



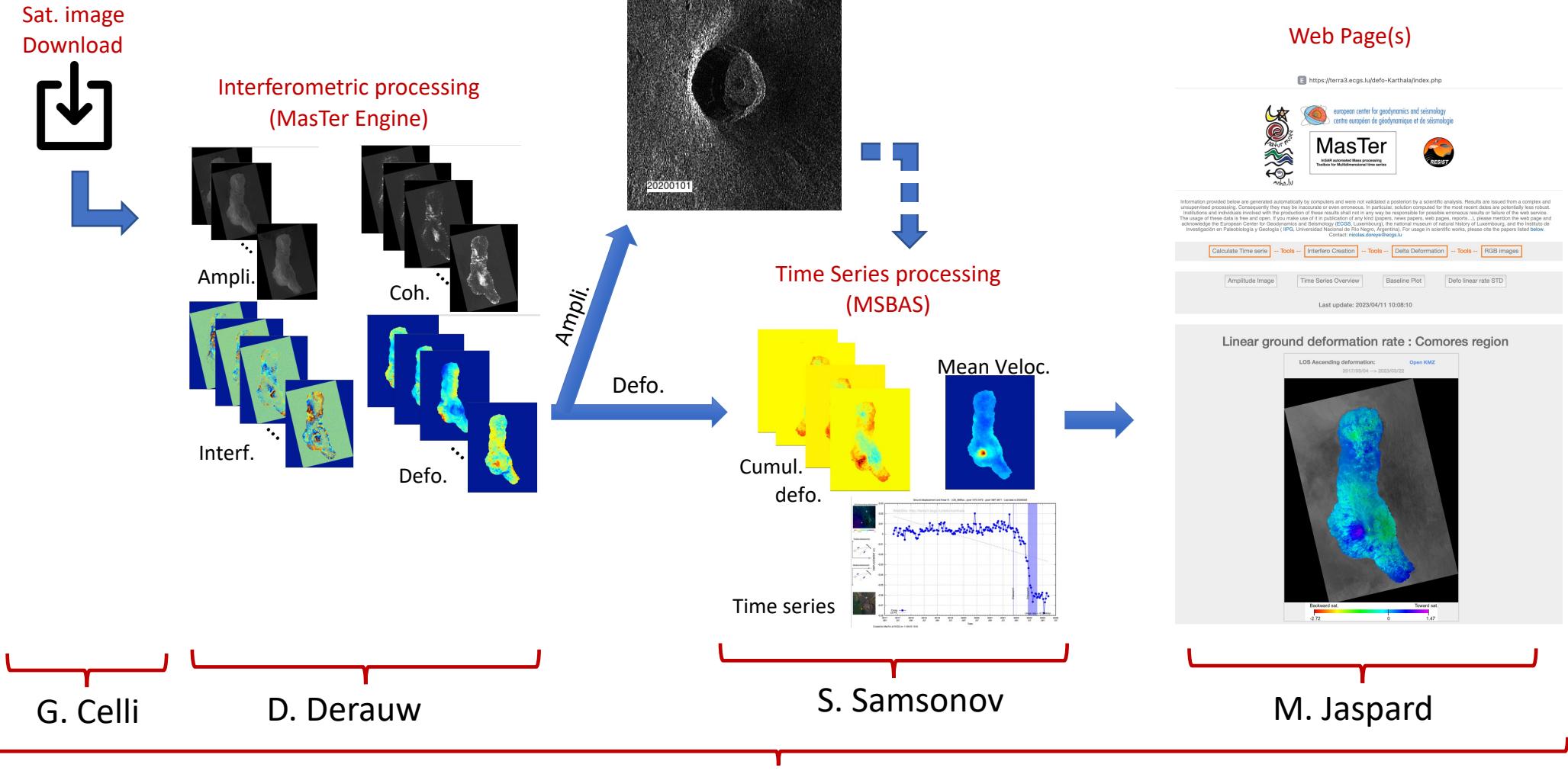
Summer School in InSAR, time series processing and deformation modelling

Time Series plotting

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MasTer Toolbox





Time Series plotting

Plan: Time Series of single component: *PlotTS.sh*

Time Series in UD-EW component *PlotTS_AllComp.sh*

Insets

Error bars

Other options

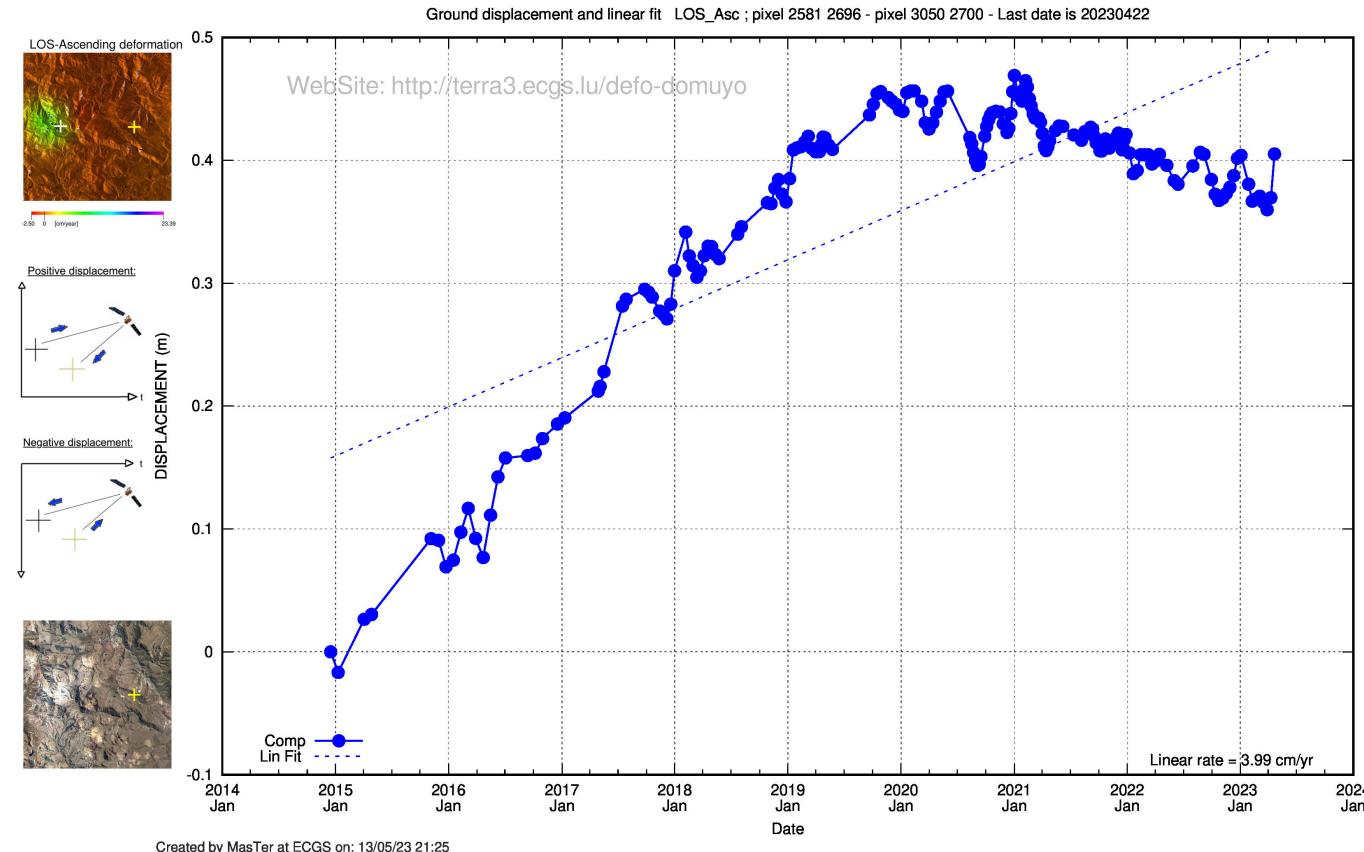
Time Series plotting

Time Series of single component: *PlotTS.sh*

- Must be run in directory where MSBAS data of the component are, that is e.g.
`.../3602/MSBAS/YourRegion_and_Some_Info/zz_LOS_Asc....`
- Templates required:
`plotTS_template.gnu` or
`plotTS_template_fit.gnu`
- Syntax: Needs the following parameters:
 - Coord. (`lines` and `cols`) of pixel(s)
 - Optional :
 - -f and -r (to display linear fit and rate)
 - -t (to add tag with direction of displacement)
 - -g, -d or -D (to clean gnu and txt files)
 - -EVENTS=/PathToEventsDir
(see options here after)
 - start=`YYYYMMDD` -stop=`YYYYMMDD`

Note:

See hard coded lines if needed to be launched from QGIS

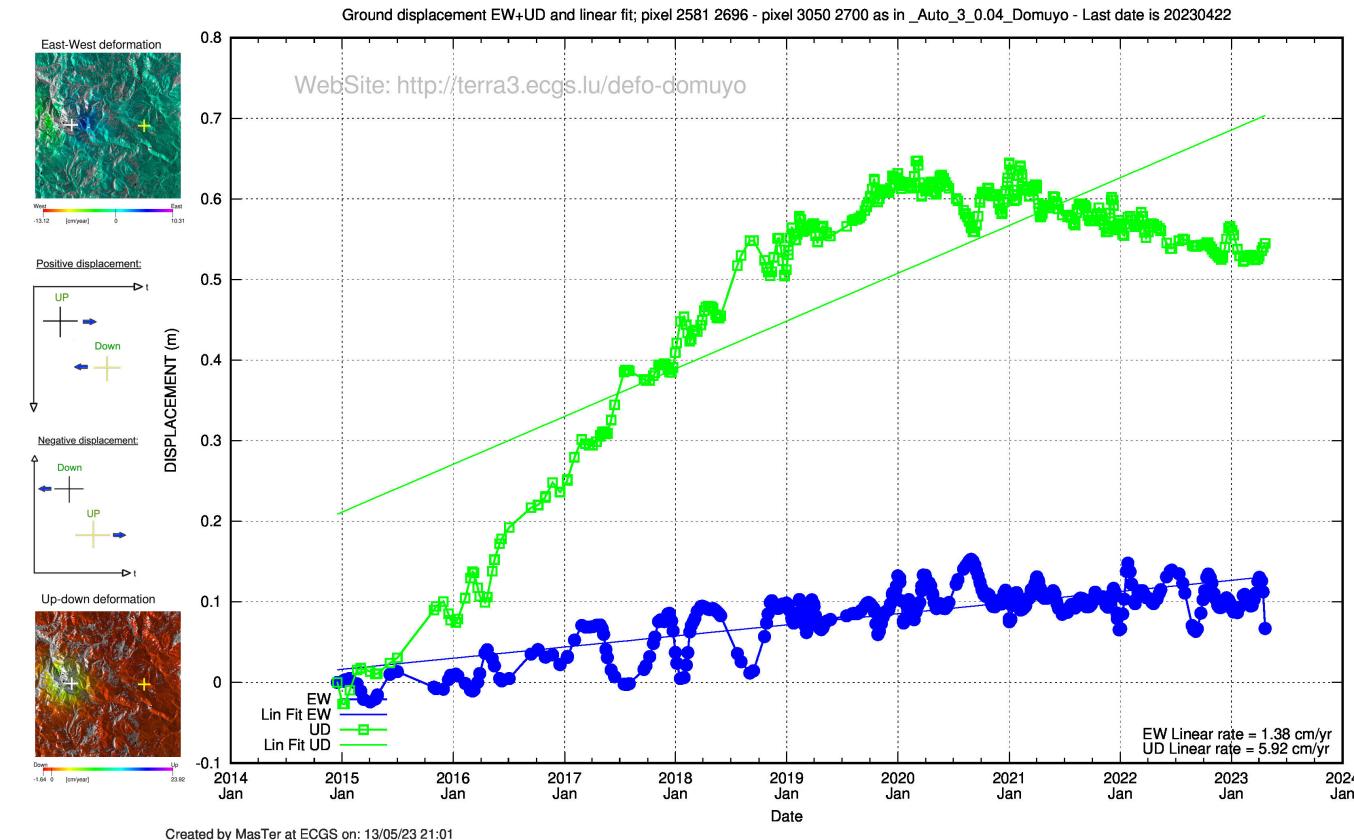


Time Series plotting

Time Series of single component: *PlotTS.sh*

Time Series in UD-EW component *PlotTS_AllComp.sh*

- Must be run in directory where MSBAS data are in sub directories, that is e.g. .../3602/MSBAS/YourRegion_and_Some_Info/
- Templates required:
 - [plotTS_template_multi.gnu](#) or
 - [plotTS_template_multi_fit.gnu](#)
- Syntax: Needs the following parameters:
 - Remak used in dir naming of the components
e.g. `zz_EW_REMARKDIR`
 - Coord. ([lines](#) and [cols](#)) of pixel(s)
 - Optional :
 - -f and -r (to display linear fit and rate)
 - -t (to add tag with direction of displacement)
 - -g, -d or -D (to clean gnu and txt files)
 - -EVENTS=/PathToEventsDir
(see options here after)
 - start=[YYYYMMDD](#) -stop=[YYYYMMDD](#)
 - Coh=Option to display error bars (see here after)



Time Series plotting

Time Series of single component: *PlotTS.sh*

Time Series in UD-EW component *PlotTS_AllComp.sh*

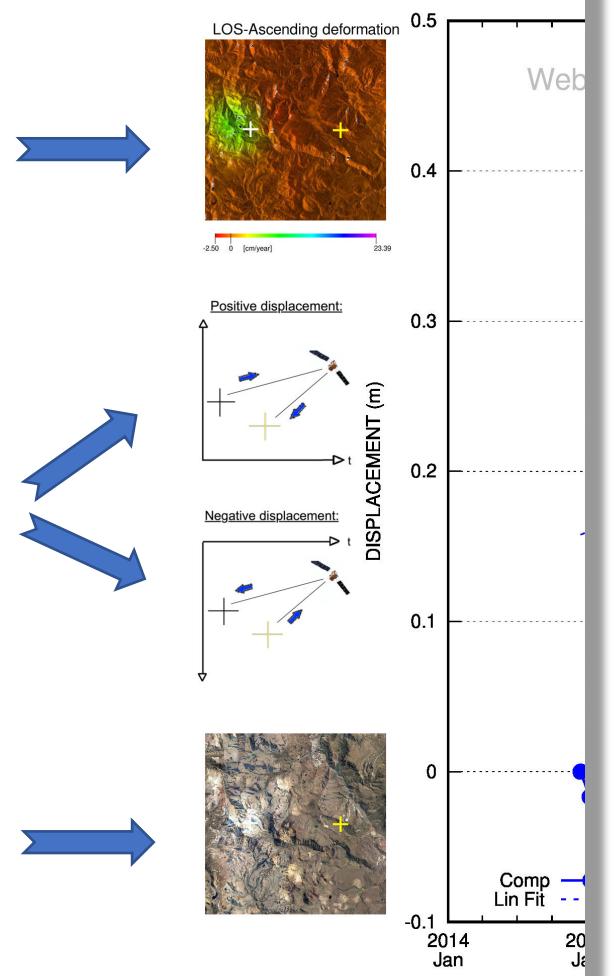
Insets

3 types of insets are displayed automatically, that is

- Inset to display the pixel localisation on velocity map
- Insets to display the direction of displacement
- Inset to display the location on Google Earth (Single component only)

providing that the correct info are present where needed:

- [TS_Displ_comp.png](#)
These figs are located in [/SCRIPTS_MT/TSCombiFiles](#)
They will be copied automatically in
[.../3602/MSBAS/YourRegion_and_Some_Info/](#)
- [TS_parameters.txt](#) located in [/SCRIPTS_MT/TSCombiFiles](#)
which contains the following parameters (to be adjusted to your needs – see after)
- [Satview.jpg](#) in [.../3602/MSBAS/YourRegion_and_Some_Info/CombiFiles](#)
which contains the Google Earth map (see after how to prepare it).
Note that its tif version might be needed for the web page ([Satview.tif](#))



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Time Series and maps plotting

Time Series of single component: *PlotTS.sh*

Time Series in UD-EW component *PlotTS_AllComp.sh*

Insets

[TS_parameters.txt:](#)

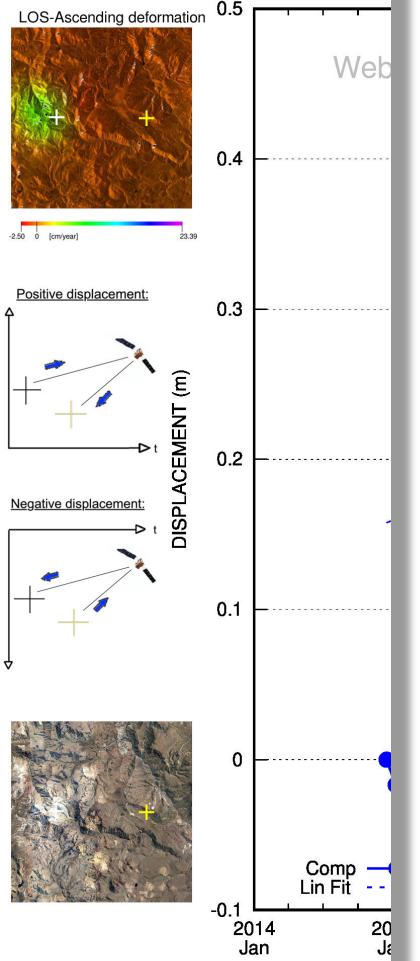
```

# Data related to HP server path
defo-domuyo          # WebPage

# Fiji_Amp_Defo_Coh script and ImageCreator.sh
# Value used to build the legend of the deformation maps
1.3      # IJAMPMin           (Minimum value for brightness to build amplitude image using ImageJ)
2.7      # IJAMPMax            (Maximum value for brightness to build amplitude image using ImageJ)
40       # MarkUp              (Legend vertical bar position Up)
90       # MarkDown             (Legend vertical bar position Down)
125      # LegValPosH          (Vertical Position of the value in the legend)
125      # LegUnitPosH          (Vertical Position of the unity in the legend)
35       # LegTxtPosH           (Vertical Position of the text info in the legend)
8        # LegAdjZero           (Fine adjustment of the horizontal positionnement of Zero)
60       # LegAdjMin            (Fine adjustment of the horizontal positionnement of Min Val)
10       # LegAdjMax            (Fine adjustment of the horizontal positionnement of Max Val)
70       # LegAdjLOS             (Fine adjustment of the horizontal positionnement of Max Val for LOS maps)
200      # LegAdjUnit           (Fine adjustment of the horizontal positionnement of Unity related to the left)
    
```

[...]

This first part of [TS_parameters.txt](#) usually doesn't need to be changed



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Time Series plotting

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Insets

[TS_parameters.txt](#): review the parameters in red:

```
# CreateColorFrame script + Fiji_Amp_Defo_Coh script
100      # Margin
800      # LegendWidth
0.6      # ColorBackgrdLegnd (0 = white --> 1 = grey)
35       # LegendTxtSize (Size of the text in the legend)
140      # LegendHeight (Height of the legend in pixels margin include)
40       # FrameTop (distance between top of color frame and top of the legend)
60       # FrameBott (distance between bottom of color frame and top of the legend)

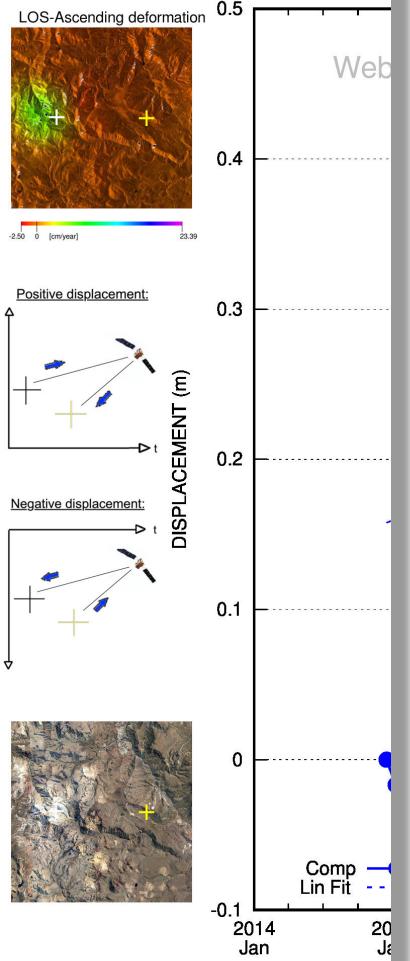
# ImageCreator.sh and TimeSeriesInfo.sh
1000     # Crop_X (Top left X coordinate of the cropped zone)
1000     # Crop_Y (Top left Y coordinate of the cropped zone)
3361     # Crop_L (Horizontal size of the cropped zone)
2800     # Crop_H (Vertical size of the cropped zone)

# TimeSeriesInfo.sh
100      # CrossTresh (Distance between 2 points (Vert or Horiz) which determine the size of the cross)
15       # CrossBig Size of the cross in defo map as thumbnail if spacement between 2 pts are > treshold)
15       # CrossSmall Size of the cross in defo map as thumbnail if spacement between 2 pts are < treshold)

2.5      # RateResoSatView (Rate of pixels number compare with envi files)
```

← Depends on the size
of your full image

← Needs explanation !



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Time Series plotting

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Time Series in UD-EW component *PlotTS_AllComp.sh*

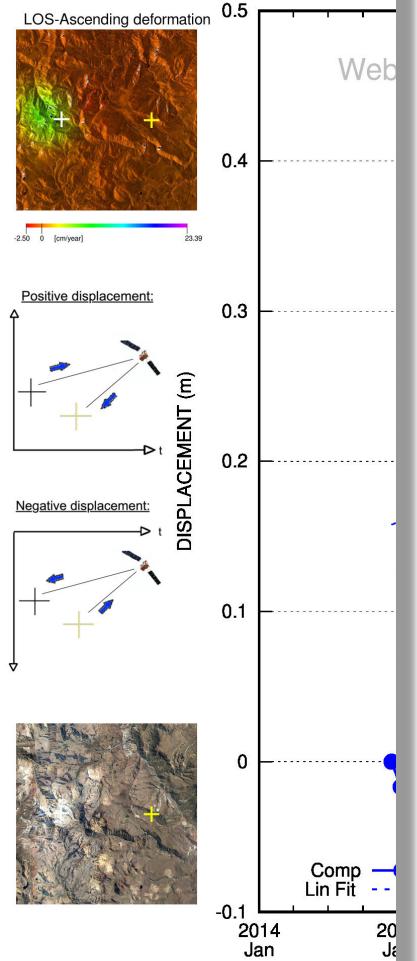
Insets

How set the `RateResoSatView` param for `TS_parameters.txt` ?

How create the `Satview.tif` (and `terrain.tif` – for web page)

(See also manual `Web_tool_V1.3.docx`)

1. Open a Google Earth background in QGIS as layer 1
2. Import a product map (defo, coh....) with the size of the msbas products as layer 2
3. Right-click on layer1 and select ‘Export – >save as’ with following option:
 - Output mode = Raw data
 - Format = Geotiff
 - Disable ‘Create VRT’ (untick the box to the right of “Format” box)
 - Change the CRS manually as the one of layer2 (You can find it in hdr file of layer2)
 - In extend, click on “Layer” and select layer2 (envi file).
 - in the “Horizontal” and “Vertical” boxes, enter the layer resolution factor to get image size of layer 1 (in lines/col) e.g. 5 time larger than of layer 2. Try e.g. entering a factor 10 or 50 and see the lines and col sizes in boxes “Columns” and “Rows”.



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Time Series plotting

Time Series of single component: *PlotTS.sh*

Time Series in UD-EW component *PlotTS_AllComp.sh*

Insets

How set the `RateResoSatView` param for `TS_parameters.txt` ?

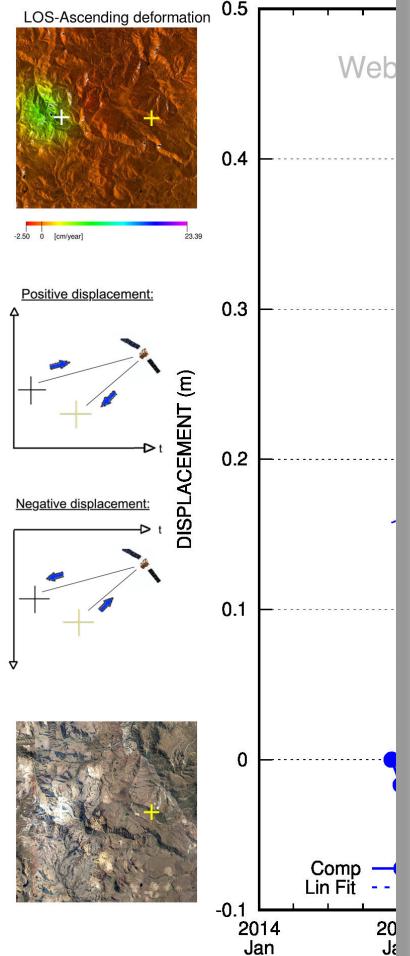
How create the `Satview.tif` (and `terrain.tif` – for web page)

(See also manual `Web_tool_V1.3.docx`)

4. Save your file in `.../3602/MSBAS/YourRegion_and_Some_Info/CombiFiles` as `satview.tif` (for the web page, you may want to do the same with Google terrain and save it as `terrain.tif`)
5. Convert it as jpg using convert: **`convert satview.tif satview.jpg`**
6. Edit the `TS_parameters.txt` to set:
 - The “RateResolutionFactor” (The RateResolutionFactor to write in `TS_parameters.txt`, is the size (either the number of lines or columns) of the layer 1 jpg image divided by the size of the MSBAS products)
 - The size/crop of the msbas products

```

# ImageCreator.sh and TimeSeriesInfo.sh
1000      # Crop_X (Top left X coordinate of the cropped zone)
1000      # Crop_Y (Top left Y coordinate of the cropped zone)
3361      # Crop_L (Horizontal size of the cropped zone)
2800      # Crop_H (Vertical size of the cropped zone)
[...] 
2.5       # RateResoSatView (Rate of pixels number compare with envi files)
  
```



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Time Series in UD-EW component *PlotTS_AllComp.sh*

Insets

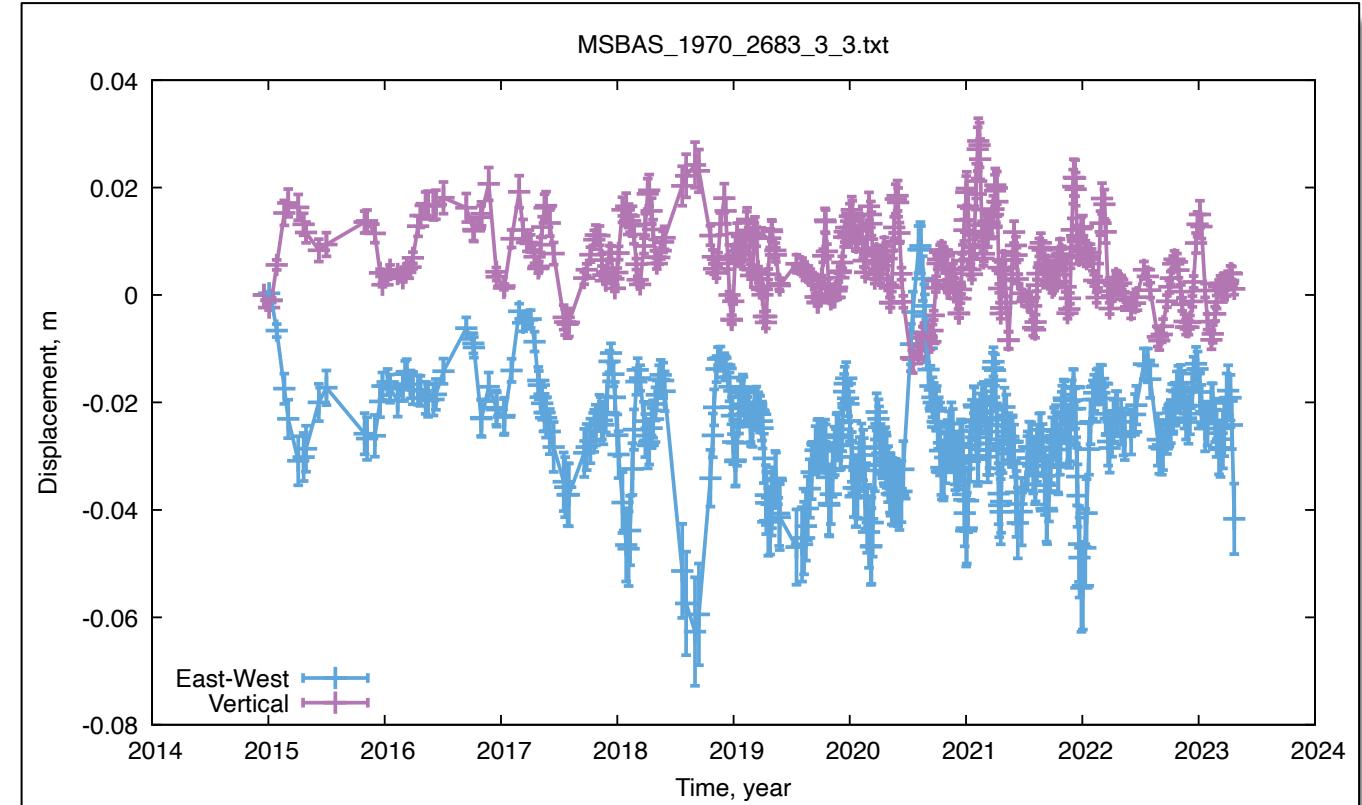
Error bars

2 types of error bars plots are possible:

- During operation of msbas: cfr list of points, e.g.
[Points_TS_Domuyo.txt](#)

```

name x y radiusX raduisY
LagunaMaule_Summit 2357 1443 0 0
LagunaMaule_W 1653 1443 3 3
LagunaMaule_S 2357 2146 3 3
LagunaFea_1 2494 1698 0 0
LagunaFea_2 2515 1685 3 3
  
```



Figures are stored in [pdf](#) format

in [.../3602/MSBAS/YourRegion_and_Some_Info/zz_UD_EW_TS...](#)

Error bars = stdv among values of pixels in a box of $\pm radiusX$ and $\pm radiusY$ around the pixel.

Time Series plotting

Time Series of single component: *PlotTS.sh*

Time Series in UD-EW component *PlotTS_AllComp.sh*

Insets

Error bars

2 types of error bars plots are possible:

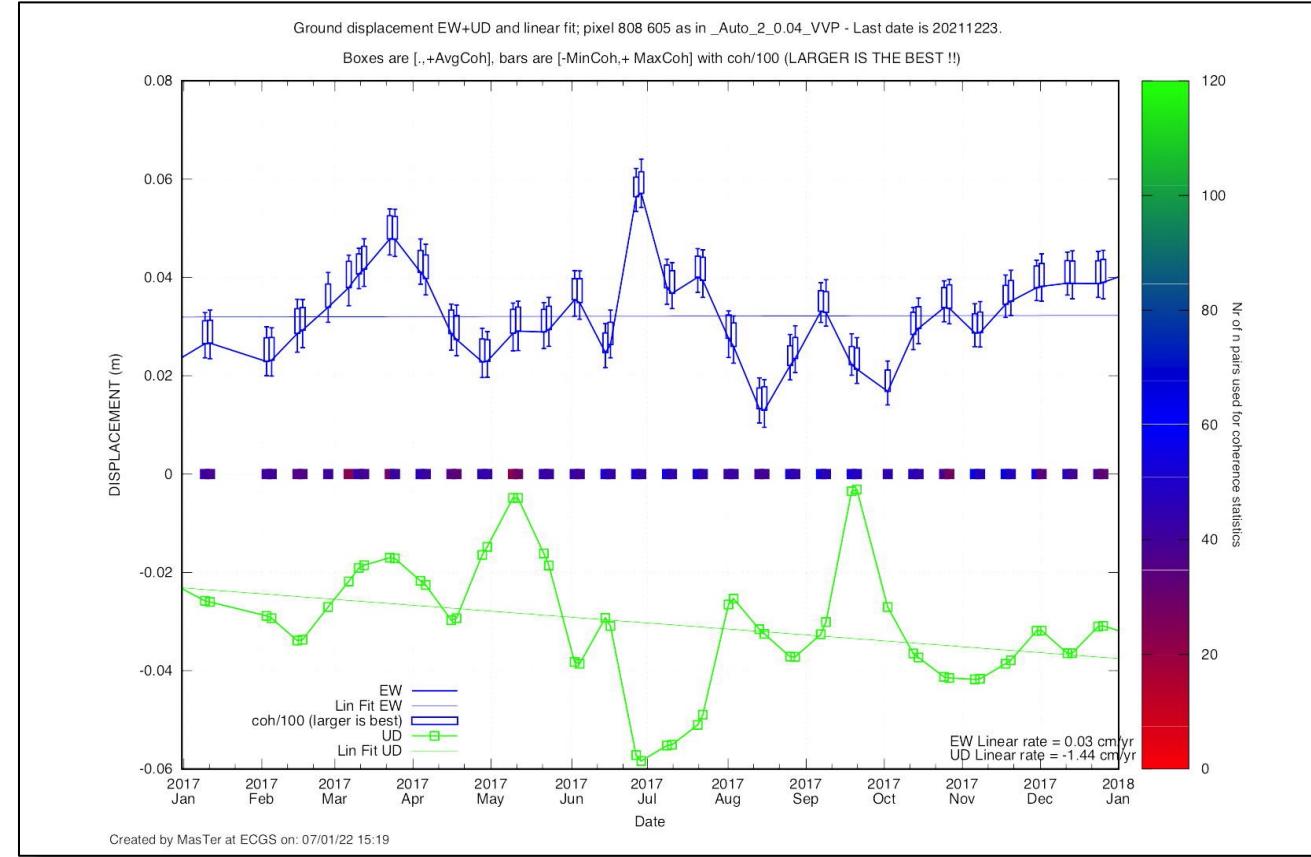
- After msbas processing, with *PlotTS_AllComp.sh*
with option (See manual § 6.4b)
`-coh=avgavg, avgmin, avgminmax or avgavgminmax`

The script computes the mean coherence (avg), min and max coherence (/100 !).

Note that because these boxes and bars are coherence related info and not “error bars”, the **larger is the best!**.

Color-coded symbols are added along the y=0 axis corresponding to the number of pairs used to compute the coherence statistics.

Figures are stored in **eps** format on single pixel plots in
`.../3602/MSBAS/YourRegion_and_Some_Info/zz_UD_EW_TS_...`



Example of plot with option `-coh=avgminmax`.
 Bottom of the box is displacement, top of the box is the average coherence (/100).
 Lower and upper bars are min and max coherence (/100) respectively.



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Time Series in UD-EW component *PlotTS_AllComp.sh*

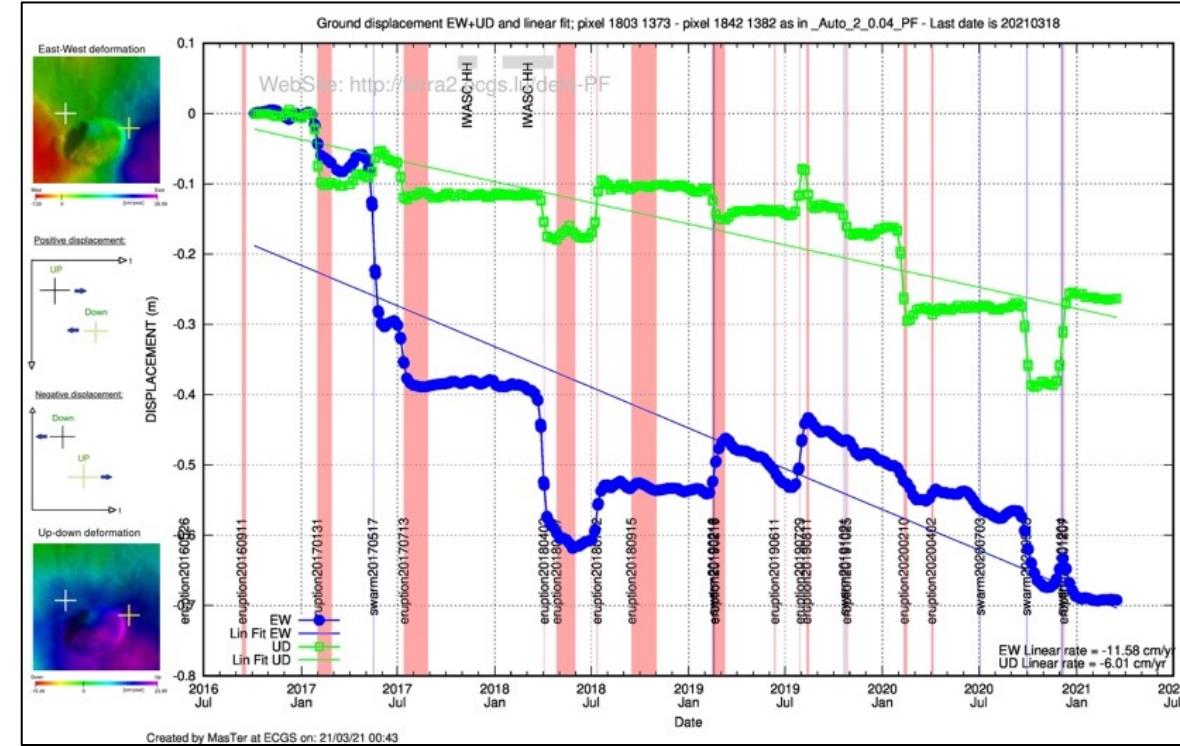
Insets

Error bars

Other options

By providing the path to a directory (-EVENTS=/PathTo/EVENTS_TABLES) that contains some formatted files, one can plots additional features:

- **EQ_YourPlace.txt**: (vertical blue dashed line) e.g.
EQplace yyyymmdd
 - **EQ_Swarms_YourPlace.txt**: (vertical blue rectangle) e.g.
EQplace yyyymmdd yyyymmdd
 - **Eruptions_YourPlace.txt**: (vertical red rectangle) e.g.
ErVolc yyyymmdd yyyymmdd
 - **Sat_Cover_YourPlace.txt**: (horiz. blue and/or red rectangles) e.g.
Sat_Mode yyyymmdd yyyymmdd
 - **Asymmetric_Acquisition_YourPlace.txt**: (horiz. grey rectangles) e.g.
Desc-Only yyyymmdd yyyymmdd
 - **Other_events_YourPlace.txt**: (vertical blue dashed line) e.g.
Name vvvvymdd



May need to change gnu scripts to adjust position of tags etc...

Events tables must contains names and dates in columns separated by a single tab. **No empty lines in the files or at the bottom.**



Time Series plotting

Plan: Time Series of single component: *PlotTS.sh*

Time Series in UD-EW component *PlotTS_AllComp.sh*

Insets

Error bars

Other options

- DONE ! -