GeoImage Workflow Editing Resources
Giwer

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Introduction

Image interpretation tasks:

- Display images
- Apply varied processing algorithms
- Access varied file formats
- Fast operation
- Combine arbitrary processes into workflows from the available functions

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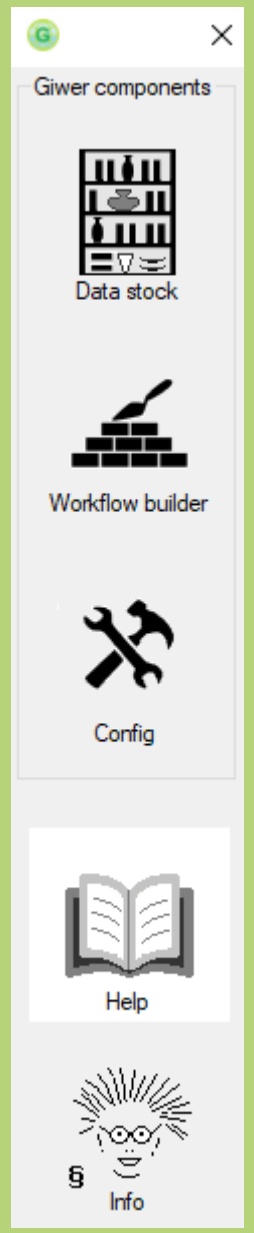

Implemented functionality

- GeoImage Workflow Editing Resources
  - Frame program (Giwer): organizes pack components
  - Interactive image interpretation pack (DataStock)
    - Loads images (tif, geotif, jpg, bil)
    - Converts images (any to gwr)
    - Runs processes by menu driven logic
    - Displays images and results

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Basic classes

- GeoImageData: essential I/O functions
- GeoImageTools: advanced image handler functions
- GeoFilters: filtering functions
- GeoMultiBandMethods: special multiband functions
- DTM: 3D, digital terrain modeller
- ImageWindow: display images

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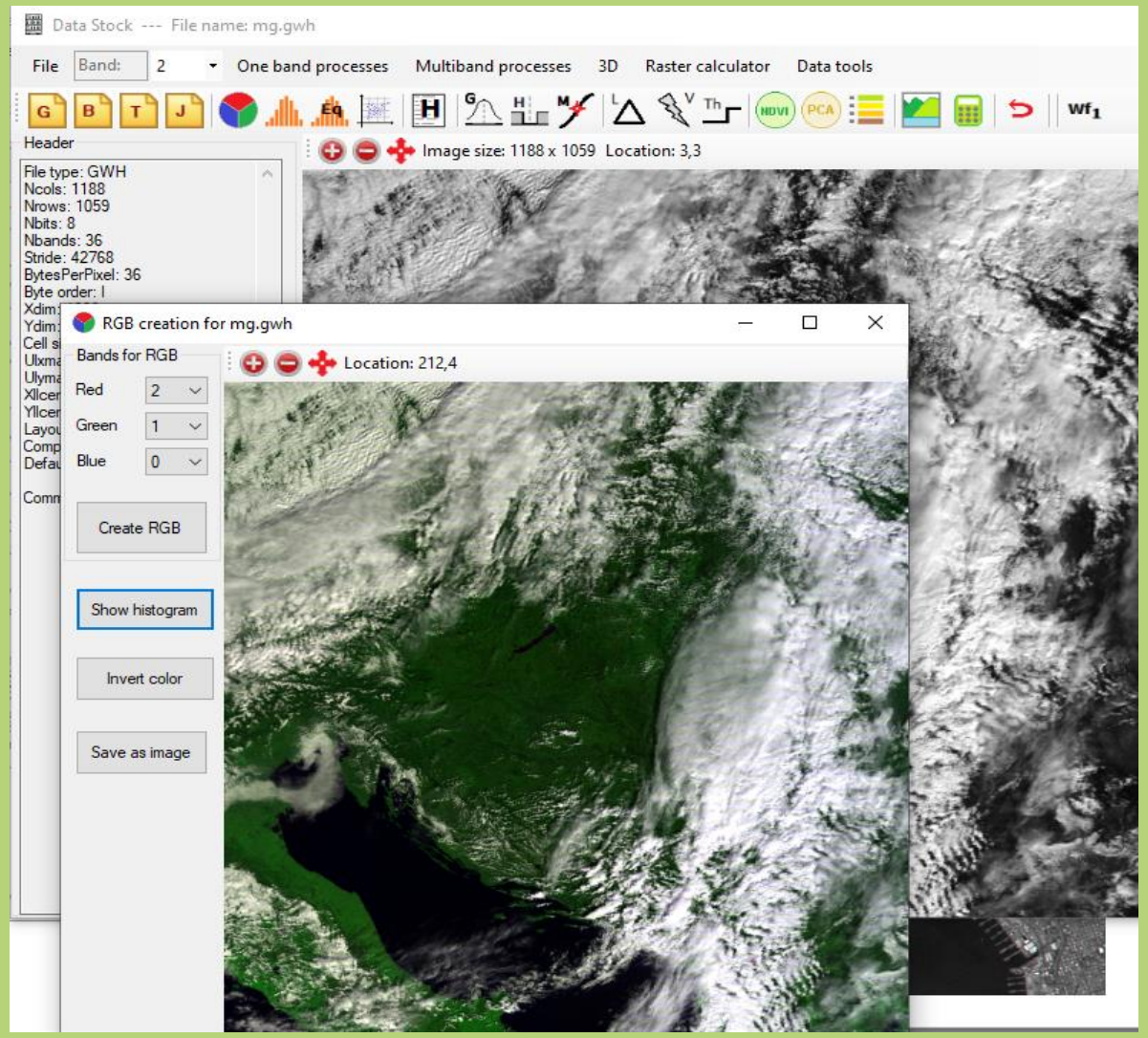
DataStock examples



- Loads images from different file format: gwr,bil,tif,jpg, 8,16,24,48 bits, with many bands from 3 (RGB) to 250 bands
- Creates RGB display
- Displays histogram and equalizes images
- Draws crossplot with any of two bands
- Displays file header
- Applies functions of the filter bank
- Computes NDVI and PCA
- Loads and displays 3D data (digital terrain modell)
- Raster calculator (select pixels under the given condition)
- Combines images (add, average, exor, subtract, etc)
- Segmentation

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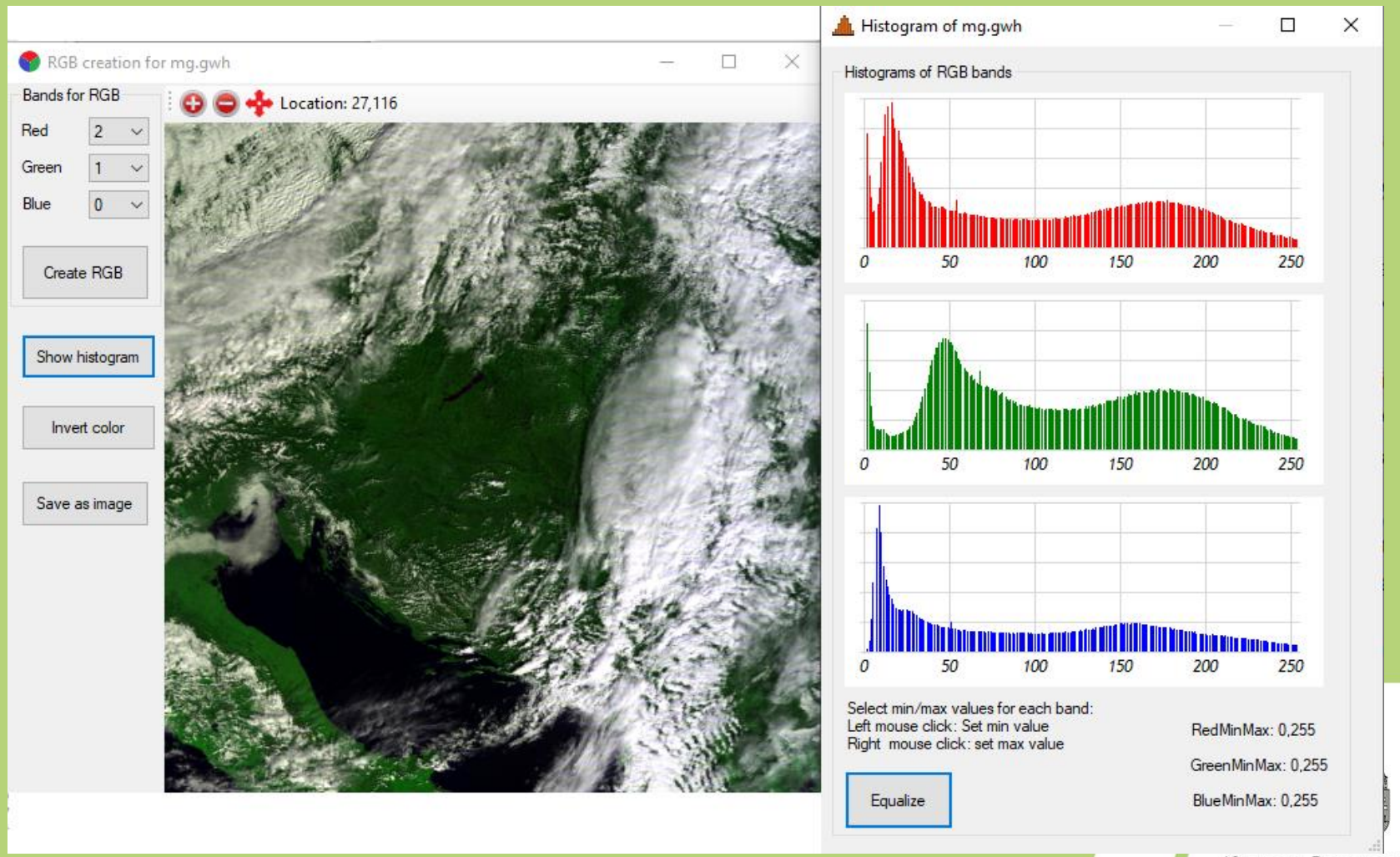
DataStock examples (histo)



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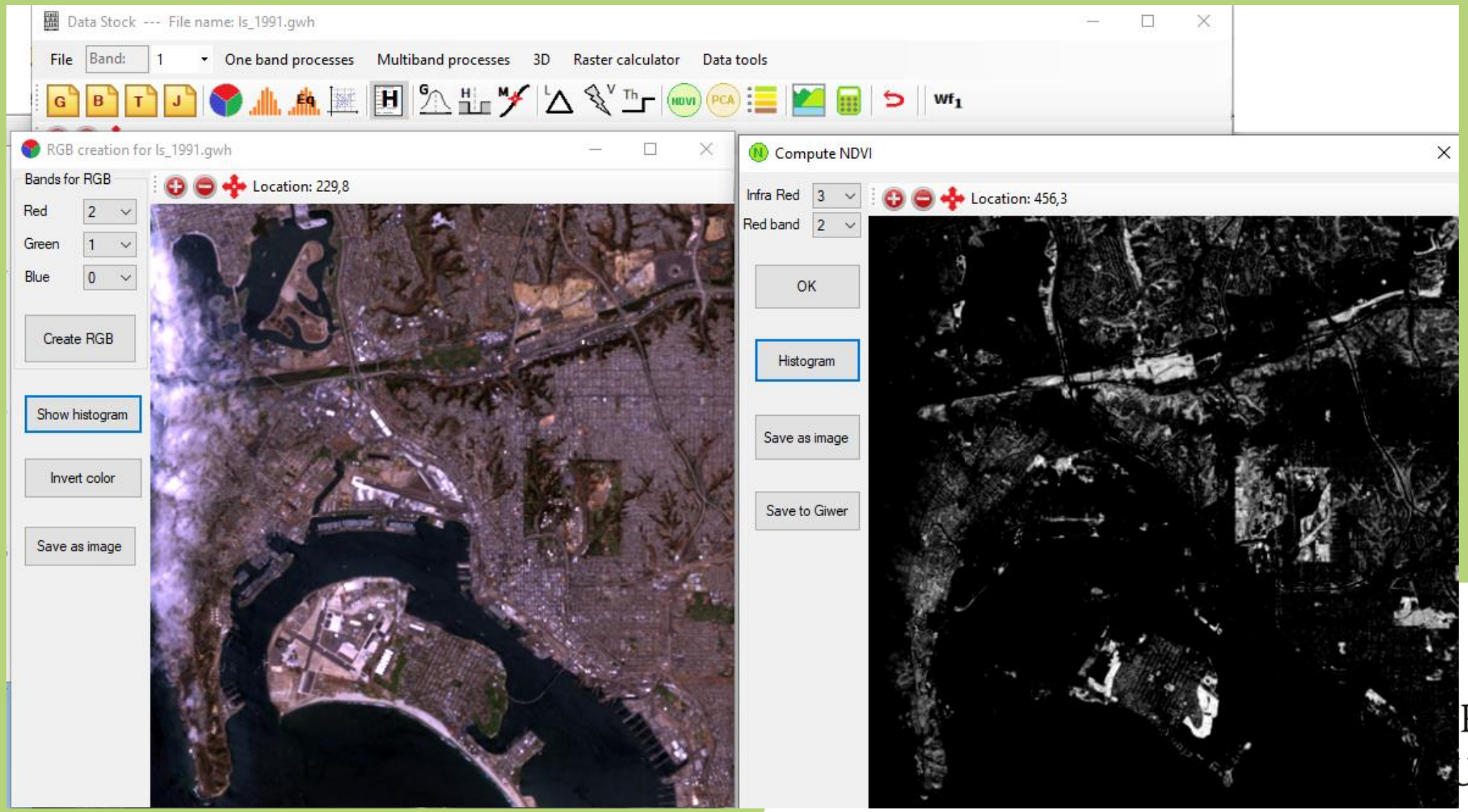
DataStock examples (ndvi)



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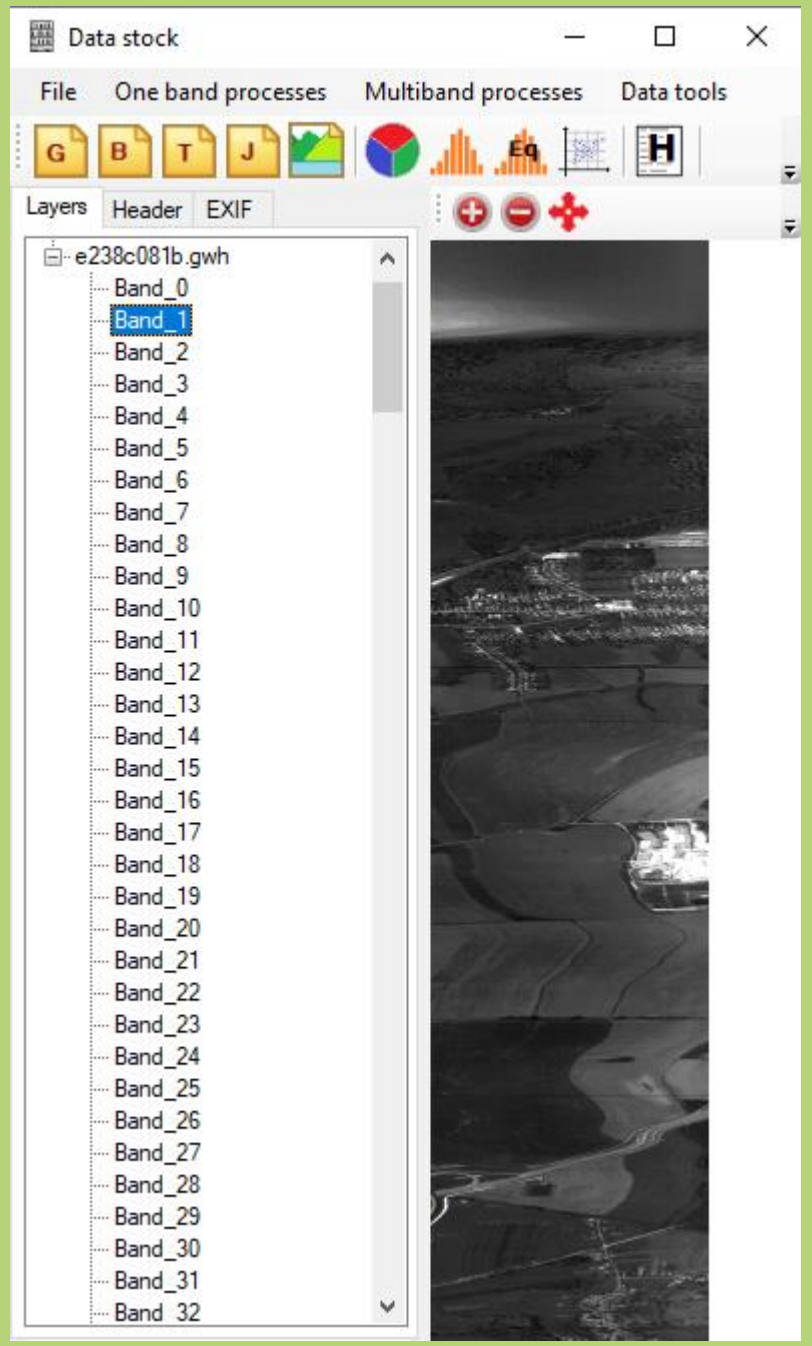

DataStock examples
(hiperspectral image with 250 bands)

You can select any band for further processing workflows

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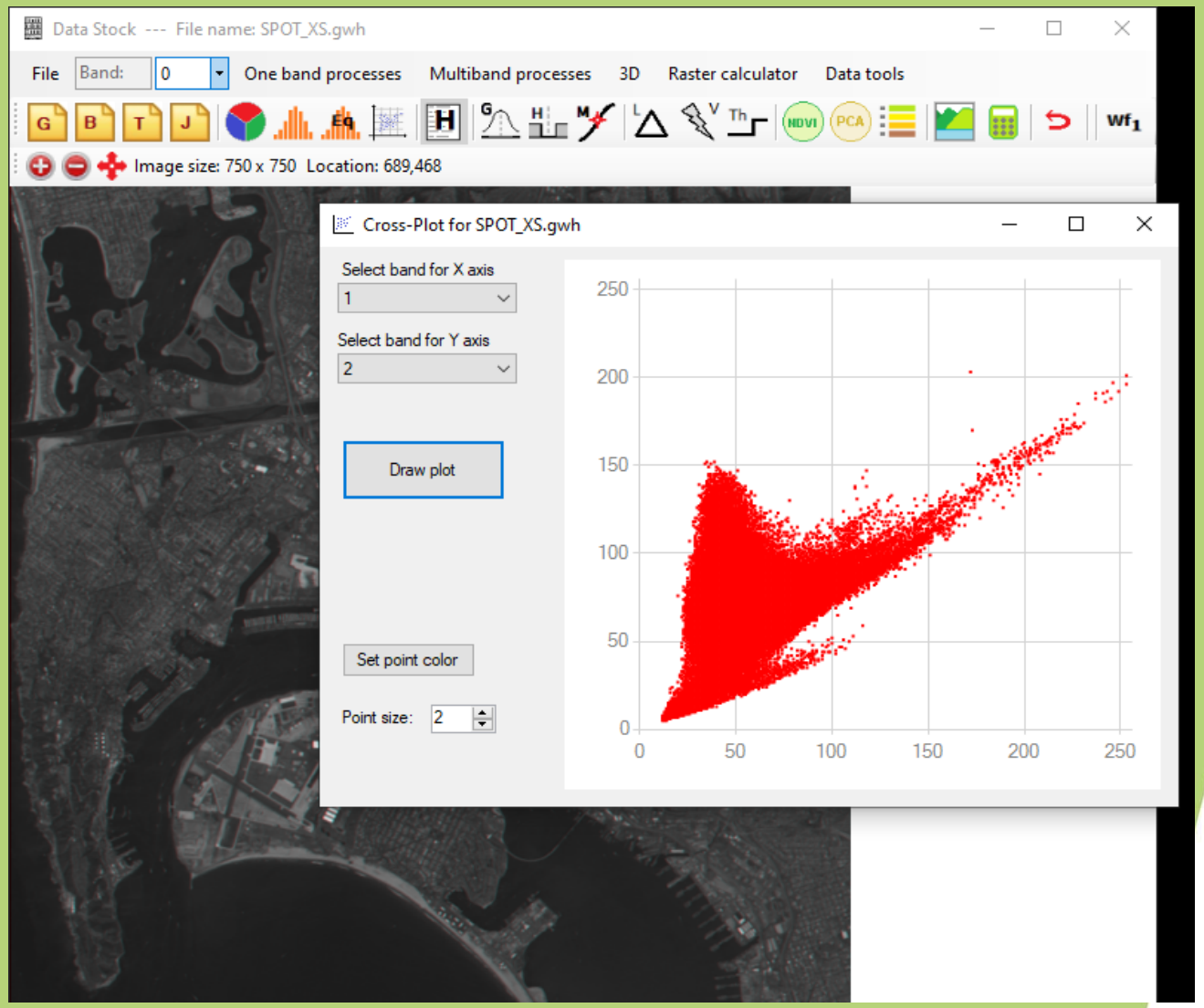
DataStock examples (cross-plot)



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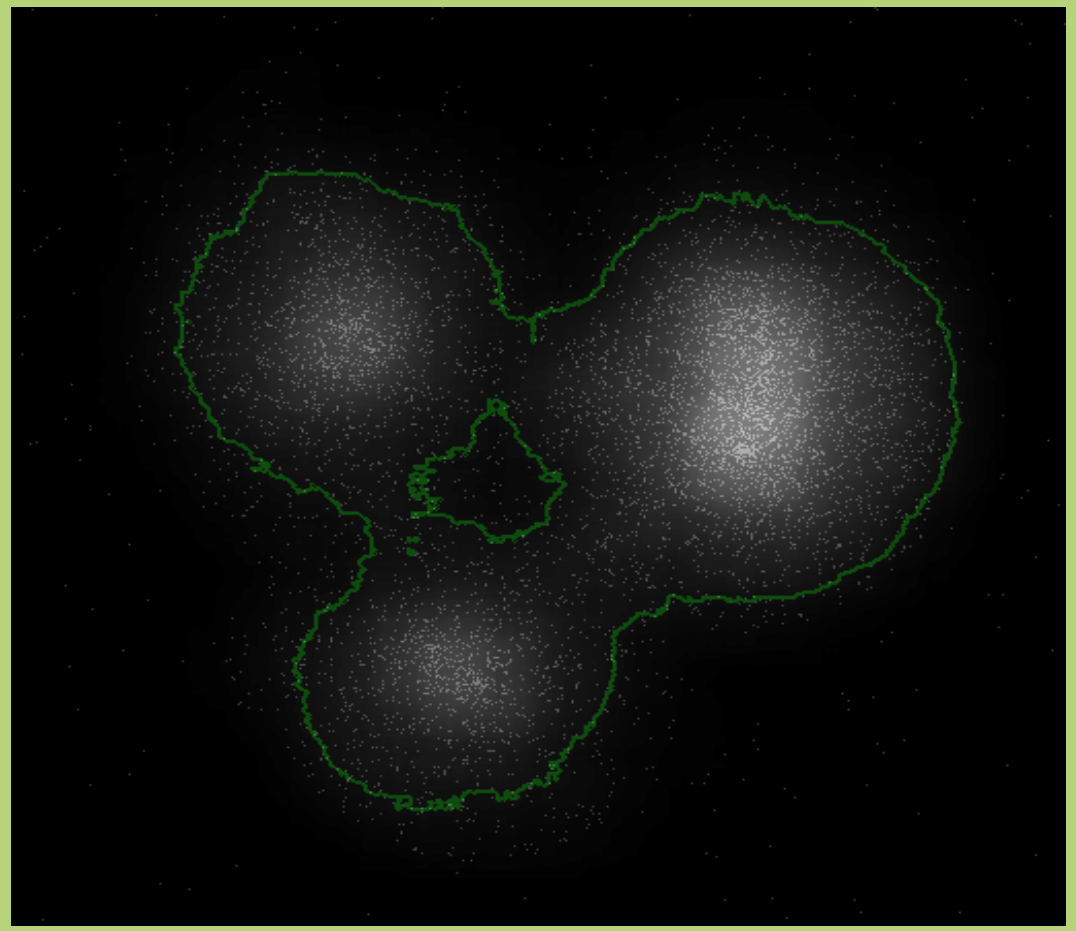
DataStock examples (workflow)



This workflow defines boundaries of the given point cloud

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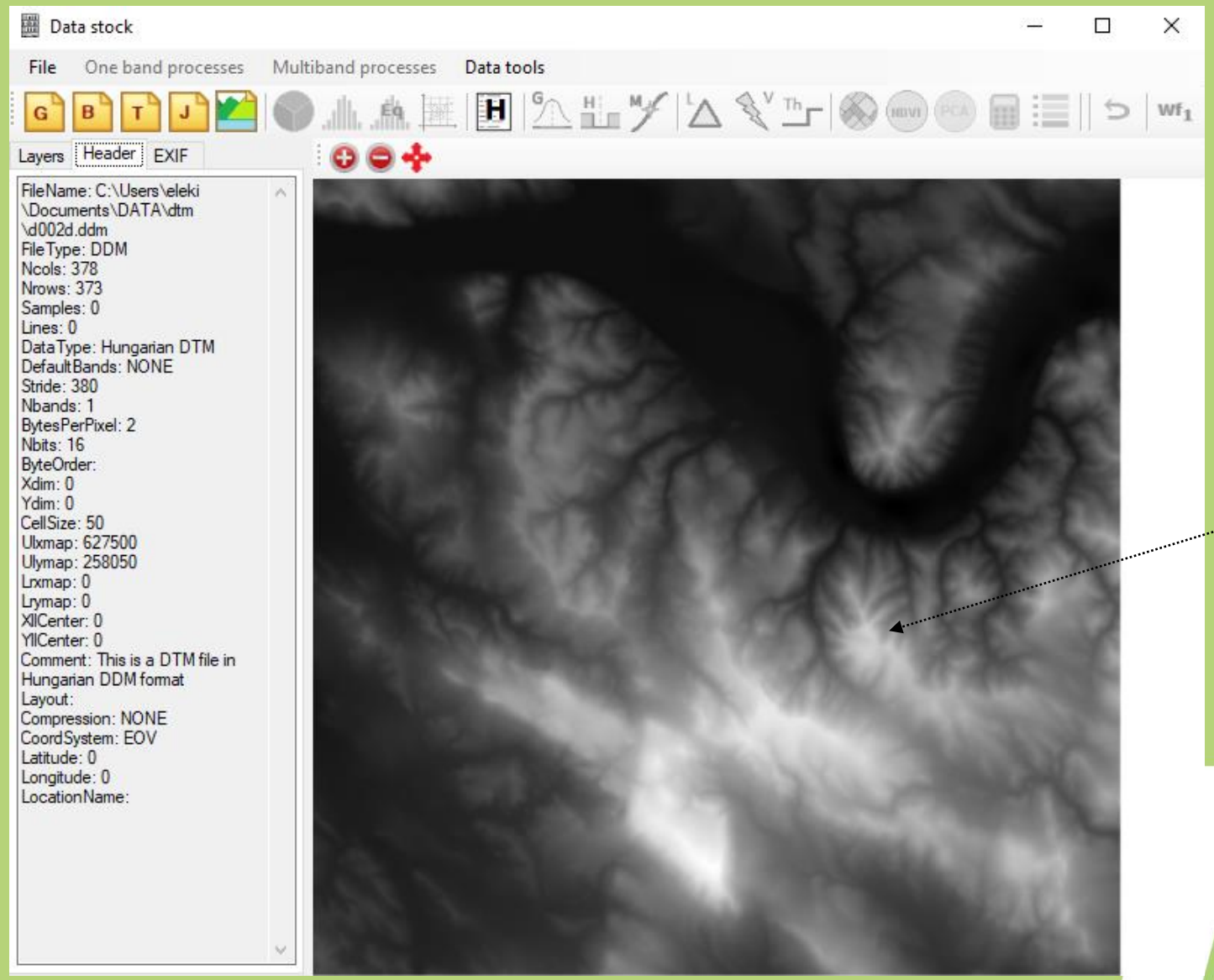
DataStock examples (digital terrain mod.)



The Danube Bend in Visegrad region

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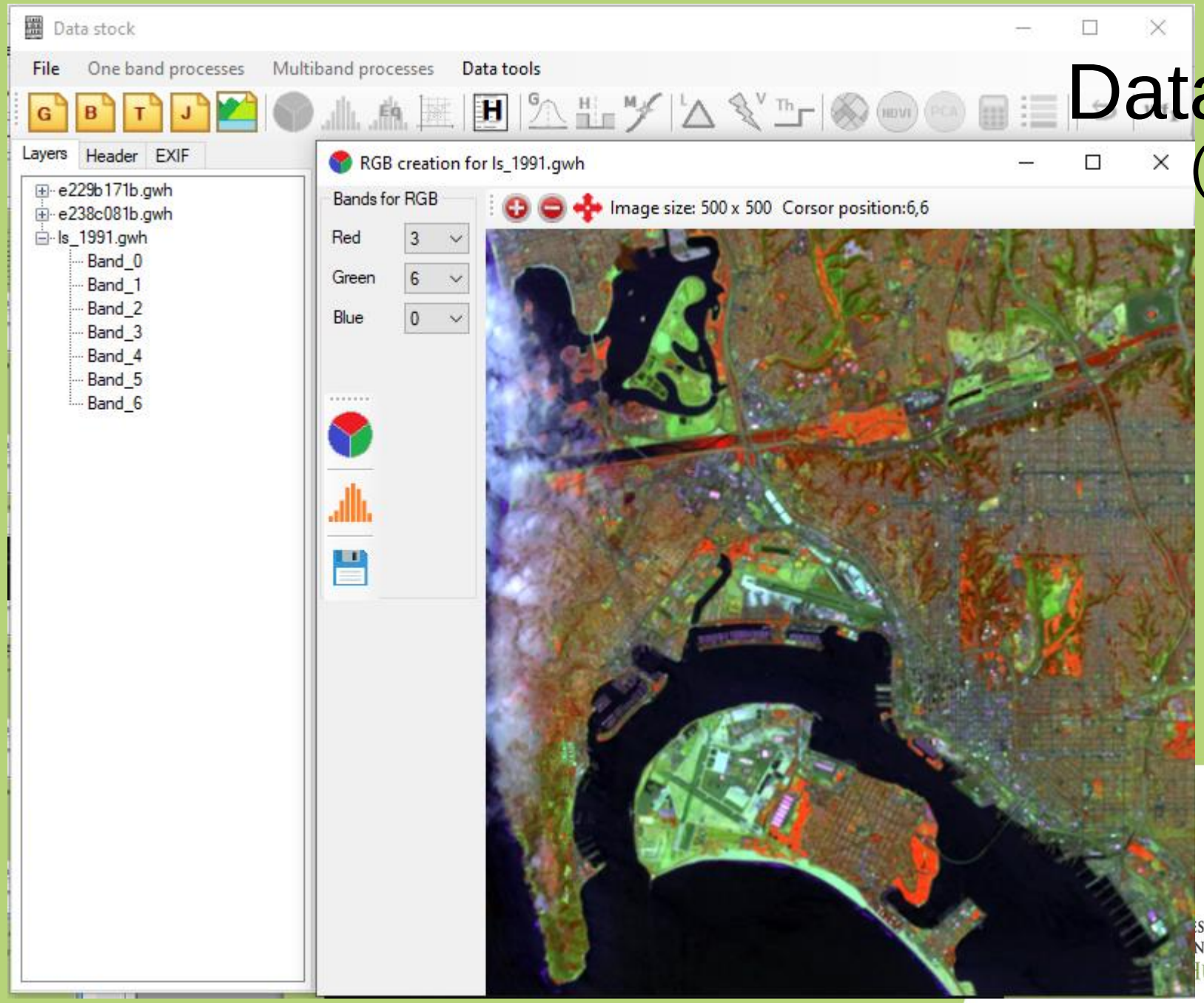
DataStock examples
(false color display)



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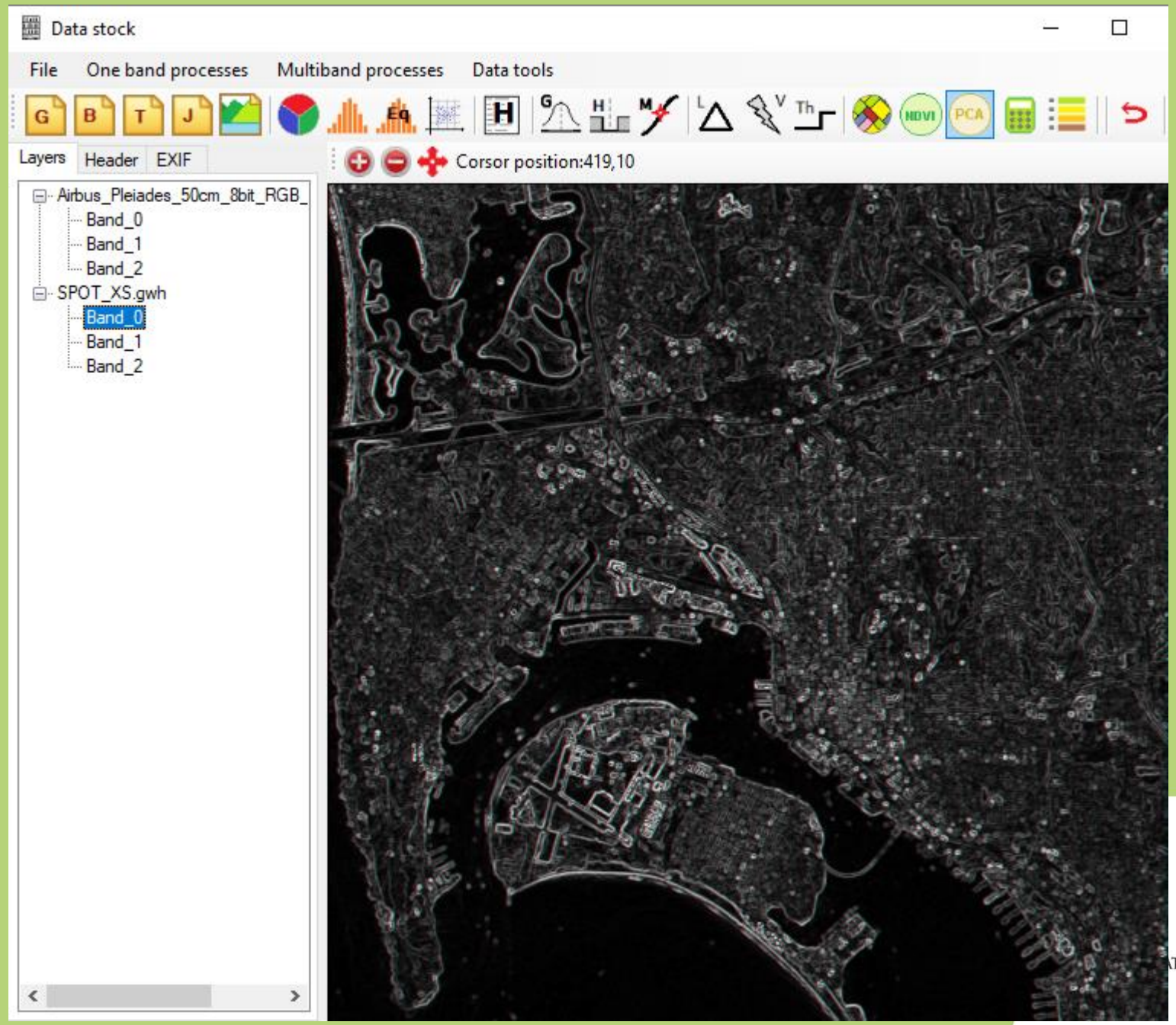

DataStock examples (edge detecting)

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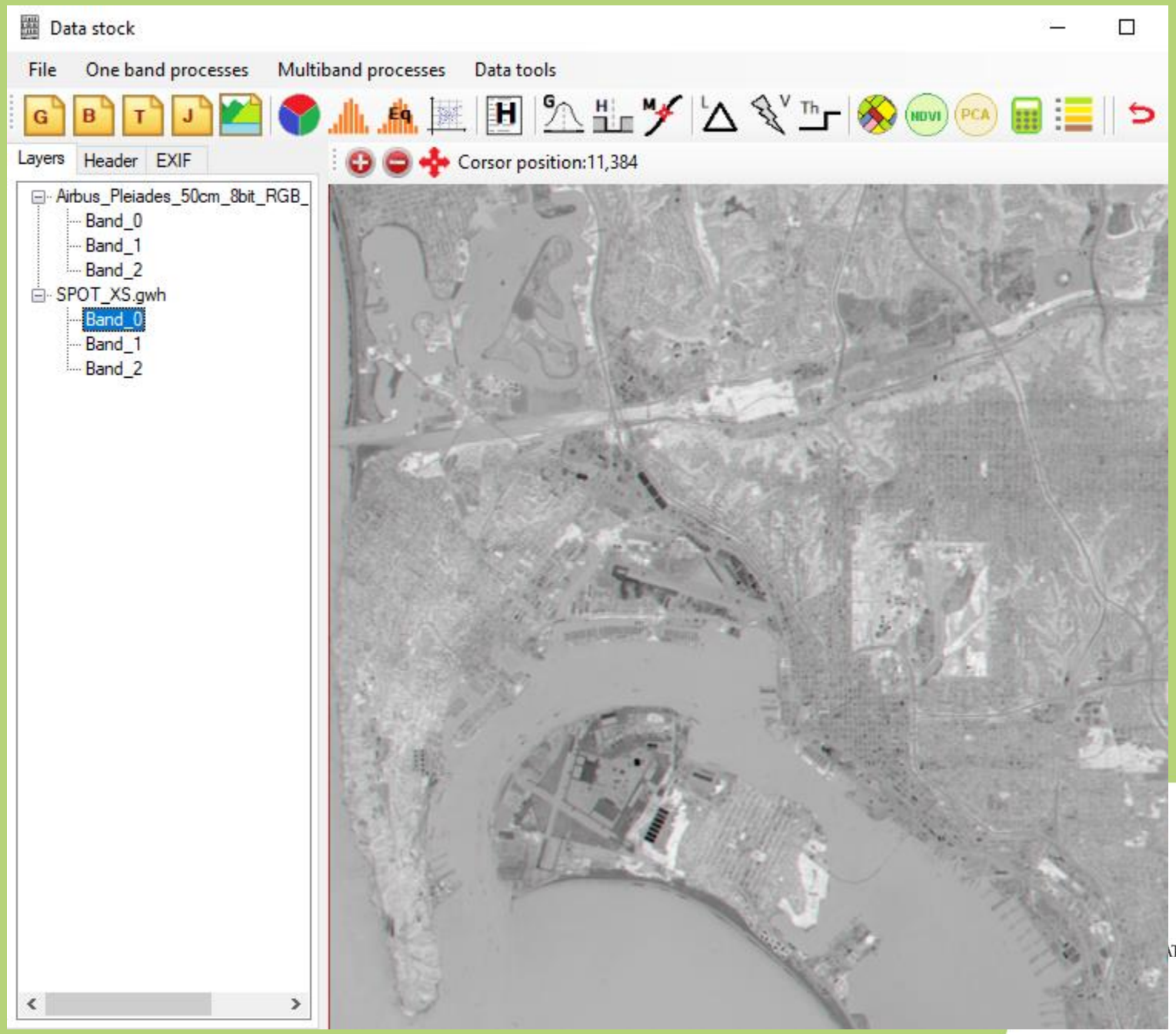

DataStock examples (PCA → PC1)

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Segmentation for multiband images

- Calculate the first principal component (PC1) of a multi- or a hiperspectral image, which includes the largest common part of their variances
- Apply the segmentation algorithm to the PC1
- Apply the classification algorithms to the segments instead of the pixels

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Publication

Istvan Elek: „**Boundary Detection of Point Clouds on the Images of Low-Resolution Cameras for the Autonomous Car Problem**”, SAI Conferences: Computing Conference 2020, July 15-18, London (accepted)

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Future plans

- We are going to continue to develop Giwer and add additional features to its existing capabilities
- We are going to implement resource editing capabilities in a separate module, thus the user becomes independent from the interactive working mode (DataStock). Arbitrary image processing functions can be implemented based on the users' request, i.e. the Giwer pack becomes a taylor made system.

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