Microwave Remote Sensing Lab (MRSLab), IIT Bombay

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Multi-date RADARSAT-2 full-pol SLC data preprocessing in SNAP

We use SNAP Desktop environment and graph.xml files for processing.

User Guide:

- Save all processing graphs (.xml files) in a folder. Graphs can be downloaded from Github repository, and modify as per user requirement. Here, we show multi-date RADARSAT-2 SLC data processing example with two dataset.

Name	Date modified	Type	Size
Module1_Cal_Mat_Spk	30-12-2020 09:35 AM	XML Document	3 KB
Module2_Coregistration	30-12-2020 09:44 AM	XML Document	4 KB
Module3_TerrainCorrection	30-12-2020 10:23 AM	XML Document	5 KB

- Download RADARSAT-2 data from data provider services (FTP servers) in .zip format. Unzip them and extract in designated folders as given in example with only two dates:

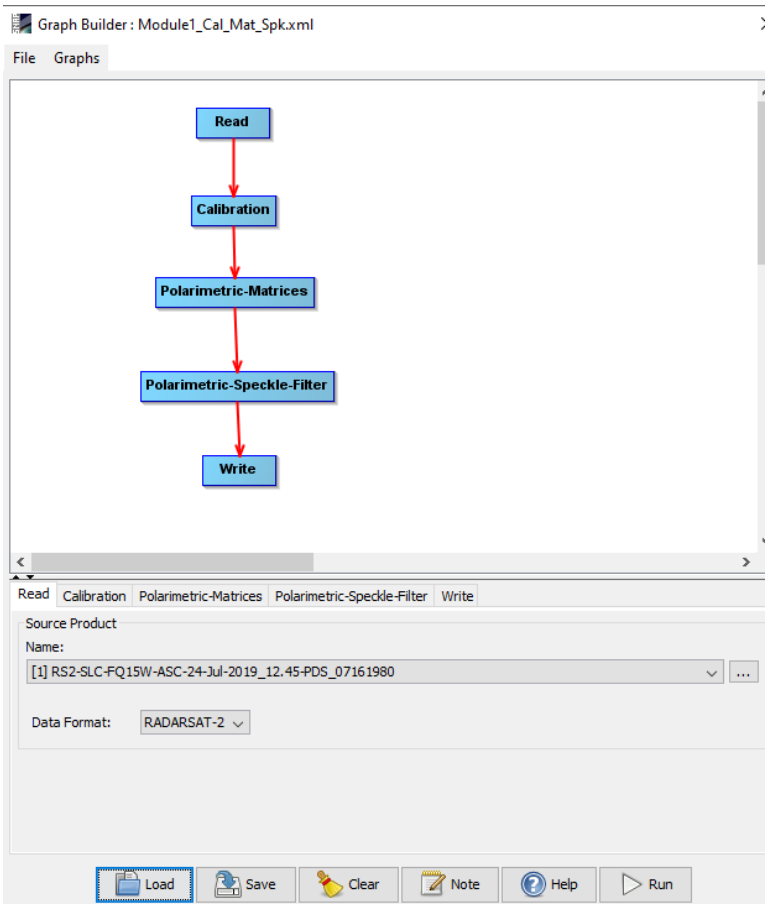
Name	Date modified	Type	Size
RS2_OK106814_PK930271_DK875266_FQ15W_20190724_124514_HH_VV_HV_VH_SLC	07-12-2020 08:50 PM	File folder	
RS2_OK106814_PK980622_DK918087_FQ15W_20191028_124510_HH_VV_HV_VH_SLC	07-12-2020 10:45 AM	File folder	

Each folder contains complex images in HH, HV, VH and VV channels and associated meta files (product.xml), as shown in the following example.

Name	Date modified	Type	Size
schemas	25-07-2019 06:38 PM	File folder	
BrowseImage	25-07-2019 06:32 PM	TIF File	961 KB
imagery_HH	25-07-2019 06:32 PM	TIF File	1,32,780 KB
imagery_HV	25-07-2019 06:32 PM	TIF File	1,32,780 KB
imagery_VH	25-07-2019 06:32 PM	TIF File	1,32,780 KB
imagery_VV	25-07-2019 06:32 PM	TIF File	1,32,780 KB
LI-11525-34 RS2 EULA_Single User_V1-11_...	03-01-2019 05:45 PM	Adobe Acrobat D...	39 KB
LI-11525-34 RS2 EULA_Single User_V1-11_...	03-01-2019 05:45 PM	Adobe Acrobat D...	42 KB
LI-11525-34 RS2 EULA_Single User_V1-11_...	03-01-2019 05:45 PM	Adobe Acrobat D...	39 KB
lutBeta	25-07-2019 06:32 PM	XML Document	78 KB
lutGamma	25-07-2019 06:32 PM	XML Document	78 KB
lutSigma	25-07-2019 06:32 PM	XML Document	78 KB
product	25-07-2019 06:32 PM	KML	4 KB
product	25-07-2019 06:32 PM	XML Document	167 KB
readme	04-01-2019 04:53 PM	Text Document	1 KB

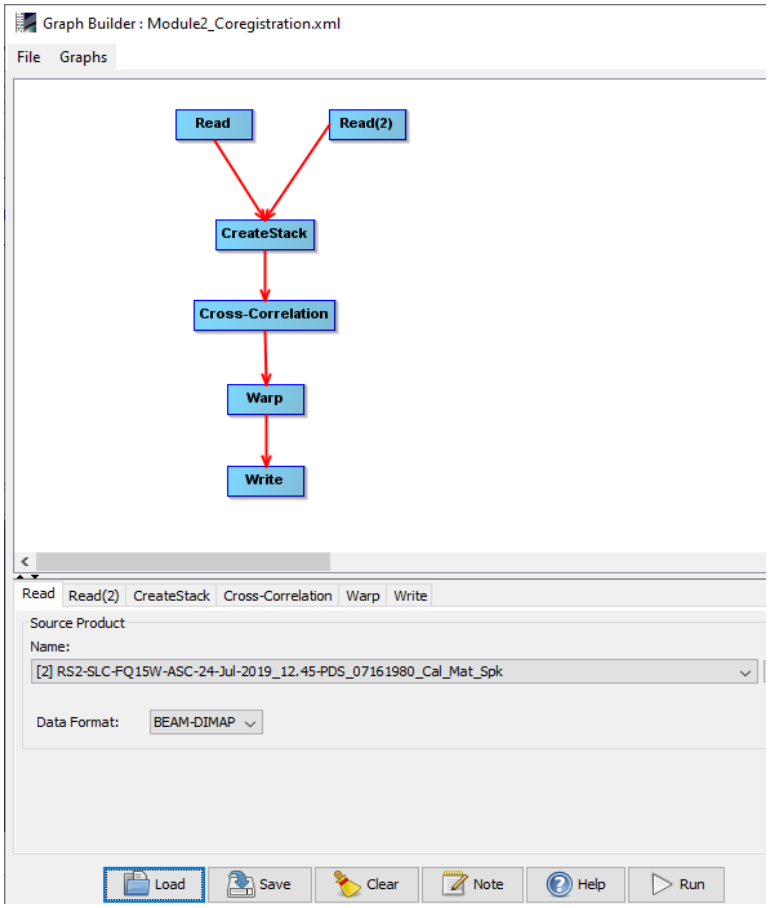
Running SNAP Desktop and processing

1. Load both the products in SNAP desktop using File>Import>SAR Sensors>RADARSAT-2 , and then by selecting product.xml files.
2. Now, we process each date separately using Module1_Cal_Mat_Spk.xml graph. Open Graph interface from Tools>GraphBuilder; Then load the Module1_Cal_Mat_Spk.xml

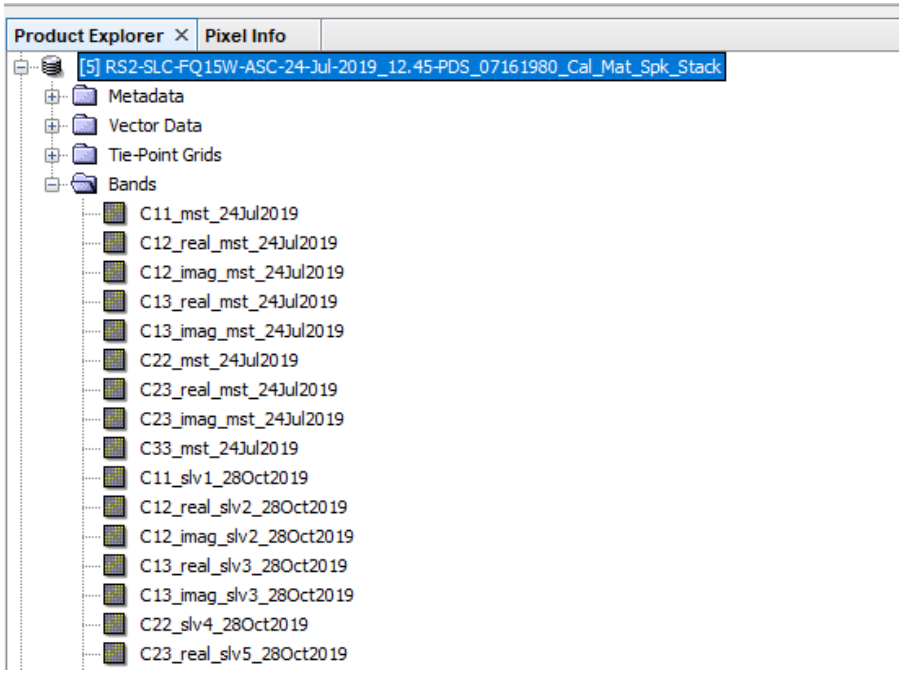


Change the read and write files and directories as per user folders. And finally hit the Run button. It will write Calibrated and speckle filtered Covariance matrix (C3) elements in the writing directory. Repeat the same process for the another date.

3. Now it is essential to coregister these two products (multi-date). Load the products from the previous step (if not loaded yet). Then load Module2_coregistration.xml and set the input and output files properly and run the graph.

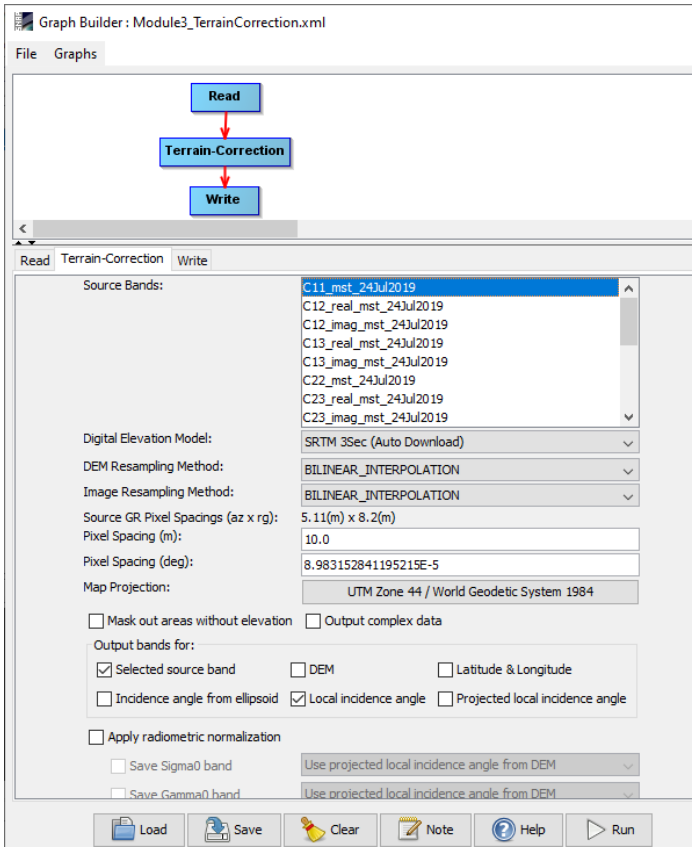


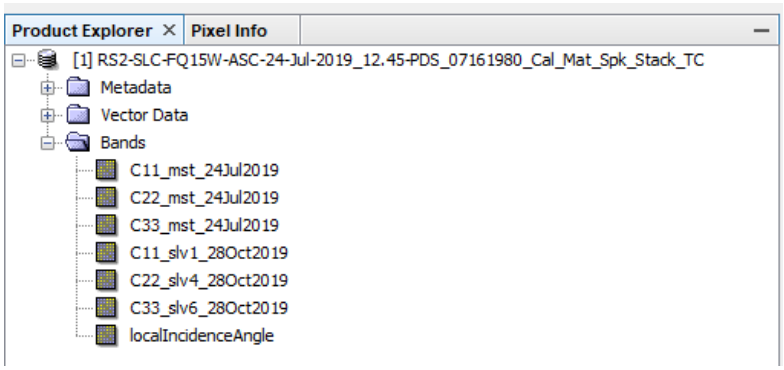
This step will create a stacked coregistered product, where each bands have their associated dates and master or slave nomenclature.



Additionally it saves residual errors in a log file, which indicated the RMS mean and std. The log file can be accessed from User\.snap\var\log\ *_residual.txt

4. In this step we terrain correct and geocode the coregistered stack product using the Module3_TerrainCorrection.xml. We have only saved the C11, C22 and C33 elements (source band) and local incidence angle from each date while writing TC products. Be specific about the projection (preferably UTM) and pixel size (we kept 10m).





5. Finally the terrain corrected product is exported as GeoTiff format for further operations File>Export>Geotiff. This single Geotiff image will have 7 bands as shown in the previous image.