

SENTINEL-1 PROCESSING IN SNAP

Data: Sentinel-1A IW GRDH 1SDV:

- S1A_IW_GRDH_1SDV_20151217T043422_20151217T043447_009077_00D092_FEF5.zip

1. Open file
 - 1.1. File / Open Product
 - 1.2. Browse to S1A_IW_GRDH_1SDV_20151217T043422_20151217T043447_009077_00D092_FEF5.zip
2. View metadata
 - 2.1. Select plus icons by filenames in “Product Explorer”, expand “Metadata”, double click on “Extracted Metadata”. Here you can see the basic product information such as acquisition date, product type, acquisition mode, and geometry (antenna pointing, incidence angle, pass).
3. View world map
 - 3.1. View / Tool Windows / World Map
 - 3.2. Select magnifying glass icon to zoom to image footprint
 - 3.3. Use mouse wheel and left click to zoom and pan respectively
4. View image single bands
 - 4.1. Select “Bands” folder in “Product Explorer” window and view each band by double clicking on band name.
5. View multiple viewers
 - 5.1. Close metadata views, leaving only viewers with bands
 - 5.2. Synchronise views by selecting the relevant icons in the “Navigation” tab
 - 5.3. Select: Window / Tile Horizontally
6. Crop
 - 6.1. Zoom into Riga, (or Cesis, if you can find it!)
 - 6.2. Raster / Subset... and select OK
7. Save the newly created subset image
 - 7.1. Select image in “Product Explorer”
 - 7.2. Select: File / Save Product As...
 - 7.3. Select “Yes” to convert to BEAM DIMAP format (SNAP native file format)
 - 7.4. Select an output filename and location, and select “Save”
 - 7.5. In order to view the saved file with the filename you specified, close the cropped image and reopen it
8. Calibrate
 - 8.1. Radar / Radiometric / Calibrate
 - 8.2. Convert S0 to decibel (logarithmic scale)
 - 8.3. Expand the list of bands of the calibrated image, right mouse click on the band “Sigma0_VH”, select: “Linear to/from dB”. Repeat this also for the “Sigma0_VV” band.
 - 8.4. Right click on the newly created “Sigma0_VH_db” and “Sigma0_VV_db” bands and select “Convert Band” to save the virtual bands to file.
9. Filter speckle
 - 9.1. Radar / Speckle Filtering / Single Product Speckle Filter
 - 9.2. In the “Processing Parameters” tab, select only the “Sigma0_VH” and “Sigma0_VV” bands in the “Source Bands” list (using the control key with the left mouse button to select both simultaneously).
 - 9.3. In the “Filter” dropdown box, select “Lee”
 - 9.4. In “Filter Size X:” and “Filter Size Y:” select 3, and 3 respectively.

9.5. Select “Run”

9.6. When the process is finished, convert the speckle filtered bands of the new image again to dB.

10. RGB image view

10.1. Window / Open RGB Image Window

10.2. Select the following bands: Red = Sigma0_VV_db, Green = Sigma0_VH_db, Blue = Sigma0_VV_db

10.3. Contrast stretch the images: Colour Manipulation tab, move triangular sliders to either side of the histogram for each R, G and B channel.

10.4. Repeat the process for the image prior to speckle filtering, and compare both speckle filtered and non-speckle filtered images: Window / Tile Horizontally, then link viewers in the “Navigation” tab

11. Terrain Correction

11.1. Radar / Geometric / Terrain Correction / Range-Doppler Terrain Correction

11.2. In the “Processing Parameters” tab, select only the Sigma0_VH and Sigma0_VV bands

11.3. Select “DEM” in the “Output bands for” list.

11.4. Now select “Run”

11.5. When the process is finished, convert the terrain corrected bands of the new image again to dB.

11.6. View the same RGB combination of the terrain corrected bands in dB: Red = Sigma0_VV_db, Green = Sigma0_VH_db, Blue = Sigma0_VV_db.

12. Compare S1, S2 and DEM

12.1. Open the Sentinel-2 image subset over Beijing that has been reprojected to geographic lat/lon.

12.2. Open in separate viewers the terrain corrected Sigma0_VH_db and Sigma0_VV_db bands, the Sentinel-2 band 8, and the DEM (“elevation” band in the terrain corrected S1 image), and enhance the contrast of each by moving the triangular sliders to either side of the histogram in the “Colour Manipulation” tab.

12.3. If you wish you can change the LUT (Look Up Table) of the DEM (elevation) image: In the “Colour Manipulation” tab, select the icon labelled “Import colour palette from text file” and select another colour palette.

12.4. In one of the image viewers, add as separate layers all images that have been opened (terrain corrected Sigma0_VH_db, Sigma0_VV_db and elevation, Sentinel-2 band 8): Select “Layer Manager”, select the “Add Layer” icon, select “Image of Band / Tie-Point Grid”, select “Next”, then browse to each band in turn.