

# GUIDELINE INSAR\_G2S Ver 1.5

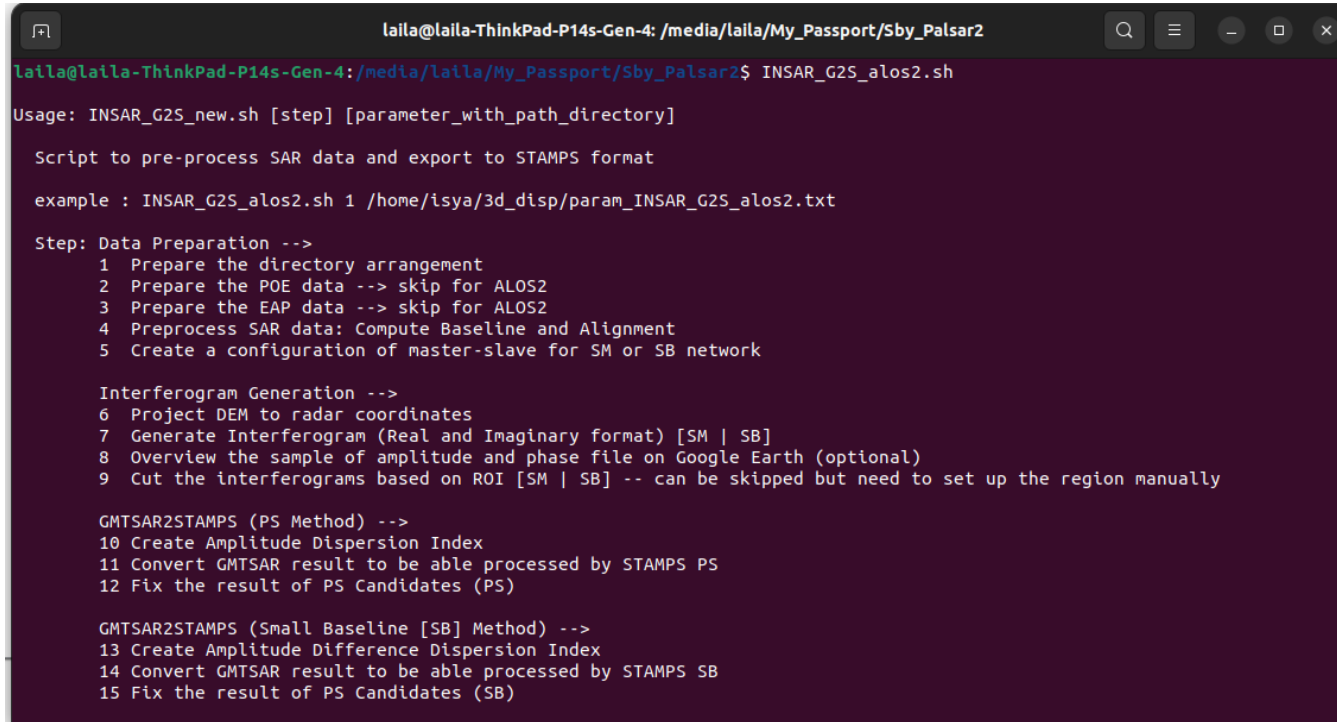
## For ALOS PALSAR-2 (FBR) Data



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# INSAR\_G2S\_alos2.sh



```
laila@laila-ThinkPad-P14s-Gen-4: /media/laila/My_Passport/Sby_Palsar2
laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2$ INSAR_G2S_alos2.sh

Usage: INSAR_G2S_new.sh [step] [parameter_with_path_directory]

Script to pre-process SAR data and export to STAMPS format

example : INSAR_G2S_alos2.sh 1 /home/isya/3d_disp/param_INSAR_G2S_alos2.txt

Step: Data Preparation -->
1 Prepare the directory arrangement
2 Prepare the POE data --> skip for ALOS2
3 Prepare the EAP data --> skip for ALOS2
4 Preprocess SAR data: Compute Baseline and Alignment
5 Create a configuration of master-slave for SM or SB network

Interferogram Generation -->
6 Project DEM to radar coordinates
7 Generate Interferogram (Real and Imaginary format) [SM | SB]
8 Overview the sample of amplitude and phase file on Google Earth (optional)
9 Cut the interferograms based on ROI [SM | SB] -- can be skipped but need to set up the region manually


GMTSAR2STAMPS (PS Method) -->
10 Create Amplitude Dispersion Index
11 Convert GMTSAR result to be able processed by STAMPS PS
12 Fix the result of PS Candidates (PS)

GMTSAR2STAMPS (Small Baseline [SB] Method) -->
13 Create Amplitude Difference Dispersion Index
14 Convert GMTSAR result to be able processed by STAMPS SB
15 Fix the result of PS Candidates (SB)
```

Command Interface

# Preparation

To extract the IMG, VOL, LED and TLR ALOS PALSAR-2 data from zip, define the path on param\_INSAR\_G2S\_alos2.txt. You need to modify some parameters to your own processing data as seen by the rectangle box.



```
1 ##### set parameters #####
2 dataorbit      = ascending
3               # OPTION: ascending or descending
4 raw_path       = /media/laila/My_Passport/PALSAR-2_SBY_DATA
5 temp_bl        = 300
6 spatial_bl     = 300
7 n_range        = 2
8 n_azimuth      = 2
9 ov_range       = 50
10 ov_azimuth     = 200
11 threshold      = 0.6
12 heading        = 324.122034637100
13               # Option: auto or for descending: -164.296, for ascending: -12.00707218611660e --> Sen1
14 master_date    = 231031
15 master_PRM     = IMG-HH-ALOS2509747040-231031-FBDR1.1 A
16 suffix_file    = HH
17               # Option: HH or HV
18 type_data      = FBD
19               # Option: FBD or FBS
20 sensor_data    = PALSAR2
21               # Option: Sentinel1 or PALSAR2
22 #####
23 Download DEM
24 demLong_min    = 112.375878
25 demLong_max    = 112.968754
26 demLat_min     = -7.539721
27 demLat_max     = -6.869404
28 #####
29 AOI (cut region)
30 long_min_aoi   = 112.629334
31 long_max_aoi   = 112.862491
32 lat_min_aoi    = -7.373392
33 lat_max_aoi    = -7.180099
34 #####
```

*For the installation on your computer, please see the previous guideline (INSAR\_G2S Ver 1)*

## Explanation of param\_INSAR\_G2S\_alos2.txt

```
##### set parameters #####
dataorbit      = the orbit direction (could be ascending / descending)
                # OPTION: ascending or descending
raw_path       = the full path directory of your SLC SAR data (ZIP files)
temp_bl        = the maximum limit of temporal baseline
spatial_bl     = the maximum limit of spatial perpendicular baseline
n_range        = number of patches in range
n_azimuth      = number of patches in azimuth
ov_range       = overlapping pixels between patches in range
ov_azimuth     = overlapping pixels between patches in azimuth
threshold      = threshold of amplitude (difference) dispersion (0.4-0.6 is reasonable) 0.4 for SM and 0.6 for SB
heading        = heading angle or azimuth direction (calculate manually based on state vector of "master".LED file)
                # Option: auto or for descending: -164.296, for ascending: -12.00707218611660e --> Sen1
master_date    = date of super master
master_PRM     = the file name of master PRM
suffix_file    = polarization type
                # Option: HH or HV
type_data      = mode type
                # Option: FBD or FBS
sensor_data    = PALSAR2
                # Option: Sentinel1 or PALSAR2
#####
Download DEM
demlong_min    = DEM information, the minimum of longitude coordinate
demlong_max    = DEM information, the maximum of longitude coordinate
demlat_min     = DEM information, the minimum of latitude coordinate
demlat_max     = DEM information, the maximum of latitude coordinate
#####
AOI (cut region)
long_min_aoi   = ROI information, the minimum of longitude coordinate
long_max_aoi   = ROI information, the maximum of longitude coordinate
lat_min_aoi    = ROI information, the minimum of latitude coordinate
lat_max_aoi    = ROI information, the maximum of latitude coordinate
#####
```

# Step 1

Open terminal at **the base of processing directory**, then type this following command:

```
$ INSAR_G2S_alos2.sh 1 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
```

|                                       |  |
|---------------------------------------|--|
| INSAR_G2S_alos2.sh                    | → the automatic script to run for ALOS PALSAR-2 data |
| 1                                     | → step 1   |
| /media/laila/My_Passport/Sby_Palsar2/ | → path directory location                            |
| param_INSAR_G2S_alos2.txt             | → the parameter file to be used on the processing    |

```
laila@laila-ThinkPad-P14s-Gen-4: /media/laila/My_Passport/Sby_Palsar2
laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2$ INSAR_G2S_alos2.sh 1 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
ascending
/home/laila/Process/PALSAR-2_SBY_DATA
HH
FBD
-----> Prepare the directory arrangement for ascending SAR data

INSAR_G2S STEP ---->> 1
1 Prepare the directory arrangement
Path must be located on the basement

Archive: /home/laila/Process/PALSAR-2_SBY_DATA/0000586157.zip
extracting: 0000586157_001001_ALOS2563567040-241029.zip
Archive: /home/laila/Process/PALSAR-2_SBY_DATA/0000586159.zip
extracting: 0000586159_001001_ALOS2530447040-240319.zip
Archive: /home/laila/Process/PALSAR-2_SBY_DATA/0000586160.zip
extracting: 0000586160_001001_ALOS2526307040-240220.zip
Archive: /home/laila/Process/PALSAR-2_SBY_DATA/0000586161.zip
extracting: 0000586161_001001_ALOS2522167040-240123.zip
Archive: /home/laila/Process/PALSAR-2_SBY_DATA/0000586162.zip
extracting: 0000586162_001001_ALOS2518027040-231226.zip
Archive: /home/laila/Process/PALSAR-2_SBY_DATA/0000586163.zip
extracting: 0000586163_001001_ALOS2513887040-231128.zip
Archive: /home/laila/Process/PALSAR-2_SBY_DATA/0000586164.zip
extracting: 0000586164_001001_ALOS2509747040-231031.zip
Archive: /home/laila/Process/PALSAR-2_SBY_DATA/0000586165.zip
extracting: 0000586165_001001_ALOS2499397040-230822.zip
All data are Dual Polarisation
Archive: /media/laila/My_Passport/Sby_Palsar2/batch_asc/raw_orig/0000586165_001001_ALOS2499397040-230822.zip
extracting: IMG-HH-ALOS2499397040-230822-FBDR1.1__A
```

Note:  
For Palsar-2 processing data,  
please **skip** the step 2 and 3.

# Step 4

Run the step of 4 at the **base** directory, then type this following command:

```
$ INSAR_G2S_alos2.sh 4 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
```

The process will create topo folder and download DEM SRTM 1 arc (dem.grd). Make sure that your computer has an internet access.

```
laila@laila-ThinkPad-P14s-Gen-4: /media/laila/My_Passport/Sby_Palsar2

From now you will work on batch_asc directory

laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2$ INSAR_G2S_alos2.sh 4 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
ascending
/media/laila/My_Passport/PALSAR-2_SBY_DATA
HH
FBD
-----> Prepare the directory arrangement for ascending SAR data

INSAR_G2S STEP ----> 4
4 Preprocess SAR data: Download DEM, Compute Baseline and Alignment
Path must be located on the basement

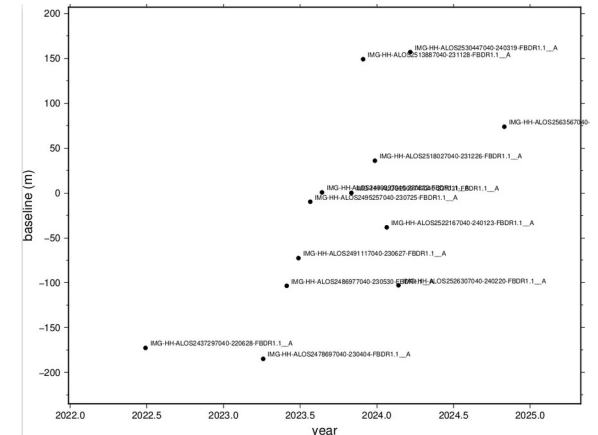
mkdir: cannot create directory 'topo': File exists
DEM AOI 112.375878/112.968754/-7.539721/-6.869404

START: make_dem.csh

grdcut [WARNING]: (w - x_min) must equal (NX + eps) * x_inc, where NX is an integer and |eps| <= 0.0001.
grdcut [WARNING]: w reset from 112.375878 to 112.37555556
grdcut [WARNING]: (e - x_min) must equal (NX + eps) * x_inc, where NX is an integer and |eps| <= 0.0001.
grdcut [WARNING]: e reset from 112.968754 to 112.969166667
grdcut [WARNING]: (s - y_min) must equal (NY + eps) * y_inc, where NY is an integer and |eps| <= 0.0001.
grdcut [WARNING]: s reset from -7.539721 to -7.54
grdcut [WARNING]: (n - y_min) must equal (NY + eps) * y_inc, where NY is an integer and |eps| <= 0.0001.
grdcut [WARNING]: n reset from -6.869404 to -6.869166667

created dem.grd, heights relative to WGS84 ellipsoid

ALIGN BATCH - END
Finished aligning 13 ALOS2 images
baseline_table.dat does not exist, try to regenerate.
From now you will work on batch_asc directory
laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2$
```



You can see the aligned result in raw folder, baseline.pdf, the axis-y 0 is the master date.

# Step 5 (SM → PS-InSAR)

From step 5, you need to run at **batch\_”orb”** directory, then type this following command:

```
$ INSAR_G2S_alos2.sh 5 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
```

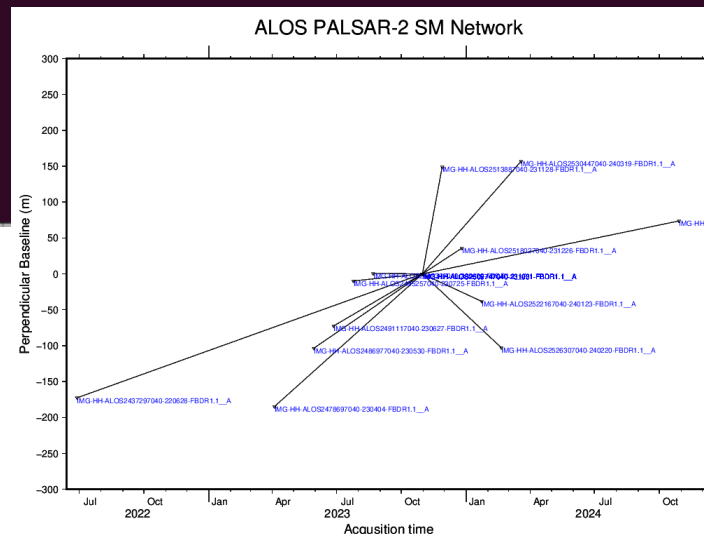
You must define whether to use Single Master (SM) or Small Baseline (SB) configuration. If you choose **SM**, then the master SAR image is set by the parameter name → “master\_date” on param\_INSAR\_G2S\_alos2.txt

```
laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2/batch_asc$ INSAR_G2S_alos2.sh 5 /media/laila/My_Passpor
t/Sby_Palsar2/param_INSAR_G2S_alos2.txt
ascending
/media/laila/My_Passport/PALSAR-2_SBY_DATA
HH
FBD
-----> Prepare the directory arrangement for ascending SAR data

INSAR_G2S STEP ---->> 5
5 Create a configuration of master-slave for SM or SB network
Path must be located on batch_asc

-----> Create Master-Slave network for PS (SM) and SB mentod
-----> Please choose an option
Single Master (MS) or Small Baseline (SB) network [type: SM or SB]? SM
```

*The result of SM configuration can be seen in batch\_”orb”  
folder with the name file of **baseline\_pair\_SM.ps**.*



## Step 5 (SB $\rightarrow$ SB InSAR)

From step 5, you need to run at **batch\_”orb”** directory, then type this following command:

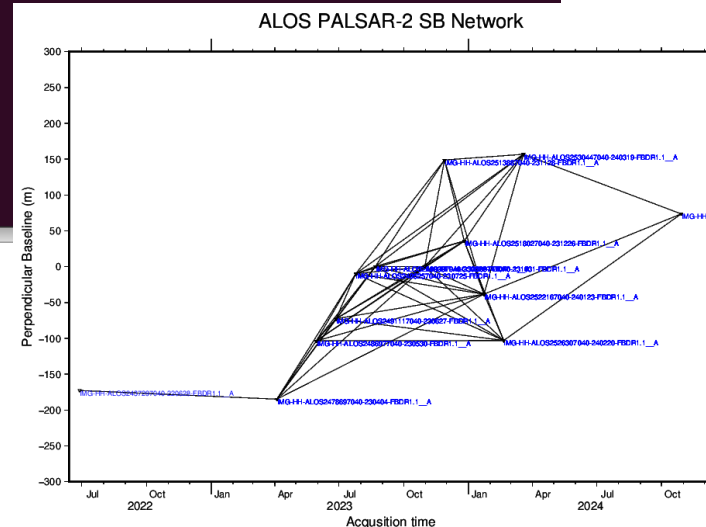
```
$ INSAR_G2S_alos2.sh 5 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
```

You must define whether to use Single Master (SM) or Small Baseline (SB) configuration. If you choose **SB**, then define the maximum perpendicular and temporal baseline from → “temp\_bl” and “spatial\_bl” on param INSAR\_G2S\_alos2.txt

```
laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2/batch_asc$ INSAR_G2S_alos2.sh 5 /media/laila/My_Passpor
t/Sby_Palsar2/param_INSAR_G2S_alos2.txt
ascending
/media/laila/My_Passport/PALSAR-2_SBY_DATA
HH
FBD
-----> Prepare the directory arrangement for ascending SAR data

INSAR_G2S STEP ---->> 5
5 Create a configuration of master-slave for SM or SB network
Path must be located on batch_asc

-----> Create Master-Slave network for PS (SM) and SB mentod
-----> Please choose an option
Single Master (MS) or Small Baseline (SB) network [type: SM or SB]? SB
```



The result of SB configuration can be seen in batch\_”orb” folder with the name file of **baseline\_pair\_”days”\_”baseline(m)”**.ps.



# Step 6

Run at **batch\_”orb”** directory, then type this following command:

```
$ INSAR_G2S_alos2.sh 6 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
```

```
laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2/batch_asc$ INSAR_G2S_alos2.sh 6 /media/laila/My_Passpor
t/Sby_Palsar2/param_INSAR_G2S_alos2.txt
ascending
/media/laila/My_Passport/PALSAR-2_SBY_DATA
HH
FBD
-----> Prepare the directory arrangement for ascending SAR data

INSAR_G2S STEP ---->> 6
6 Project DEM to radar coordinates
Path must be located on the batch_asc

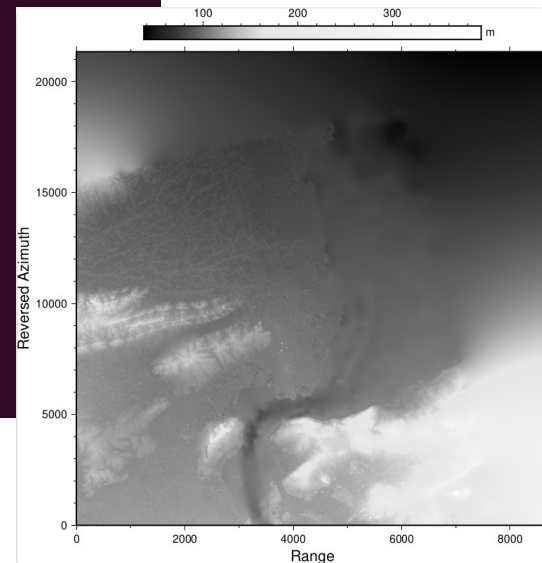
BACKGEOCODING - START

Skipping stage 4 5 6 ...

clean up topo/ folder

DEM2TOPO_RA.CSH - START
USER SHOULD PROVIDE DEM FILE
Working over 0/8710/0/21344 ...
  range decimation is: 2
blockmedian [INFORMATION]: Provides 3, expects 3-column binary data
blockmedian [INFORMATION]: Processing input table data
blockmedian [INFORMATION]: Cartesian input grid
```

*DEM downloaded from Step 4 will be projected to radar coordinates,  
check the result in topo folder → topo\_ra.pdf*



# Step 7 – Create Interferogram for SM Network

Run at **batch\_”orb”** directory, then type this following command:

```
$ INSAR_G2S_alos2.sh 7 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
```

```
laila@laila-ThinkPad-P14s-Gen-4: /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt x
laila@laila-ThinkPad-P14s-Gen-4: ~/Downloads v
INSAR_G2S STEP ---->> 7
7 Generate Interferogram (Real and Imaginary format) [SM | SB]
Path must be located on the batch_asc

Working on batch_asc directory

-----> Please choose an option
Single Master (MS) or Small Baseline (SB) mode [type: SM or SB]? SM
Interferogram is generated with SM network
using command line
.....master LED file IMG-HH-ALOS2509747040-231031-FBDR1.1__A.LED
.....aligned LED file IMG-HH-ALOS2437297040-220628-FBDR1.1__A.LED
using command line
.....master LED file IMG-HH-ALOS2509747040-231031-FBDR1.1__A.LED
.....aligned LED file IMG-HH-ALOS2509747040-231031-FBDR1.1__A.LED
intf.csh
running phasediff...
reading topo topo_ra.grd
xdim 8710, ydim 21344
using command line
.....master LED file IMG-HH-ALOS2509747040-231031-FBDR1.1__A.LED
.....aligned LED file IMG-HH-ALOS2478697040-230404-FBDR1.1__A.LED
using command line
.....master LED file IMG-HH-ALOS2509747040-231031-FBDR1.1__A.LED
.....aligned LED file IMG-HH-ALOS2509747040-231031-FBDR1.1__A.LED
intf.csh
running phasediff...
reading topo topo_ra.grd
xdim 8710, ydim 21344
```

Note:

Please **skip** the step 8,  
since the overview SAR  
image is only for  
Sentinel-1 data.

# Step 7 – Create Interferogram for SB Network

Run at **batch\_”orb”** directory, then type this following command:

```
$ INSAR_G2S_alos2.sh 7 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
```

```
laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2/batch_asc$ INSAR_G2S_alos2.sh 7 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
ascending
/media/laila/My_Passport/PALSAR-2_SBY_DATA
HH
FBD
-----> Prepare the directory arrangement for ascending SAR data

INSAR_G2S STEP ----> 7
7 Generate Interferogram (Real and Imaginary format) [SM | SB]
Path must be located on the batch_asc

Working on batch_asc directory

-----> Please choose an option
Single Master (MS) or Small Baseline (SB) mode [type: SM or SB]? SB
Interferogram is generated with SB network
using command line
.....master LED file IMG-HH-ALOS2478697040-230404-FBDR1.1_A.LED
.....aligned LED file IMG-HH-ALOS2486977040-230530-FBDR1.1_A.LED
using command line
.....master LED file IMG-HH-ALOS2478697040-230404-FBDR1.1_A.LED
.....aligned LED file IMG-HH-ALOS2478697040-230404-FBDR1.1_A.LED
```

Note:

Please **skip** the step 8,  
since the overview SAR  
image is only for  
Sentinel-1 data.

## Step 9 – Cut Interferogram based on AOI (SM)

Run at **batch\_"orb"/stack** directory, then type this following command:

```
$ INSAR_G2S_alos2.sh 9 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
```

AOI parameters are imported from `long_min_aoi`, `long_max_aoi`, `lat_min_aoi`, and `lat_max_aoi`.

```
laila@laila-ThinkPad-P14s-Gen-4: /media/laila/My_Passport/Sby_Pals... x laila@laila-ThinkPad-P14s-Gen-4: ~/Downloads x
laila@laila-ThinkPad-P14s-Gen-4: /media/laila/My_Passport/Sby_Palsar2/batch_asc/stack$ INSAR_G2S_alos2.sh 9 /media/laila/My_P
assport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
ascending
/media/laila/My_Passport/PALSAR-2_SBY_DATA
HH
FBD
-----> Prepare the directory arrangement for ascending SAR data

INSAR_G2S STEP ---->> 9
9 Cut the interferograms based on AOI (optional) [SM | SB]
Path must be located on the batch_asc/stack

Working on batch_asc/stack directory

-----> Please choose an option
Single Master (MS) or Small Baseline (SB) mode [type: SM or SB]? SM
surface [INFORMATION]: Provides 3, expects 3-column binary data
surface [INFORMATION]: Cartesian input grid
surface [INFORMATION]: Cartesian input grid
surface [INFORMATION]: Grid domain: W: 112.62 E: 112.89 S: -7.38 N: -7.18 n_columns: 54 n_rows: 40 [gridline registration]
surface [INFORMATION]: Processing input table data
surface [INFORMATION]: Input 3 columns via binary records using format fff
surface [INFORMATION]: Reading Data Table from file llr
surface [INFORMATION]: Minimum value of your dataset x,y,z at: 112.617500305 -7.3822221756 1907.65209961
surface [INFORMATION]: Maximum value of your dataset x,y,z at: 112.892219543 -7.1777776718 6050.82763672
surface [INFORMATION]: Eliminate data points that are not nearest a node.
surface [WARNING]: 727375 unusable points were supplied; these will be ignored.
surface [WARNING]: You should have pre-processed the data with block-mean, -median, or -mode.
surface [WARNING]: Check that previous processing steps write results with enough decimals.
surface [WARNING]: Possibly some data were half-way between nodes and subject to IEEE 754 rounding.
```

# Step 9 – Cut Interferogram based on AOI (SB)

Run at **batch\_”orb”/stack** directory, then type this following command:

```
$ INSAR_G2S_alos2.sh 9 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
```

AOI parameters are imported from long\_min\_aoi, long\_max\_aoi, lat\_min\_aoi, and lat\_max\_aoi.

```
laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2/batch_asc/stack$ INSAR_G2S_alos2.sh 9 /media/laila/My_Passp
ort/Sby_Palsar2/param_INSAR_G2S_alos2.txt
ascending
/media/laila/My_Passport/PALSAR-2_SBY_DATA
HH
FBD
-----> Prepare the directory arrangement for ascending SAR data

INSAR_G2S STEP ---->> 9
9 Cut the interferograms based on AOI (optional) [SM | SB]
Path must be located on the batch_asc/stack

Working on batch_asc/stack directory

-----> Please choose an option
Single Master (MS) or Small Baseline (SB) mode [type: SM or SB]? SB
surface [INFORMATION]: Provides 3, expects 3-column binary data
surface [INFORMATION]: Cartesian input grid
surface [INFORMATION]: Cartesian input grid
surface [INFORMATION]: Grid domain: W: 112.62 E: 112.89 S: -7.38 N: -7.18 n_columns: 54 n_rows: 40 [gridline registration]
surface [INFORMATION]: Processing input table data
surface [INFORMATION]: Input 3 columns via binary records using format fff
surface [INFORMATION]: Reading Data Table from file llr
```

# **SM Configuration Step 10 – 12**

**For PS-InSAR Processing**

# Step 10 – Calculate Amplitude Dispersion (AD) for SM Network

Run at **batch\_”orb”/stack** directory, then type this following command:

```
$ INSAR_G2S_alos2.sh 10 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
```

*Tips:*

*On the script of **dispersion.csh**, you can set/modify the filter based on filters provided by GMTSAR at /usr/local/GMTSAR/gmtsar/filters/. You may modify the name of filter on line 43.*

```
laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2/batch_asc/stack$ INSAR_G2S_alos2.sh 10 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
ascending
/media/laila/My_Passport/PALSAR-2_SBY_DATA
HH
FBD
-----> Prepare the directory arrangement for ascending SAR data

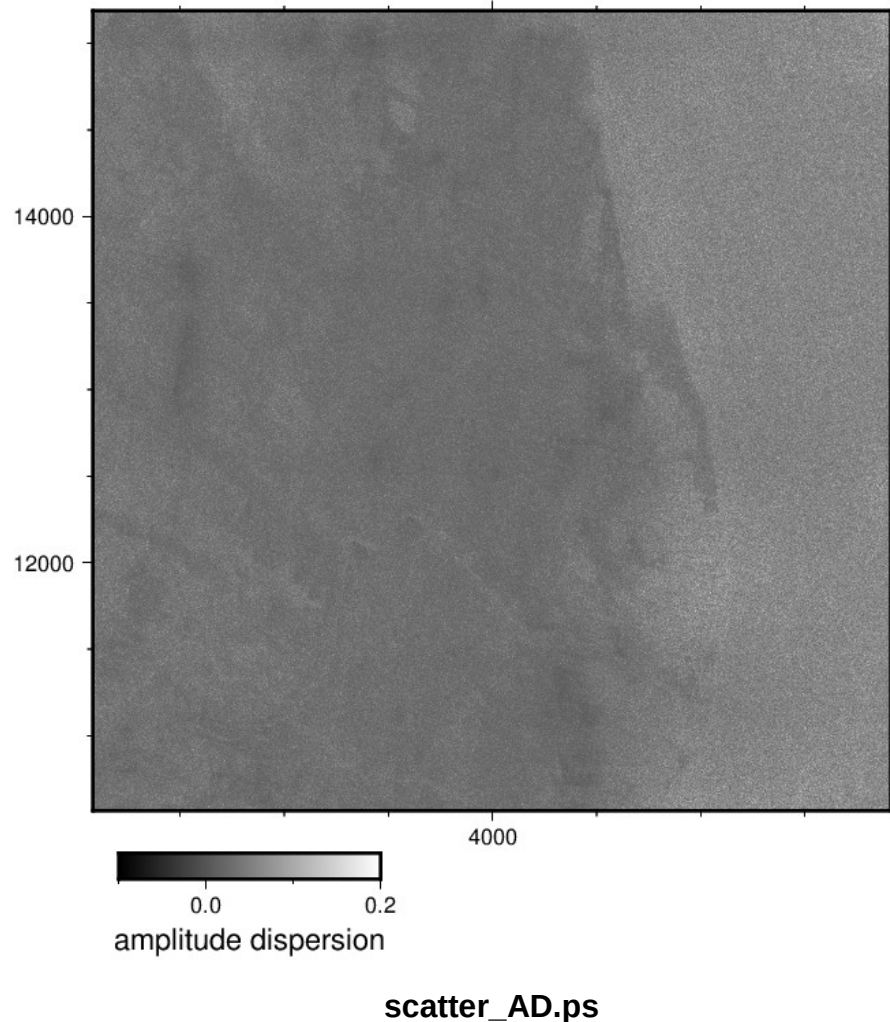
INSAR_G2S STEP ---->> 10
10 Create Amplitude Dispersion Index
Path must be located on the batch_asc/stack

Working on batch_asc/raw directory

Compute AD for PS method

Start -- compute amplitude dispersion

compute amplitude from SLCs ...
running conv on file IMG-HH-ALOS2437297040-220628-FBDR1.1__A
█
```



Tips:

To define the threshold, see **the result of scatter\_SM.grd**. Identify the minimum and maximum of AD value. Use a reasonable AD value lower than the maximum one.

For example. The left picture shows the threshold of **0.125** is reasonable to be chosen → It will be used on **step 11**.

You can see the statistical .grid with the following command:

**gmt grdinfo -L1 -M scatter\_SM.grd**

```
lailagLaila-ThinkPad-P14s-Gen-4:/media/Laila/My_Passport/Sby_Palsar2/batch_asc/raw$ gmt grdinfo -L1 -M scatter_SM.grd
scatter_SM.grd: Title: Produced by grdmath
scatter_SM.grd: Command: grdmath stg_A.grd M_A.grd DIV = scatter_SM.grd
scatter_SM.grd: Remark:
scatter_SM.grd: Pixel node registration used [Cartesian grid]
scatter_SM.grd: Grid file format: nf = GMT netCDF format (32-bit float), CF-1.7
scatter_SM.grd: x_min: 2079 x_max: 5914 x_inc: 1 name: x n_columns: 3835
scatter_SM.grd: y_min: 10566 y_max: 15188 y_inc: 1 name: y n_rows: 4622
scatter_SM.grd: v_min: 0.00195353943855 at x = 2564.5 y = 13699.5 v_max: 0.157735213637 at x = 5417.5 y = 10575.5
scatter_SM.grd: scale_factor: 1 add_offset: 0
scatter_SM.grd: 0 nodes (0.0%) set to NaN
scatter_SM.grd: median: 0.0366760604084 scale: 0.0149186844489
scatter_SM.grd: format: netCDF-4 chunk_size: 133,129 shuffle: on deflation_level: 3
```



# Step 11 – Convert Interferogram to StaMPS format with selected AD

Define how many PATCH will you divide the PS candidates as sub-regions. The patches are divided based on range and azimuth direction, Modify the parameter of “n\_range” and “n\_azimuth”. The number of PATCH is n\_range x n\_azimuth.

Run at **batch\_”orb”/stack** directory, then type this following command:

```
$ INSAR_G2S_alos2.sh 11 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
```

```
laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2/batch_asc/stack$ INSAR_G2S_alos2.sh 11 /media/laila/My_Passp
ort/Sby_Palsar2/param_INSAR_G2S_alos2.txt
ascending
/media/laila/My_Passport/PALSAR-2_SBY_DATA
HH
FBD
-----> Prepare the directory arrangement for ascending SAR data

INSAR_G2S STEP ---->> 11
11 Convert GMTSAR result to be able processed by STAMPS PS
Path must be located on the batch_asc/stack

Working on batch_asc/stack directory

ln: failed to create symbolic link 'param_dir.txt': File exists
width = 3836
length = 4623
width range = 1918
length azimuth = 2311

1918
2311
```

## Step 12 – Fix the PS candidates size of matrices

Please count how many PATCH do you have, you will need to define how many patches that you will be corrected.

Run at **batch\_”orb”/stack/PS** directory, then type this following command:

```
$ INSAR_G2S_alos2.sh 12 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
```

```
laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2/batch_asc/stack$ cd PS
laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2/batch_asc/stack/PS$ INSAR_G2S_alos2.sh 12 /media/laila/My_Pa
ssport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
ascending
/media/laila/My_Passport/PALSAR-2_SBY_DATA
HH
FBD
-----> Prepare the directory arrangement for ascending SAR data

INSAR_G2S STEP ----->> 12
12 Fix the result of PS Candidates (PS)
Path must be located on the batch_asc/stack/PS

Working on PS directory

How many patches do you have? 4
surface [INFORMATION]: Provides 3, expects 3-column binary data
surface [INFORMATION]: Cartesian input grid
surface [INFORMATION]: Cartesian input grid
surface [INFORMATION]: Grid domain: W: 2064 E: 4048 S: 10560 N: 13088 n_columns: 248 n_rows: 79 [gridline registration]
surface [WARNING]: Your grid dimensions are mutually prime. Convergence is very unlikely.
surface [INFORMATION]: Hint: Choosing -R2032/4080/10560/13120 [n_columns = 256, n_rows = 80] might cut run time by a factor of 87
```

# Congratulations!

You are success to convert GMTSAR to StaMPS using INSAR\_G2S

Now, you can continue the time series InSAR with StaMPS. Run matlab on PS folder and

type

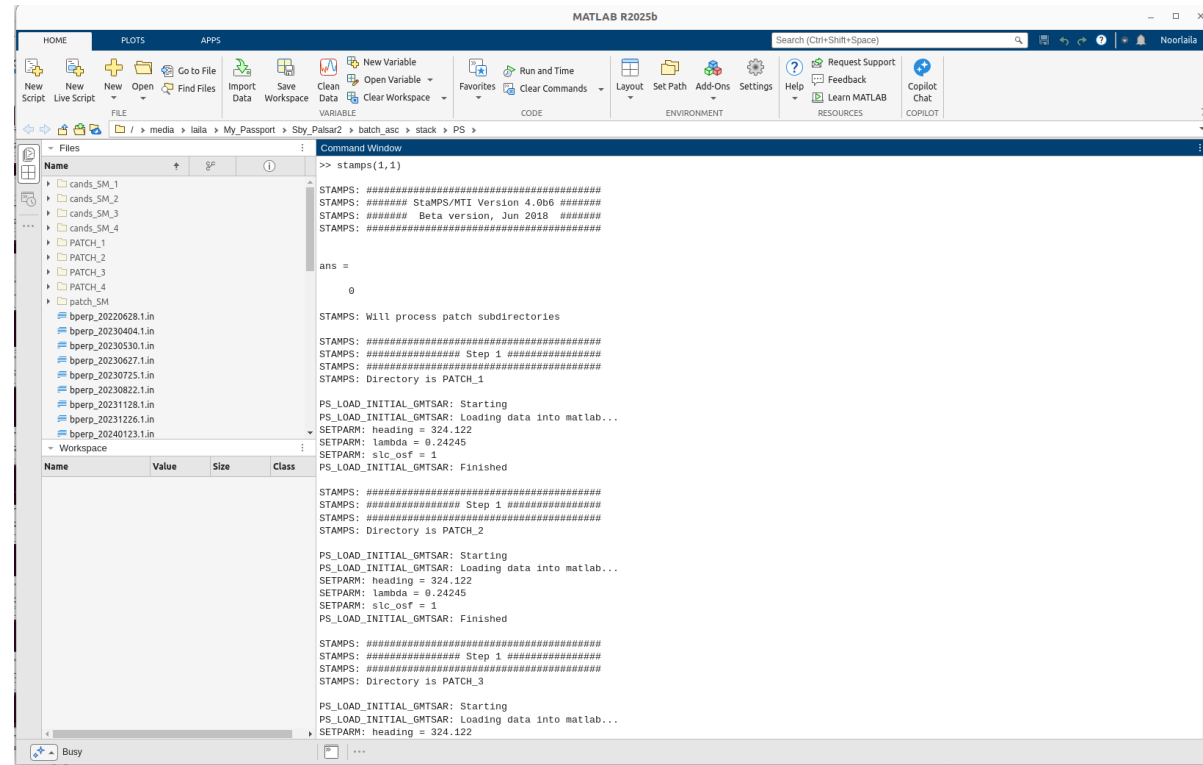
>> stamps (1,1) and so on...

or

sequence processing

>> stamps(1,5)

>> stamps(6,7)



```
>> stamps(1,1)

STAMPS: #####
STAMPS: ##### StaMPS/MTI Version 4.0b6 #####
STAMPS: ##### Beta version, Jun 2018 #####
STAMPS: #####

ans =

     0

STAMPS: Will process patch subdirectories

STAMPS: #####
STAMPS: ##### Step 1 #####
STAMPS: #####
STAMPS: Directory is PATCH_1

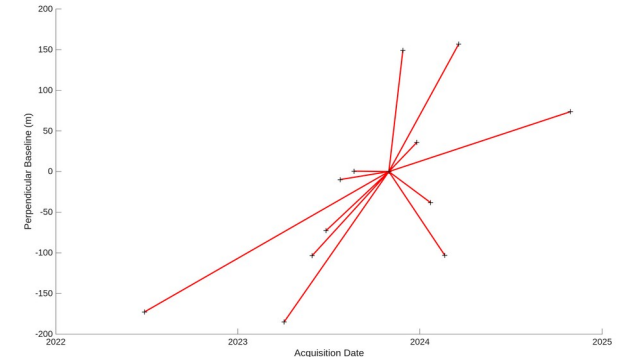
PS_LOAD_INITIAL_GMTSAR: Starting
PS_LOAD_INITIAL_GMTSAR: Loading data into matlab...
SETPARM: heading = 324.122
SETPARM: lambda = 0.24245
SETPARM: slc_osf = 1
PS_LOAD_INITIAL_GMTSAR: Finished

STAMPS: #####
STAMPS: ##### Step 1 #####
STAMPS: #####
STAMPS: Directory is PATCH_2

PS_LOAD_INITIAL_GMTSAR: Starting
PS_LOAD_INITIAL_GMTSAR: Loading data into matlab...
SETPARM: heading = 324.122
SETPARM: lambda = 0.24245
SETPARM: slc_osf = 1
PS_LOAD_INITIAL_GMTSAR: Finished

STAMPS: #####
STAMPS: ##### Step 1 #####
STAMPS: #####
STAMPS: Directory is PATCH_3

PS_LOAD_INITIAL_GMTSAR: Starting
PS_LOAD_INITIAL_GMTSAR: Loading data into matlab...
SETPARM: heading = 324.122
```



## **SB Configuration Step 13 – 15**

**For Small Baseline InSAR Processing**

# Step 13 – Calculate Amplitude Difference Dispersion (ADD) for SB Network

Run at **batch\_”orb”/stack** directory, then type this following command:

```
$ INSAR_G2S_alos2.sh 13 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
```

*Tips:*

On the script of **dispersion\_sb.sh**, you can set/modify the filter based on filters provided by GMTSAR at `/usr/local/GMTSAR/gmtsar/filters/`. You may modify the name of filter on line 43.

```
laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2/batch_asc/stack$ INSAR_G2S_alos2.sh 13 /media/laila/My_Passp
ort/Sby_Palsar2/param_INSAR_G2S_alos2.txt
ascending
/media/laila/My_Passport/PALSAR-2_SBY_DATA
HH
FBD
-----> Prepare the directory arrangement for ascending SAR data

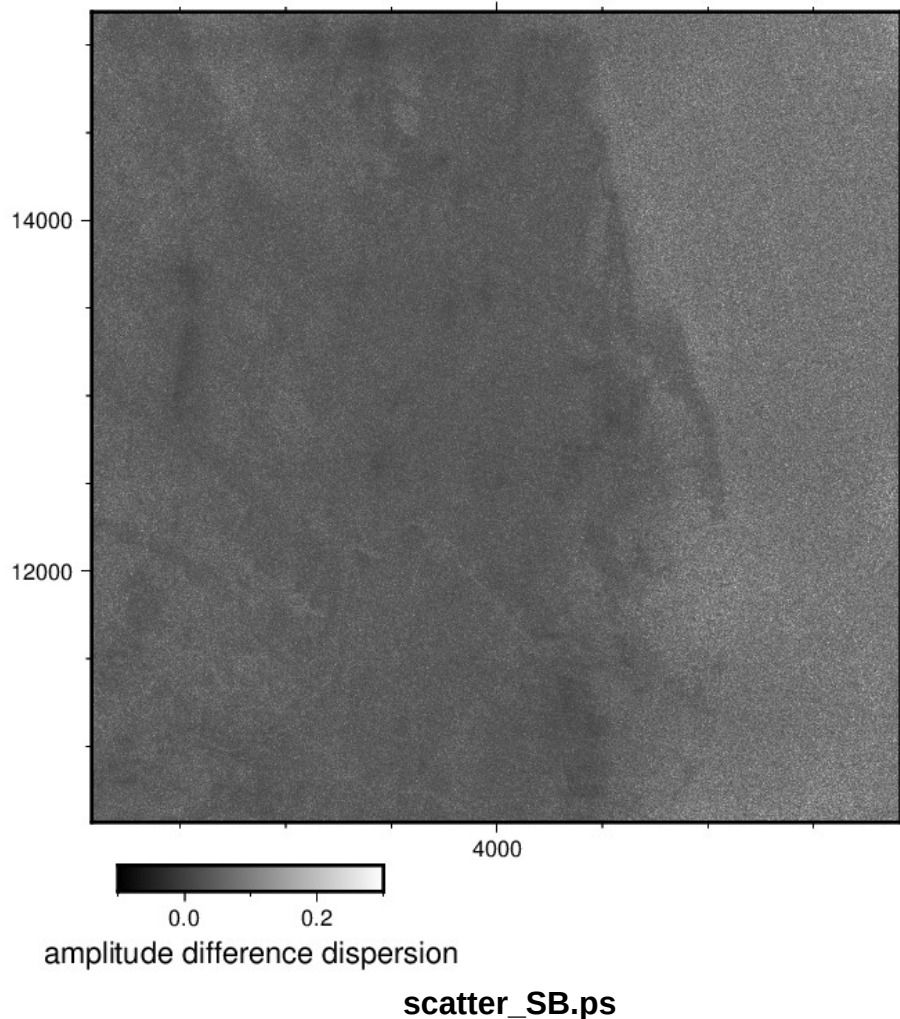
INSAR_G2S STEP -----> 13
13 Create Amplitude Difference Dispersion Index
Path must be located on the batch_asc/stack

Working on batch_asc/raw directory

Compute ADD for SB method

Start -- compute amplitude difference dispersion

compute amplitude from SLCs ...
grdimage [INFORMATION]: Read header from file IMG-HH-ALOS2437297040-220628-FBDR1.1__A.grd
```



Tips:

To define the threshold, see **the result of scatter\_SB.grd**. Identify the minimum and maximum of AD value. Use a reasonable AD value lower than the maximum one.

For example. The left picture shows the threshold of **0.2** is reasonable to be chosen  
→ **It will be used on step 14.**

You can see the statistical .grd with the following command:

**gmt grdinfo -L1 -M scatter\_SB.grd**

```
laila@laila-ThinkPad-P14s-Gen-4: /media/laila/My_Passport/Sby_Palsar2/batch_asc/raw$ gmt grdinfo -L1 -M scatter_SB.grd
scatter_SB.grd: Title: Produced by grdmath
scatter_SB.grd: Command: grdmath sig_delta_A.grd M_A_sb.grd DIV = scatter_SB.grd
scatter_SB.grd: Remark:
scatter_SB.grd: Pixel node registration used [Cartesian grid]
scatter_SB.grd: Grid file format: nf = GMT netCDF format (32-bit float), CF-1.7
scatter_SB.grd: x_min: 2079 x_max: 5914 x_inc: 1 name: x n_columns: 3835
scatter_SB.grd: y_min: 10566 y_max: 15188 y_inc: 1 name: y n_rows: 4622
scatter_SB.grd: v_min: 0.00154513271991 at x = 3422.5 y = 15002.5 v_max: 0.292532354593 at x = 5704.5 y = 10662.5
scatter_SB.grd: scale_factor: 1 add_offset: 0
scatter_SB.grd: 0 nodes (0.0%) set to NaN
```

# Step 14 – Convert Interferogram to StaMPS format with selected AD

Define how many PATCH will you divide the PS candidates as sub-regions. The patches are divided based on range and azimuth direction, Modify the parameter of “n\_range” and “n\_azimuth”. The number of PATCH is n\_range x n\_azimuth.

Run at **batch\_”orb”/stack** directory, then type this following command:

```
$ INSAR_G2S_alos2.sh 14 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
```

```
laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2/batch_asc/stack$ INSAR_G2S_alos2.sh 14 /media/laila/My_Passport/Sby_Palsar2
/param_INSAR_G2S_alos2.txt
ascending
/media/laila/My_Passport/PALSAR-2_SBY_DATA
HH
FBD
-----> Prepare the directory arrangement for ascending SAR data

INSAR_G2S STEP ---->> 14
14 Convert GMTSAR result to be able processed by STAMPS SB
Path must be located on the batch_asc/stack

Working on batch_asc/stack directory

ln: failed to create symbolic link 'param_dir.txt': File exists
width = 3836
length = 4623
width range = 1918
length azimuth = 2311

1918
```



## Step 15 – Fix the PS candidates size of matrices

Please count how many PATCH do you have, you will need to define how many patches that you will be corrected.

Run at **batch\_”orb”/stack/PS** directory, then type this following command:

```
$ INSAR_G2S_alos2.sh 12 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
```

```
laila@laila-ThinkPad-P14s-Gen-4:/media/laila/My_Passport/Sby_Palsar2/batch_asc/stack/PS/SMALL_BASELINES$ INSAR_G2S_alos2.sh 15 /media/laila/My_Passport/Sby_Palsar2/param_INSAR_G2S_alos2.txt
ascending
/media/laila/My_Passport/PALSAR-2_SBY_DATA
HH
FBD
-----> Prepare the directory arrangement for ascending SAR data

INSAR_G2S STEP ---->> 15
15 Fix the result of PS Candidates (SB)
Path must be located on the batch_asc/stack/PS/SMALL_BASELINES

Working on SMALL_BASELINES directory

How many patches do you have? 4
□
```



# Congratulations!

## You are success to convert GMTSAR to StaMPS using INSAR\_G2S

Now, you can continue the time series InSAR with StaMPS.  
Run matlab on PS folder and

type

```
>> stamps (1,1) and so on...
```

or

sequence processing

```
>> stamps(1,5)
```

```
>> stamps(6,7)
```

