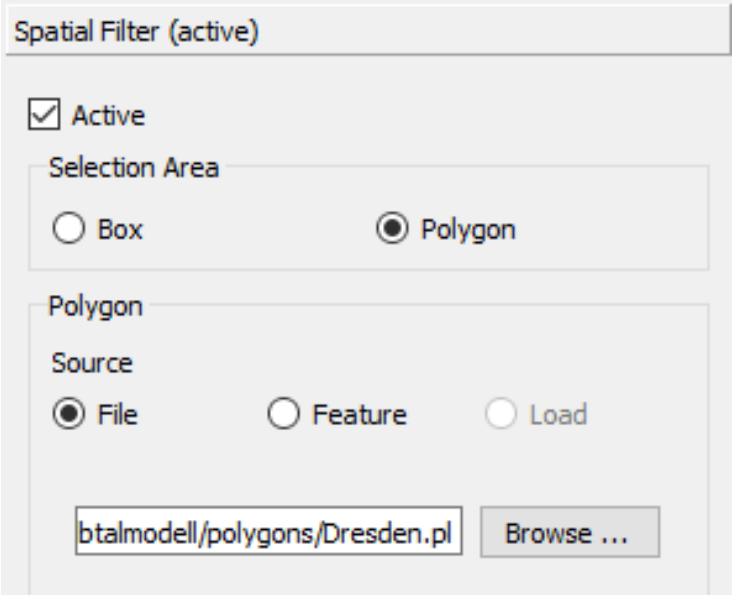
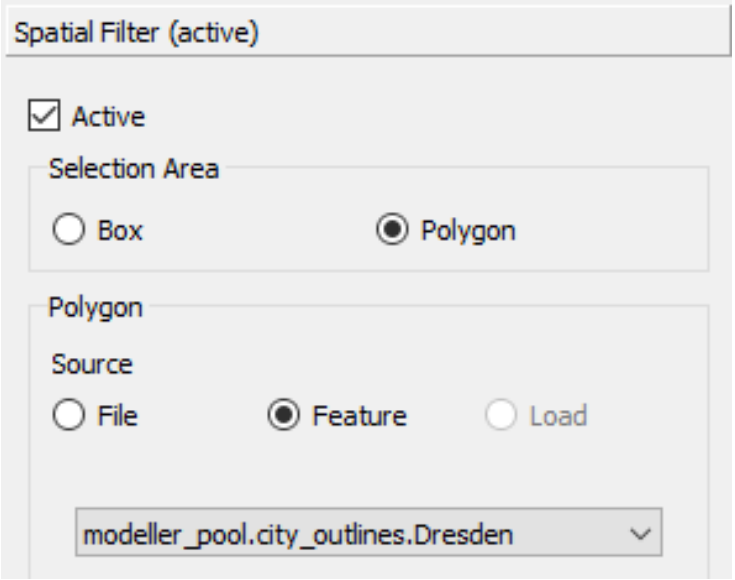


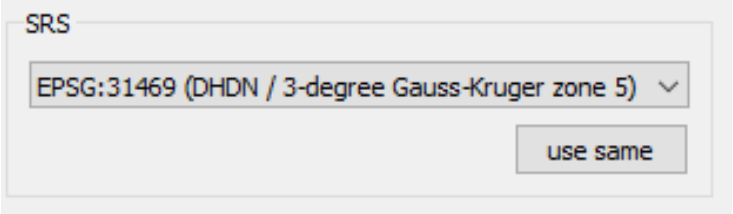

Figure 7.7
Selection Area - Polygon from Feature




## SRS

Here you need to specify the SRS of the Selection Area. The **use same** button will use the SRS of the features in the **Global Selection**.

Figure 7.8
Selection Area - SRS



## Area Inclusion Criteria

This option lets you specify when a Feature is accepted by the Selection Area.

* **Intersected** Only Features that intersect with the Selection Area will be accepted.
* **Contained** Only Features completely inside the Selection Area will be accepted.
* **Include Partial Border Simplexes** Sets whether partial border simplexes should be included. A border simplex is partial, if at least one but not all of its vertices are inside the selection area.

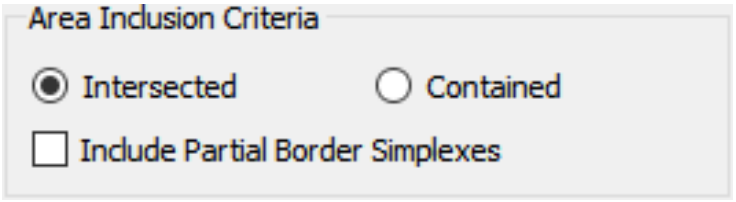



Figure 7.9 Selection Area - Area Inclusion Criteria

## Border Size

Here you can specify the safe area border size. This is mostly useful when using a check-out for modification inside an area. This option is activated if you use **Set Lock** with **Inside Spatial Filter** also active.

See Locking – Download data for modification on page 89 for more information.

Figure 7.10 Selection Area - Border Size

## 7.4 Manage

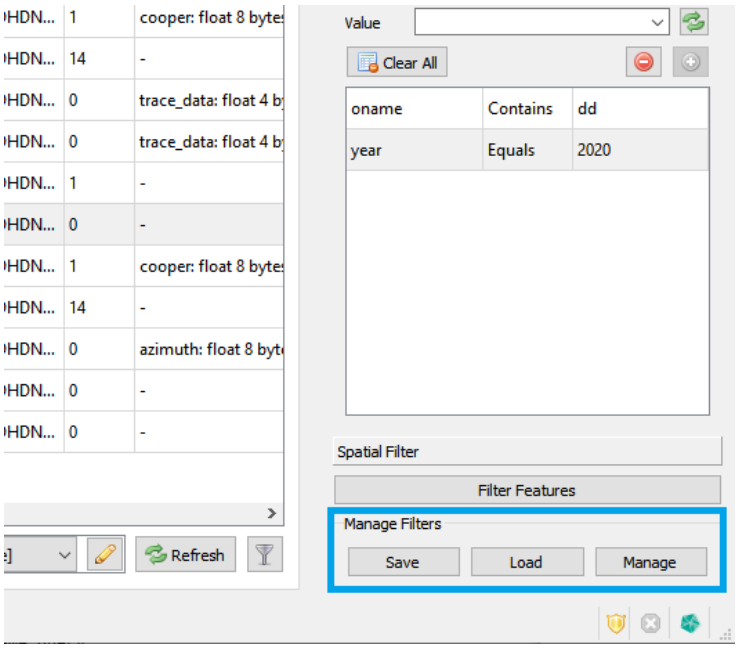



Figure 7.11
Selection Area - SRS

### Save

**Save** lets you save the current filter settings. It opens a dialog to enter the owner and name of the filter.

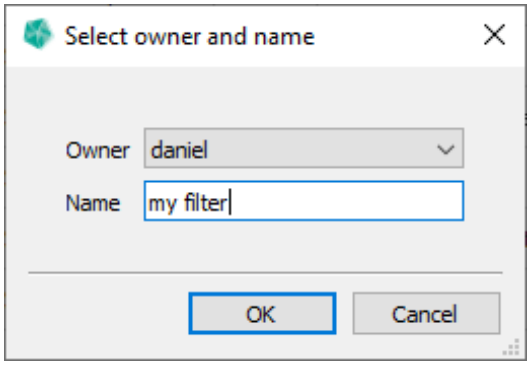
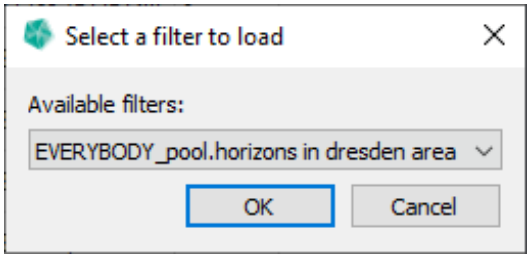



Figure 7.12
Selection Area - SRS

### Load

**Save** lets you load one of the available filters.

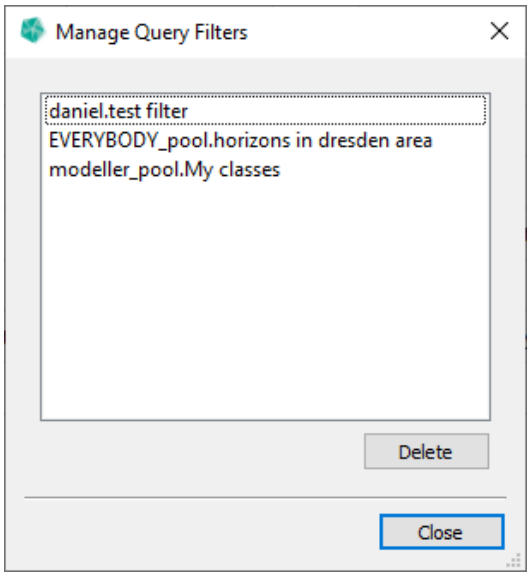
Figure 7.13
Selection Area - SRS




### Manage

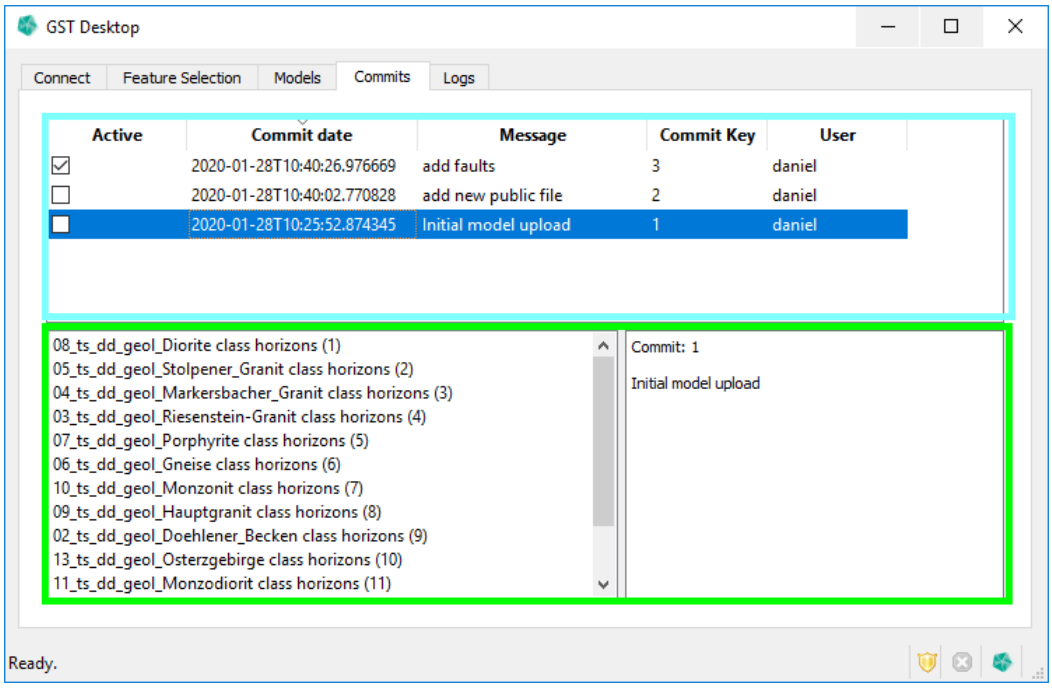
**Manage** opens a list of available filters and lets you **Delete** the highlighted ones.

Figure 7.14
Selection Area - SRS



# 8 Tab: Commits

Figure 8.1
Tab "Commits"




The Tab **Commits** lists the progress of uploads and updates of geometries. The Tab is divided into commit list [turquoise] and the commit details below [green].

The commit list shows the following columns:

* **Active**: Indicating the current active commit. When you download data in Tab **Feature Selection**, data of the active commit is downloaded.
* **Commit date**: The commit date column shows the timestamp the commit was done.
* **Message**: The first line of the message is shown here.
* **Commit Key**: The commit key is a unique reference for the commit.
* **User**: Shows who has made the commit.

When selecting a commit in the commit list you get the commit details in the lower part of the window.

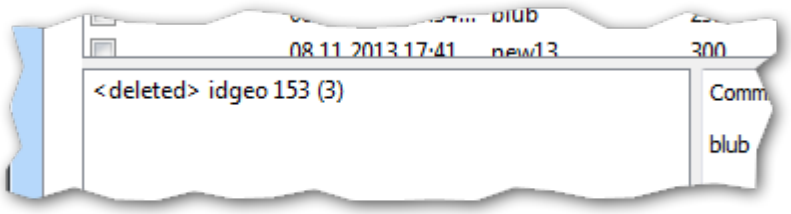
* On the left side the geometries affected by the commit are listed in the following form

  <feature name> class <feature class name> [<geometry version>]

* On the right side the commit message is displayed

If a geometry gets deleted it gets deleted from commit history too and cannot be restored. In such a case the geometry in the commit details is listed as follows:

Figure 8.2
Geometry in commit details



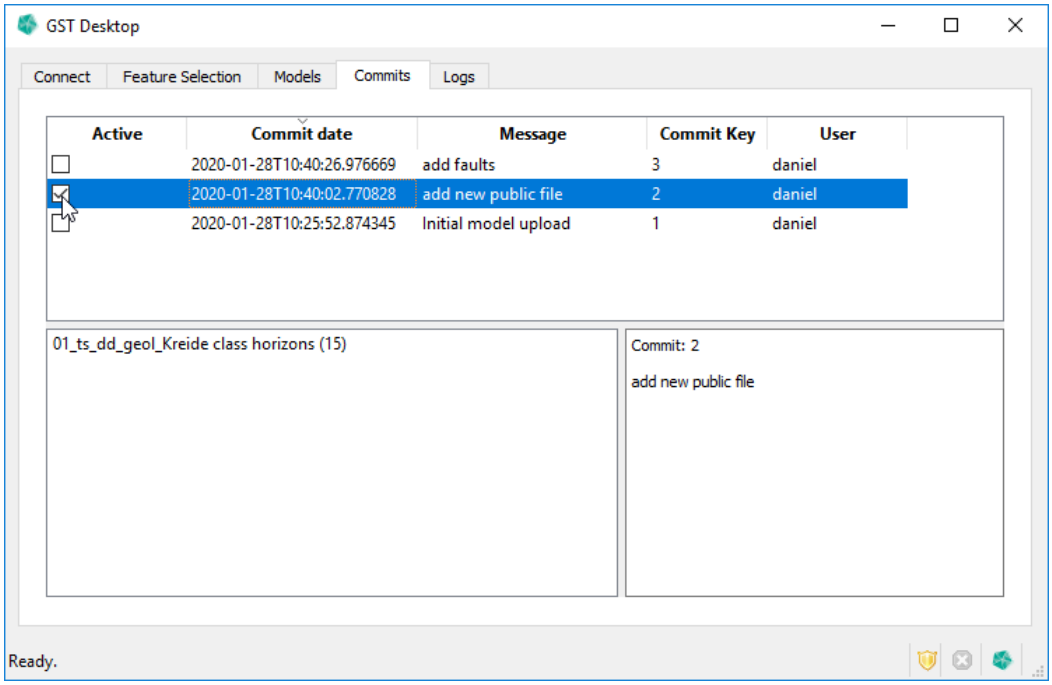

This indicates a geometry that was involved in the commit, but does not exist in the current instance of GST Storage. Its latest version was version 3.

## 8.1 Active Commit

At default the current active commit is always the latest commit. Thus if you download data you always get the latest version of your data.

In order to step back in history, e.g. if you want to reproduce an older state of your data, you need to change the active commit to the timestamp you want to reproduce. Therefore double click on the commit.

Figure 8.3
Double Click to change the active commit




To download the data in the active commit, continue downloading in Tab: Feature Selection.

# 9 Tab: Models (Model Management)

The **Model Management** can be found under the **Models** tab.

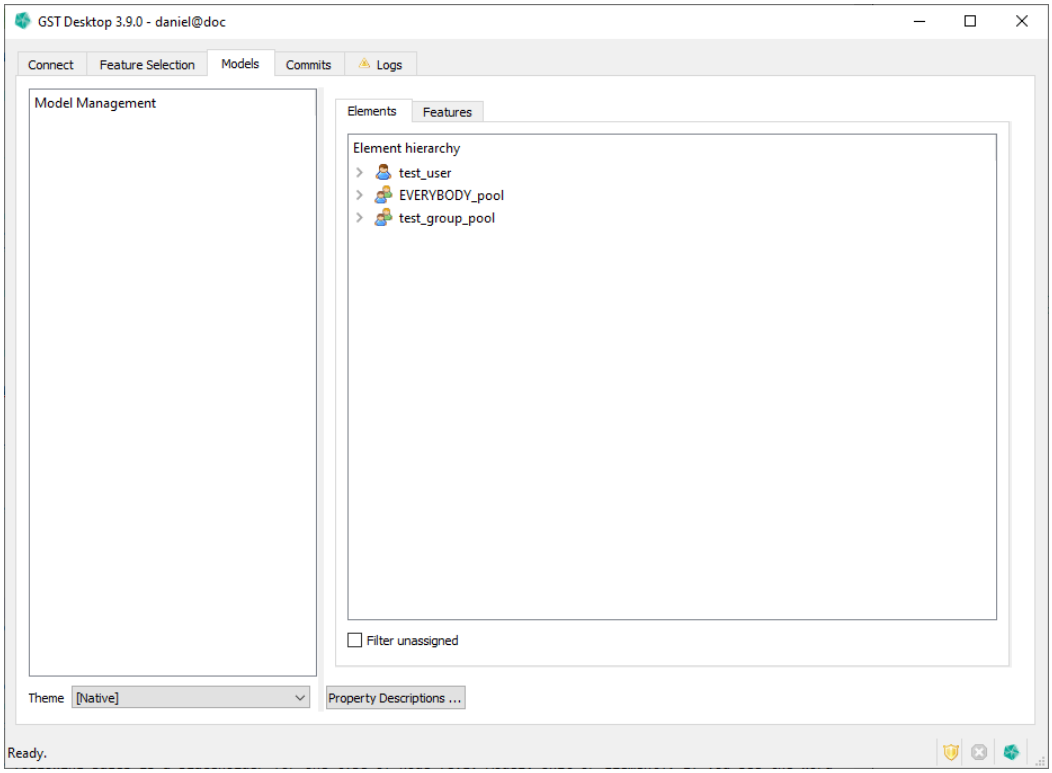
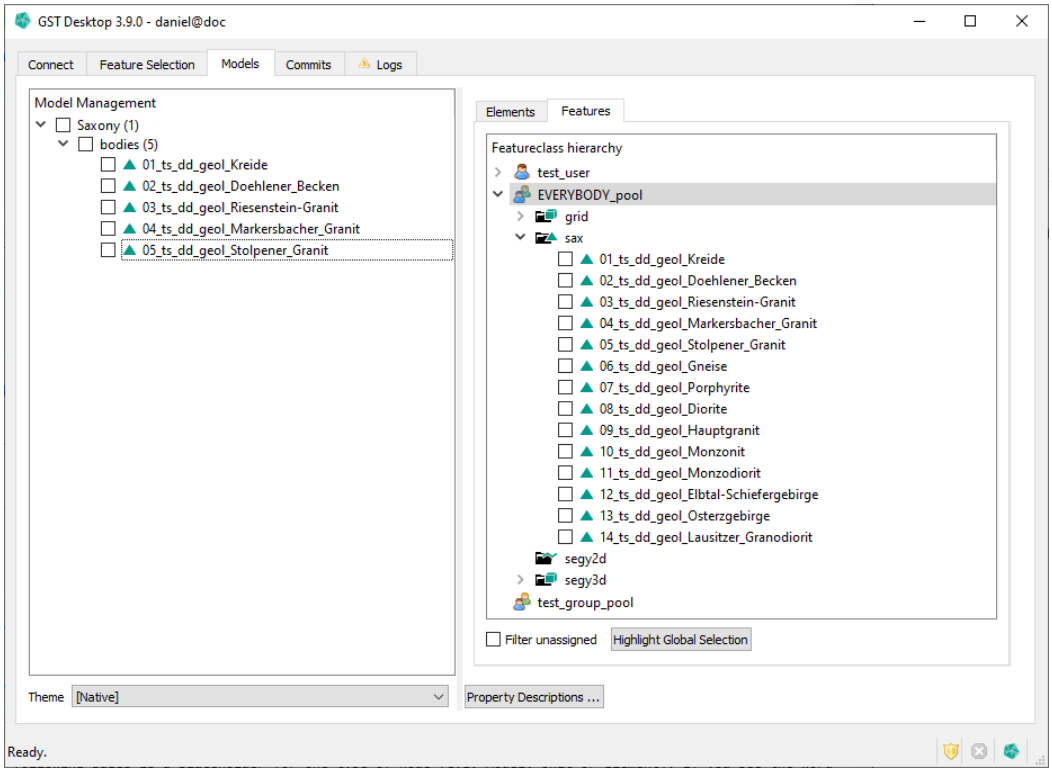



Figure 9.1
"Models" tab

The above picture shows what the Model Management dialog looks like in an empty state.

Model Management (MoMa abbreviated) is a way to arrange and view your features in a file-structure-like tree view. A MoMa tree consists of Elements and Features. Features can be linked to any level of the tree, but for the top level (you need to have at least one Element to link a Feature to).

Figure 9.2
Populated Model Maganegement tree




Here you can see a populated MoMa tree, just so you get an idea what it could look like.

A short overview of MoMa features (explained in more detail below):

* Arrange your features in predefined structures (e.g. you have three levels, models, units and elements. Models could be something like model of Saxony. Units could be some subparts of the model like a specific region let's say the city of Freiberg. Finally elements could be more modelling specific parts like faults or mineshafts. This is just an example, you can define this on your own.
* The MoMa tree conforms to the GST user system. Meaning users can only see that part of the tree they have created themselves or was published to a group for which they have access to.
* Download all features linked in a subtree.

**Some definitions**

1. If we talk about child and parent node, we mean that a child is directly below the parent in the context of the tree hierarchy. A child also can be a parent in another context. E.g. Unit1 is the child of Model1 in the above picture, but it is at the same time the parent of Element1.
2. A subtree consists of a part of the tree, starting with a parent and all of its children and grandchildren. The subtree starting with Element2 would be: Element2 and test_freature1-2.

## 9.1 Explanation of the Models Tab

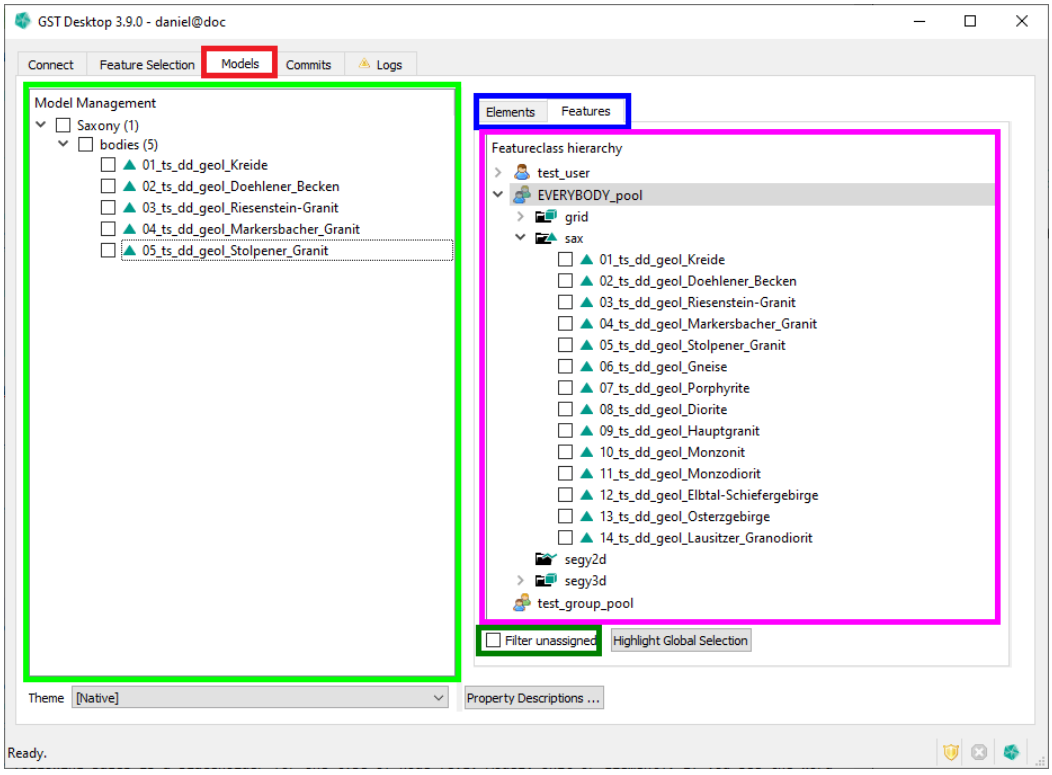



Figure 9.3
Explanation of the Models Tab

* Models Tab: Get to MoMa by selecting the Models tab.
* Tree View: The left pane will show the MoMa tree.
* Node View: The right pane will show the different elements or features that can be put into the tree. The elements are divided by their owning user and/or group.

  The features are also divided by their owning user and/or group and further by their feature class. Symbols: User Group
* Models Tab Bar: With the tab bar above the Node View you can select the elements

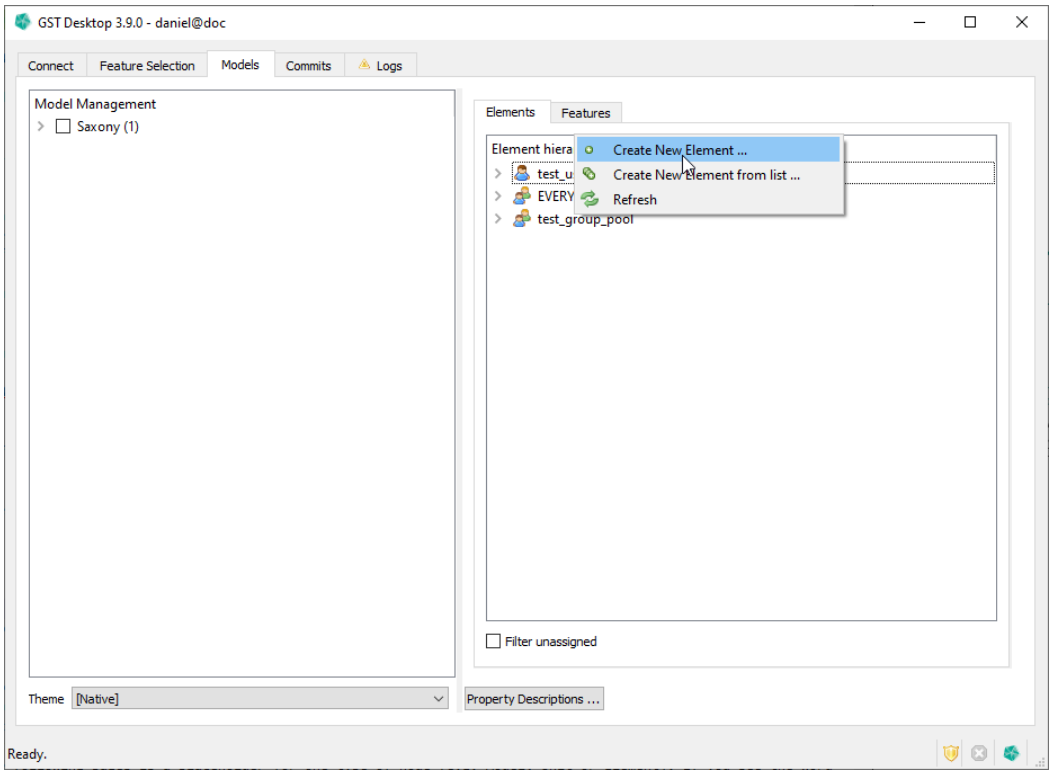
shown in the Node View. The second tab will show the features, as seen in the picture.

* **Filter unassigned** Checkbox: If you activate the checkbox, the Node View will only show those elements or features that are not yet assigned in the tree.

## 9.2 Element Creation, Deletion and Assignment

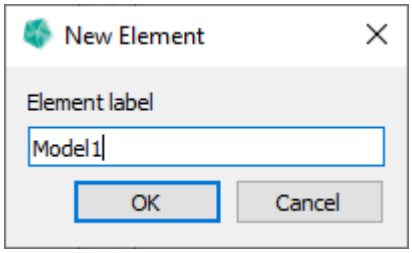
### Create a new MoMa Tree Element

Figure 9.4
Create a new MoMa Tree Element




1. Select the element tab from the Models Tab Bar.
2. Decide if the new element should be private to your user or public to one of the groups you user is in.
3. Right click one user or group and click on the **Create New Element** entry from the context menu.

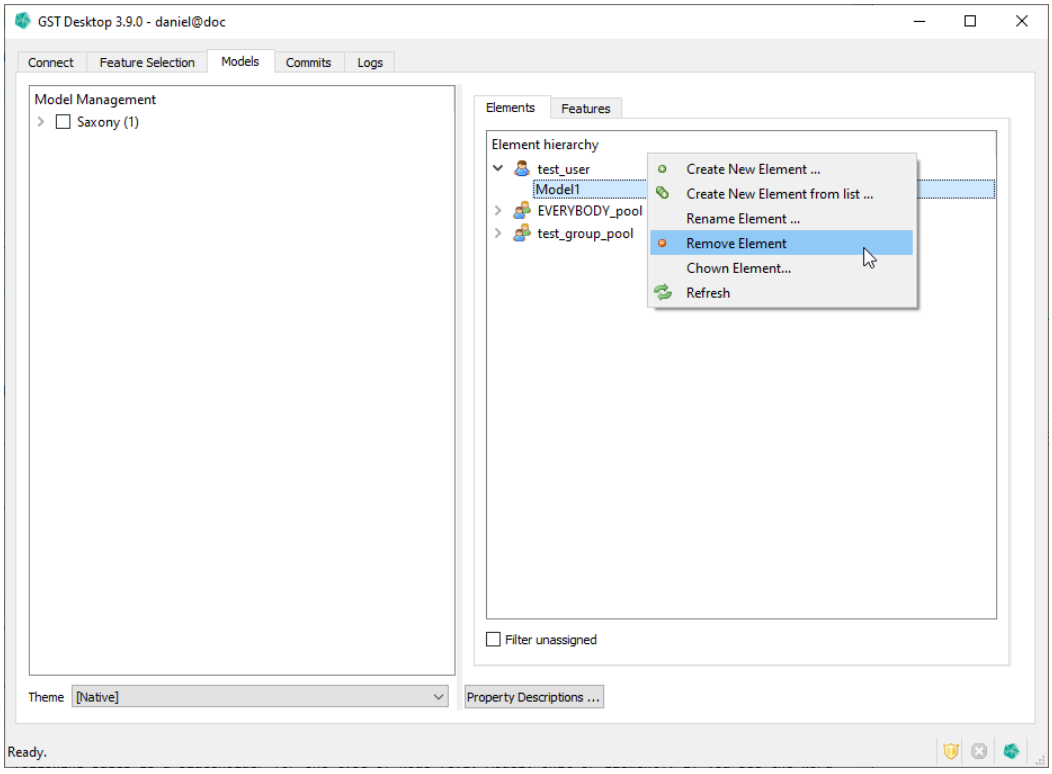
Figure 9.5
"New Element"
Dialog




4. In the **New Element** Dialog type in the name of the new element.
5. Press
   a) **Ok** to confirm the Element creation.
   b) **Cancel** to abort the Element creation.

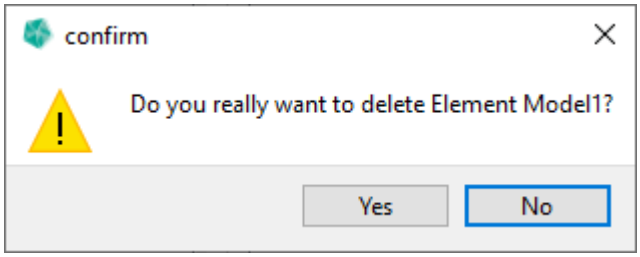
## Delete an Element

Figure 9.6
Remove Modell




1. Right click on the element you want to delete inside the Node View.
2. Click on the **Remove Element** entry from the context menu.
3. You will be presented with the **Confirm Element deletion** dialog.

Figure 9.7
Confirm deletion




4. Press

   a) **Ok** to confirm the Element deletion.
   b) **Cancel** to abort the Element deletion.

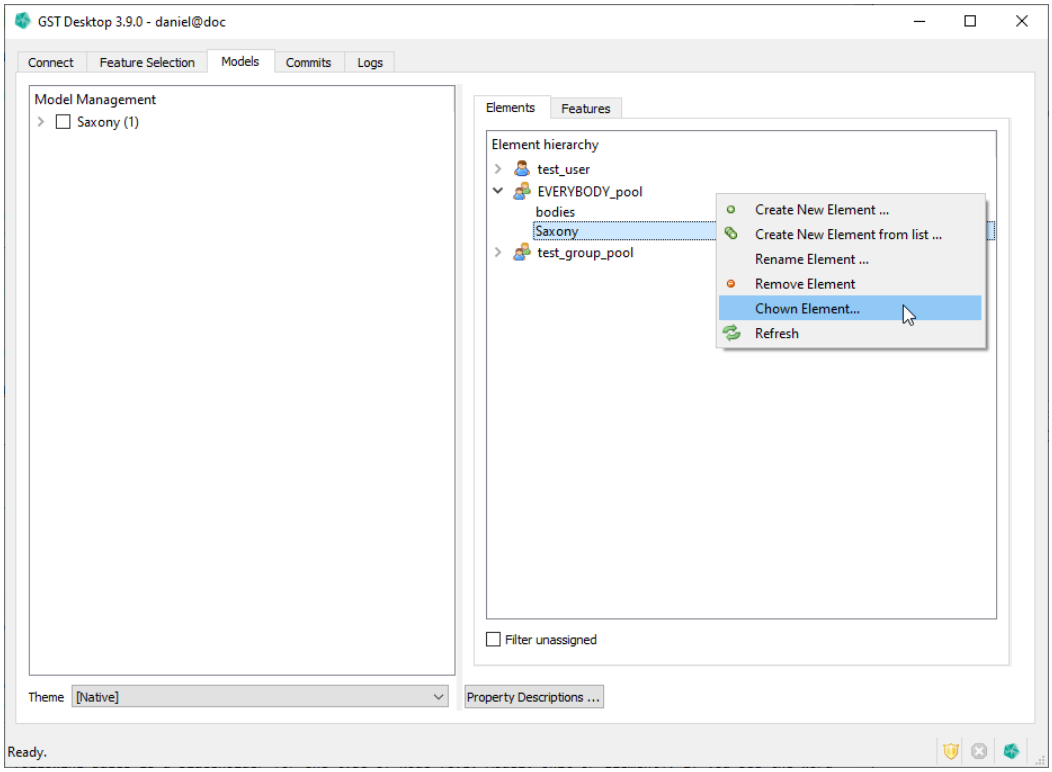
**Restriction for deleting an Element**

You can only delete an element that is not assigned anywhere in the MoMa tree. For example if you want to delete an element from a public group and the element is not assigned in the tree visible to you, but the deletion fails anyway. Why? Because the element was still assigned in the private part of the tree from another user of the public group.
If the deletion fails, view the log for information about which user still has the element in their tree.

## Change the owner of an Element

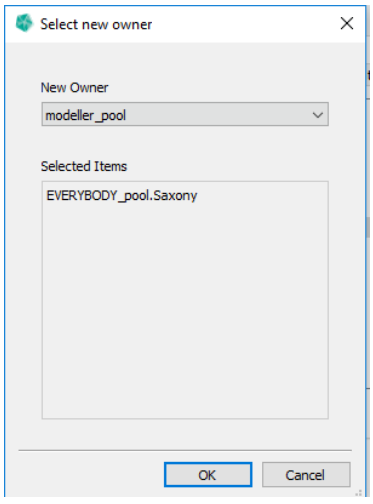
The following steps explain how you can change the owner of an Element. You can also change the owner of multiple Elements at once.

Figure 9.8
Change owner of Model




1. Right click on the element you want to change inside the Node View.
2. Click on the **Chown Element...** entry from the context menu.
3. You will be presented with the **Select new owner** dialog.

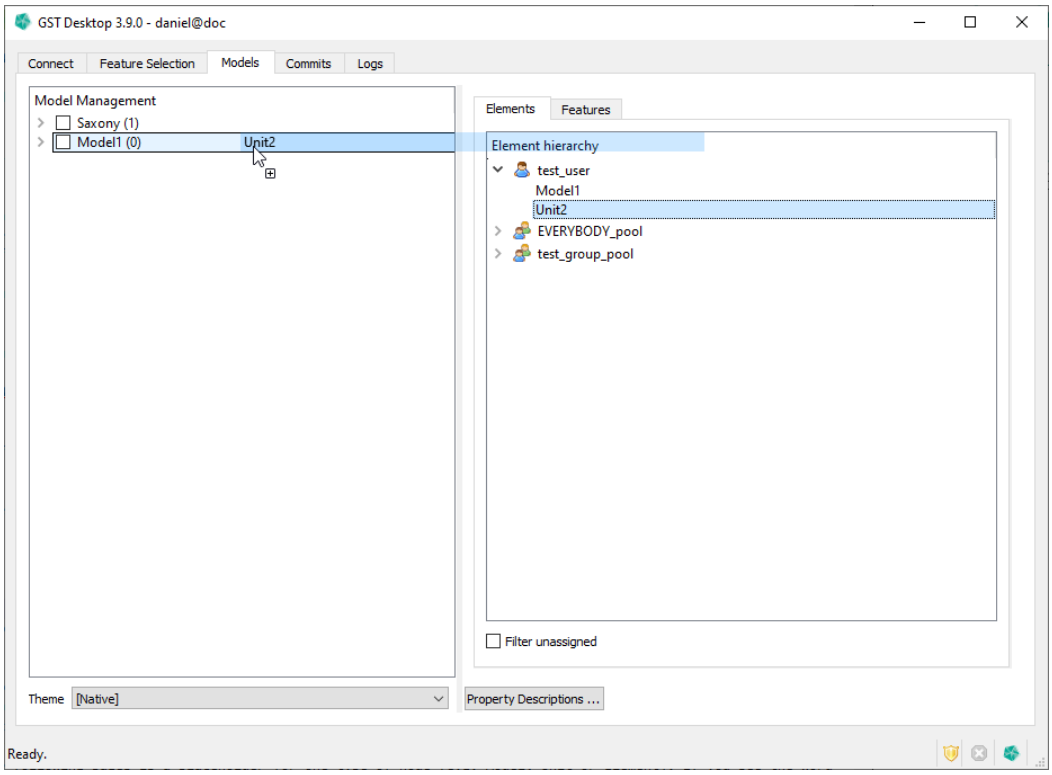
Figure 9.9
Select new owner




4. Here you can select the new owner. Press **Ok** to confirm, **Cancel** to abort.

## Assign Element or Feature to the tree

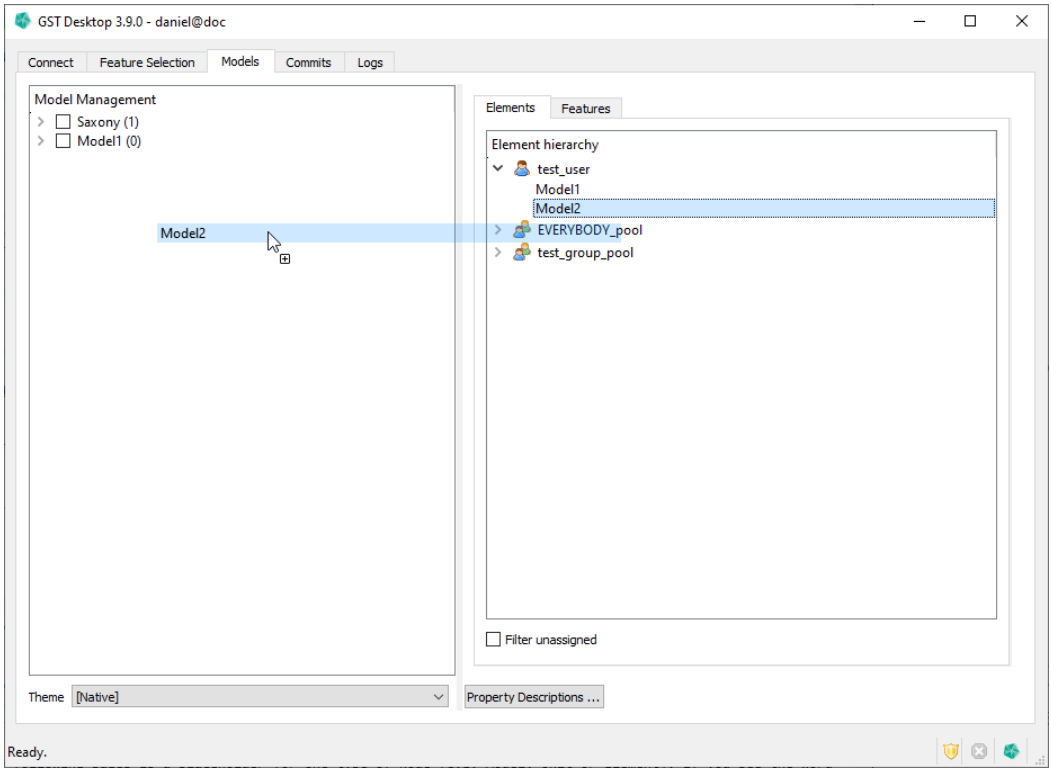
Figure 9.10
Assign Element




**Restriction for Features**

Features cannot be at the top (root) level and can't have child nodes.

Figure 9.11
Assign Element as top element




To assign an element at the top level:

1. Drag it from the Node View to the Tree View
2. Drop it on an empty space in the tree view.

To assign an element or feature to a parent element:

1. Drag it from the Node View to the Tree View
2. Drop it on the element you want to have it assigned to.

**Note**

You cannot assign anything to a feature.

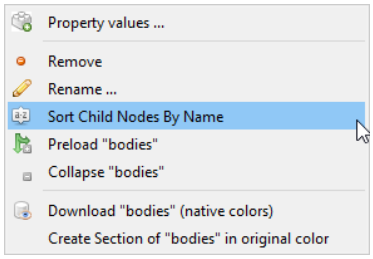
### Reorder MoMa nodes (since 3.2.0)

You can drop an element between, above or below existing elements of the same level to set its position to that place.

You can reorder sibling nodes by drag and drop.

You can sort all child nodes by name with the **Sort Child Nodes By Name** context menu entry from a parent node.

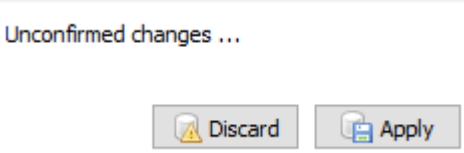
Figure 9.12
Sort Child Nodes By Name




### Save the changes

After you have successfully assigned the element or feature with one of the above methods you should see it slightly greyed out in the tree. You also should see the **Unconfirmed changes** dialog on the bottom of the Tree View.

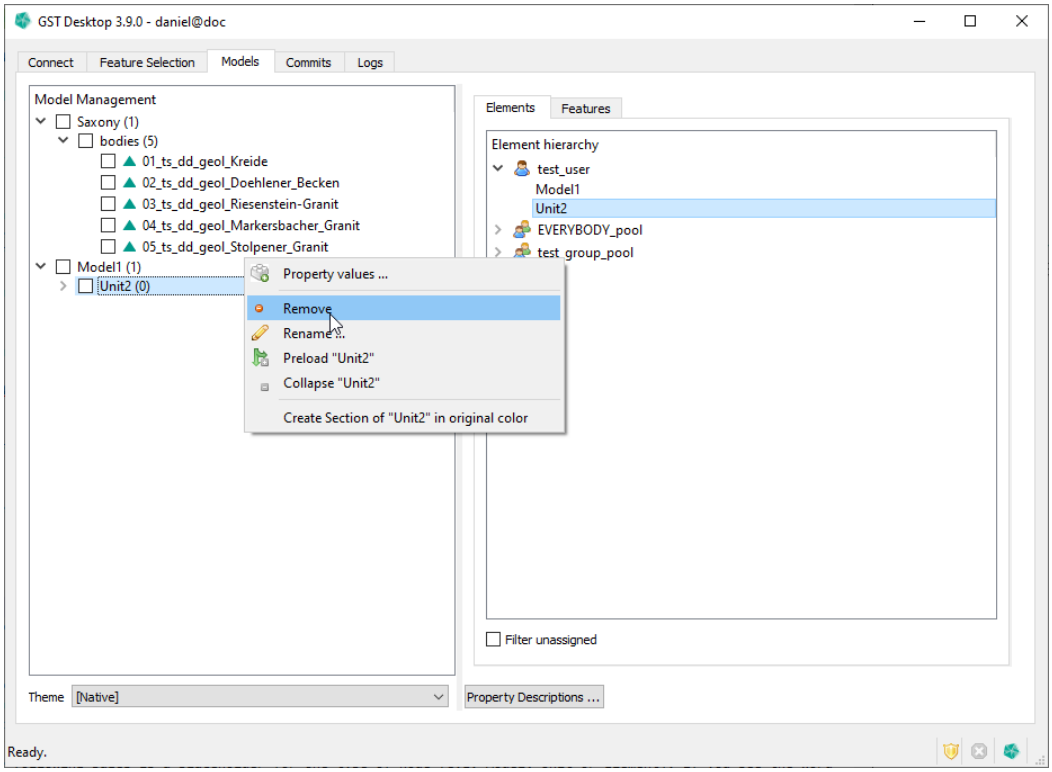
Figure 9.13
"Unconfirmed changes" dialog




3. Press
   a) **Apply** to confirm the assignment.
   b) **Discard** to reject the assignment.

## Unassign Element or Feature from the tree

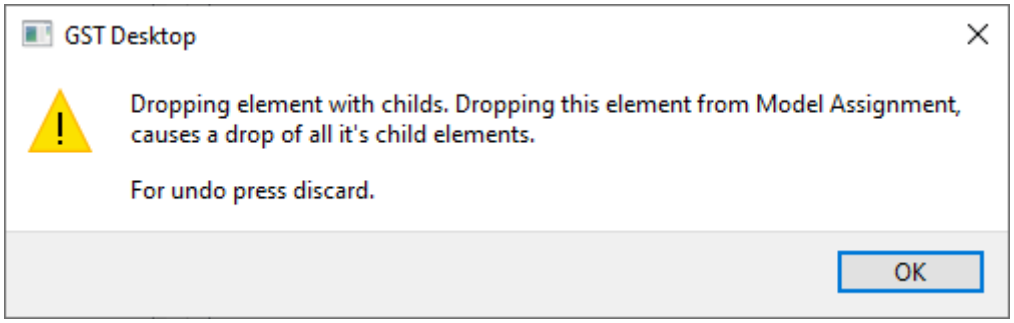
Figure 9.14
Unassign element




1. Right click the element or feature you want to unassign from the tree
2. Choose the **Remove** entry from the context menu.

You can also do this for a whole subtree by right clicking the top most element of the subtree instead. This will produce following warning:

Figure 9.15
Warning dialog




3. Press ok, you can still discard this in the step.

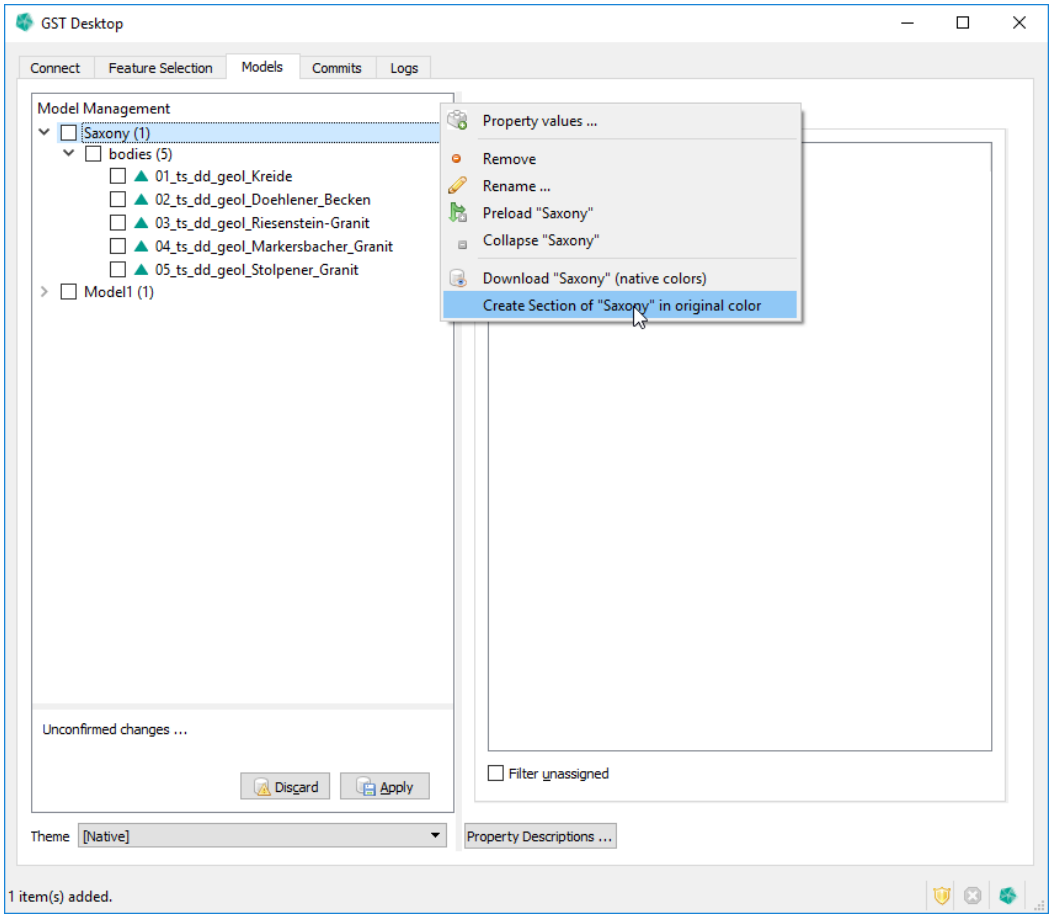
After you applied one of the above methods to unassign an element or a feature from the tree you should see the discarded element(s) or feature(s) slightly grayed out in the tree.

4. Confirm or discard the changes as above with "assign Element or Feature to the tree".

# 10 Tab: Models (GST Sections)

## 10.1 Initiate a Section

Figure 10.1
Initiate a section




1. Choose a tree element you want to intersect.
2. Right click the element .
3. Select **Create Slice of <element_name>**

This will open the **Section Image Designer** Dialog.

## 10.2 Section Image Designer

The **Section Image Designer** Dialog helps you constructing section through models. Here you can set all parameters, design sections with the parameters to deploy your section service.

### Section Image Designer

The dialog helps to

* Generate a Borehole, a Section or a Map output of a Model
* Design an URL to use the GST Section Module in third party services. Refer to page 147 how to setup an URL.

#### Overview

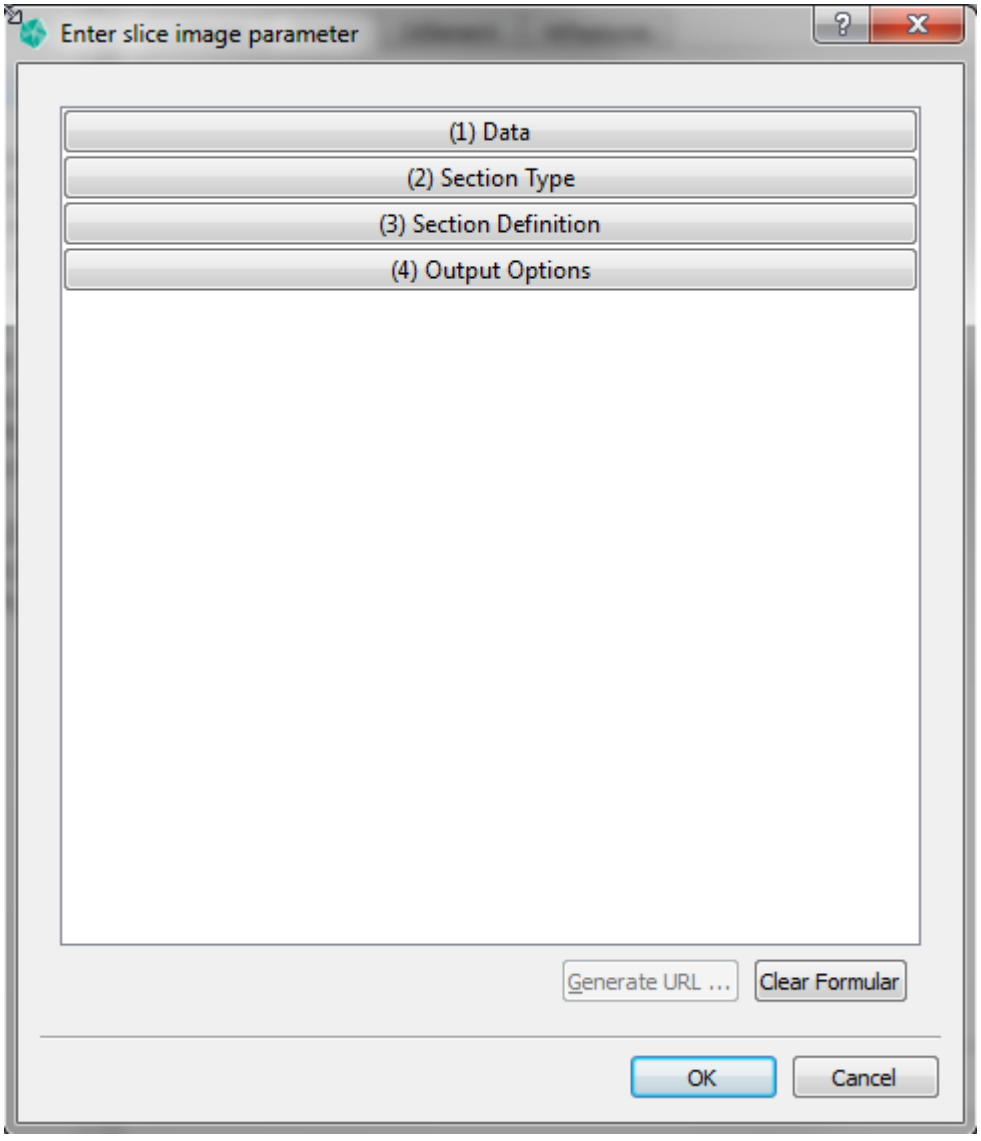



Figure 10.2 Section Image Designer dialog after first entrance

1. Click on one of the four tabs to expand the respective section.
2. Click again to collapse each section.

The four sections are:

* Data (Choose between native, interpreted and property colors.) . . . . . page 130
* Section Type ( Choose between virtual borehole, virtual section, virtual map) page 132
* Section Definition . . . . . page 133
    * Define borehole point . . . . . page 134
    * section line . . . . . page 135
    * map area . . . . . page 136
* Output Options . . . . . page 138
    * Define output location of result image.
    * Define output image scale.
    * Define template file input location.

### (1) Data tab

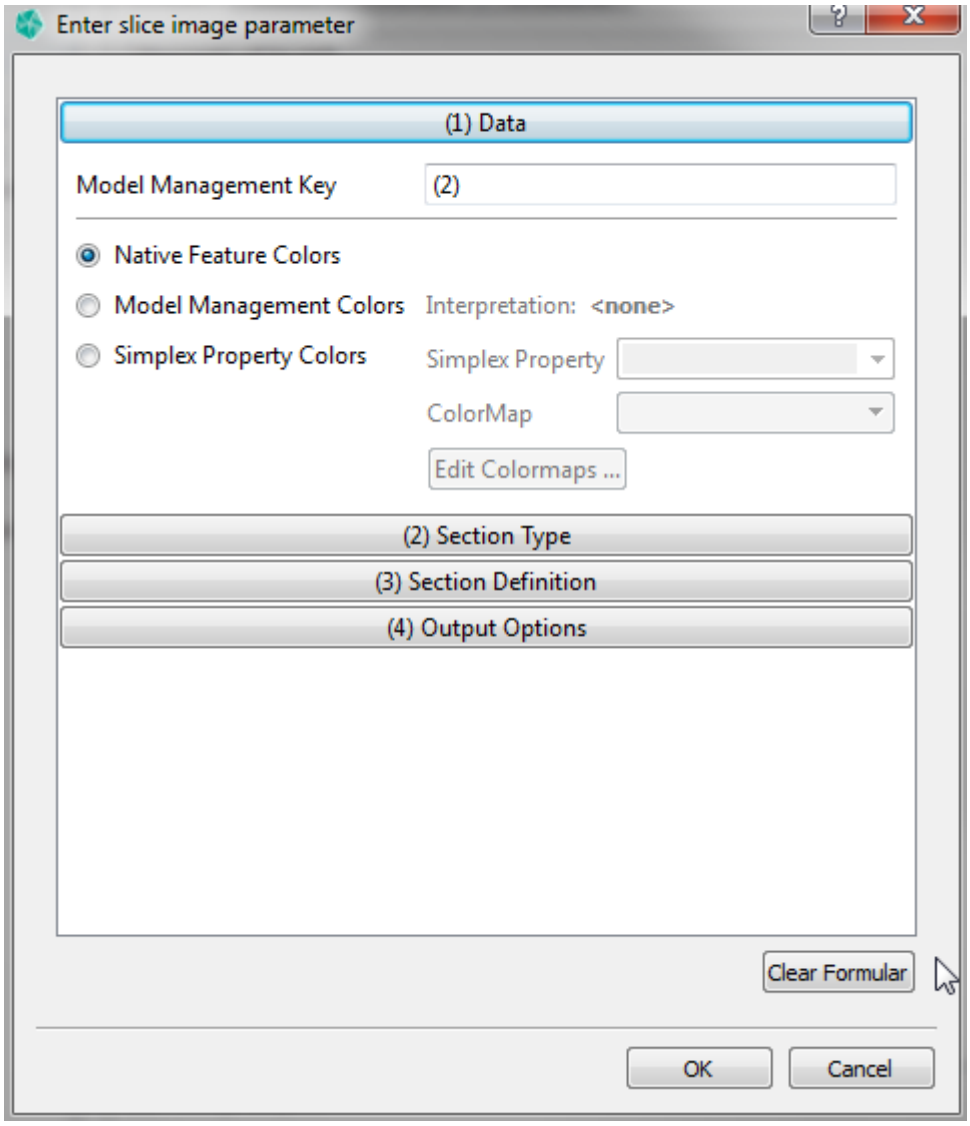



Figure 10.3
Data tab

On the data tab you see in the **Model Management Key** textbox the key of the selected element.

1. Choose the color type for the intersection.

   a] **Native Feature Colors** :
   generates the intersection with the native feature colors.

   b] **Model Management Colors** :
   generates the intersection with the interpreted colors. The **Interpretation** label shows the active interpretation.

   c] **Simplex Property Colors** :

generates the intersection with color from a simplex property value. The specific colors can be defined via a color map. **Simplex Property** lists the available simplex property name for the features resolved by the given Model Management Key above. (Of course the available simplex properties depend on the feature classes the features belong to.) With the help of the **Edit Colormaps** Button you can create, modify or delete colormap that are available in your GST Storage instance.

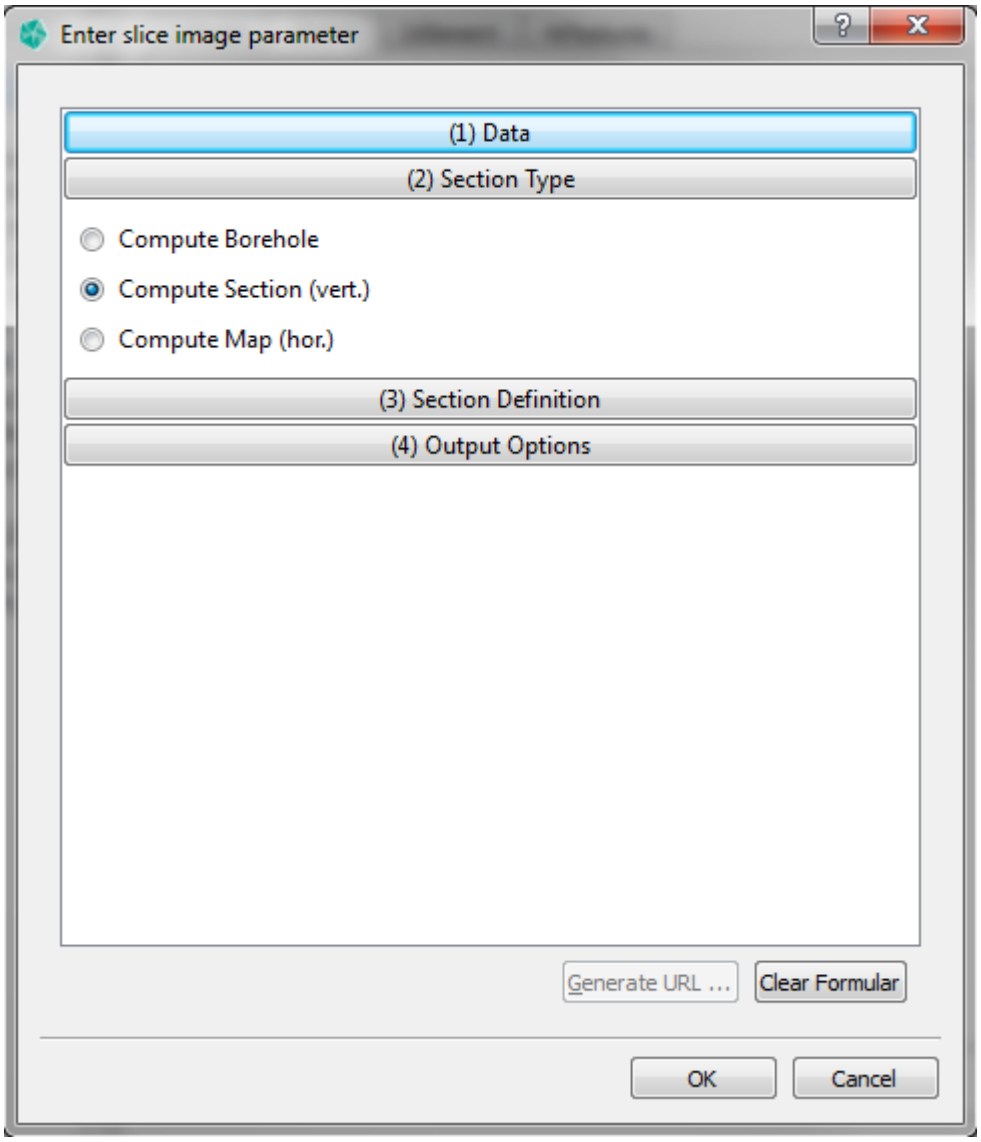
The dropdown box **Color Map** lists all in your GST Storage instance available Colormaps (created or modified by **Edit Colormaps...**). Choose one from the list that is used for the Slice colouring.

**Note**

Features without interpretation will be skipped if you are choosing the **Model Management Colors**.

### (2) Section Type tab

Figure 10.4
Section Type tab




1. Choose the section type for the intersection. The choice changes the layout of the **Section Definition** tab.

   a) **Compute Borehole** :
   computes a virtual borehole image.

   b) **Compute Section (vert.)** :
   computes a virtual section image.

   c) **Compute Map (hor.)** :
   computes a virtual map image.

### (3) Section Definition tab

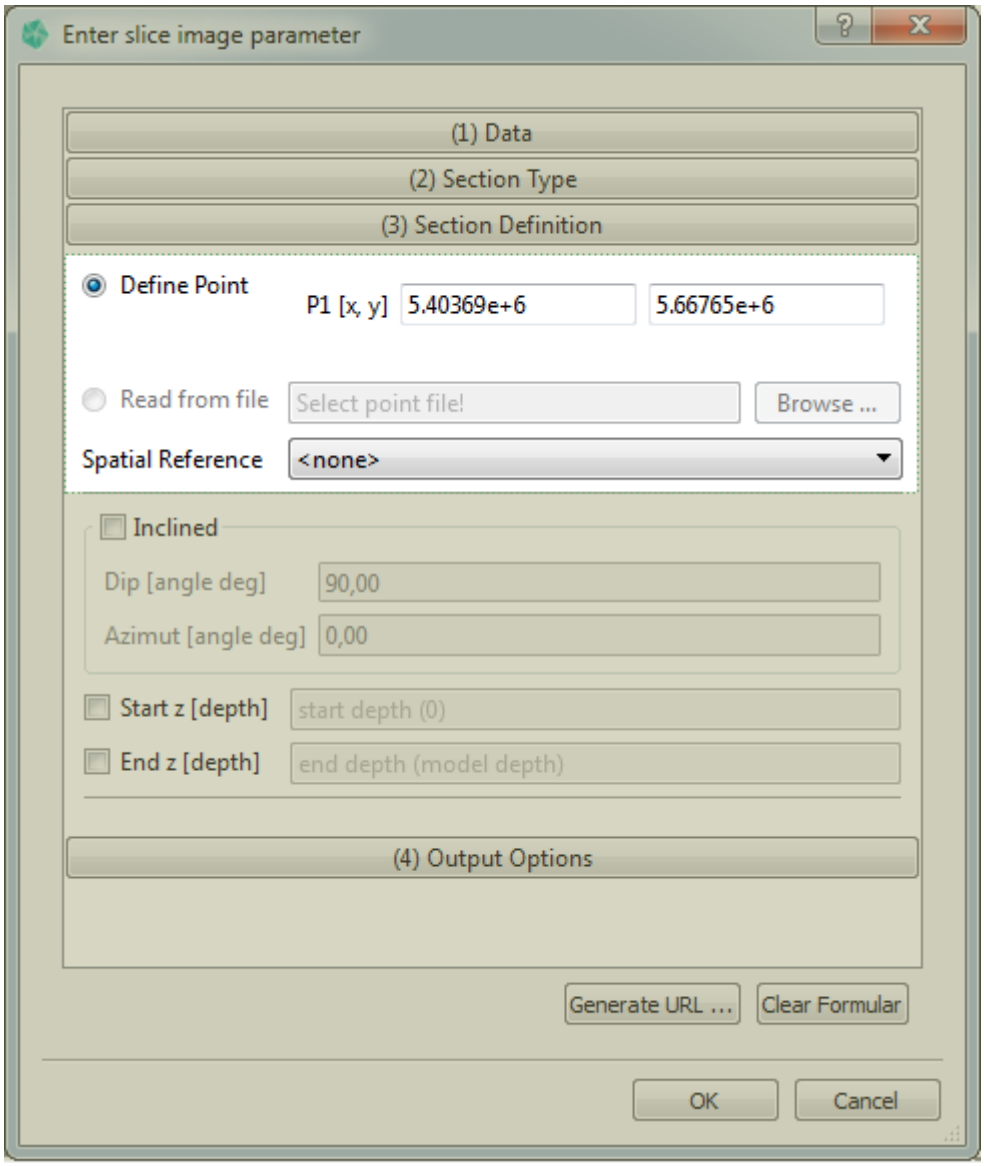



Figure 10.5 Common parameters in Section Defintion tab

Independently of the choice in the **Section Type** tab the **Section Definition** tab has some **common elements**.

1. If you want to read from a geometry file with point data for a borehole or line data for a section select **Read from file**. This file has to be in one of the valid input formats of GST. E.g. a gocad .pl file with line data.
2. Select the SRS of the input by using the **Spatial Reference** drop down menu (optional). All features will be transformed to this SRS if they have a different SRS.

**Note**

If no SRS is selected no SRS transformation will be performed while the section generation. This make sense only if all features beyond your selected Model item are in same SRS.

### (3) Section Definition tab for Boreholes

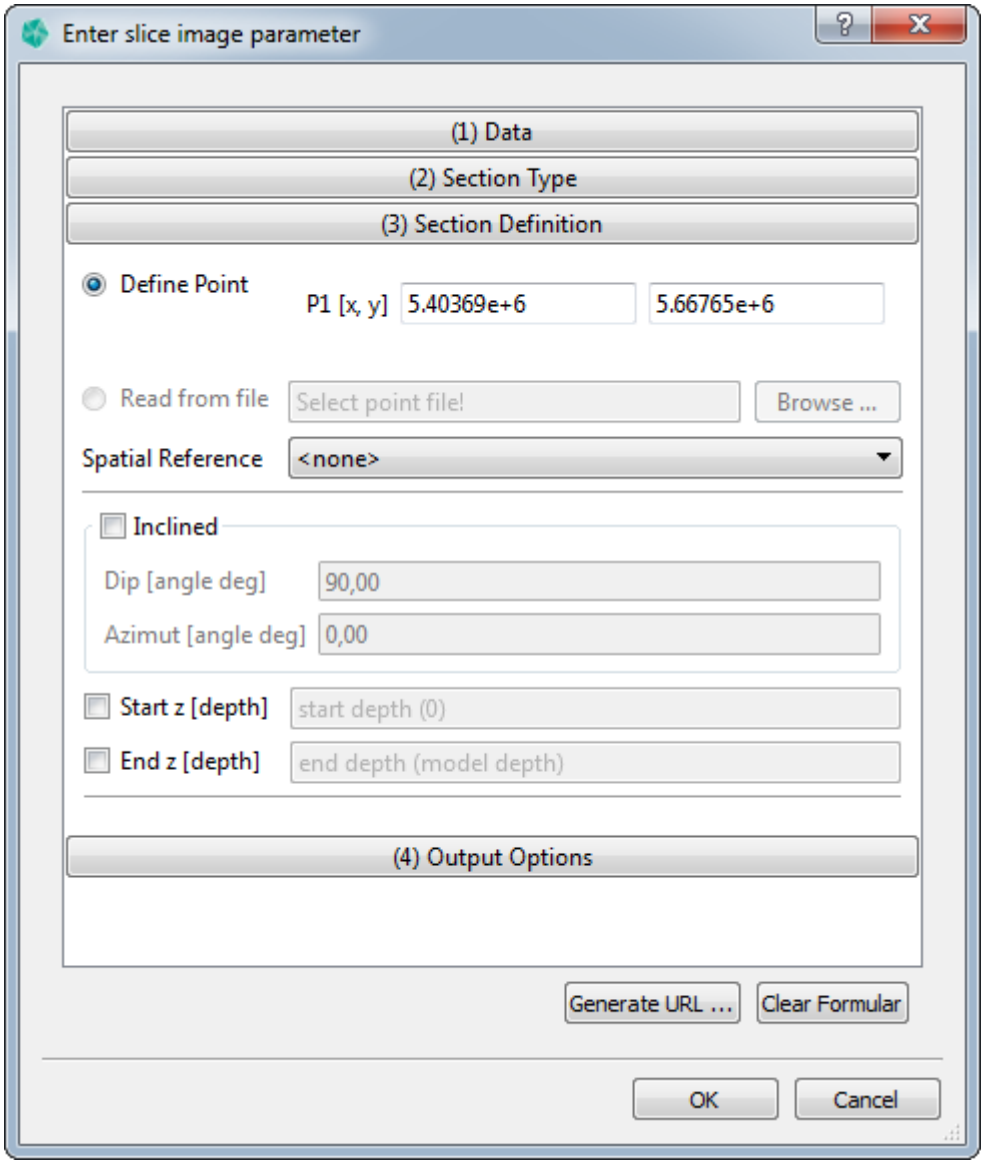



Figure 10.6 Section Definition tab for computing boreholes

If **Compute Borehole** is choosen in the Section Type tab some specific elements need to be set:

1. Define the Cartesian x and y coordinate of the borehole point or choose the com-

mon element **Read from file**.

2. Define the Dip and Azimut angle to define an inclined borehole
3. If specified a **Start z** it will cut of from the generated path from the model top to the given depth.
4. If specified a **End z** it will cut of from the generated path below the given depth (measured from Model top).

### (3) Section Definition tab for Vertical Sections

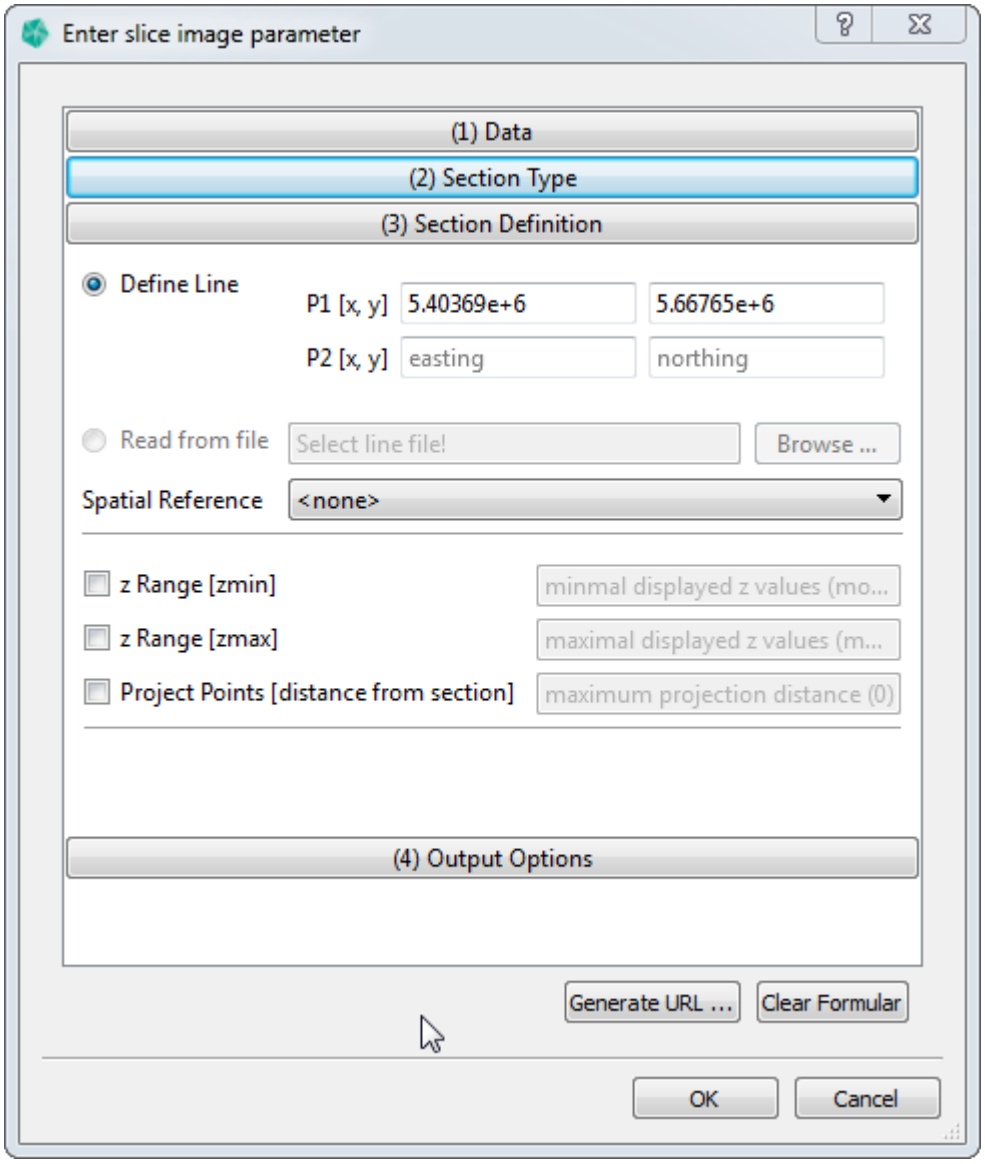



Figure 10.7
Section Definition tab for computing a section

If **Compute Section** is choosen in the Section Type tab some specific elements need to be

set:

1. Define the Cartesian x and y coordinate for the start and end point of the section line under **Define Line**.
2. Define the min and max coordinate of the height- (z-) axis (optional) by selecting **z Range [zmin]** and **z Range [zmax]**.
3. Define a distance for points on plane projection (optional) by selecting **Project Points**. All points that have an orthogonal distance that is smaller than the input distance will be projected onto the intersection image.

### (3) Section Definition tab for Map generation

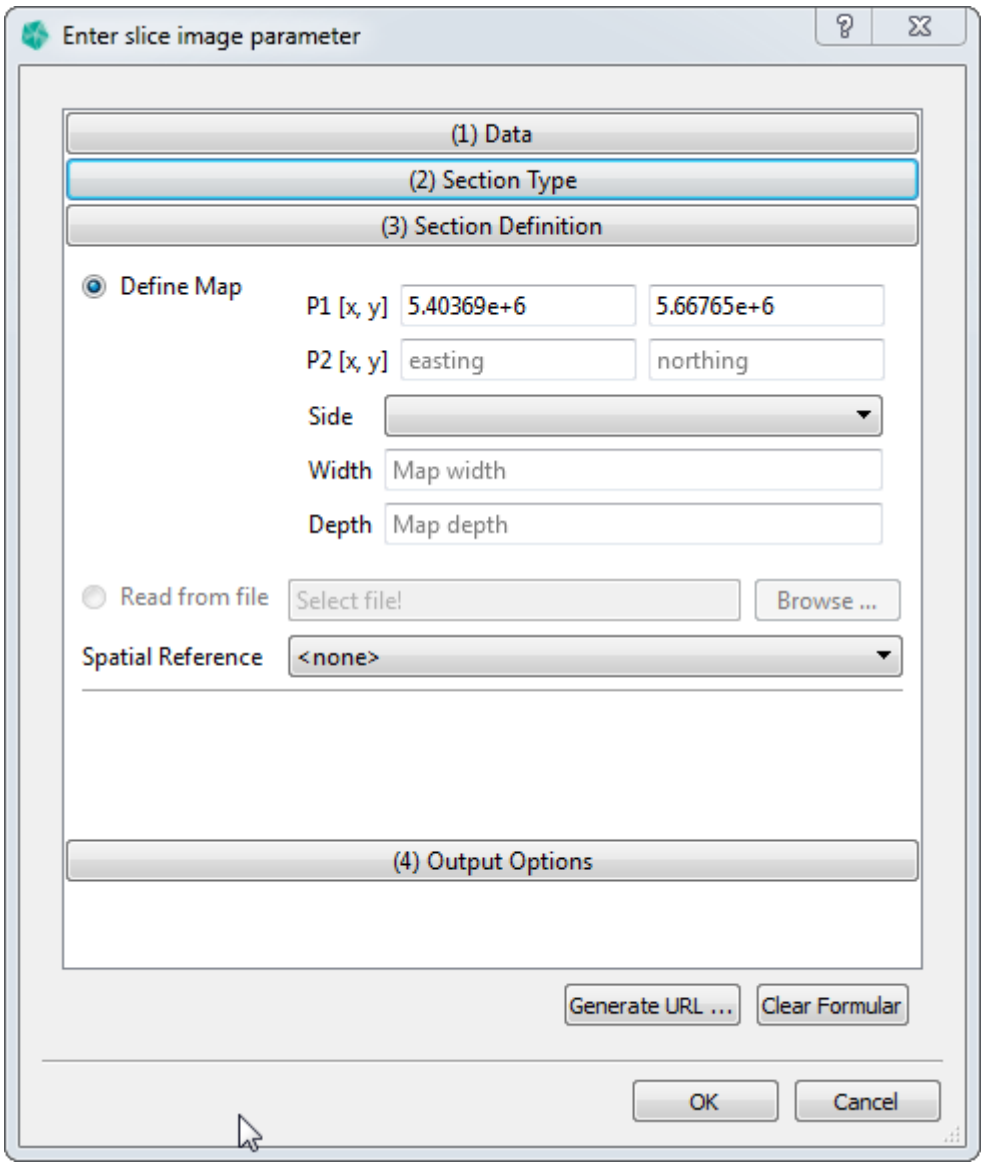



Figure 10.8
Section Definition tab for computing a map

If **Compute Map** is choosen in the Section Type tab some specific elements need to be set:

1. Define the Cartesian x and y coordinate for the start and end point of section line under **Define Map**.
2. Define the side to which the area extends, seen from the line defined before by using the **Side** drop down menu.
3. Define how far the area extends from the line defined above in the **Width** textbox.
4. Define the starting height (z) of the map area **Depth** textbox.

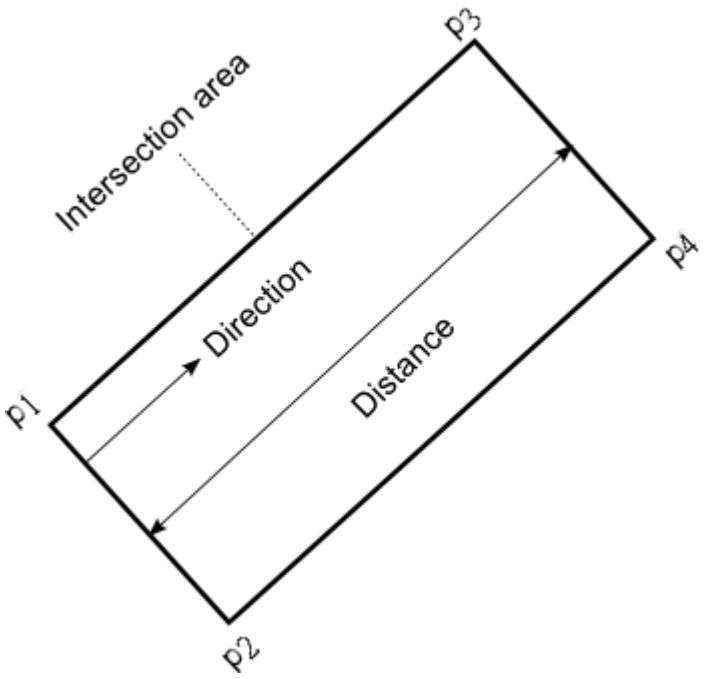
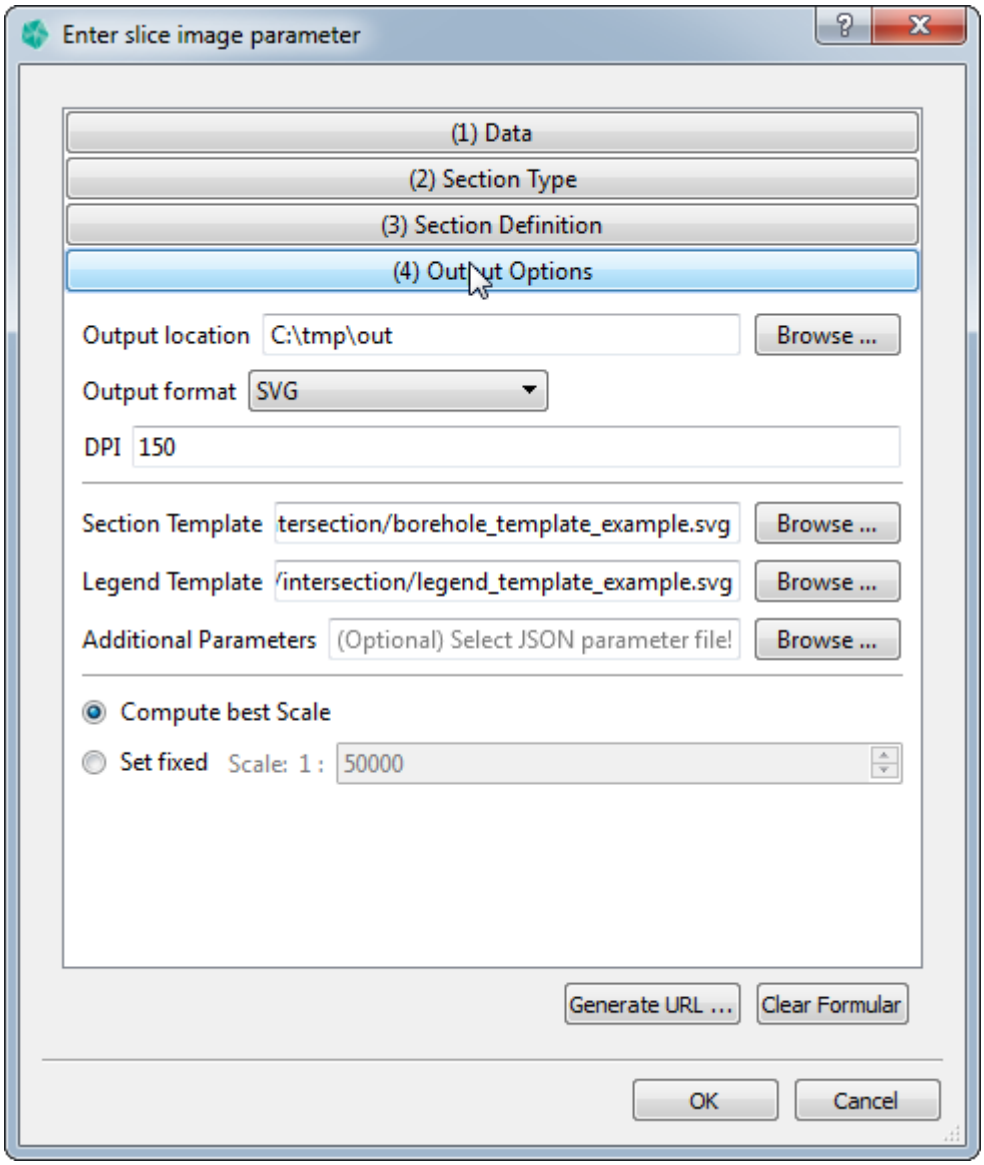



Figure 10.9
Map definition with the parameters **P1**, **P2**, direction (=**Side**), distance (=**Width**).

### (4) Output Options tab

Figure 10.10
Output Options tab




1. Set output location for the generated intersection image. Using the **Browse ...** button for selecting the location.

2. Set output image format of the generated intersection image by using the **Output format** drop down menu.

**Requesting SHP format / Additional Parameters**

Additional information about the shape file format, files and information that are generated can be found on Additional JSON Parameters on page 209.

3. Set the location of the intersection template file. Using the **Browse ...** button for selecting the location.

4. Chose the scale by:

   a) selecting **Compute best scale and exaggeration** to set the scale automatically so that the image fits the template.

   b) selecting **Set fixed Scale** to chose own values for the scale. First change the scale for the width in the **Scale** box. Second set fixed **Vert. exaggeration** to changes the scale for the height. This is ''height scale'' = ''width scale'' * ''vertical exaggeration''.

**Note**

Setting a specified scale or exaggeration value might cause the image to grow outside of the boundaries defined in the template file. See the Section Template File on page 146 for more information.

# 11 Section Template File

Template files are used to customize the Section output. They can be used to control the following:

* Template allows to layout the output. This means in the template **area placeholders** can define the location where at runtime the section output and legend output will be written to. Additionally the template allows to place static content onto the section output, e.g. your company logo or a disclaimer text.
  See subsection Section Template File on page 141.
* In the template **text placeholders** can be defined. They are replaced on section generation runtime. They can be used e.g. to print the current date and model information like the displayed scale.
  See subsection Section Template File on page 145.
* In the template parameters can be defined to control the output (like setting font size in the generated (area) content).
  See subsection Section Template File on page 146

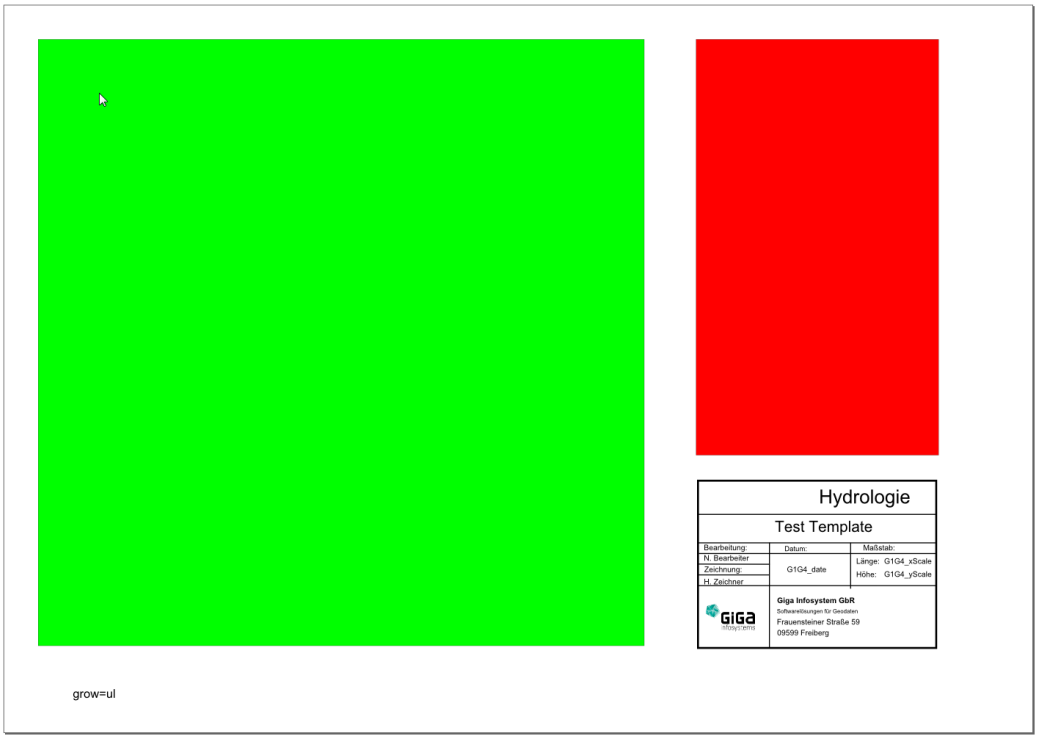



Figure 11.1 Example of a user defined template file, modified from the template skeleton.

**Note**

Sample Template files are located in GST Desktop setup directory GiGa infosystems/GST Desktop/templates

## Template Structure and Area Placeholders

Figure 11.2
Skeleton file opened in a text editor

```
<?xml version="1.0" encoding="UTF-8"?>
<svg xmlns="http://www.w3.org/2000/svg"
    version="1.1"
    width="297mm"
    height="210mm"
    viewBox="0 0 297 210">
    <rect
        x="10"
        y="10"
        width="175"
        height="175"
        fill="rgb(0,255,0)"
        stroke-width="0.05"
        stroke="rgb(0,0,0)"
        id="G1G4_isec" />
    <rect
        x="200"
        y="10"
        width="70"
        height="120"
        fill="rgb(255,0,0)"
        stroke-width="0.05"
        stroke="rgb(0,0,0)"
        id="G1G4_legend" />
    <text
        x="20"
        y="200"
        fill="#000000"
        font-size="3.5"
        font-family="Sans"
        id="G1G4_params">
            grow=ul
    </text>
</svg>
```

To understand the template structure we open the template file in a text editor. The template is a regular SVG xml file that has several predefined <rect> and <text> tags with well-defined id values that behave like placeholders or input parameters for the section

output. The template file can be customized to your liking (e.g. adding additional elements, moving/resizing the existing boxes, etc.).
You can add items to your template as you like (e.g. adding: disclaimer texts, copyright information, icons, your Cooperate Design elements etc.).

**Note**

Usually you don't need to open a template with a text editor. Use a SVG-editor of your choice to edit the template skeleton. We recommend Inkscape (`http://www.inkscape.org`) as a free open source SVG-editor allowing users to browse the structure of the SVG with the build-in xml editor.

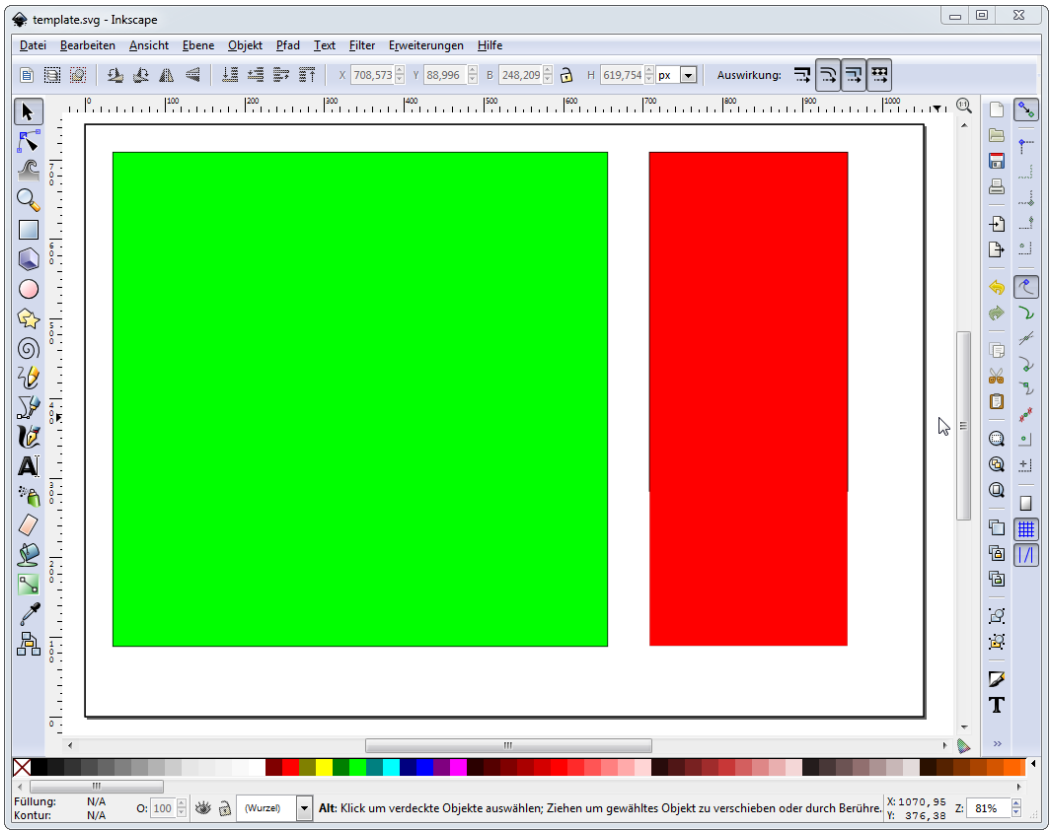



Figure 11.3
Skeleton file opened with a SVG-editor (here Inkscape)

The simplest template consists of one or two **placeholder parts**. A placeholder part is referenced by its xml-tag **id** (as shown in the section above you can browse them with any text editor). If you are using Inkscape you can browse the **id** of an object using the context menu -> "Object Properties".

**Tip**

You should almost never need to change those ids by hand. In addition, it is known that some editors do not allow users to change the tags id's.
We recommend to use the template skeletons provided by GST Desktop Setup and modify them to your needs using your favorite SVG editor.

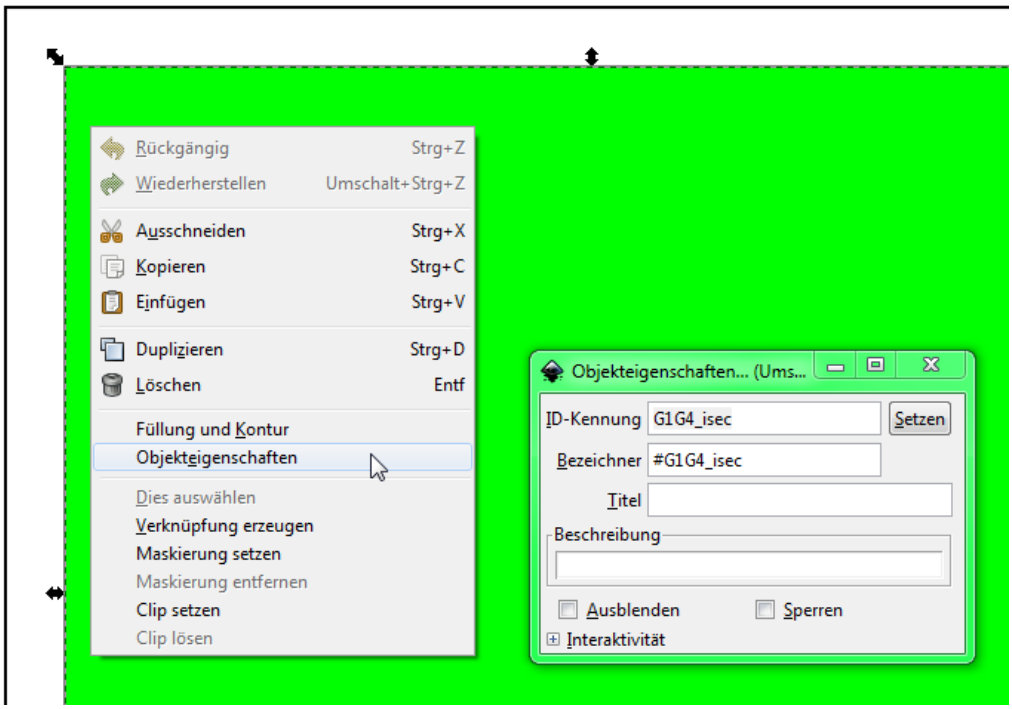



Figure 11.4
Display object ids with Inkscape

The basic placeholders are:

* **G1G4_isec** The green box represents the area where the intersection image will be placed. The size of this area will also determine the size of the intersection image. This box is mandatory and the intersection will exit with an error if it is not present. The color of the box has no usage (it is just for easy visual identification beside the id.)
* **G1G4_legend** (Optional) The red box represents the area where the intersection legend will be placed. As with the green box, the area also determines the size of the legend.
* **G1G4_params_json** (Optional) Advanced output parameters that are controlling the section and legend generation
* **G1G4_overview** (Optional) A placeholder of an overview map. The map will show the current location/section on an WMS map. (Note: The overview map replacement is

available only by the Section generation on GST Web.)

You can move the placeholders around and resize them according to your needs. You can also place more elements into the template like a disclaimer text, an author/ownership text, your logo etc. There are also a set of placeholder strings available to make these additional (static) elements more flexible and enrich them with more information about the section (e.g. time/date of creation, Scale information etc.). Please consult section Section Template File on page 146 to get a detailed list about the available placeholder strings.

**Note**

There is a restriction for the minimum size of a placeholder box. This is dependent on the overall document size. For an A4 document as example, a box needs to have a minimum of 50mm in width and height. See Intersection Template detailed information on page 190 for further information.
The maximum size of any box cannot exceed the size of the document.
If you overlap boxes or move them out of the document area, the content of those boxes will also be overdrawn or be outside the document area in the final image.

**Note**

In some cases the **G1G1_isec** box can "grow". This will happen if a user requests a section or borehole to be in a certain scale (see parameter scale on page 138 resp parameter scale at the URL parameters on page 213). This requires to display the section or borehole in a certain scale that might enlarge the **G1G1_isec** placeholder box. See parameter grow on page 145 to control in which direction the **G1G1_isec** can grow.

## Text placeholders

Any of these parameters present in a text field will be replaced by the mentioned value in the final image.

* **G1G4_date**
  * Will be replaced by the current date.
  * Format: ''dd.mm.yyyy''.
  * Example: ''20.03.2014''.
* **G1G4_xScale**
  * Will be replaced by the width scale.
  * Format: ''1 : xxxxxx''.
  * Example: ''1 : 20000''.
* **G1G4_yScale**
  * Will be replaced by the height scale.
  * Format: ''1 : yyyyyy''.
  * Example: ''1 : 3000''.
* **G1G4_title**
  * Will be replaced by a custom title. passed as parameter

## JSON parameters

The parameter textbox is identified by id=**G1G4_params_json**. The textbox will be removed from output image. All text in that box requires the JSON format.

**Example:**

Sample **G1G4_params_json** content:

```
{
        "unit":"px",
        "dpi":300,
        "borehole-image-width":800,
        "borehole-image-height":600
}
```

Please refer to the Appendix on page 194 for a list of all parameters and their behavior.

**Tip**

You can also pass this parameters as JSON string as a parameter called **additionalParameters** by the Section Image Designer Dialog and the URL Assistant Dialog. If values are duplicated the values in **additionalParameters** will overwrite the values specified in **G1G4_params_json**.
If a parameter is defined neither in **G1G4_params_json** nor in **additionalParameters** a default value will be calculated. (Please refer to the appendix on page 194 about the default values).

## 11.1 Deploying Sections/Boreholes as a Service

**System prerequisites**

This function requires GST Web in order to deploy services.

You can deploy sections a service. Thus enables third party applications to request sections or boreholes by GST as done be GST Desktop. You can setup a section service in GST Desktop, where you define parameters that can be configured by the third party service. So the third party service functions a graphical interface or simply as parameter input service where the output is generated by the GST section service.
GST Desktop helps you with an URL Generation Assistant to generate an URL that can be used by the third party service. The generated URL contains a set of placeholder (well defined strings to search) that can be replaced by the third party service in order to push parameter values from that service.

**Example:**
The third party service is a map application. You want to put a function onto your map application where the user can pick virtual boreholes through the 3D model stored in GST. You want to set the location of the virtual borehole by your map application anything else should be generated by GST. For this concept GST Desktop provides you with an Assistant.

The Assistant of GST generates a KVP-Style URL with placeholders. Your application needs to replace the placeholder in order to change e.g. the location of a virtual borehole. See the following section on page 148 on howto do this.

**Example:**
A KVP-Styled URL looks like this:
`http://somehost/pathToGSTWeb/createBorhole.php?key1=#VALUEPLACEHOLDER1#&key=value2`
#VALUEPLACEHOLDER1# is a placeholder that should be replaced by the third party service, e.g. your map application.

### Howto: Deploy a service

Use GST Desktop to design a section request. It's explained in the sections above on page 127 how to generate Sections.
Once the section / the borehole fits your requirements and you want to deploy the section as a service press the **Generate URL** button at the bottom of the **Section Image Designer** Dialog.

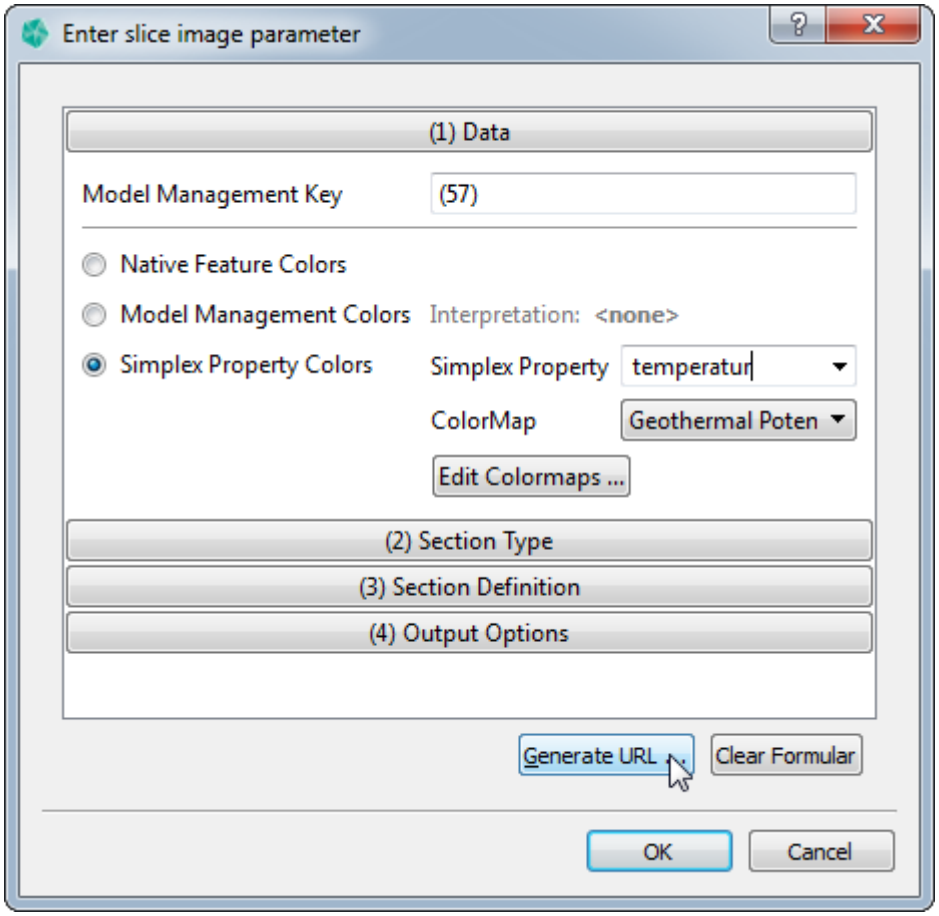
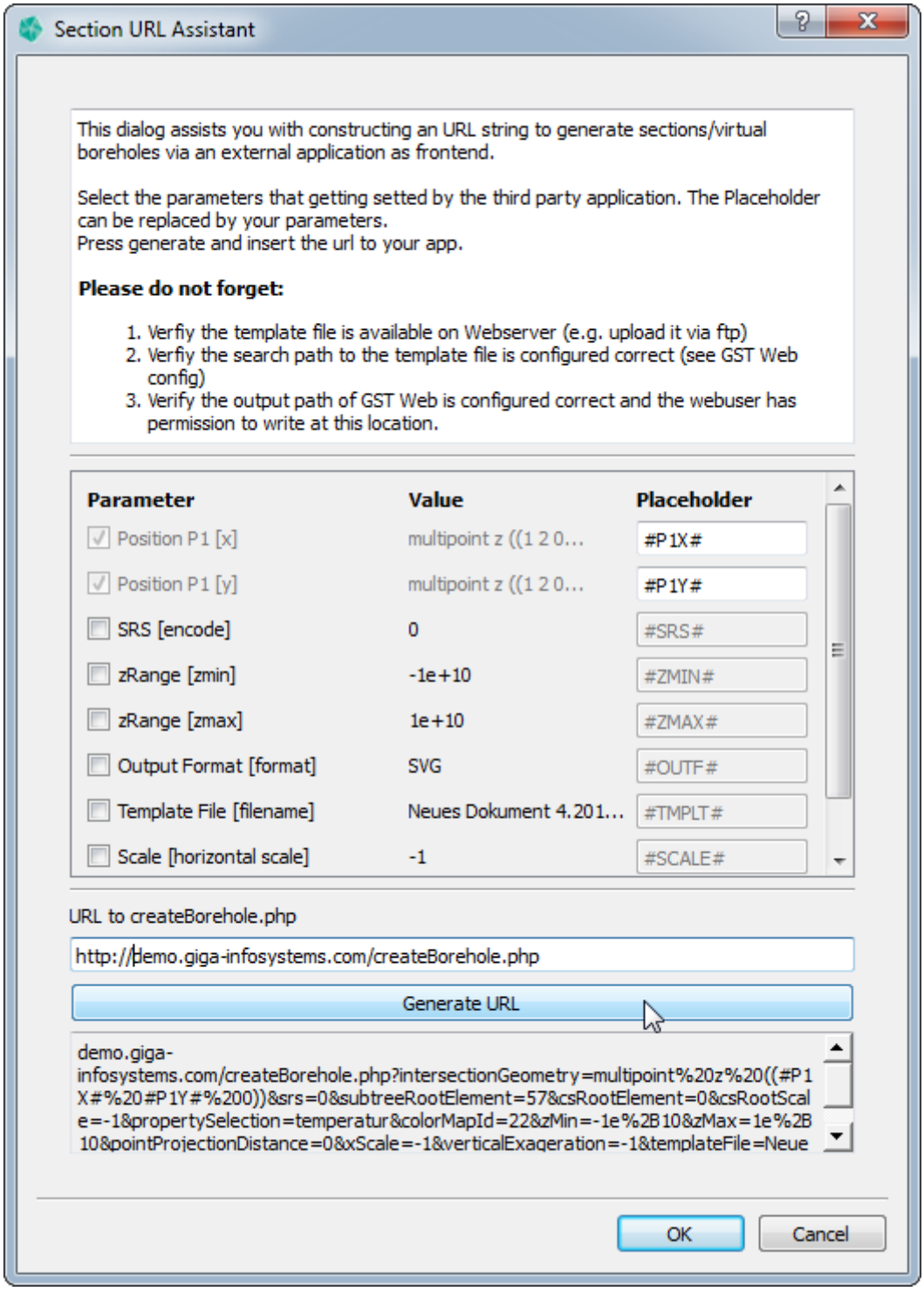



Figure 11.5 Section Image Designer

1. Press the **Generate URL** Button to open the Section URL Assistant.

Figure 11.6
Section URL Assistant




The Section Assistant shows up all configurable parameters.
An activated checkbox on the left marks a parameter to be defined by the third party service.
Unchecked parameters are defined by the GST Desktop and getting hard coded into the

URL (as you set them in Section Image Designer).
The position of the section / borehole is always a parameter that is defined with placeholders.

1. Change the placeholder string on the right if you want to.
2. Enter the URL stump to createBorehole.php of your GST Web Instance
3. Press
   a) **Generate URL** to generate the URL.
   b) **Cancel** to abort.
4. To deploy the section service, copy the generated URL to the third party service administrator. The third party service should replace the placeholders by the desired values in order to generate an output.
5. Please verify that the template file you specify is available for GST Web (temporal path of GST Web, see var.inc.php)!

**Note**

A list of all section parameters is available in Appendix on page 213

# 12 Manage Themes

## 12.1 Motivation and concept of Themes

**Themes** are intended to visualize and group geomodels based on their (object) properties and display a group name instead of the technical object names. In GST Web the geomodels will be colored and represented in that group when a Theme is activated. GST Web allows to setup a default theme that is displayed at the startup.

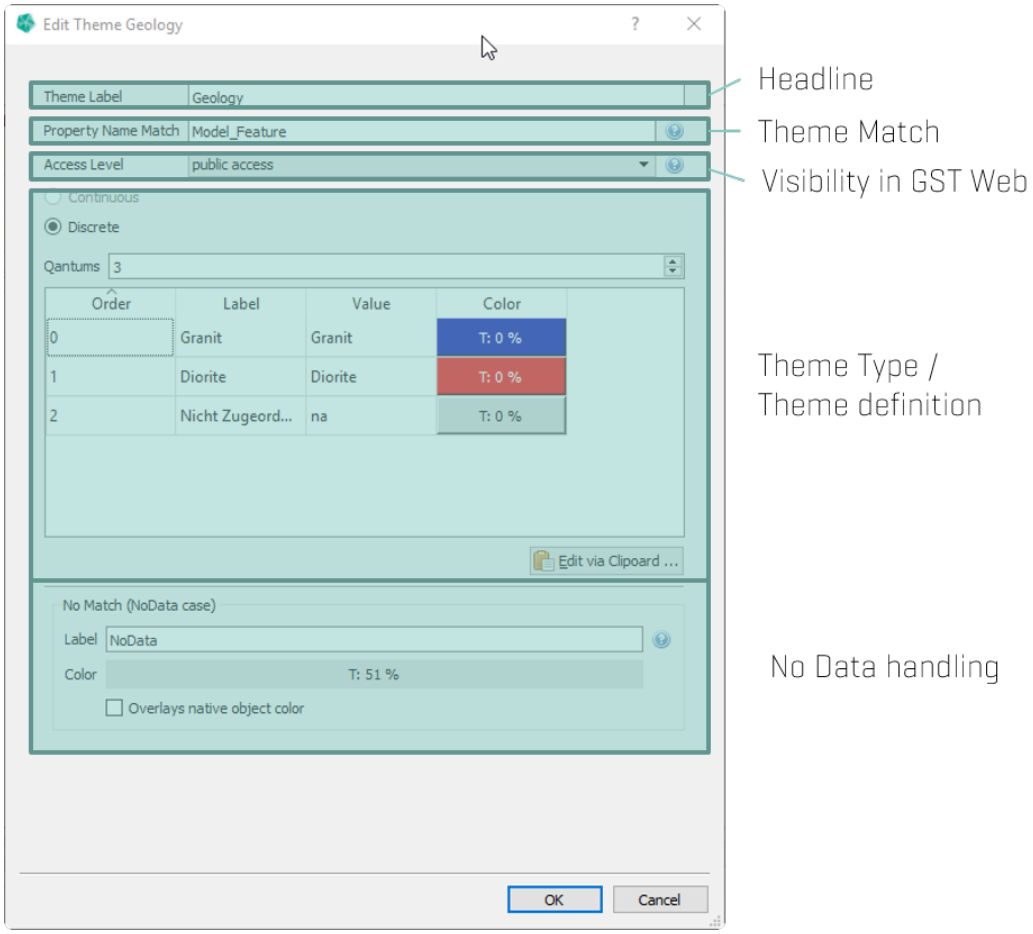
### Relevance of Themes

A Theme can be understood as an implementation of a **generalized legend**. Based on object properties a Feature will be interpreted to be part of something. A generalized legend could be a litho-stratigraphic view, a hydraulic view or a (thermal) potential view for a example.
Of course generalized legends can differ in context. That is why multiple Themes can be created.

A theme consists of

* A **Theme label** - a human readable text, like a headline
* A **Property Name Match** pattern - defines a connection from an Object Property to a Theme. . . . . . page 152
* A **Access Level** - the Theme visibility on GST Web . . . . . page 152
* A **Theme type** - depending on the Property Data type the definition how property values are represented in the Legend . . . . . page 153 ff
* A **No data** handling - how the value "no data" is handled and which values shall be ignored in the Theme . . . . . page 153

Figure 12.1
Theme Editor




## Match pattern

One Theme can be assigned to Features from different Feature Classes having slightly different Property names (e.g. when features are used in Model Trees each feature can be integrated from a different Feature Class). Therefore a **match pattern** is a **semicolon ";" separated** list supporting **"?" (wildcard)** and **"*" (kleene)** operators and doing a **case insensitive** comparison.

**Example:**

Feature Properties

- Temperature
- Temp
- temp

matched by **temp;temperature**
(also matched by **temp***)

## Theme visibility on GST Web / Access Levels

Within **GST Web** each Web user can be assigned to an Access Level. (Please consult the **GST Web User manual** for a howto.) They are used to filter content for specific users. Access Levels that are installed by default are:

* **public**
* **partner**
* **private**

Access Levels are hierarchical (from bottom to top in the list above), thus the most restricted level is **public**. Users assigned to that level can see content assigned to that level only. The level **partner** includes all content that is available for **partner** AND **public**, and so on.

Themes can be assigned to an Access Level in order to restrict the occurrence of Themes for specific users.

**Note**

Themes that have an Access Level **higher than public** are only visible for web users that are assigned to that level (or higher). By default the public login is mapped to a web user that is assigned to the Access Level **public**. Thus, Themes set to the Access Level **partner** or **private** are not accessible for the public login.

## Theme types

Depending on the datatype of the property GST distinguishes between two Theme types.

* **Continuous type** for continuous datatypes like integer, float or double
* **Discrete type** for discrete datatypes like integer, text and boolean

Please continue with chapter Define Themes on page 155 for more information about **Continuous type** and **Discrete type**.

## No Data handling

The lower part of the Dialog handles how the no data case will be displayed.

A no data value is either

* the NULL value or
* a value depending on the Theme type
    * outside the defined interval (for continous Themes)

* a value that is not matched with the table (for discrete Themes)

Simply define a label that will occur in the legend for the no data interpreted objects. (Useful terms here are: "no data", "not defined, "not interpreted", "other", ...).

Defining a color will show all no data interpreted objects in that color (e.g. black, grey or semi transparent).

If the checkbox **Overlays object color** is activated, this color will be ignored and the objects are displayed in their native defined colors (see Browsing Features and changing Object Property Values on page 22).

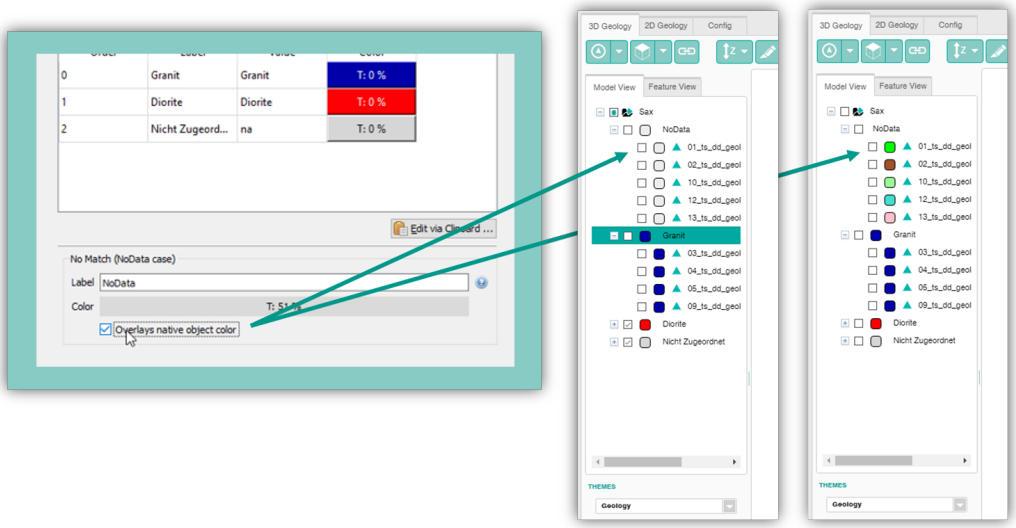



Figure 12.2
**Overlays object color** controls how the no data interpreted objects will be displayed in GST Web

Figure 12.3
GST Web with regular object color (Default Theme)

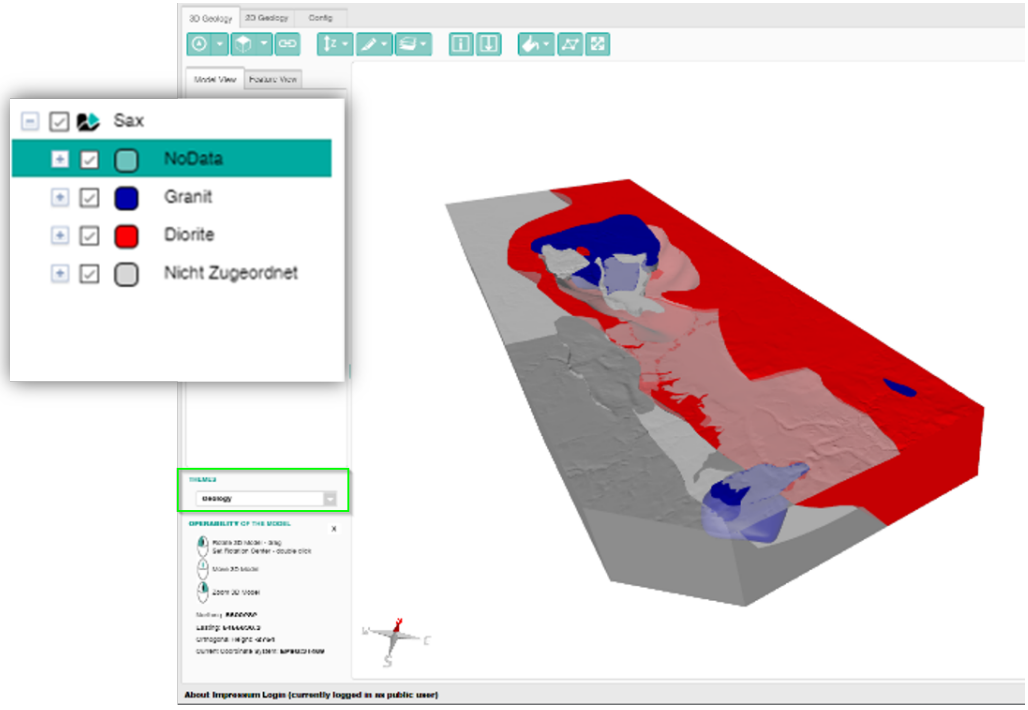



Figure 12.4
GST Web with Theme color. The user can switch the current theme with the drop down menu in the lower left. The default displayed Theme can be configured within GST Web administrative page.

## 12.2 Define Themes

Themes have a prominent appearance in GST Desktop. They are accessible within the tabs **Feature Selection** and **Model** (see Figure 12.5).

The first time GST Desktop is started the Default Theme is selected which means, no Theme is used. The objects are displayed in their object colors.

Hovering the mouse over the Theme dropdown element enables the control buttons

* add
* remove (not available for Default Theme)
* edit (not available for Default Theme)

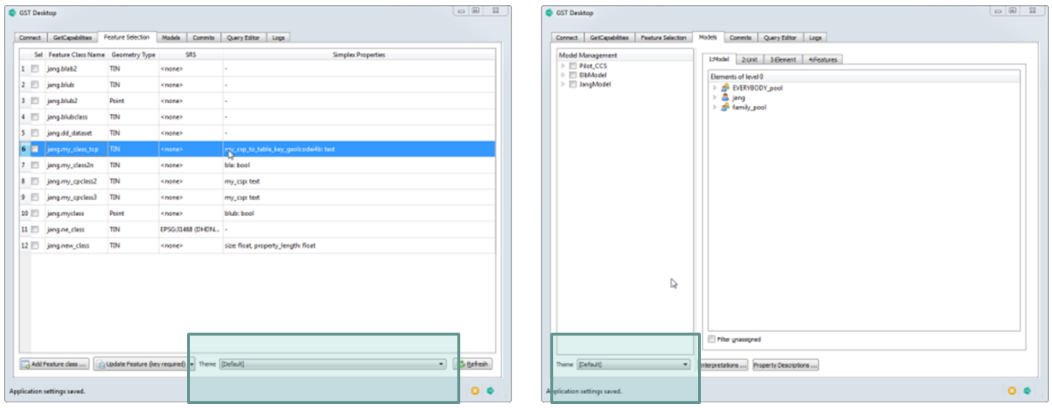


Figure 12.5 The Theme dropdown element has a prominent position in GST Desktop

## Definition of a Continuous Theme

Figure 12.6 Concept of a Continuous Theme

For continuous property values the values might range from the full real number space (depending on the property datatype). Within Continuous Themes the full range is delimited into intervals. Each interval is defined by it's right border and the left neighbored interval border. (As a result the intervals are in mathematic terms left open and right closed, that is depicted in Figure 12.6 with the black square brackets.)

### Within GST Desktop

Within GST Desktop create a Continuous Theme by hovering over the Theme dropdown element with the mouse and pressing the add button.

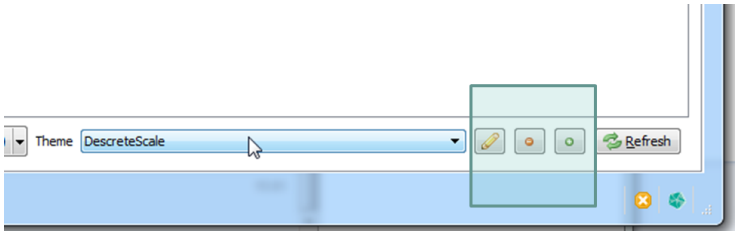



Figure 12.7 Hovering the Theme dropdown menu will show the control buttons

In the **Edit Theme dialog** type in a **Theme label** and a **Property Name Match** and select the radio button **Continuous** to create a Continuous Theme. This will change the lower part of the Dialog (compare Figure 12.8 and Figure 12.10).

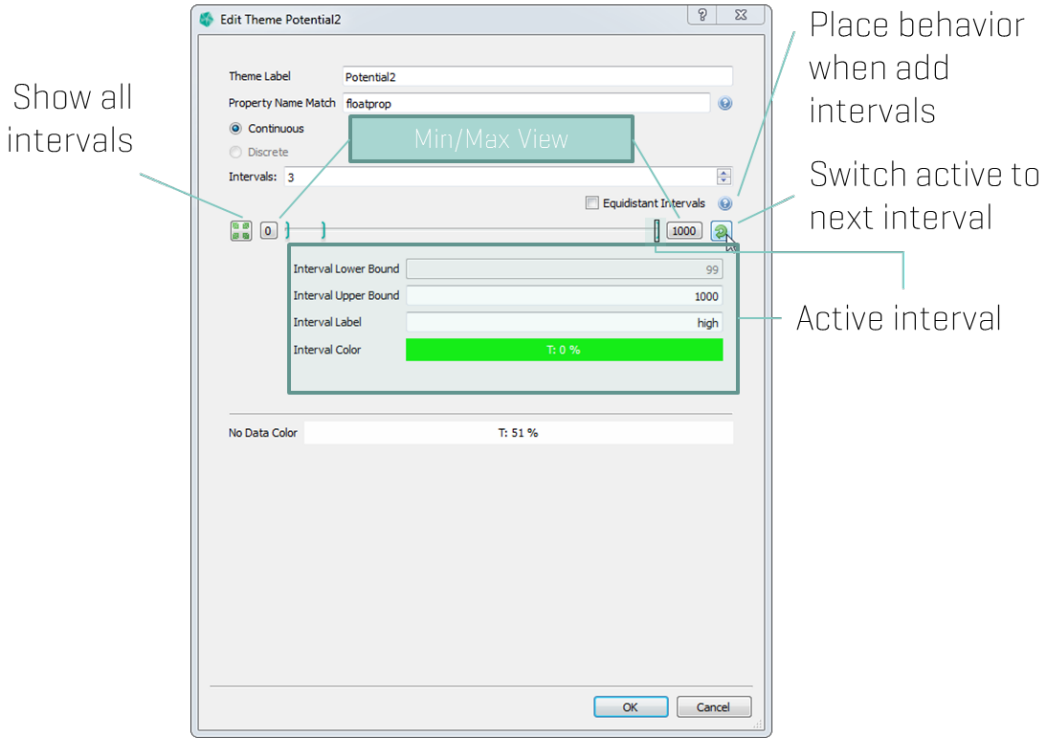



Figure 12.8
The lower part of the Edit Theme dialog will change when ☑ **Continuous** checkbox is activated.

Place new interval handles by increasing the **Intervals** spinbox (in Figure 12.8 it is set to **3**). The way intervals are placed can be controlled by the checkbox ☑ **Equidistant Intervals** (see Note box below for additional information). Drag intervals with the mouse to change the interval border or activate a handle by clicking the **switch** button. The current active handle is highlighted by a small box ( ). The interval border (**Interval Upper Bound**), the **Interval Label** and the **Interval Color** can be set below the slider for the current activated handle. Set the **No Data Color** for all Theme Interpretation left from the lowest and right from the highest intervall (see Figure 12.6)

The Min/Max View buttons allow to zoom on the slider (changing visible range). They do not change any interval value so they can be changed without care. Use the **reset zoom** to undo and view all handles. (Note that the Min/Max View buttons will change their labels to the visible range.)

**Equidistant Intervals**

**Checked** When new Intervals are added (incrementing Spinbox value above) the Interval handles are placed in equal distances on the multislider. This means existing intervals will change their values in order to form equidistant intervals.
**Unchecked** Non Equidistant Intervals are always inserted in the last Interval. No Existing Interval is changed.

## Definition of a Discrete Theme

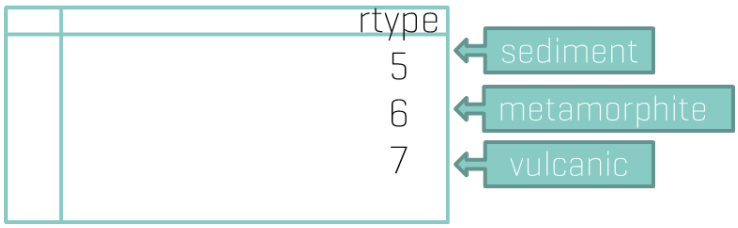


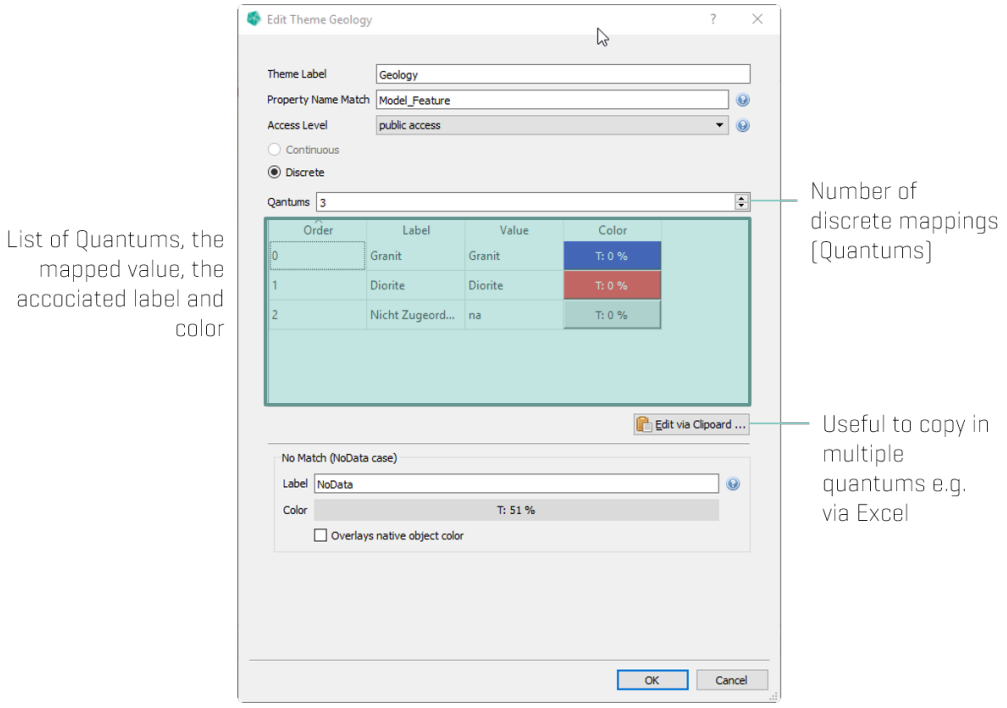

Figure 12.9
Concept of a Discrete Theme

Discrete Themes are 1:1 mappings from Property Values to Theme Value, label and Color. They can be used to group data or visualize geocodes.

### Within GST Desktop

Within GST Desktop create a Discrete Theme by hovering over the Theme dropdown element with the mouse and pressing the add button. In the **Edit Theme Dialog** select the radio button Discrete to create a Discrete Theme.

Figure 12.10
Discrete Themes in Edit Theme Dialog



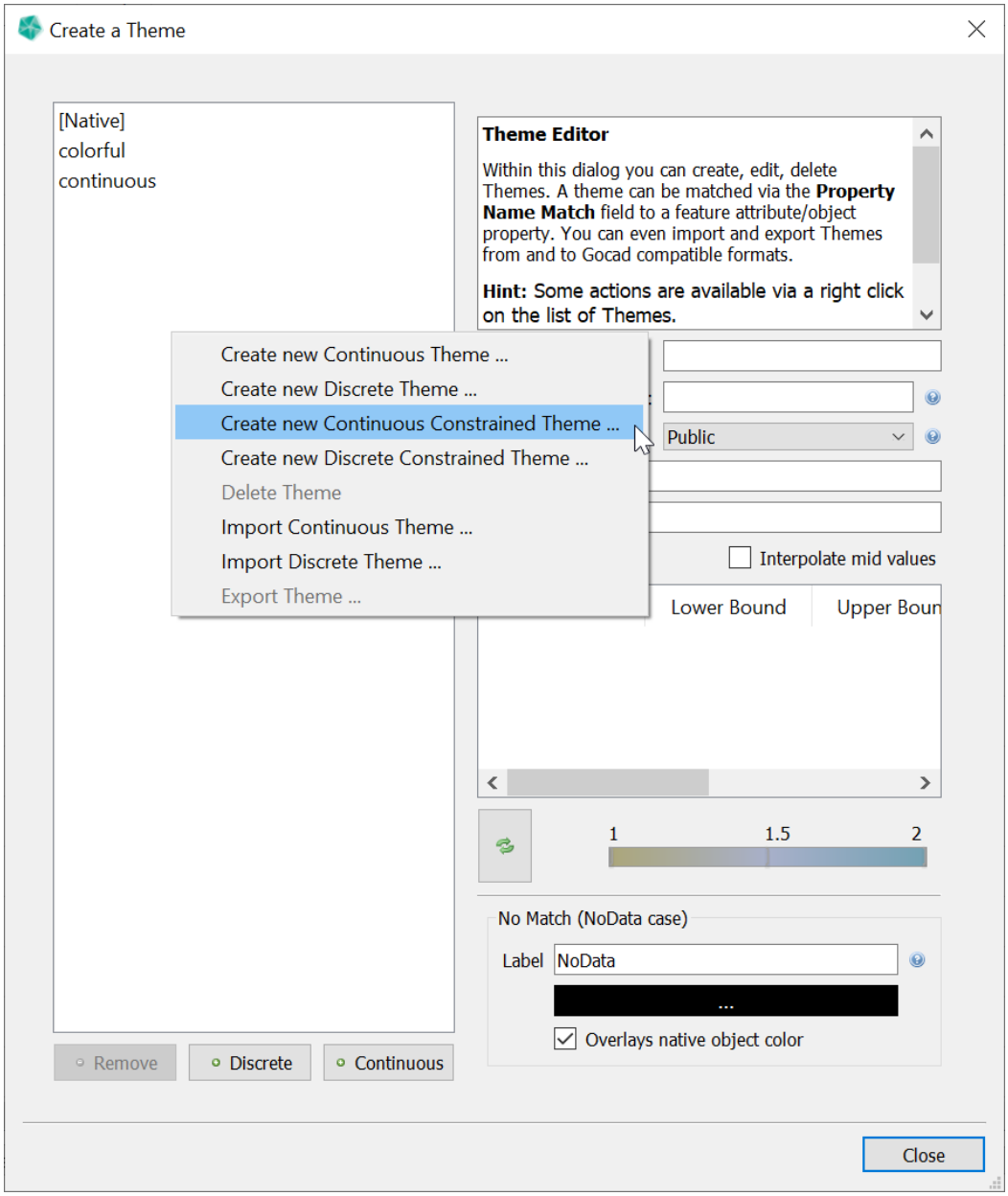

The table below the **Quantums** spinbox represents the mapping. The column **Value** represents the Property Value that will be mapped to the **Label** and **Color**. **Order** can be used to control the order of the Theme Interpretations, e.g. a legend.

## 12.3 Constrained Theme

A Constrained Theme allows you to read the theme data from an external source.

This section will explain how to setup the constrained part, for the specifics about themes themselves, please see the previous section.

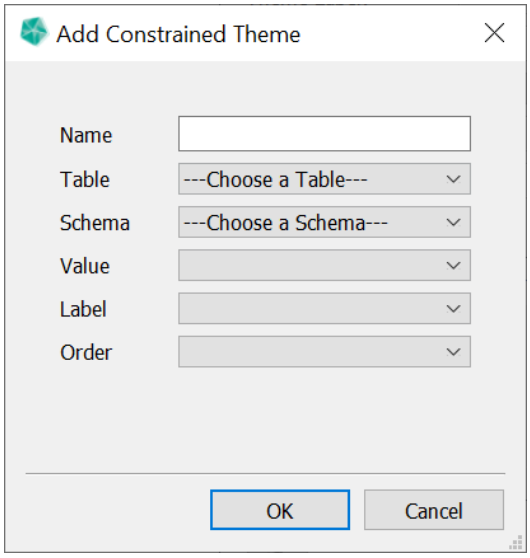
Figure 12.11
Create Constrained Theme




To add a new continuous constrained theme, select **Create new Continuous Constrained Theme ...**. For a discrete constrained theme, select **Create new Discrete Constrained Theme ...**.

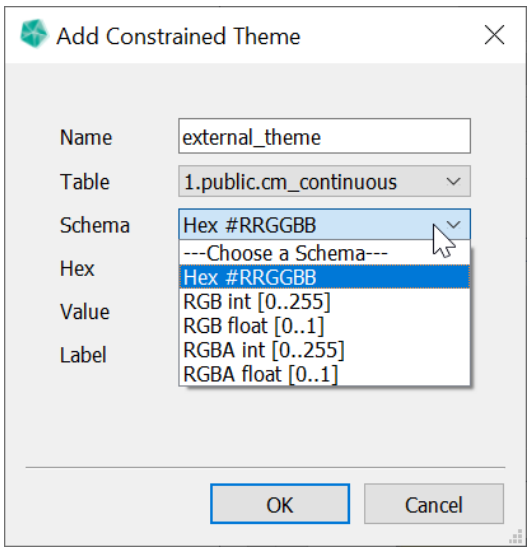
After selecting one of the options, you can setup the external table information.

Figure 12.12
Add Constrained Theme Dialog




- **Name** The name of the theme.
- **Table** The external table.
- **Schema** The column schema of the color value.

### Color Column Schema

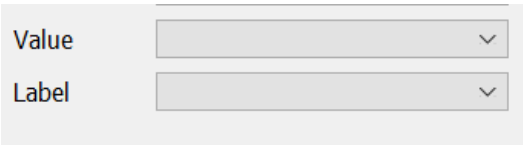



We currently support the following color column schemas:

- **Hex** color is read from a text column. The text values must have the form "#RRGGBB" where each letter is a hex number [0-9A-Fa-f].
- **RGB[A] int** color is read from 3 [4] integer columns. Values must be between 0 and 255.

- **RGB[A] float** color is read from 3 [4] float columns. Values must be between 0 and 1.

### Continuous Column Schema




- **Value** The column with the map value. Type float.
- **Label** The column with the label of the value. Type text.

### Discrete Column Schema

- **Value** The column with the map value. Type text.
- **Label** The column with the label of the value. Type text.
- **Order** The column with the order of the value. Type integer.

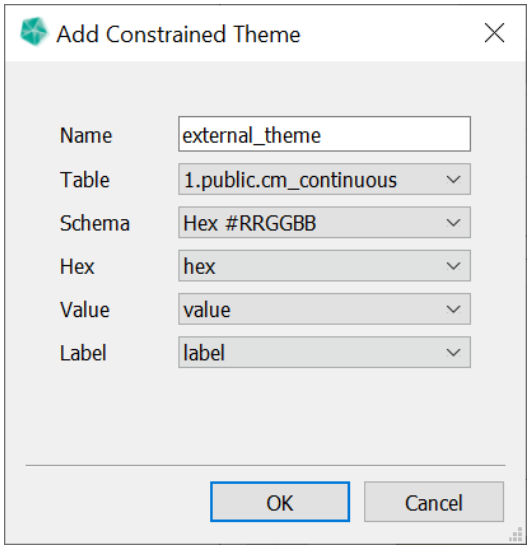
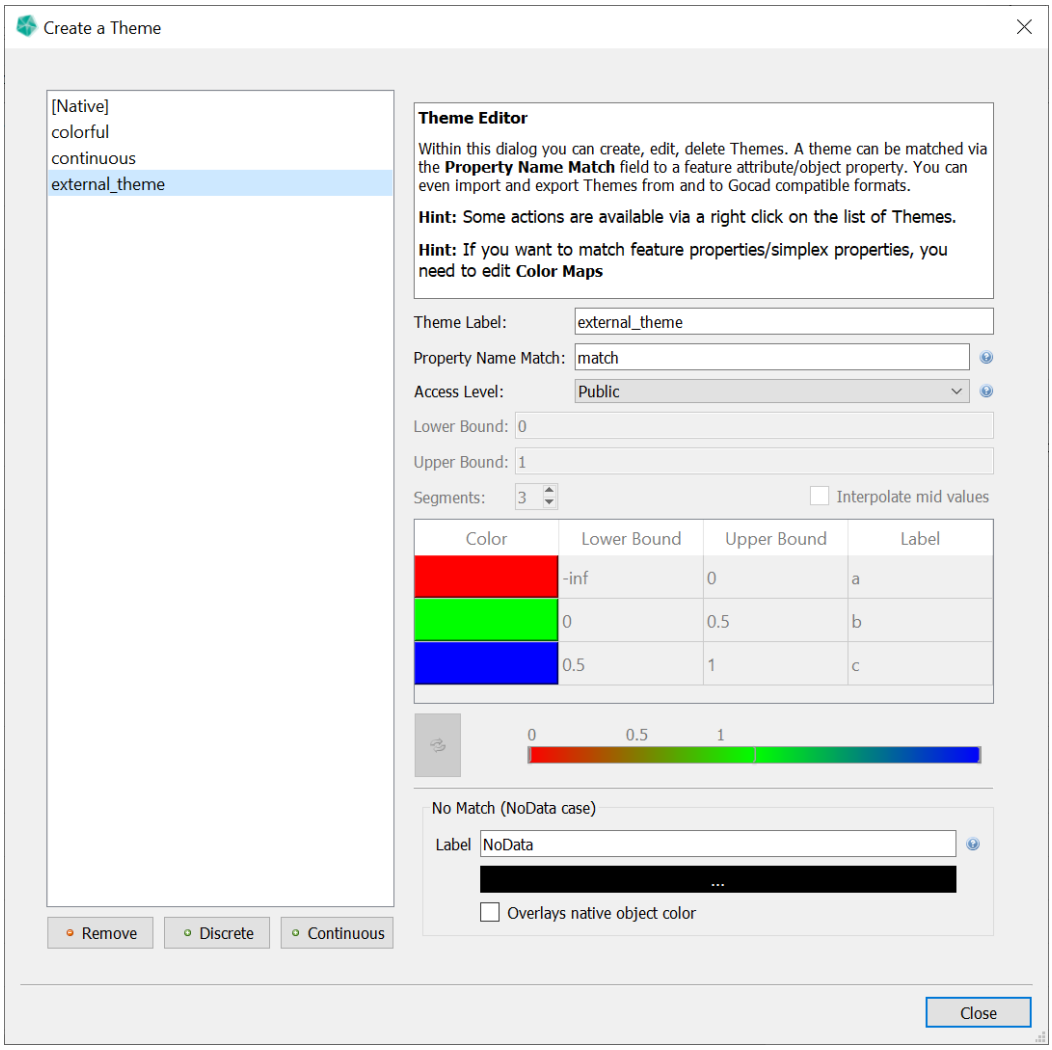



Figure 12.13 Add Constrained Theme Dialog - Example

After you setup the table and column information, press ok to add the map to the theme list. Here you can change the matching string and the name. After everything is setup, **Apply** the unconfirmed changes to write them to the database.

For Constrained Themes, only the sections **Theme label**, **Property Name Match**, **Access Level** and **No Match** are editable. The other information is read from the connected table.

Figure 12.14
Constrained Theme Entry - Example



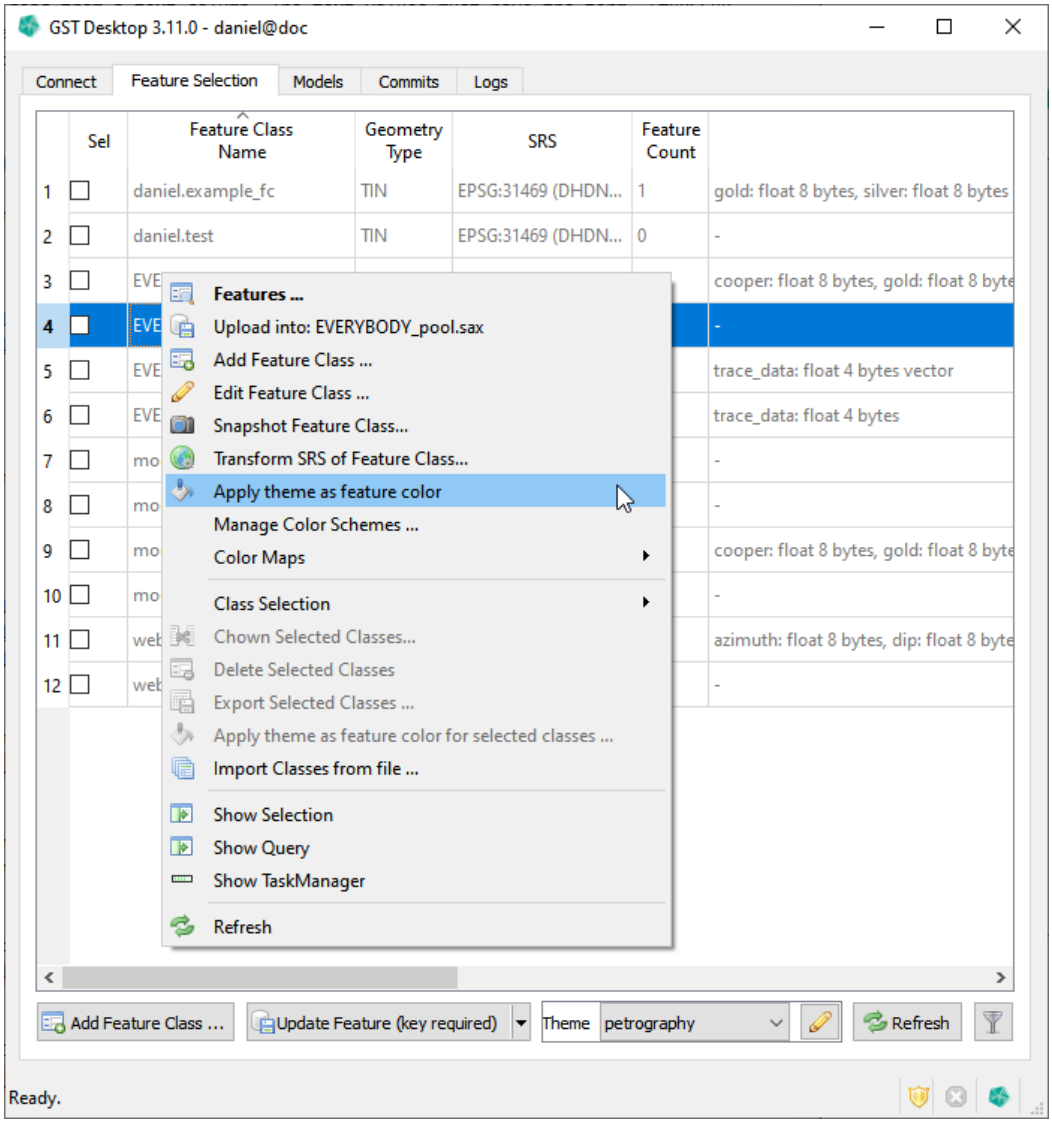

**Note**

The color entries currently are only shown after the theme has been written to the database.

## 12.4 Apply Theme as Feature Color

This is an option to set the default feature color for features of a feature class to the colors of a specific theme.

Figure 12.15
Apply Theme as Feature Color




Choose the theme you want to apply in the **Theme Selection**. Select the context menu action "Apply Theme as Feature Color" on the chosen feature class. Now all features of this feature class have the default feature color set from the selected theme.

# 13 Manage Simplex Property Color Maps

The context menu of a Feature Class shows all Simplex Properties assigned to that Feature Class. Simplex Properties which are not connected to any Color Map are displayed in italic font.

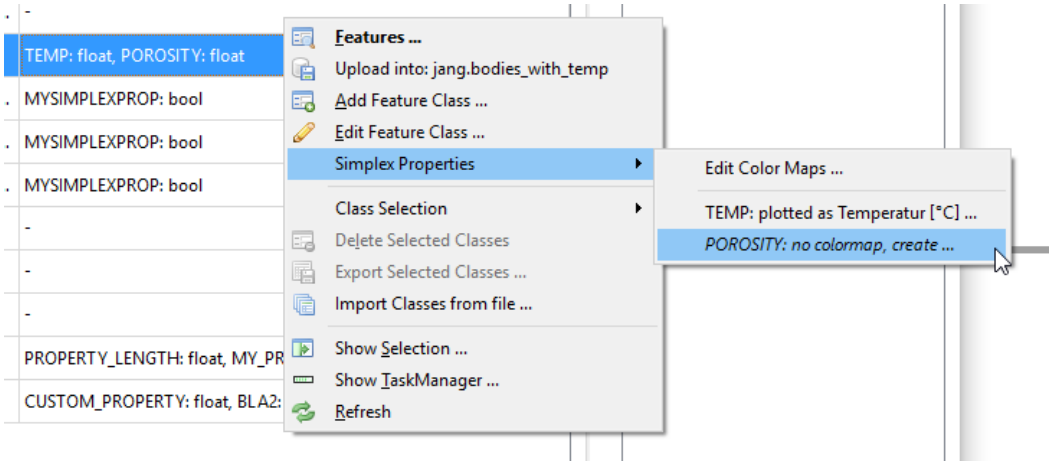



Figure 13.1
The context menu of a Feature Class shows all Simplex Properties assigned to that Feature Class. Simplex Properties which are not (yet) connected to any Color Map are displayed in italic.

Simplex Properties are used to color code Simplex Property values in the 3D scene of **GST Web**. This can be customized by defining Color Maps. A legend allows the user to trace back a color to a value.

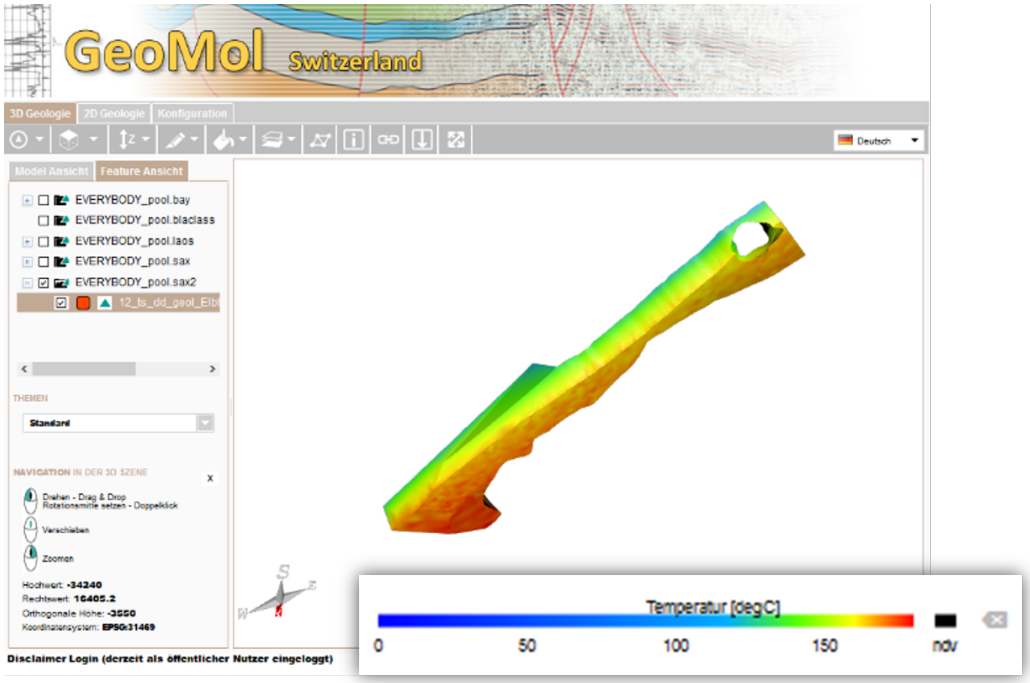



Figure 13.2
Color Maps are used color code Simplex Property values in the 3D scene of GST Web. A legend allows the user to trace back a color to a value.

## 13.1 Create or edit a Continuous Color Map

In order to create a Continuous Color Map, click on a non assigned Continuous Simplex Property with type float (printed in italic font), see figure 13.1. (To edit an existing Color Map click an assigned Simplex Property, printed in non italic font.) The Color Map Editor opens up (figure 13.3), where the **Property Name Match** is adjusted to connect the Color Map with the Simplex Property specified before.

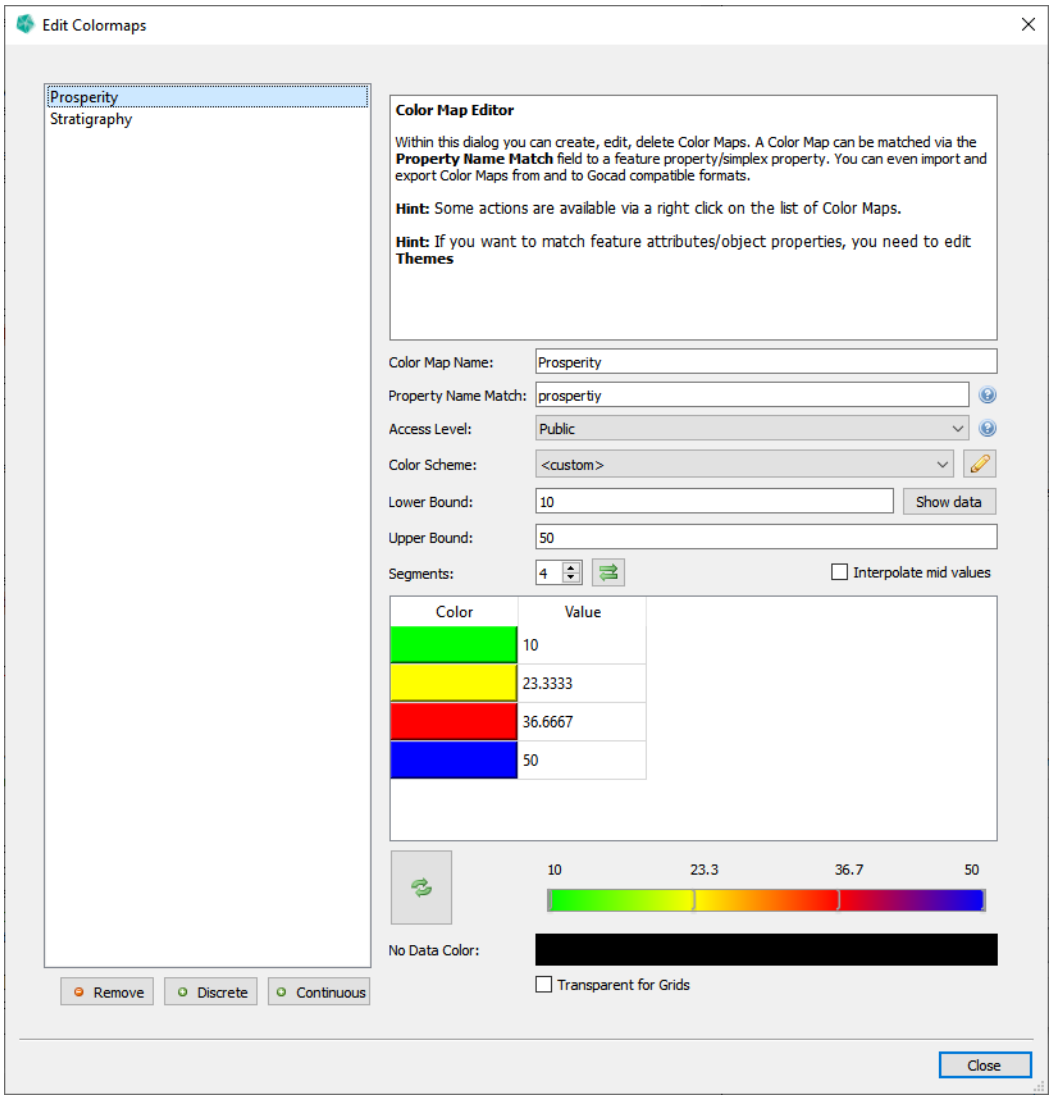



Figure 13.3
Create or edit a Continuous Color Map

Within the Color Map Editor you define how the Simplex Property is going to be visualized in GST Web. The following controls are available to define the Color Map. A legend **Preview** is available at the bottom of the Color Map Editor.

**Color Map Label** defines the label or name of the Color Map (displayed next to the legend in GST Web).

**Property Name Match** defines the Simplex Properties this Color Map is connected to. Analogue to Themes this match string supports a semicolon separated list, * and ? operator in order to match multiple Simplex Properties differing in name. Please refer to the example box in subsection **Match pattern** of chapter Motivation and concept of Themes on page 152 for an example of match patterns!

**Access Level** defines the level of GST Web users this Color Map is visible to. Please refer to subsection **Access Levels** of chapter Motivation and concept of Themes on page 152 for an explanation about Access Levels!

**Color Scheme** use a predefined color scheme. Helps to auto fill the table with color value pairs. See Color Schemes on page 174 for more information on color schemes.

**Lower Bound, Upper Bound** helps to auto fill the table. Type in numbers and check the checkbox **Interpolate mid values** in order to fill the table in a quick and easy way.

**Segments** defines the number of color value pairs of the Color Map.

**No Data Color** defines the color used for no data values (NULL values).

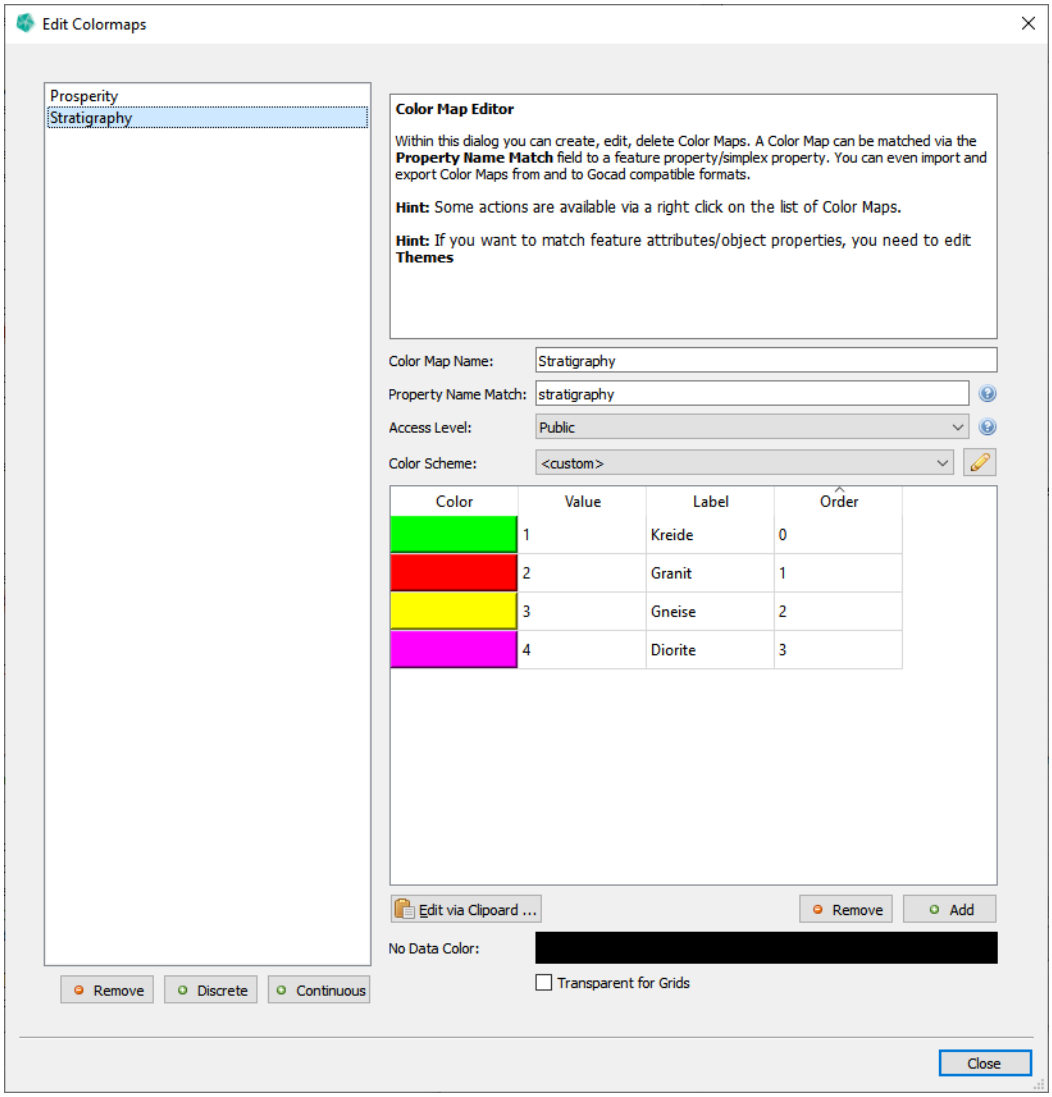
**Transparent for Grids** If active, no data values (NULL values) for Grid Geometries will be visualized transparently. This affects the presentation in GST-Web and Intersections. Otherwise, the **No Data Color** applies.

Press **Apply** to save your changes. **Discard** will discard your changes and not save anything.

## 13.2 Create or edit a Discrete Color Map

In order to create a Discrete Color Map, click on a non assigned Simplex Property with a discrete type bool, integer or text (printed in italic font), see figure 13.1. (To edit an existing Color Map click an assigned Simplex Property, printed in non italic font.) The Color Map Editor opens up (figure 13.4), where the **Property Name Match** is adjusted to connect the Color Map with the Simplex Property specified before.

Figure 13.4
Create or edit a Discrete Color Map




## Explanation of the general input fields

**Color Map Label** defines the label or name of the Color Map (displayed next to the legend in GST Web).

**Property Name Match** defines the Simplex Properties this Color Map is connected to. Analogue to Themes this match string supports a semicolon separated lists, * and ? operator in order to match multiple Simplex Properties differing in name. Please refer to the example box in subsection **Match pattern** of chapter Motivation and concept of Themes on page 152 for an example of match patterns!

**Access Level** defines the level of GST Web users this Color Map is visible to. Please refer to subsection **Access Levels** of chapter Motivation and concept of Themes on page

152 for an explanation about Access Levels!

**Color Scheme** use a predefined color scheme. Helps to auto fill the table with color values. See Color Schemes on page 174 for more information on color schemes.

**No Data Color** defines the color used for no data values (NULL values).

**Transparent for Grids** If active, no data values (NULL values) for Grid Geometries will be visualized transparently. This affects the presentation in GST-Web and Intersections. Otherwise, the **No Data Color** applies.

### Explanation of the entries

- **Color** The display color of the mapped value.
- **Value** The mapped value. A Simplex Property value must match this to be mapped to this entry.
- **Label** The display name of the mapped value.
- **Order** Order of entries, for example in a legend.

Press **Apply** to save your changes. **Discard** will discard your changes and not save anything.

## 13.3 Manage Color Maps

In order to manage Color Maps click **Edit Color Maps ...** in the Feature Class context menu (figure 13.1).

Here you can create new Color Maps or edit and delete existing ones.

To edit or remove a Color Map, select it on the left side in the Color Map Editor (figure 13.3). Use the button **Remove** to remove the selected Color Map.

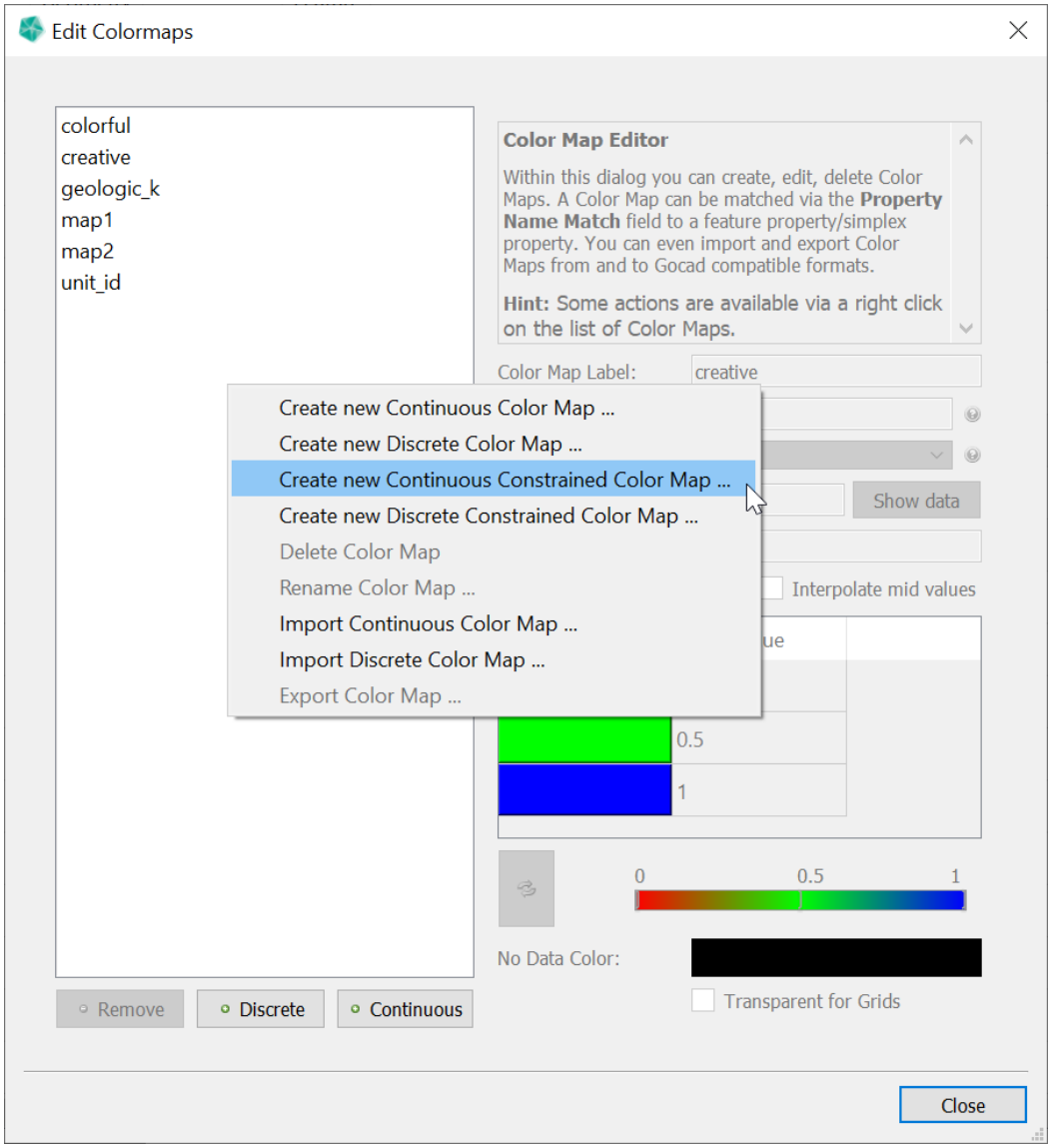
To create a Discrete Color Map use the button **Discrete**. To create a Continuous Color Map use **Continuous**. The **Property Name Match** is empty and requires to match with a Simplex Property Name in order to be connected with a Simplex Property.

## 13.4 Constrained Color Map

A Constrained Color Map allows you to read the color map data from an external source.

This section will explain how to setup the constrained part, for the specifics about color maps themselves, please see Create or edit a Discrete Color Map or Create or edit a Continuous Color Map.

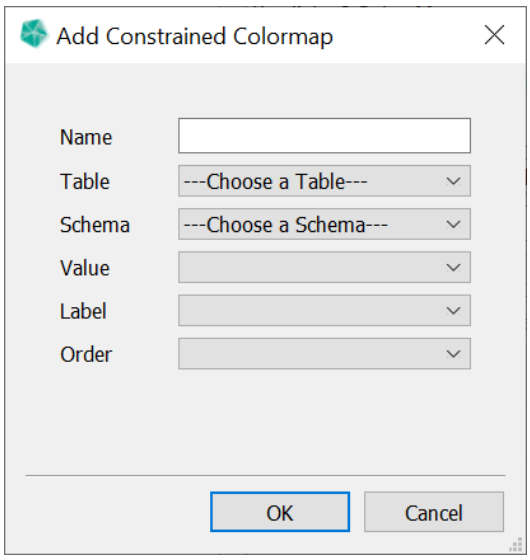
Figure 13.5
Create Constrained Color Map




To add a new continuous constrained color map, select **Create new Continuous Constrained Color Map ...**. For a discrete constrained color map, select **Create new Discrete Constrained Color Map ...**.

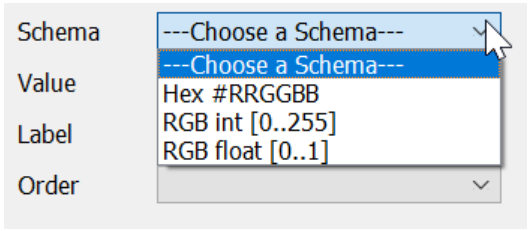
After selecting one of the options, you can setup the external table information.

Figure 13.6
Add Constrained Color Map Dialog




- **Name** The name of the color map.
- **Table** The external table.
- **Schema** The column schema of the color value.

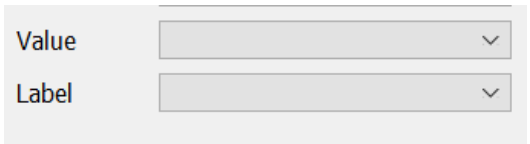
### Color Column Schema




We currently support the following color column schemas:

- **Hex** color is read from a text column. The text values must have the form "#RRGGBB" where each letter is a hex number [0-9A-Fa-f].
- **RGB int** color is read from 3 integer columns. Values must be between 0 and 255.
- **RGB float** color is read from 3 float columns. Values must be between 0 and 1.

### Continuous Column Schema

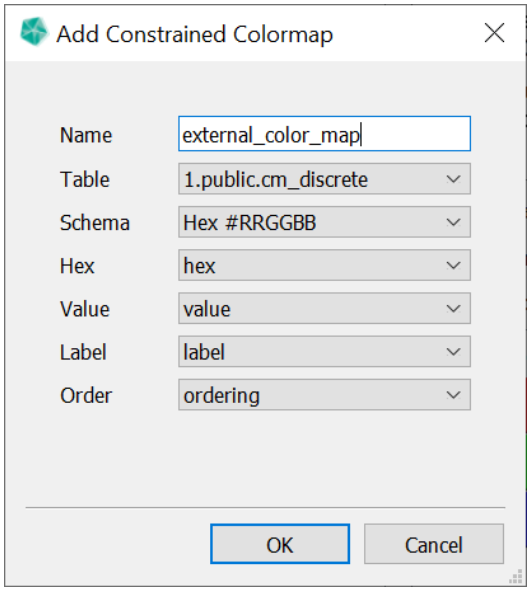


- **Value** The column with the map value. Type float.
- **Label** The column with the label of the value. Type text.

### Discrete Column Schema

- **Value** The column with the map value. Type text.
- **Label** The column with the label of the value. Type text.
- **Order** The column with the order of the value. Type integer.

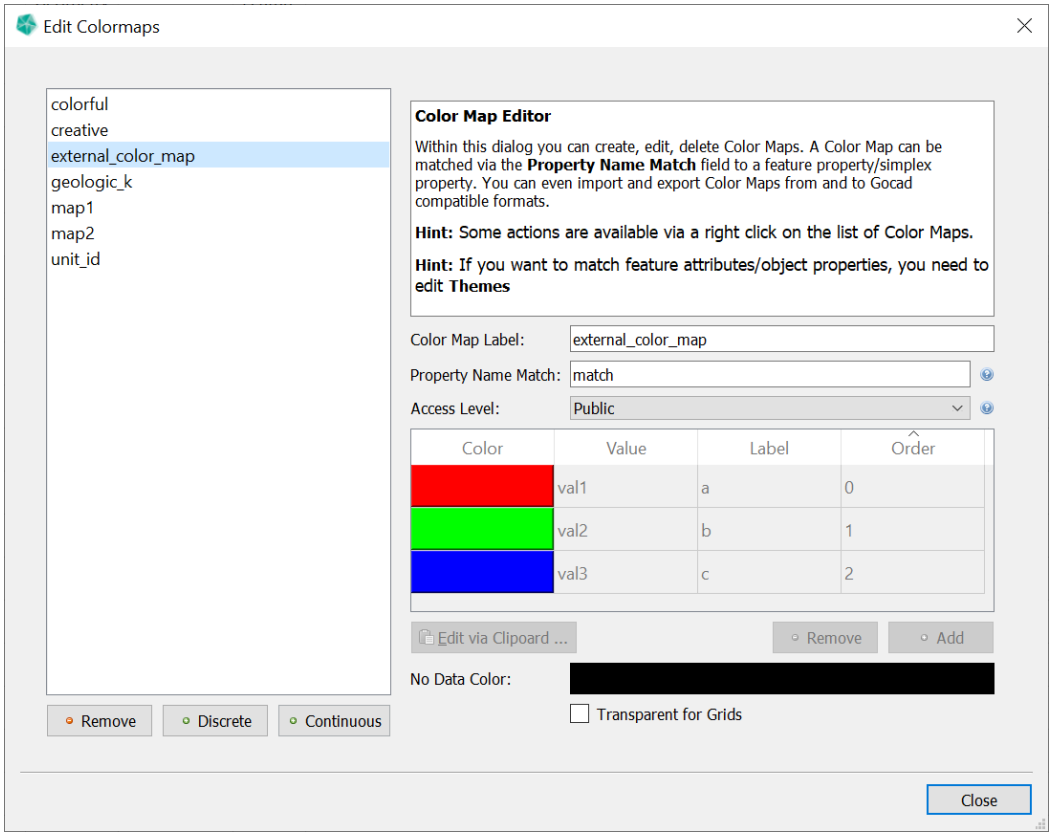
Figure 13.7 Add Constrained Color Map Dialog - Example




After you setup the table and column information, press ok to add the map to the color map list. Here you can change the matching string and the name. After everything is setup, **Apply** the unconfirmed changes to write them to the database.

For Constrained Color Maps, only the sections **Color Map label**, **Property Name Match**, **Access Level** and **No Data Color** are editable. The other information is read from the connected table.

Figure 13.8
Constrained Color Map Entry - Example




## Note

The color entries currently are only shown after the color map has been written to the database.

# 14 Color Schemes

Color Schemes define a sequence of colors. There are Continuous and Discrete Color Schemes.

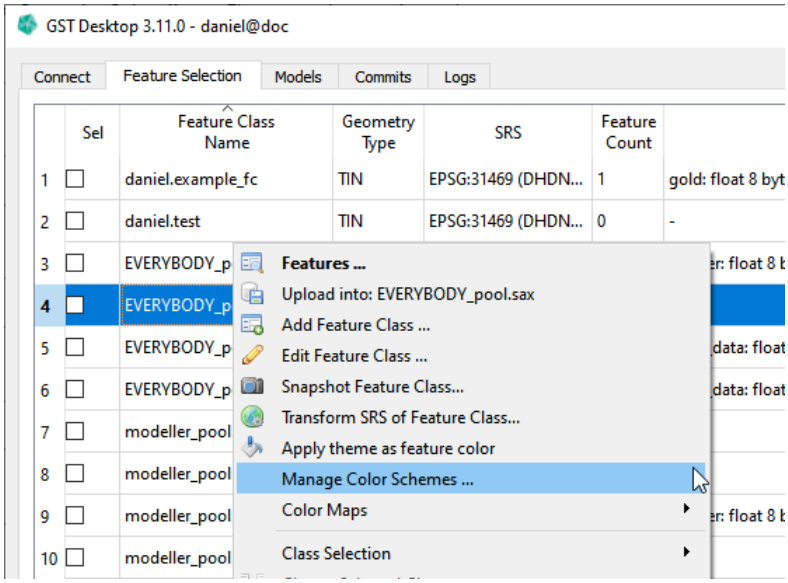
A Continuous Color Scheme defines a color ramp or color gradient. It is stored as ordered list of (color, stop) values. The range of stop values is between 0% and 100% inclusive. Each consecutive pair of values defines a color segment.

A Discrete Color Scheme defines an ordered list of colors.

Color Schemes are used to help in the creation of Themes and Simplex Property Color Maps. They are also used as options for the dynamic point cloud color maps in GST-Web.

## 14.1 Manage Color Schemes

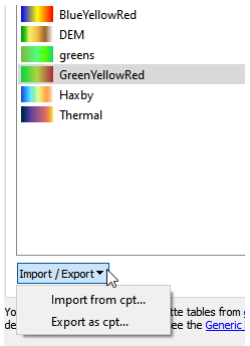
To enter the **Manage Color Schemes** dialog, right click in the **Feature Selection** tab and select the **Manage Color Schemes ...** action.



In the **Manage Color Schemes** dialog, you can view the current available Color Schemes, divided by the tabs **Continuous** and **Discrete**. You can **Add**, **Remove** and **Edit** Color Schemes.

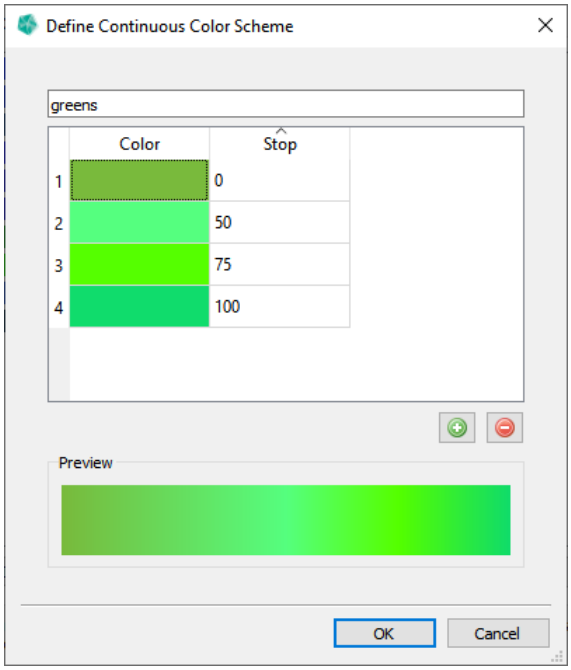
See the next section for how to define a continuous and discrete color scheme.

We also support import and export of the .cpt format. See `http://soliton.vm.bytemark.co.uk/pub/cpt-city/` for a list of .cpt maps.




## Define Continuous Color Scheme

When adding or editing a continuous color scheme, you will see the **Define Continuous Color Scheme** dialog.




* Set the name of the color scheme at the top.
* Add a new row after the highlighted row. The initial color and stop value of the new row will be interpolated between the highlighted row and next row.
* Remove the highlighted row.
* Change a color by double clicking the color field.
* Change a stop value by double clicking the stop field. The row might move based on the stop value order.

**Note**

You can not remove the first or last row or change their stop value.
You can change their color.

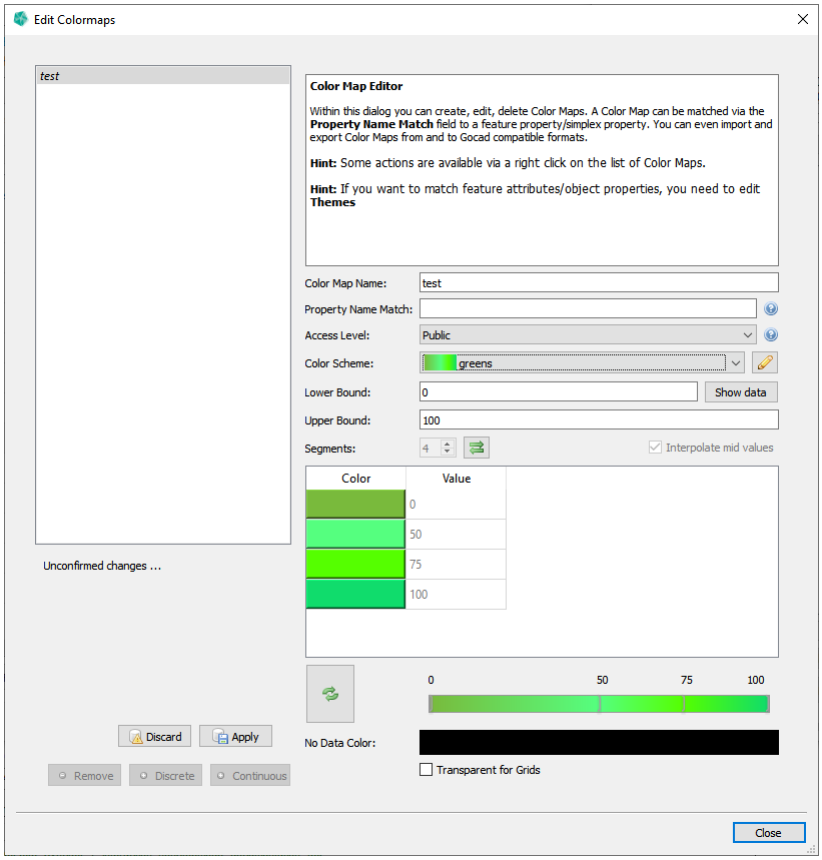
## Define Discrete Color Scheme

When adding or editing a discrete color scheme, you will see the **Define Discrete Color Scheme** dialog.

* Set the name of the color scheme at the top.
* **Add** a new color to the end of the list.
* **Remove** the highlighted color from the list.
* Change a color by double clicking it.
* Drag and drop entries to change the order.

## 14.2 Use Color Schemes

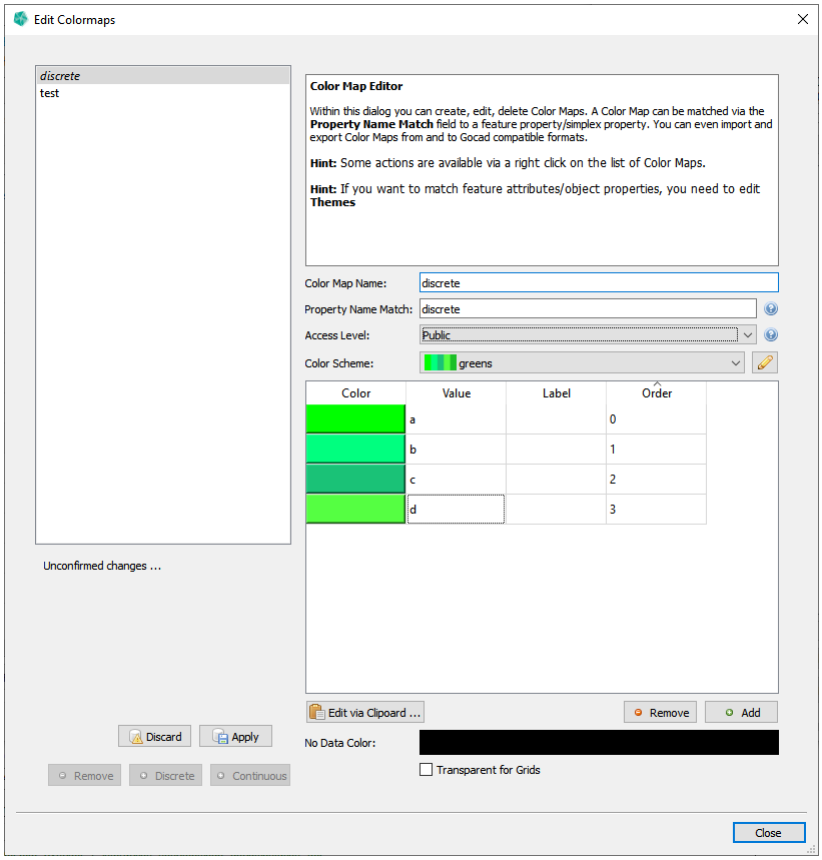
You can use Color Schemes when creating Themes and Simplex Property Color Maps. In the following we will use Color Maps, but the same applies for Themes.




When defining a Continuous Color Map, you can select one of the available Continuous Color Schemes from the **Color Scheme** combo box. Once done so, the number of segments, colors and values will be based on the Color Scheme and the entered **Lower Bound** and **Upper Bound**. Changing **Lower Bound** and **Upper Bound** will remap the values to the new bounds.

## Note

When you activate a Color Scheme, you will no longer be able to change the number of segments or the values, since these are based on the selected Color Scheme. You can switch to the **<custom>** Color Scheme to freely change the current values.




When defining a Discrete Color Map, you can select one of the available Discrete Color Schemes from the **Color Scheme** combo box. Once done so, entries will use one color from the Color Scheme taking the Color Scheme order into account. If there are more entries than Color Scheme colors, the process will repeat from the front.

# 15 Member Properties

Within GST Desktop it is possible to define **Member Properties**. Member Properties are indicated by an $m_$ prefix in their property name. Commonly Member Properties are used to link external data files with geometry objects.

Supported Member Properties are


* Textured Lines . . . . . page 180
* Linked Files . . . . . page 184
* Feature Alias . . . . . page 184


## 15.1 Textured Lines

Textured lines enable the visualization of images within the 3D scene of GST-Web. They can be any image file like a section scan or a seismic image.

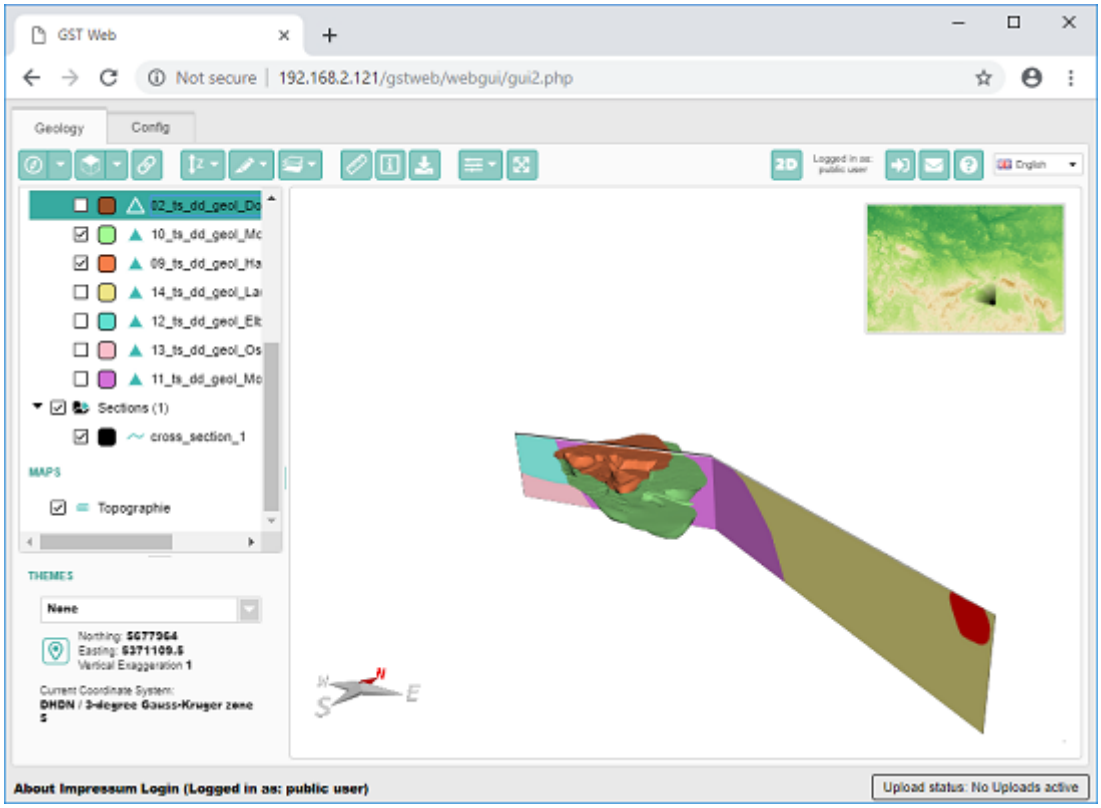
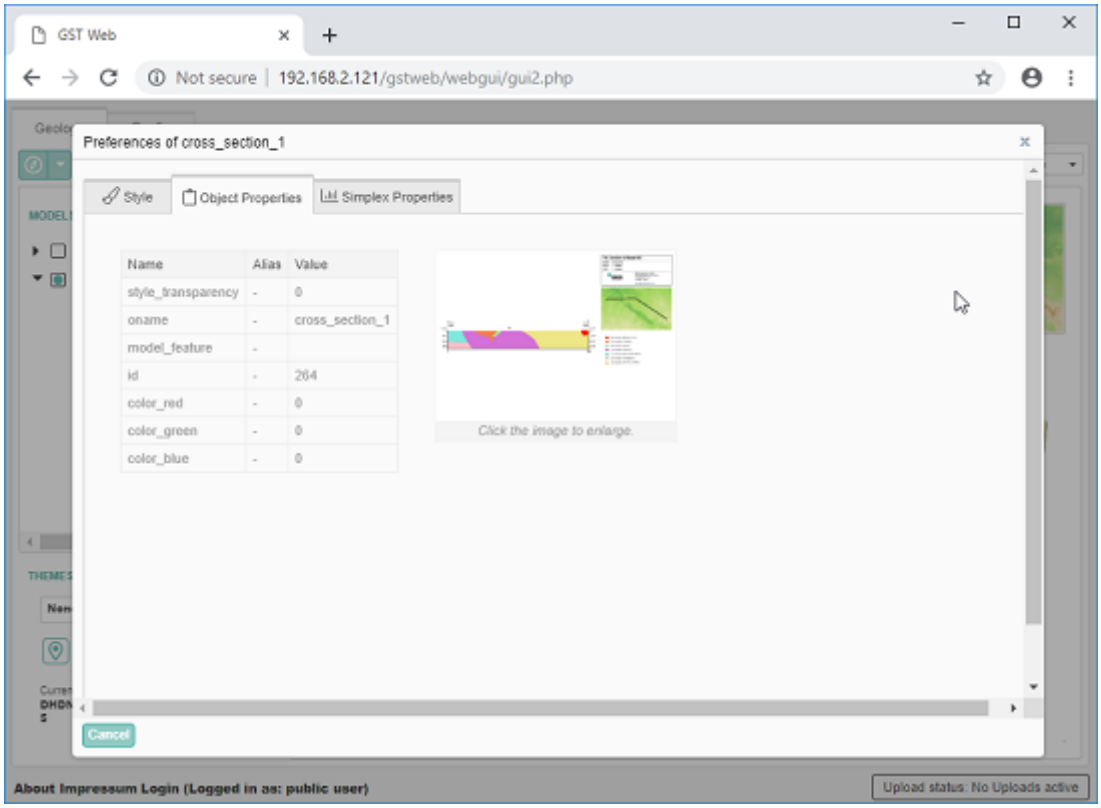



Figure 15.1
A cross section image in the GST-Web 3D scene.

The Textured Line image can be seen and downloaded in the Properties window.

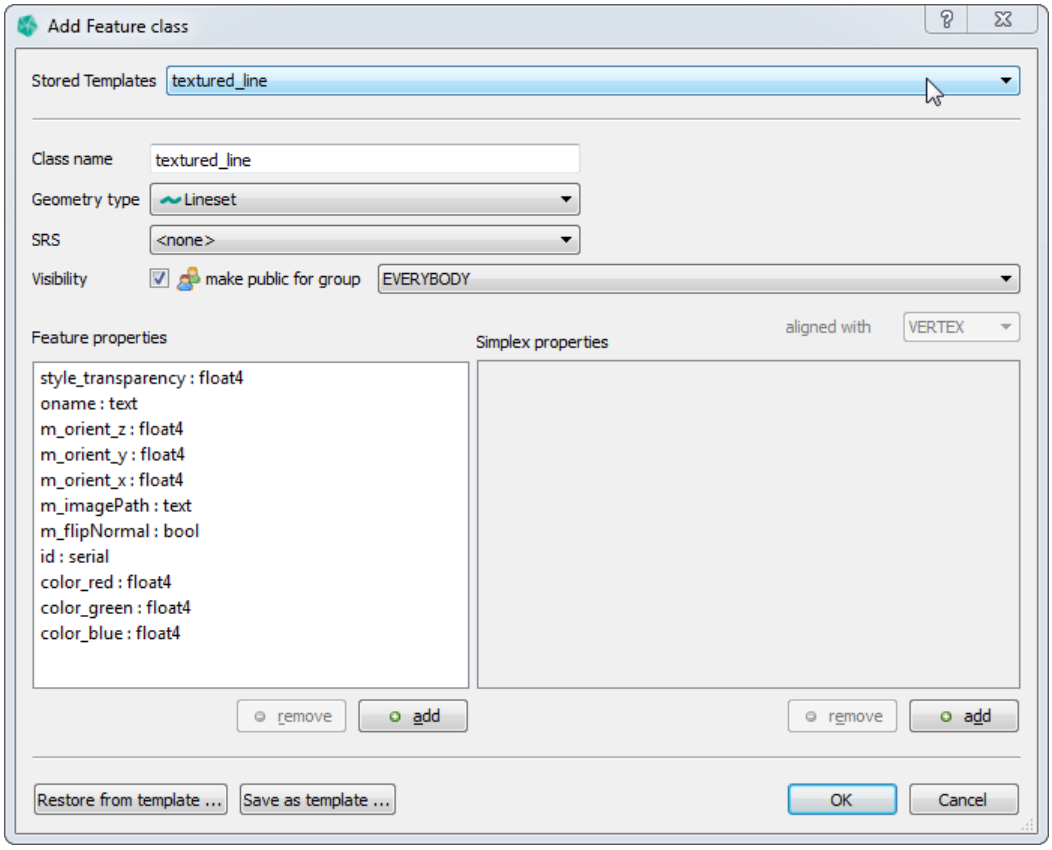
Figure 15.2
Properties window with cross section image.




## Add a Textured Line to GST

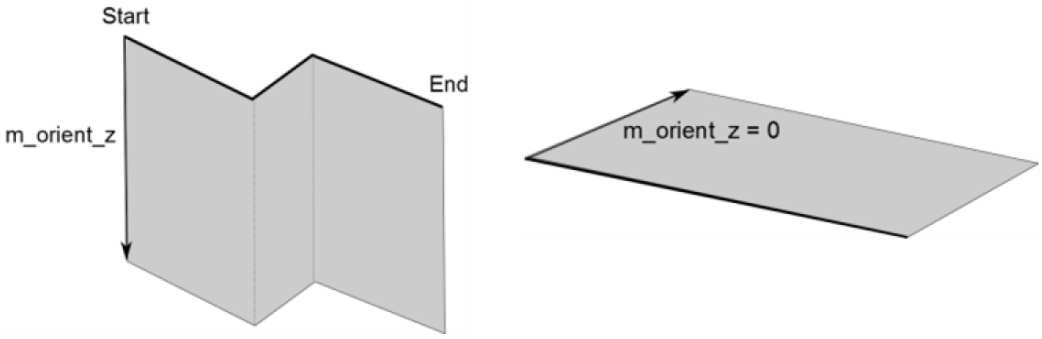
In order to add a Textured Line to GST a Feature Class needs to be of type **Lineset** and have some special Member Properties. To simplify the creation, use the Stored Templates drop-down element in the Add Feature Class dialog (see figure 15.4). Adjust the name and add additional properties as required.

Figure 15.3
Using Stored Templates




## Special Member Properties for Textured Lines

Figure 15.4
The orient vector.




* **m_orient_x** -- x component of the surface orientation. Set to 0 for a vertical image.
* **m_orient_y** -- y component of the surface orientation. Set to 0 for a vertical image.
* **m_orient_z** -- z component of the surface orientation. Set to the height of the image. A negative value places the image below the line string, a positive one above.

* **m_imagePath** -- The image filename. Images have to be placed onto the GST-Web instance. Place them in Client Data, either directly or in a subdirectory. The filename is relative as seen from Client Data.
* **m_flipNormal** Controls whether the image texture will be flipped / mirrored. If false the first point of the input line string is aligned with the upper left corner of the image. If true the first point of the line string is aligned with the upper right corner of the image.

The width of the image in the 3D scene is equal to the length of the line string. The height to the length of the orient vector.

You can set these values like any object property, either during the upload (see Section: Object Properties on page 72) or later in the Feature Class view (see Browsing Features and changing Object Property Values on page 22).

## Crop image with offset JSON

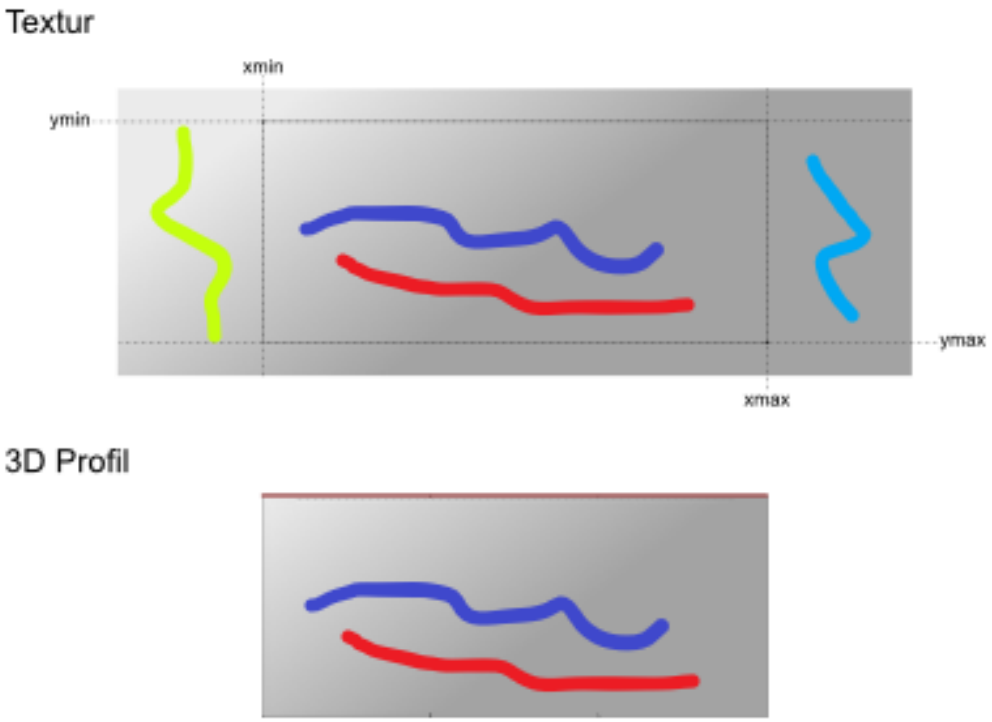
To only show part of the input image in the 3D scene, place a JSON config file next to the image in the Client Data directory. The config file must have same name as the input image with `.json` as file extension. The structure of the offset JSON is as follows.

```
{
    "xmin": 10,
    "ymin": 10,
    "xmax": 610,
    "ymax": 410,
    "width": 800,
    "height": 600
}
```

`(xmin, ymin)` define the upper left, `(xmax, ymax)` the lower right point of the cropped image. `width` and `height` have to be set to the values of the input image (before cropping). Values are in pixels and all are mandatory.

With the values above, the input image of size 800x600 will be cropped to a image starting from pixel `(10, 10)` with a size of 600x400.

Figure 15.5
Cropping example




## 15.2 Linked Files

Linked files are displayed as hyperlinks in GST Web when the Property Page is being displayed (see figure 15.2). To define a Linked File, you need to define a Member Property with the prefix **m_path_** to a custom property name, e.g. **m_path_PdfDoc** displays a hyperlink in GST Web next to the label **PdfDoc**. Like textured lines the value of this property can be set during uploading an object (see Section: Object Properties on page 72) or later in the Feature Class view (see Browsing Features and changing Object Property Values on page 22).

The value of the **m_path_** Member Property should be a relative path that is accessible from the server that is running GST Web. The easiest way to do so is to upload your files to a location into GST Web. This location can be set in the GST Web Admin interface with the parameter **Path to Textures**. Please consult the GST Web documentation for further information.

## 15.3 Feature Alias

Feature Alias can be used as an alternative display name for Features in GST Web and Intersections.

**Motivation**

The Feature name stored in GST is often rather technical (for example **06_ts_dd_geol_Gneise**). For a general audience, like a public GST Web instance, a simpler name (for this example **Gneise**) may be preferable.

If a Feature has the Alias Member Property and its value is not empty, GST Web and Intersection will use this value in places where a Feature name is displayed. In all other cases the standard Feature name is used.

To enable this for a given Feature Class, add a Member Property with the name **m_alias** and type **text** (see Edit a Feature Class on page 38).

The value of this property can be set when uploading an object (see Section: Object Properties on page 72) or later in the Feature view (see Browsing Features and changing Object Property Values on page 22).

# 16 File Formats

* ISATIS ASCII (Grids) . . . . . page 187

## 16.1 ISATIS ASCII Format (Grids)

### How to Create the ISATIS ASCII File

To create the file in ISATIS so that GST can read it, you need to use the following settings:

- Coordinates Mode: "Do Not Store Coordinates"
- CSV Output: "yes"
- Save a Description Header: "yes"
- Comment Leader: '#'
- Output Grid Sorting: "+X +Y +Z"
- Values Separator: Can be set freely
- Decimal Symbol: Can be set freely

To make sure that GST can detect that you want to upload an ISATIS ASCII file, the file extension has to be **.hd** as in **mygrid.hd**.

**Troubleshooting**

Check that you have used the correct settings as described above
Check that your file has a '.hd' file extension (e.g. mygrid.hd)

## Supported ISATIS parts

As input, GST currently supports the following parts of the ISATIS file:

- structure (Geometry information)
  - sorting=+X +Y +Z
  - x0, y0, z0 (Origin)
  - dx, dy, dz (Grid length per direction)
  - nx, ny, nz (Cell count per direction)
  - theta, phi, psi (Rotation per axis)
- field (Property information)
  - name
  - type
  - f_type
  - ffff (nodata value)
- type mappings (ISATIS => GST)
  - type = numeric and f_type = Integer => integer
  - type = numeric and f_type != Integer => double
  - type = alpha (f_type ignored) => text

GST ignores (means skips and doesn't store) the following:

- structure: x_unit, y_unit, z_unit
- field: unit, comment, f_length, f_digits, description

GST will fail for any of the following conditions:

- structure != grid
- sorting != +X +Y +Z
- Required settings not as described at the start
- File extension != '.hd'

## Example ISATIS ASCII File

```
#
# FILE SAVING: Directory: 03_Grids  File: Grid_Temp_01
#
# structure=grid, x_unit="m", y_unit="m", z_unit="m";
#                 sorting=+X +Y +Z ;
#                 x0=2496915.06 , y0=1090415.06 , z0=  -9500.00 ;
#                 dx=   5000.00 , dy=   5000.00 , dz=   1000.00 ;
#                 nx=          2 , ny=         2 , nz=         2 ;
#                 theta=      30 , phi=        0 , psi=        0
#
# csv_file=Y, csv_separator=",", csv_decimal_symbol="."
# nskip=1
# field=1, type=numeric, name="Temp", bitlength=32;
#          ffff="-9999", unit="C";
#          f_type=Decimal, f_length=10, f_digits=2;
#          description="Creation Date: Oct 31 2017   14:39:25"
#
Temp
220.23
196.36
196.36
161.94
161.94
139.78
121.43
99.94
```

# A Intersection Template detailed information

## A.1 Overview

The **intersection**, **legend**, **overview map** and **scalebar** area position and size inside the template can be defined with a SVG rectangle. To identify the area, be sure to give each rectangle the correct **id** as seen from the following table.

| area | id |
|---|---|
| intersection | G1G4_isec |
| legend | G1G4_legend |
| overview map | G1G4_overview |
| scalebar | G1G4_scalebar |

**Note**

See the **templates** directory of the **GST-Desktop** installation, for some example templates.

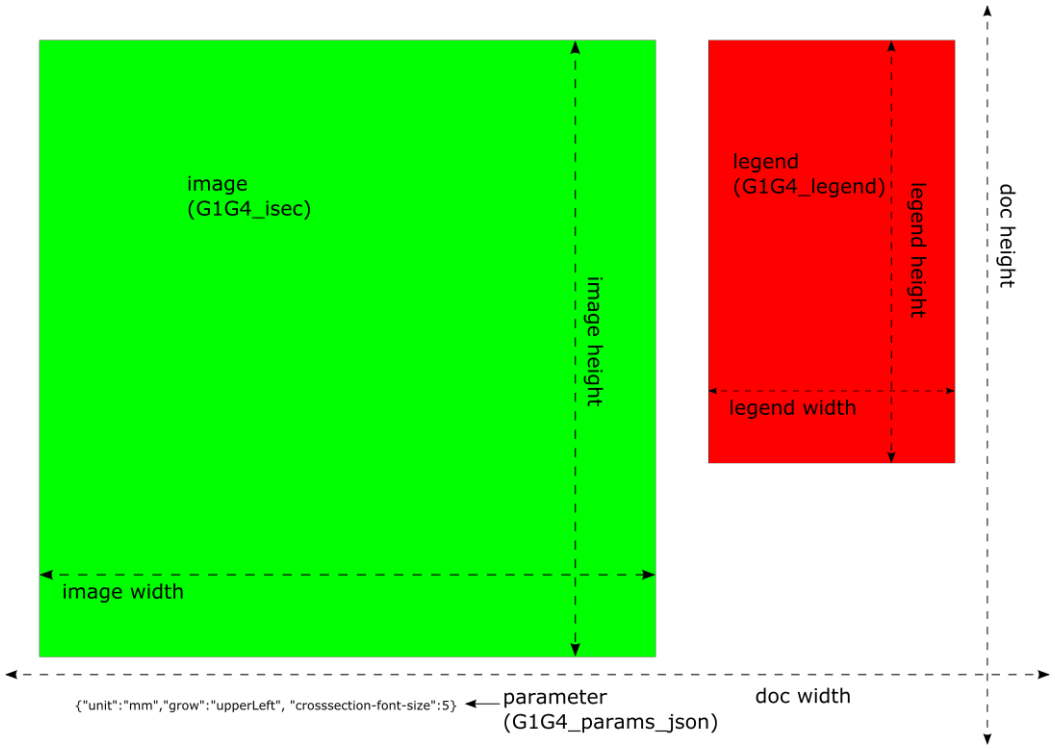



Figure A.1 Overview over the template with some parameters explained

## A.2 Image details

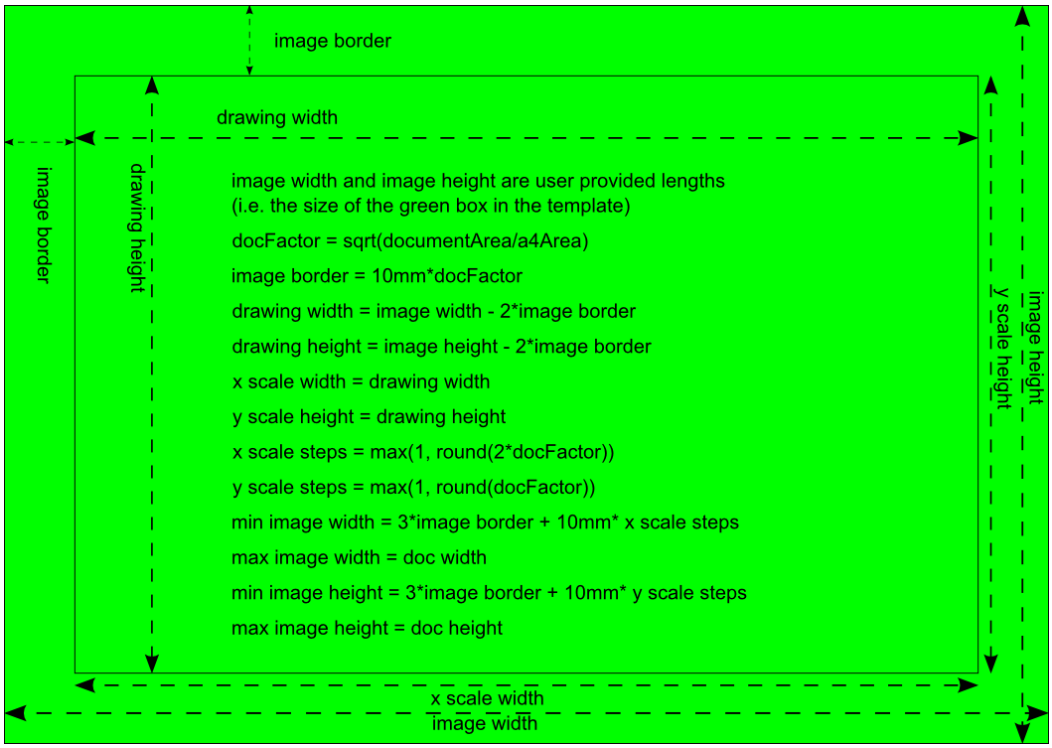



Figure A.2
Detailed parameter explanation to the intersection image box

## A.3 Legend details

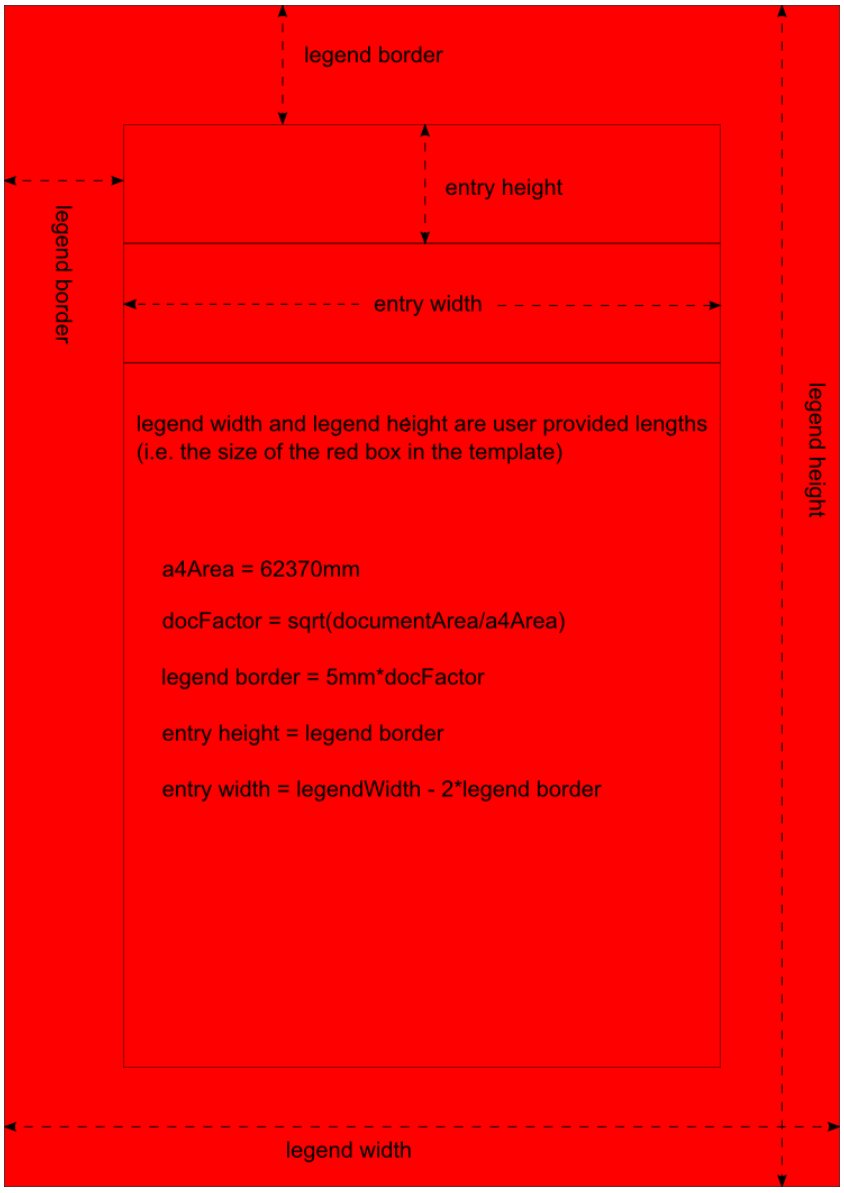
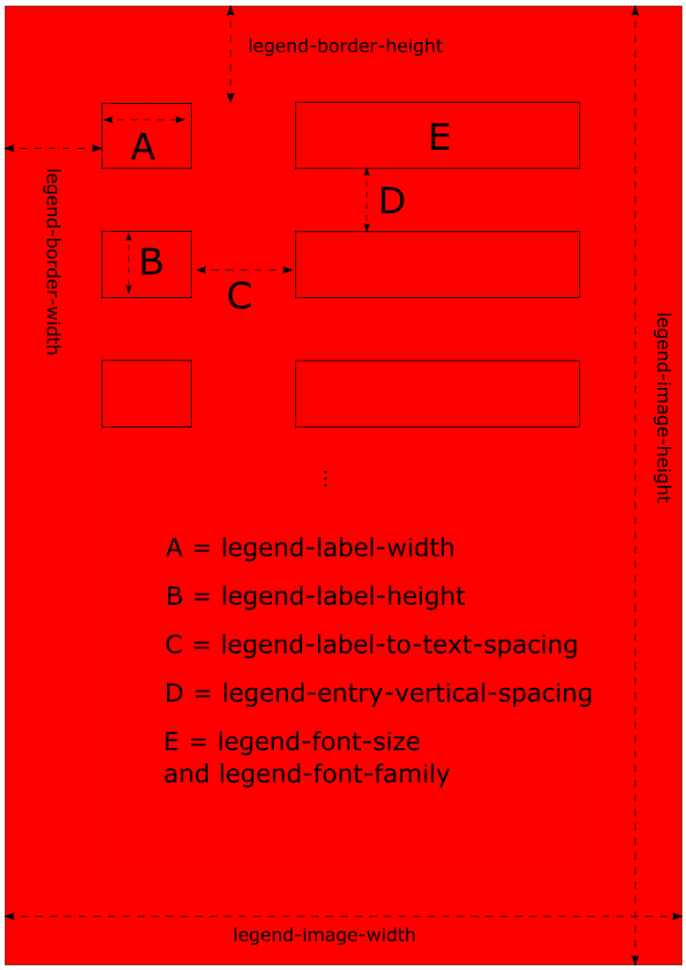


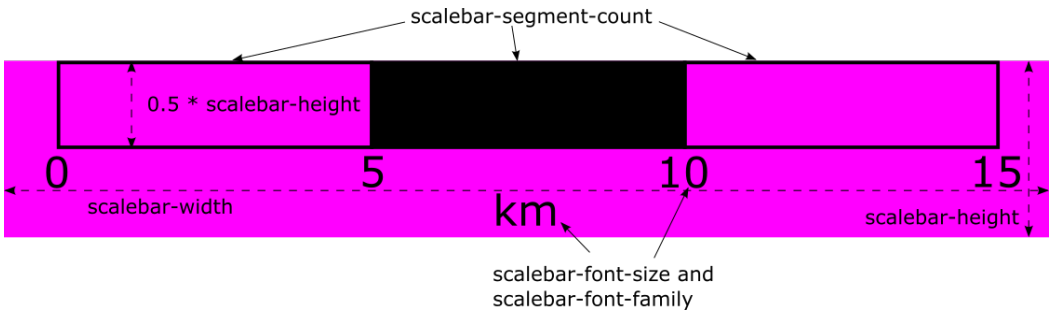

Figure A.3
Detailed parameter explanation to the legend box

Figure A.4
json parameter explanation




## A.4 Scalebar details

Figure A.5
Detailed parameter explanation to the scalebar box



## A.5 Additional JSON Parameters

Passing parameters in the Template text box **G1G4_params_json** or as **additionalParameters** to the **URL** or **Slice Parameter Dialog** in GST Desktop allows you to customize the section output.

**Example:**

Parameters are necessarily encoded in JSON format, e.g.

```
{
        "unit":"px",
        "dpi":300,
        "borehole-image-width":800,
        "borehole-image-height":600
}
```

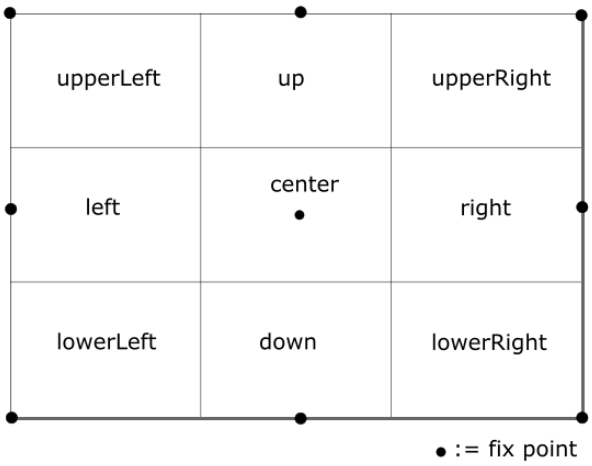
Below a complete list of parameters

### General JSON Parameters

| Parameter | Possible Values / Hints | Default value |
|---|---|---|
| **unit** | String<br>Used to transform length properties in the json_params<br>* "px" (Pixels), if set requires **dpi**<br>* "mm" (Millimeter)<br>* "cm" (Centimeter) | Required |
| | **Hint** It is a good idea to specify "mm" or "cm" when using a template. Use "px" when generate a section without templates just using JSON. (URL Parameter **templateFile** and **legendTemplate** are optional). Section Template File on page 140 | |

| Parameter | Possible Values / Hints | Default value |
|---|---|---|
| **dpi** | Integer<br>Controls the resolution of the output image.<br>* If the output format is a pixel format (e.g. png) this parameter is required.<br>* If the output format is a vector format (e.g. svg) this parameter is required if **unit** is **px**.<br>* If the output format is a vector format (e.g. svg) this parameter is ignored if **unit** is not **px**. | 300 |
| **grow** | String<br>Direction of growing. (Keeps the opposite corner of G1G4_isec fixed.). Possible values:<br>* "upperRight"<br>* "upperLeft"<br>* "lowerRight"<br>* "lowerLeft"<br>* "none" (deny growing.)<br>This parameter has no effect when generating a section with a template. | "none" |
| **image-align** | String<br>Override the alignment of the intersection image in the G1G4_isec box. Possible values (please also refer to figure A.6):<br>* "upperRight"<br>* "up"<br>* "upperLeft"<br>* "left"<br>* "center"<br>* "right"<br>* "lowerLeft"<br>* "down"<br>* "lowerRight"<br>See Figure A.6 below this table. | The opposite side of **grow**. (If **grow** is set to "none" then **image-align** defaults to "center".) |

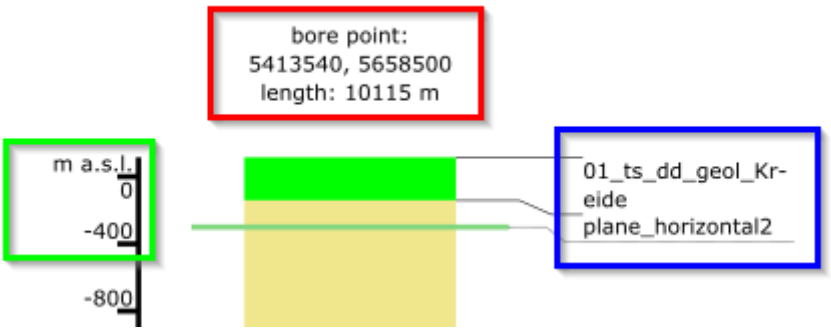
Figure A.6
Alignment values for **image-align**




Within the following sections parameters are dependent on the Intersection type. These parameters are indicated by the prefixes

* **borehole-...** page 198
* **crosssection-...** page 202
* **mapsection-...** page 205
* **legend-...** page 206

Figure A.7
Font identifiers for **font-size** and **font-family**




___-font-size, ___-font-family borehole-font-size, borehole-font-family, crosssection-font-size, mapsection-font-size

ont-size, ___-scale-font-family borehole-y-scale-font-size, borehole-y-scale-font-family, crosssection, mapsection

borehole-label-area-font-size

### Important for font-family

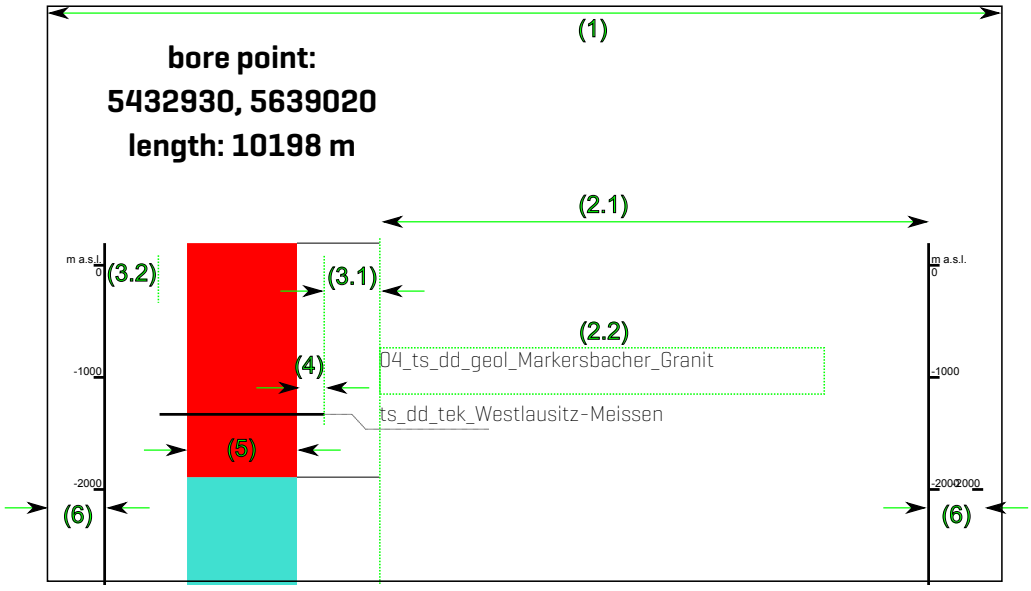
Please note for **font-family** values, that this font is **required to be installed on the rendering machine**. The rendering machine is the machine displaying the SVG Section output (or even renders PNG or PDF from SVG if the Section was requested in one of these formats).

**Example:**

In most infrastructures the rendering machine is **GST Desktop** (if the section is requested via GST Desktop) and/or **GST Web** (if section is requested via GST Web). The font is not required on the machine running GST Storage.

## Borhole JSON Parameters

Figure A.8
Borehole pillar and labeling




The numbers are referenced in the table below.

| Parameter | Possible Values / Hints | Default value |
|---|---|---|
| (1) **borehole-image-width** | Double<br>Width of **g1g4_isec** image (see Figure A.2) in specified **unit**.<br>Value is required if no template is specified. | If not specified: width of the **g1g4_isec** box |
| **borehole-image-height** | Double<br>Height of **g1g4_isec** image in specified **unit**.<br>Value is required if no template is specified. | If not specified: height of the **g1g4_isec** box |
| | **Hint** Specify **borehole-image-width** and **borehole-image-height** only for requests without a template (see Section Template File on page 140). The image size is given by the template **g1g4_isec** box size. | |
| **borehole-font-size** | Double<br>Info text (Text in red box, see Figure A.7) font size in specified unit. | Relative to image size |

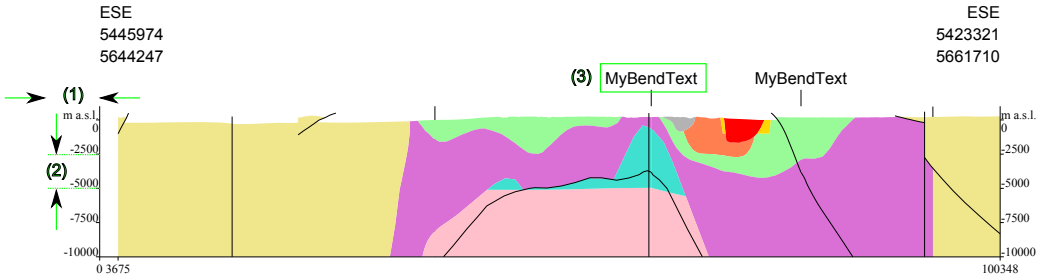
| Parameter | Possible Values / Hints | Default value |
|---|---|---|
| **borehole-font-family** | String<br>Info text Font family name. (Text in red box, see Figure A.7) | "Verdana" |
| **borehole-y-scale-reference-marker** | String<br>Defines a reference marker for the y-scale. This value is added after the unit (currently always "m") above the y-scale. E.g. for a reference marker "a.s.l." it would say "m a.s.l." or for "NN" it would say "m NN". This value is only used if "borehole-y-scale-height-reference"="masl". | "a.s.l." |
| **borehole-y-scale-height-reference** | String or Double<br>Defines y-scale reference points<br>* "masl", z zero refers to z coordinates (and negative values downwards)<br>* "depth", z zero refers to borepoint (and positive values downwards)<br>* Double Value: analog to "depth" but z zero refers to given z coordinate. This is useful if you do not have a DEM in your data.<br>(depth or masl are specified at the scale top, see Figure A.7 text in the green box) | "masl" |
| **borehole-y-scale-mode** | String<br>Defines on which side the y-scale should be drawn.<br>* "none" (hide scale)<br>* "left"<br>* "right"<br>* "both" | "left" |
| **borehole-y-scale-step-length** | Double<br>Defines distance of the ticks of the y-scale in z units (typical: meter). (In Figure A.7 this value is 400, see green box)<br>**Note:** This value is currently ignored if a template file is used for the intersection. | Relative to image size and font size avoiding crossing fonts |

| Parameter | Possible Values / Hints | Default value |
|---|---|---|
| **borehole-y-scale-font-size** | Double<br>Scale text font size in specified unit.<br>[green text in Figure A.7] | Relative to image size |
| **borehole-y-scale-font-family** | String<br>Scale text font family.<br>[green text in Figure A.7] | "Verdana" |
| [6]<br>**borehole-y-scale-width** | Double<br>Margin left of the left scale and right of the right scale that is reserved for the scale labeling. Increase this value if your scale labels are drawn out of the image bounds (not enough space for labeling). | Relative to image size |
| [4]<br>**borehole-pillar-line-overlap** | Double<br>When crossing fault objects or other non BREP models, the output in the borehole is a line. The line overlap is the distance this line is painted out of the borehole pillar [4]. | Relative to image size |
| [5]<br>**borehole-pillar-width** | Double<br>Thickness of the borehole pillar (when bore path is filled). The full space reserved for the borehole visualisation is the **borehole-pillar-width** [5] + **borehole-pillar-line-overlap** [4] | Relative to image size |
| [3.1]<br>**borehole-pillar-margin-right** | Double<br>Distance between line-overlap from borehole pillar [4] and the labeling text. Within this distance the marker line from the object in the pillar to the label text is drawn. Do not make it to small. A good idea is to use $\frac{1}{2}$ to $\frac{1}{3}$ of the pillar-width. | Relative to image size |
| [3.2]<br>**borehole-pillar-margin-left** | Double<br>Distance between line-overlap from borehole pillar [4] to the left scale axis in specified **unit**. | Relative to image size |

| Parameter | Possible Values / Hints | Default value |
|---|---|---|
| **borehole-label-area-enabled** | Boolean<br>* true enable labeling area<br>* false disable labeling area (all borehole-label-area parameters will be ignored) | true |
| (2.1) **borehole-label-area-width** | Double<br>Width of the borehole label area in specified **unit**. This is the space used for labeling texts. Do not make it to small (depending on your label length). | Relative to image size |
| | **Hint** Enabling the right scale (**borehole-y-scale-mode**:both ) will help to visualize the **borehole-label-area-width**. | |
| | **Important** Changing this parameter can cause labeling text being drawn out of image bounds. Check the **borehole-label-area-word-wrap-threshold** to break labeling lines. | |
| (2.2) **borehole-label-area-word-wrap-threshold** | Integer<br>Number of character when a label line will be breaked (into a new line). | 20 |
| | **Hint** This highly depends on the **borehole-label-font-family** and **borehole-label-font-size** and can not be computed on the time of image creation automatic. It is always a good idea to proceed in the following order: (1) Set font family and font size (2) "play" a bit with this parameter to fit in the **borehole-label-area-width**. | |
| **borehole-label-area-font-size** | Double<br>Label area font size in specified **unit**. | Relative to image size |
| **borehole-label-area-font-family** | String<br>Label area font family. | Relative to image size |
| **borehole-draw-header-info** | Boolean<br>Specifies whether or not to draw the header info | true |

## Cross section JSON Parameters

Figure A.9 Crosssection labeling




| Parameter | Possible Values / Hints | Default value |
|---|---|---|
| **crosssection-image-width** | Double<br>Width of image in specified **unit**. | Relative to image size |
| **crosssection-image-height** | Double<br>Height of image in specified **unit**. | Relative to image size |
| | **Hint** Specify **crosssection-image-width** and **crosssection-image-height** only for requests without a template (see Section Template File on page 140). The image size is given by the template **g1g4_isec** box size. | |
| **crosssection-font-size** | Double<br>Info text font size in specified **unit**. | Relative to image size |
| **crosssection-font-family** | String<br>Info text Font family name. | "Verdana" |
| **crosssection-y-scale-reference-marker** | String<br>Defines a reference marker for the y-scale. This value is added after the unit (currently always "m") above the y-scale. E.g. for a reference marker "a.s.l." it would say "m a.s.l." or for "NN" it would say "m NN". This value is only used if "crosssection-y-scale-height-reference"="masl". | "a.s.l." |

| Parameter | Possible Values / Hints | Default value |
|---|---|---|
| **crosssection-y-scale-mode** | String<br>Defines on which side the y-scale should be drawn.<br>* "none"<br>* "left"<br>* "right"<br>* "both" | "both" |
| (1) **crosssection-y-scale-width** | Double<br>Margin left of the left scale and right of the right scale that is reserved for the scale labeling. Increase this value if your scale labels are drawn out of the image bounds (not enough space for labeling). | Relative to image size |
| (2) **crosssection-y-scale-step-length** | Double<br>Defines distance of the ticks of the y-scale in z units (typical: meter).<br>**Note:** This value is currently ignored if a template file is used for the intersection. | Relative to image size |
| **crosssection-scale-font-size** | Double<br>Scale text font size in specified **unit**. | Relative to image size |
| **crosssection-scale-font-family** | String<br>Scale text font family. | "Verdana" |
| (3) **crosssection-bend-marker-text** | String<br>Defines the text used on Bend in Section markers for multi segment cross sections. | "Bend" |
| **crosssection-y-scale-width** | Double<br>Width reserved for y-scale. (This can be used to circumvent y-scale entry text getting cut off at the image border.) | Relative to image size |

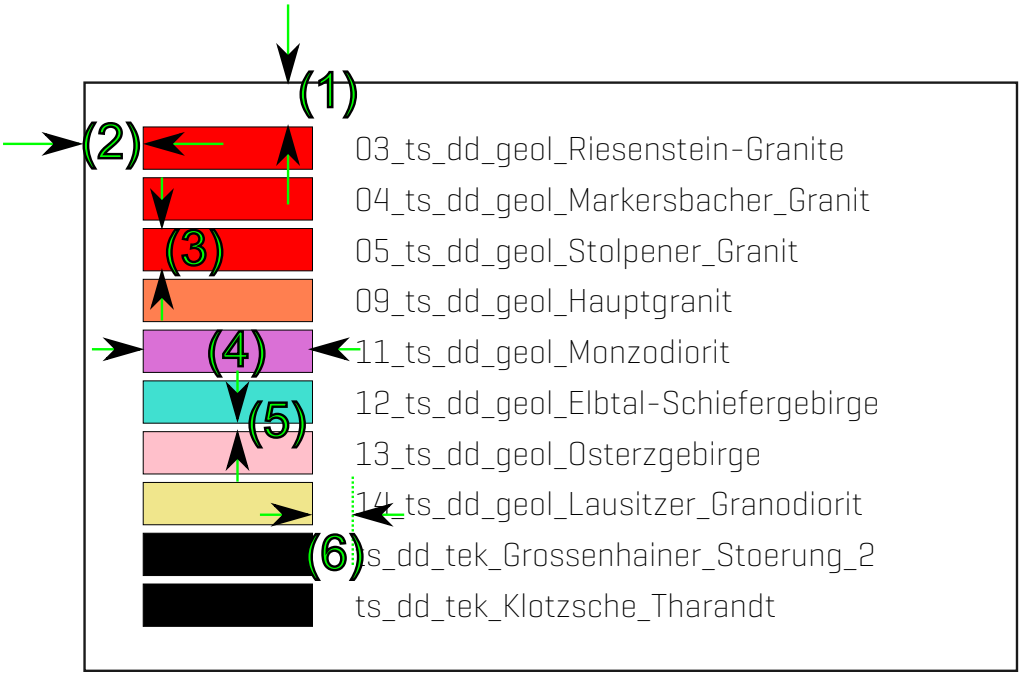
| Parameter | Possible Values / Hints | Default value |
|---|---|---|
| **crosssection-draw-header-info** | Boolean<br>Specifies whether or not to draw the header info | true |

## Map section JSON Parameters

| Parameter | Possible Values / Hints | Default value |
|---|---|---|
| **mapsection-image-width** | Double<br>Width of image in specified unit. | Relative to image size |
| **mapsection-image-height** | Double<br>Height of image in specified unit. | Relative to image size |
| **mapsection-font-size** | Double<br>Info text font size in specified unit. | Relative to image size |
| **mapsection-font-family** | String<br>Info text Font family name. | "Verdana" |
| **mapsection-scale-font-size** | Double<br>Scale text font size in specified unit. | Relative to image size |
| **mapsection-height-reference-marker** | String<br>Defines a reference marker for the height value in the info text. This value is added after the unit (currently always "m"). E.g. for a reference marker "a.s.l." it would say "height: 1000 m a.s.l." or for "NN" it would say "height: 1000 m NN". | "a.s.l." |
| **mapsection-scale-font-family** | String<br>Scale text font family. | "Verdana" |
| **mapsection-y-scale-width** | Double<br>Width reserved for y-scale. [This can be used to circumvent y-scale entry text getting cut off at the image border.] | Relative to image size |
| **mapsection-draw-outline** | Boolean<br>Specifies whether or not to draw the selection rectangle outline in the resulting image. | false |
| **mapsection-draw-header-info** | Boolean<br>Specifies whether or not to draw the header info | true |

## Legend JSON Parameters

Figure A.10
Legend distances

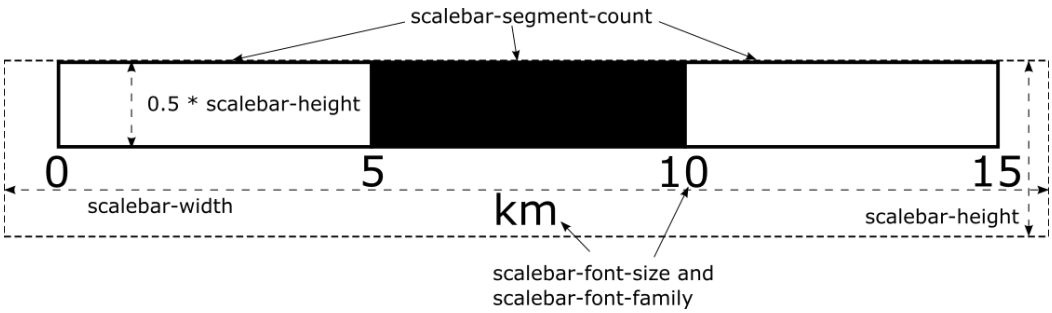



| Parameter | Possible Values / Hints | Default value |
|---|---|---|
| **legend-image-width** | Double<br>Width of legend image in specified unit. | Relative to image size |
| **legend-image-height** | Double<br>Height of legend image in specified unit. | Relative to image size |
| **legend-font-size** | Double<br>Legend text font size in specified unit. | Relative to image size |
| **legend-font-family** | String<br>Legend text font family. | "Verdana" |
| (1) **legend-border-height** | Double<br>Border height of legend in specified unit. | Relative to image size |
| (2) **legend-border-width** | Double<br>Border width of legend in specified unit. | Relative to image size |

| Parameter | Possible Values / Hints | Default value |
|---|---|---|
| (3) **legend-label-height** | Double<br>Entry label height of legend in specified unit. | Relative to image size |
| (4) **legend-label-width** | Double<br>Entry label width of legend in specified unit. | Relative to image size |
| (5) **legend-entry-vertical-spacing** | Double<br>Vertical spacing between legend entries in specified unit. | Relative to image size |
| (6) **legend-label-to-text-spacing** | Double<br>Horizontal spacing between legend label and legend entry text in specified unit. | Relative to image size |
| **legend-word-wrap-threshold** | Integer<br>Number of characters after which an entry will be split up into multiple lines. | unlimited |

## Scalebar JSON Parameters

Figure A.11
Scalebar




| Parameter | Possible Values / Hints | Default value |
|---|---|---|
| **scalebar-font-size** | Double<br>Text font size in specified unit. | Relative to image size |
| **scalebar-font-family** | String<br>Text font family. | "Verdana" |
| **scalebar-segment-count** | Integer<br>Number of segments of the scalebar. | 5 |

**Note**

scalebar-width and scalebar-height are read from the scalebar area (rectangle).

## Shape JSON Parameters

When requesting a section in shapefile format (see Section Image Designer on page 138) the section output will be written into a SHP, DBF, SHX and PRJ file and will be compressed into one ZIP file.

The generated shapefile contains one SHP Feature per intersected GST Feature. The attributes in the generated shape file are:

* **title** The user entered title for the section
* **exaggeration** The specified (or computed) exaggeration
* **orig** The GST oname column (that is original object name in GST)
* **alias** The object alias name (that is currently equal to oname)
* **date** A time stamp of the shapefile generation
* **model** The model name (top level element in Model Management) the Feature is assigned to. If the Feature is assigned in multiple models, the shapefile Feature output is duplicated (one per model). Please refer to Tab: Models (Model Management) on page 116 for more information about Model Management.

Depending on the type of the intersected geometries (whether its of type point, line, triangle etc) and the section type (whether its a virtual borehole, a vertical/horizontal section) the type of section result can differ.

Example: Generating a vertical section and cutting a GST Multiline object will create in a point representing the intersection of the line object by the section plane. Cutting different geometries will generate different types section result geometries. On the other side Features of only one geometry type can be represented by one shapefile. This is the reason why a section can can result in up to 3 shapefiles (all zipped together), representing the different section result types.

* **points** Representing all 1D intersection results (line intersected by a plane, or surface intersected by virtual borehole)
* **lines** Representing all (open) 2D intersection results (surface intersected by a plane)
* **polygons** Representing all (closed) 2D intersection results (volume is intersected by a plane)

The shapefile file names and shapefile attributes can be customized by **Shape JSON Parameters** listed in the following table.

| Parameter | Possible Values / Hints | Default value |
|---|---|---|
| * **title-column-name**<br>* **exaggeration-column-name**<br>* **orig-column-name**<br>* **alias-column-name**<br>* **date-column-name**<br>* **model-column-name** | String<br>Custom name of the shapefile attribute title, exaggeration, orig, alias, date, model | title, exaggeration, orig, alias, date, model |
| * **points-file-name**<br>* **lines-file-name**<br>* **polygons-file-name** | String<br>Custom shapefile file name for the generated shape results of type Multipoint, Multiline, Multipolygon | points, lines, polygons |

| Parameter | Possible Values / Hints | Default value |
|---|---|---|
| **bavaria-options** | JSON object<br>When this JSON object is set (not NULL), then a set of files are generated to the regular section result shapefile as follows:<br>* **profileline** A line shapefile representing the location of the generated section (equal to section location input)<br>* **bendpoint** A line shapefile representing the bend points as vertical lines (in profile coordinates)<br>* **verticalline** A line shapefile with two vertical line object representing the profile start and endpoint (in profile coordinates)<br>* **horizontalline** A line shapefile with one horizontal line representing the NN horizon (in profile coordinates)<br>The JSON object is the union of JSON string attibutes below: | NULL |
| * **profileline-file-name**<br>* **bendpoint-file-name**<br>* **verticalline-file-name**<br>* **horizontalline-file-name** | String<br>Custom shapefile file name for the generated shape results listed in **bavaria-options** | profileline, bendpoint, verticalline, horizontalline |

## A.6 Template Placeholder Values

The following table specifies the available placeholder values in a intersection template. During the final construction of the intersection image, each instance of texts defined in the column Placeholder will be replaced by its defined value.

**Note:** Empty values will remove the placeholder.

If you want to use any of these values, just put them as text somewhere in your template, be sure to check for the correct spelling. Any surrounding elements and text remain untouched by the placeholder replacement.

| Placeholder | Explanation |
|---|---|
| **G1G4_xScale** | The horizontal scale. Format "1 : X" |
| **G1G4_yScale** | The vertical scale. Format "1 : X" |
| **G1G4_date** | The date during creation of the intersection image |
| **G1G4_title** | The title provided during the intersection request |
| **G1G4_borehole_path_length** | The length of the borehole path |
| **G1G4_borehole_start_x** | The x coordinate of the start point |
| **G1G4_borehole_start_y** | The y coordinate of the start point |
| **G1G4_crosssection_start_x** | The x coordinate of the start point |
| **G1G4_crosssection_start_y** | The y coordinate of the start point |
| **G1G4_crosssection_end_x** | The x coordinate of the end point |
| **G1G4_crosssection_end_y** | The y coordinate of the end point |
| **G1G4_mapsection_height** | The height value of the map section result (unit-less) |
| **G1G4_scalebar** | A scale bar to be drawn |

## A.7 URL Parameters

### The List of Parameters for a vertical borehole

| Parameter | Possible Values / Hints | Example Values |
|---|---|---|
| **p1x**<br>**p1y**<br>**p1z** | Double<br>Northing (Y), Easting (X) and Height (Z) of the bore point | 11.425781 |
| **srs** | String<br>The spatial reference system of the input geometry for the section. If no SRS is given (value: 0), no transformation is performed. It data is kept as is.<br>1st Character: Description Encoding 2nd Character until Ende: description Valid description encodings:<br>* 0 -> No Transformation<br>* 1 -> Registered GST SRS<br>* 2 -> WKT encoding<br>* 3 -> PROJ4 encoding<br>**Remark that for URL's the paramters must be encoded.** | One of the following encodings:<br>* **0** (for ''no transformation'')<br>* **1**199 (for ''GST SRS with id 199'')<br>* **2**GEOGCS%5B%22 WGS+84%22%2C DATUM%5B%22WGS_1984%22%2C SPHEROID%5B%22WGS+84%22%2C 6378137%2C 298.257223563%2C AUTHORITY%5B%22EPSG%22%2C %227030%22%5D%5D%2C AUTHORITY%5B%22EPSG%22%2C %226326%22%5D%5D%2C PRIMEM%5B%22Greenwich%22%2C0%2C AUTHORITY%5B%22EPSG%22%2C %228901%22%5D%5D%2C UNIT%5B%22degree%22%2C 0.01745329251994328%2C AUTHORITY%5B%22EPSG%22%2C %229122%22%5D%5D%2C AUTHORITY%5B%22EPSG%22%2C %224326%22%5D%5D<br>* **3**%2Bproj%3Dlonglat +%2Bellps%3DWGS84 +%2Bdatum%3DWGS84 +%2Bno_defs |

| Parameter | Possible Values / Hints | Example Values |
|---|---|---|
| **projectZ** | Bool<br>If true: p1z will be set to the highest z-value at the (p1x,p1y) coordinates. Supplied p1z will be ignored.<br>If false: p1z will be used. | true |
| **maxBoreDepth** | Float<br>Depth of the bore hole.<br>Default/Maximum: the greatest depth at the coordinates. | 1500.50 |
| **scale** | Float<br>Fixed (horizontal) scale value. A negative value is coded as "compute best" (scale is getting computed to fit the templates width best) | * -1 (for "compute best")<br>* 50000 (for "1:50000") |
| **inclined** | Bool<br>Has to be false to get a vertical borehole | false (for vertical) |
| **templateFile** | String<br>Filename of the template file used to generate output (Take care this file is available in GST Webs temporal directory) | hydrotmpl.svg |
| **legendTemplateFile** | String<br>A separate legend template file. Overwrites legend parameters already defined in the standard templateFile. | hydrotmpl_legend.svg |

| Parameter | Possible Values / Hints | Example Values |
|---|---|---|
| **outputType** | String<br>Valid Values:<br>* SVG<br>* PNG<br>* PDF | SVG |
| **dpi** | Integer<br>Only used for outputType=PNG. Sets the DPI for the output image. | 300 |
| **title** | String<br>Title of the image | ''My image' |
| **additional-Parameters** | JSON encoded String<br>Additional output parameters (advanced). Overwrites all parameters set in the template files. | { "borehole-font-size":5 } |
| **asJSON** | Bool<br>Defines if the output should be JSON or directly an image, then set to false | false (for direct image, PDF, SHP) output) |

### The List of Parameters for a vertical an inclined borehole

| Parameter | Possible Values / Hints | Example Values |
|---|---|---|
| **p1x**<br>**p1y**<br>**p1z** | Double<br>Northing (Y), Easting (X) and Height (Z) of the bore point | 11.425781 |
| **inclined** | Bool<br>Has to be false to get a vertical borehole | true (for inclined) |
| **dip** | Float<br>Between 0 and 90 degree | 45 |
| **azimuth** | Float<br>Between 0 and 360 degree | 145 |
| **srs, projectZ, maxBore-Depth, scale, template-File, legend-Template-File, outputType, dpi, asJSON, title, additional-Parameters** | same as on previous parameter list on page 213 | |

### The List of Parameters for a vertical section

| Parameter | Possible Values / Hints | Example Values |
|---|---|---|
| **p1x**<br>**p1y**<br>**p1z** | Double<br>Northing (Y), Easting (X) and Height (Z) of the bore point | 11.425781 |
| **zmin**<br>**zmax** | Double<br>Sets the highest/lowest z-value of the section. Note: These values are restricted by the bounding box of all selected features. | 5000.55 |
| **xscale** | Float<br>Fixed (horizontal) scale value. A negative value is coded as "compute best" (scale is getting computed to fit the templates width best) | * -1 (for ''compute best'')<br>* 50000 (for ''1:50000'') |
| **vertical-Exaggeration** | Float<br>Exaggeration of section height (y) | 1 |
| **point-Projection-Distance** | Float<br>Points with this or smaller distance will be projected onto the section. | 500 |
| **srs, template-File, legend-Template-File, outputType, dpi, asJSON, title, additional-Parameters** | same as on previous parameter list on page 213 | |

### The List of Parameters for a horizontal/map section

| Parameter | Possible Values / Hints | Example Values |
|---|---|---|
| **p1x**<br>**p1y**<br>**p1z** | Double<br>Northing (Y), Easting (X) and Height (Z) of the bore point | 11.425781 |
| **direction** | Text<br>Left or Right Direction of area referenced from the area line. | left |
| **boxWidth** | Float<br>Width of the intersection area. | 50000 |
| **depth** | Double<br>Height of the intersection area | 334.54 |
| **srs,**<br>**scale,**<br>**templateFile,**<br>**legendTemplate-File,**<br>**outputType,**<br>**dpi,**<br>**asJSON,**<br>**title,**<br>**additionalPara-meters** | same as on previous parameter list on page 213 | |