

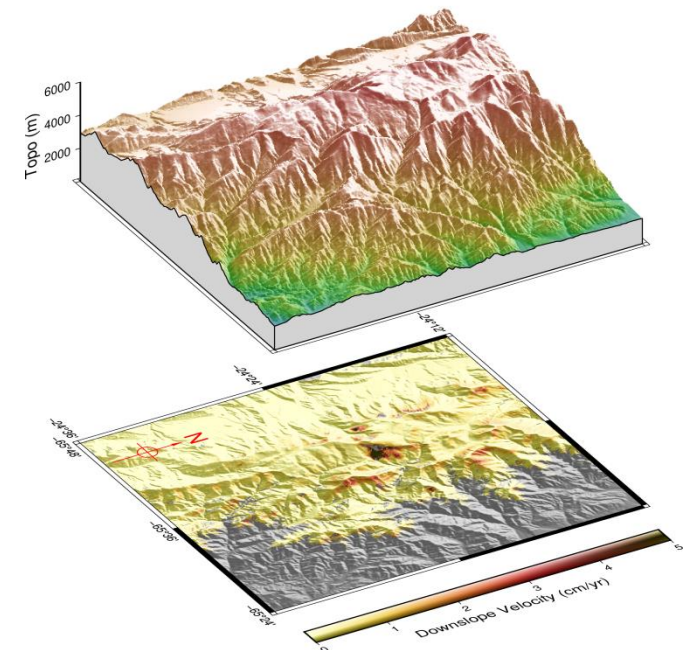
Kinematics Characterization of Slow-Moving Landslide using InSAR Time Series Analysis in the South-Central Andes of NW Argentina

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Mina Purna Landslide

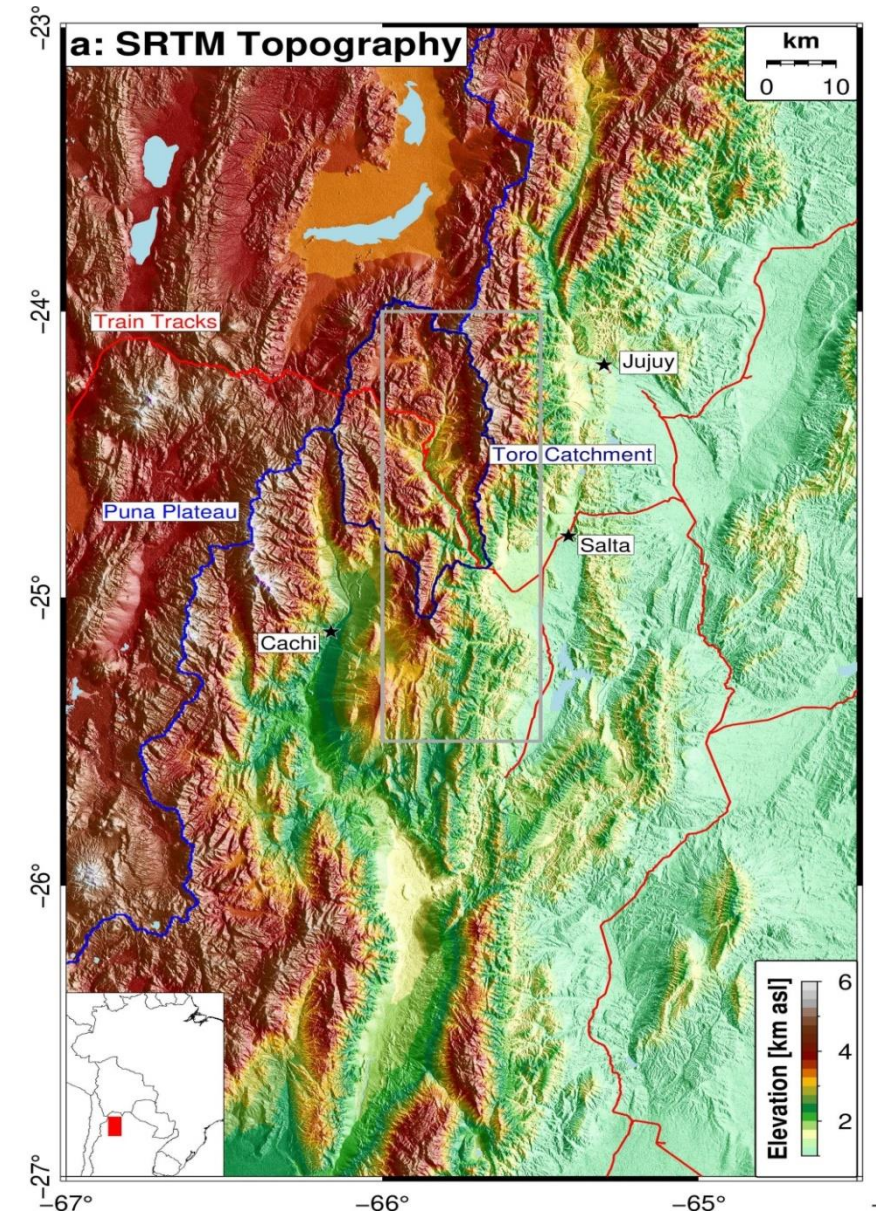


EGU22-10716 | Tuesday, 24 May | Session G3.4
Room D3

- ❑ What are the uncertainties of hillslope deformation rates in NW Argentina using InSAR processing techniques?
- ❑ What are the lowest magnitudes that can be measured from spaceborne SAR data?
- ❑ To what extent can different InSAR time series techniques, atmospheric corrections, and unwrapping techniques enhance deformation measurement in hill slope areas?

South-Central Andes of NW Argentina

- ❑ Elevations ranging from 1000m in the foreland to more than 6000m in the eastern Andean Cordillera
- ❑ Rainfall events driven by the South American monsoon
- ❑ Strong vegetation cover contrast from dense coverage in the low elevation foreland to sparse coverage at high elevation
- ❑ At some high elevations above 5000m hillslope instability are related to solifluction processes



Data Collection

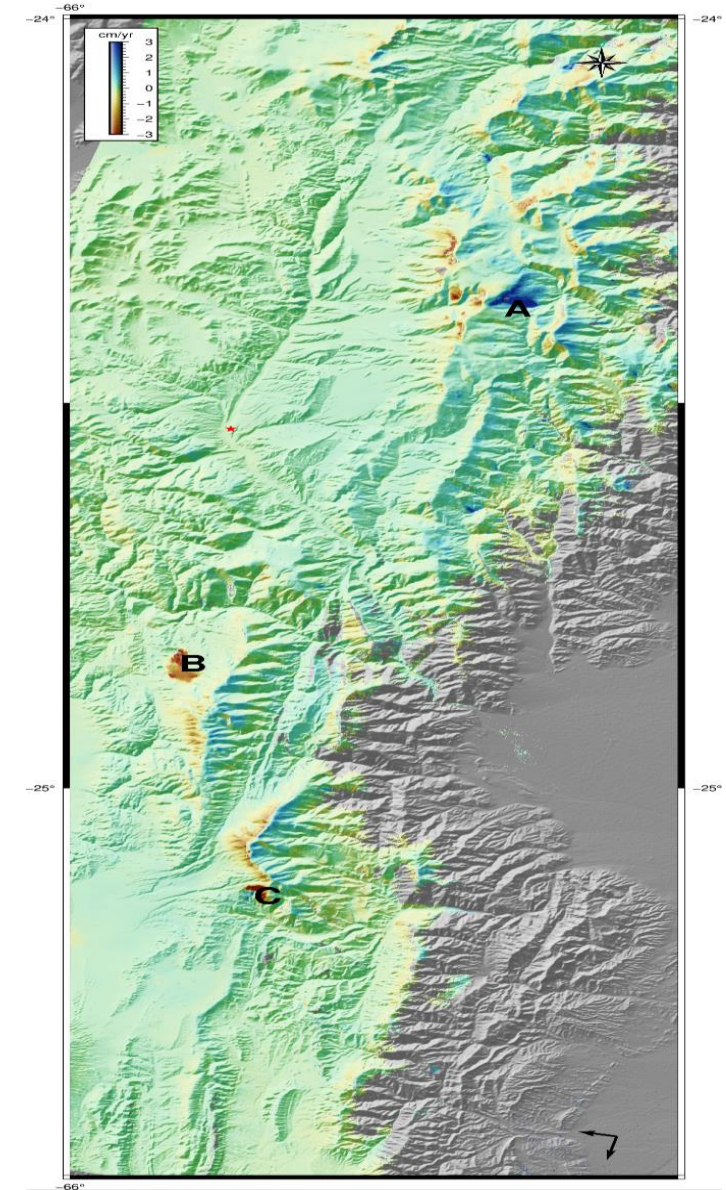
- ❑ Sentinel-1 Data 2014-2022(ascending and descending)
- ❑ ALOS-1 data ascending tracks: 96 and 97

InSAR time series Analysis

- ❑ SBAS , PSInSAR, phase linking method - sequential EMI, EVD
- ❑ Tropospheric correction: weather models, statistical methods including catchment based tropospheric correction, double difference filter (Bekaert et al., 2020)
- ❑ Ionospheric correction: split range-spectrum technique

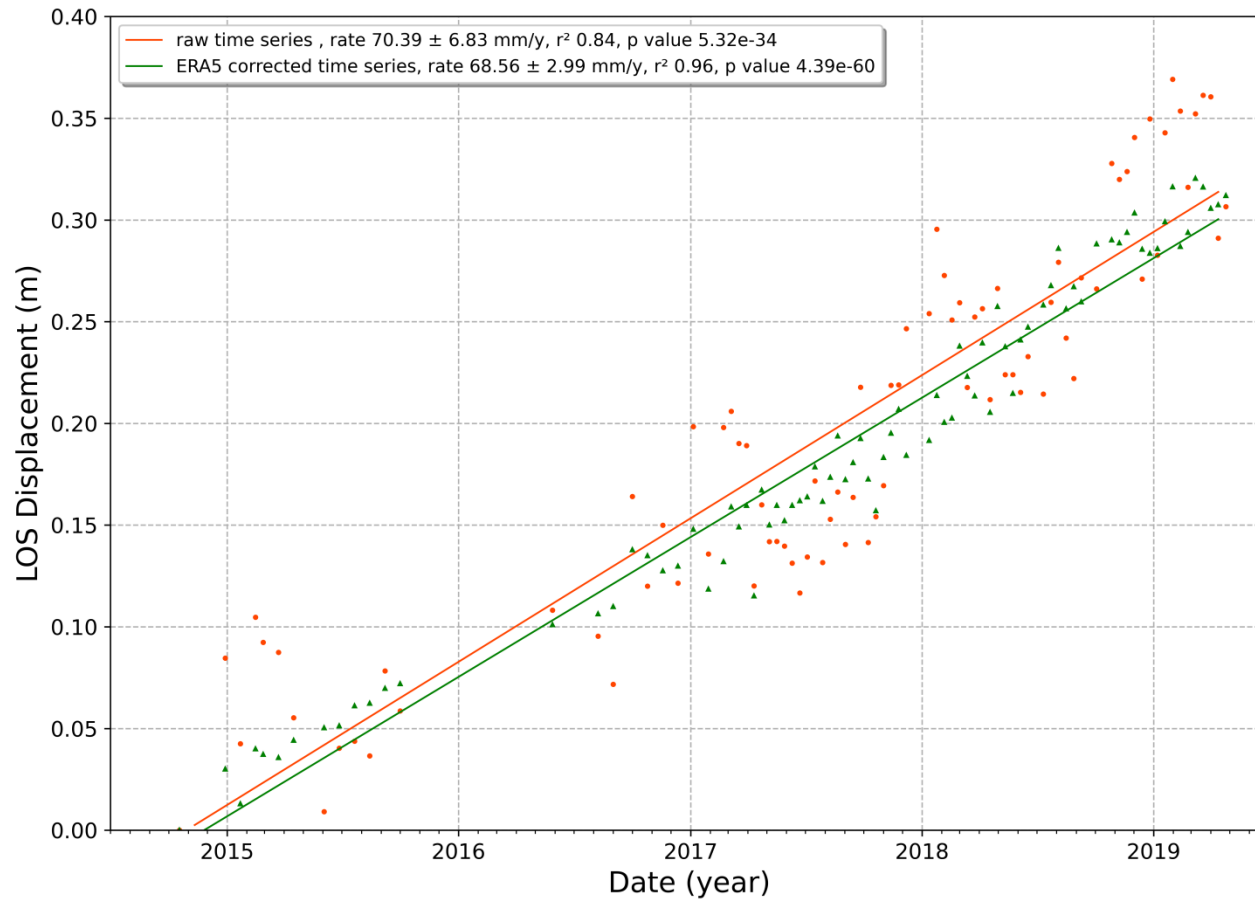
Post Processing

- ❑ 3D decomposition, downslope estimation
- ❑ Clustering and connected component analysis

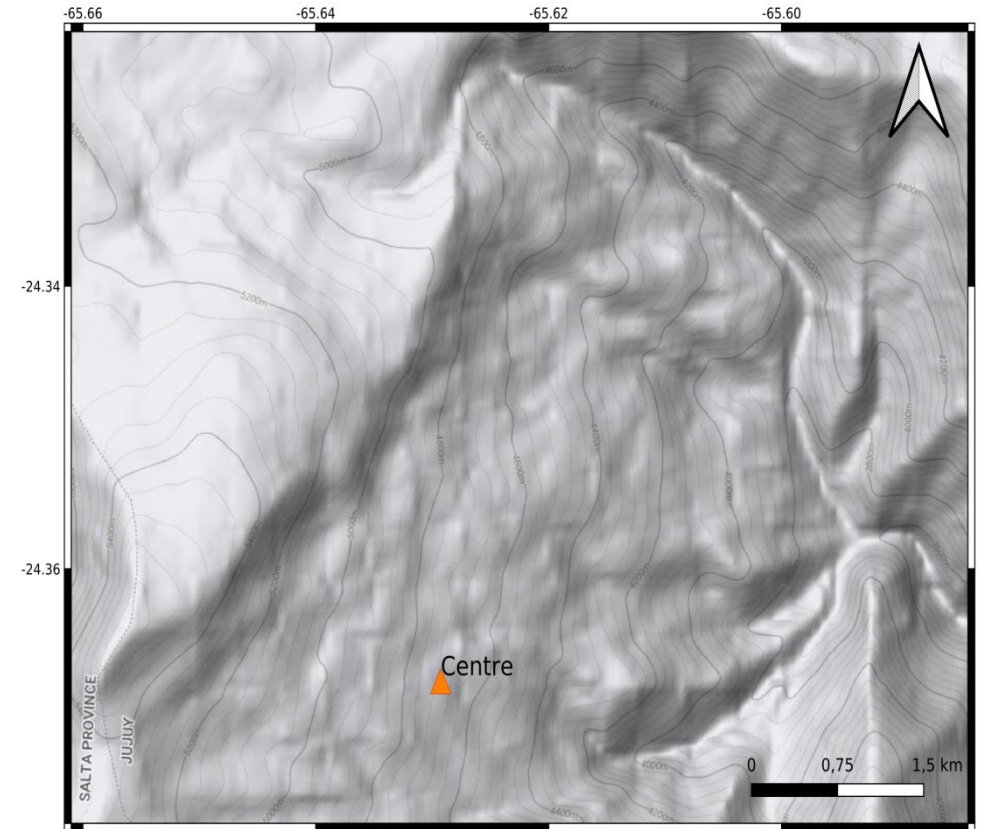


InSAR mean velocity descending track. 10

InSAR Time Series Analysis

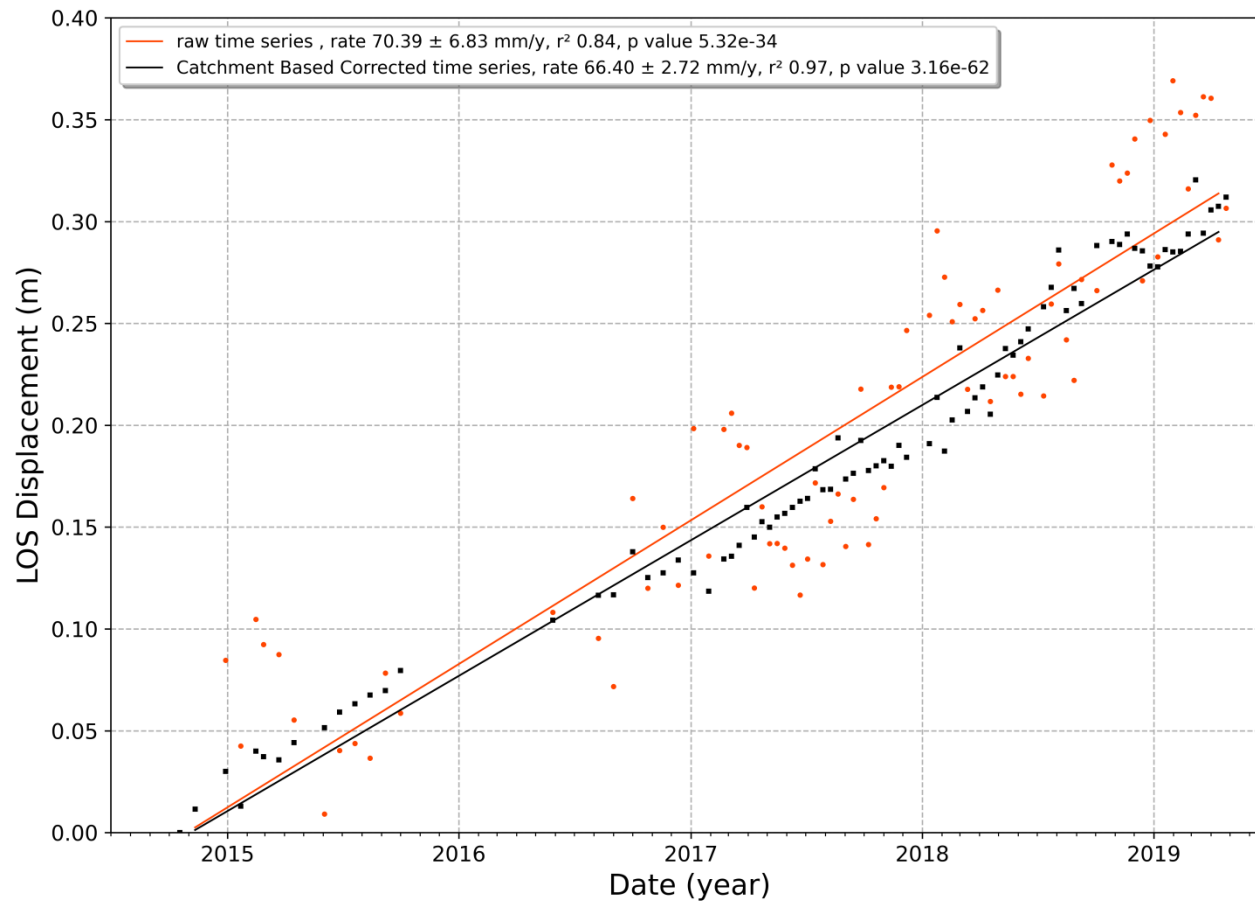


Point Centre : InSAR time series of descending track 10

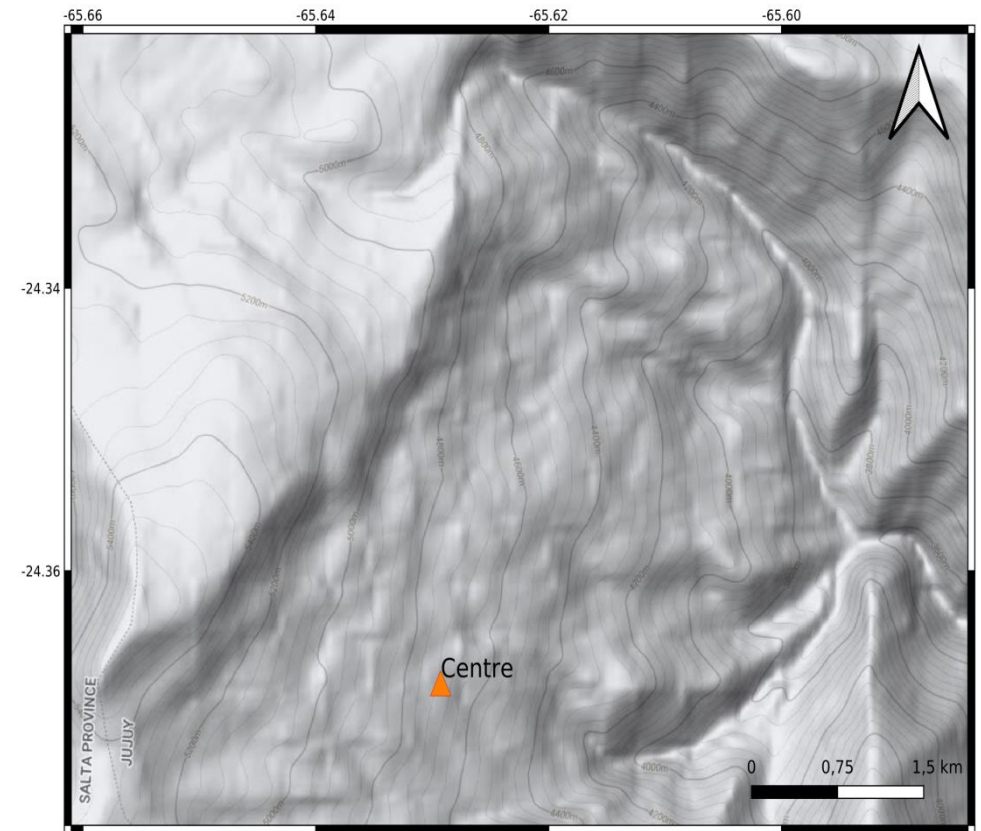


Hillshade of Mina Purna region

InSAR Time Series Analysis



Point Centre : InSAR time series of descending track 10

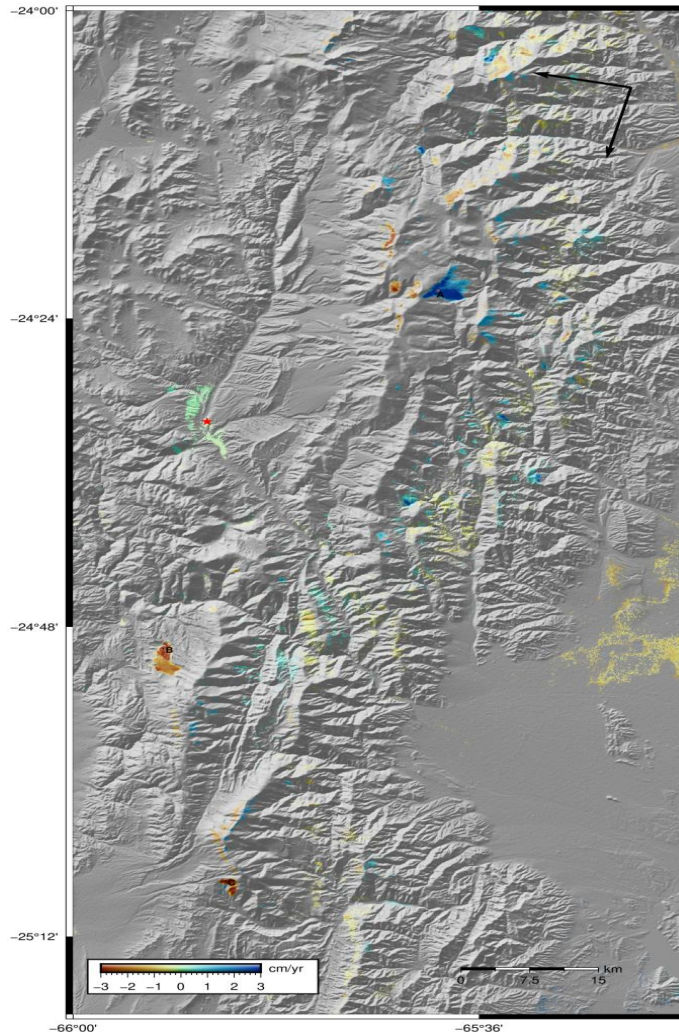


Hillshade of Mina Purna region

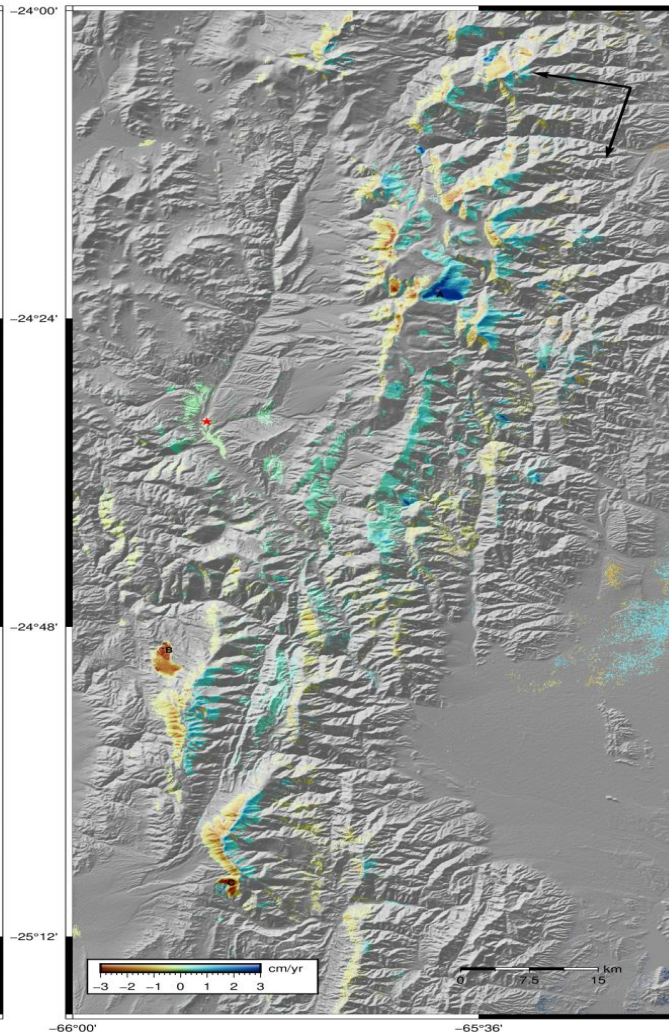
Landslide mapping: Impact of atmospheric correction

Active Deformation Areas using the absolute value of velocity (descending tr. 10) more than $3\sigma_{velocity}$

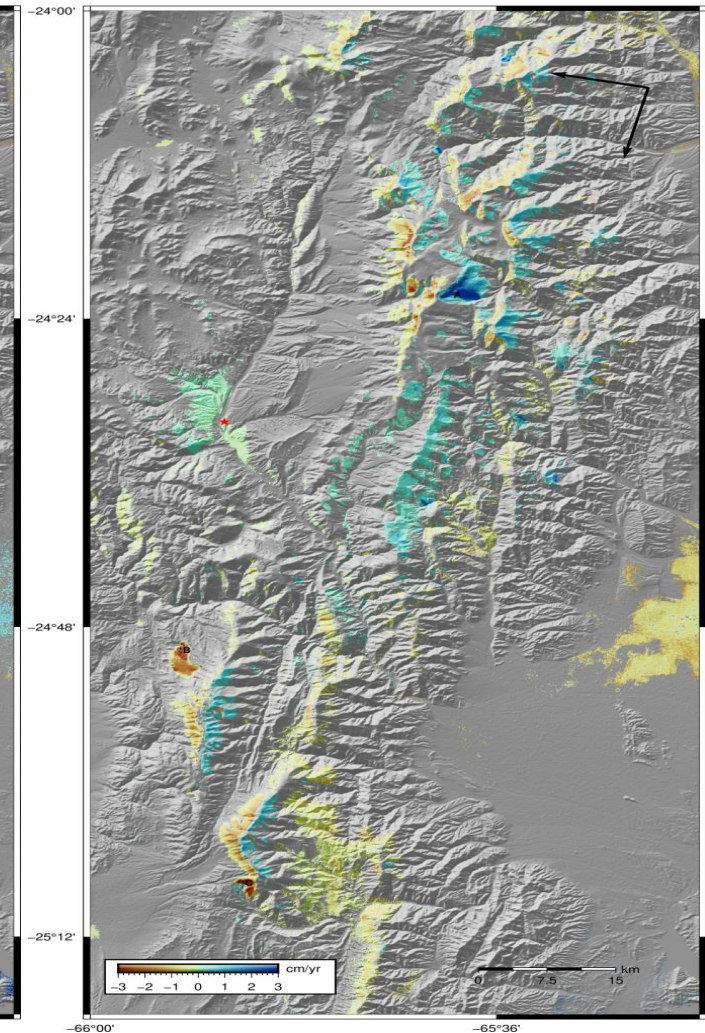
Mean velocity



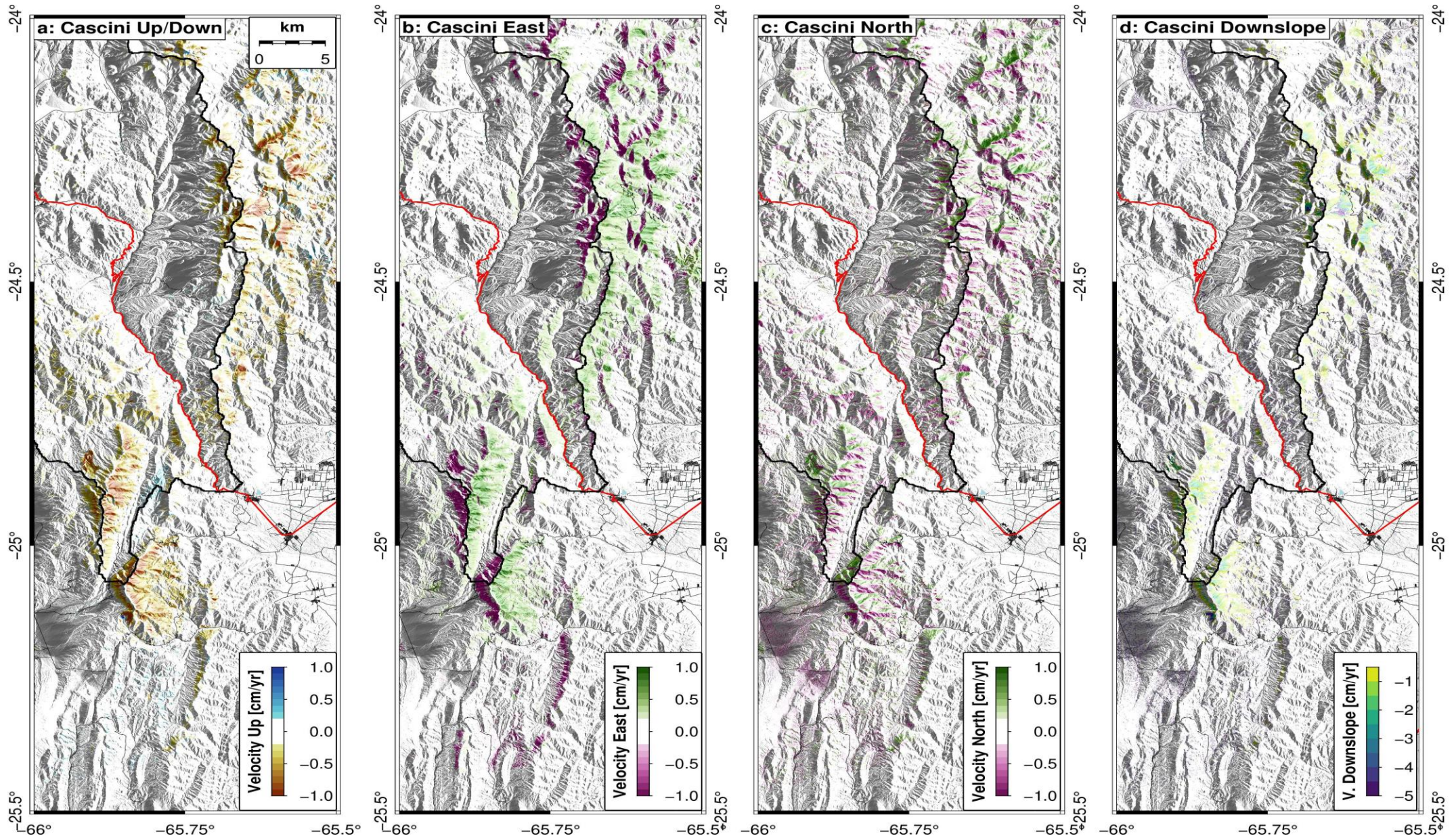
ERA5 corrected mean velocity



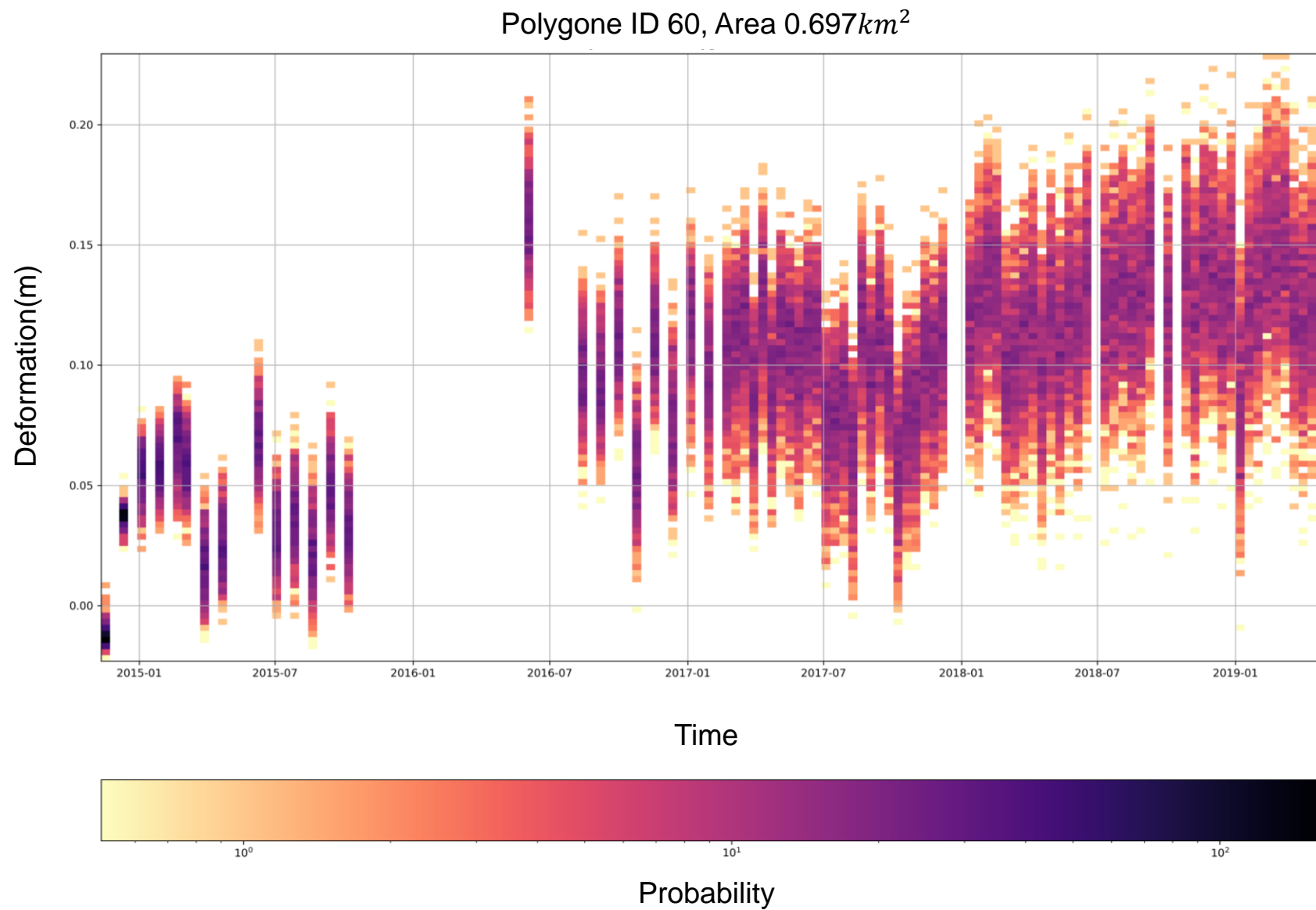
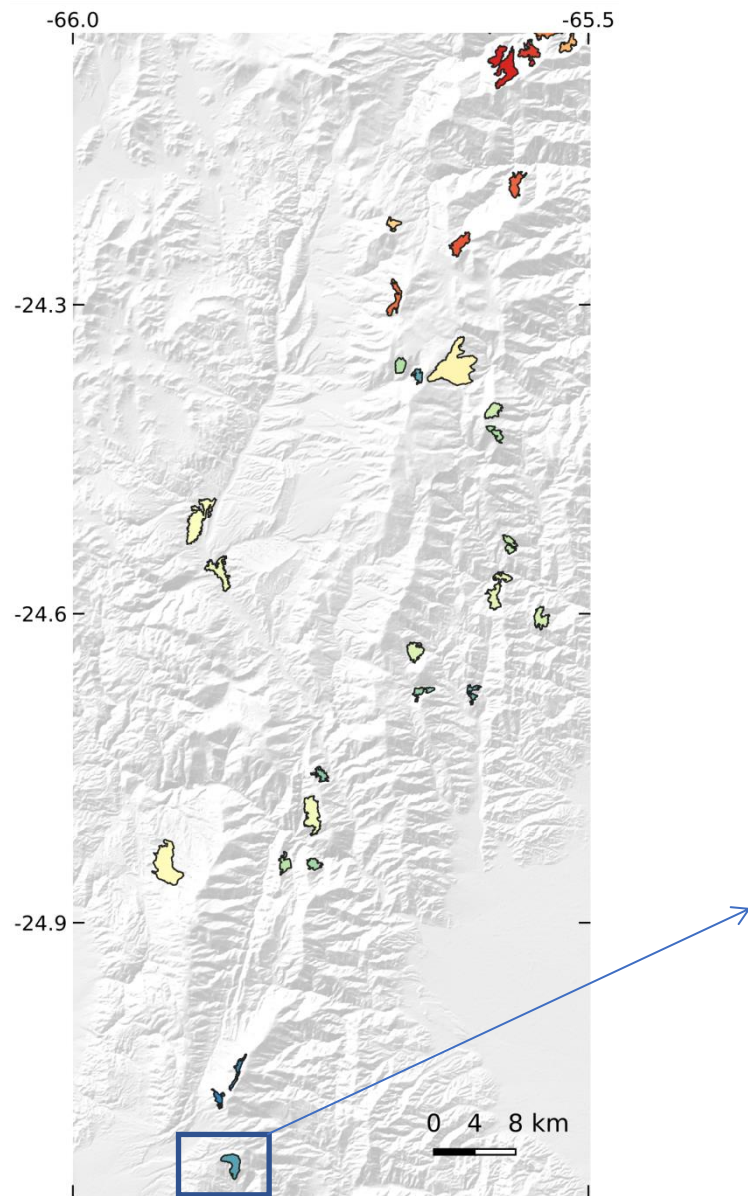
GACOS corrected mean velocity



Landslide mapping: based on 3D decomposition method (Cascini et al., 2010)



Landslide mapping :Connected Component Analysis



Thank you for your attention

Questions?

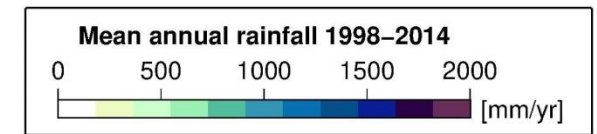
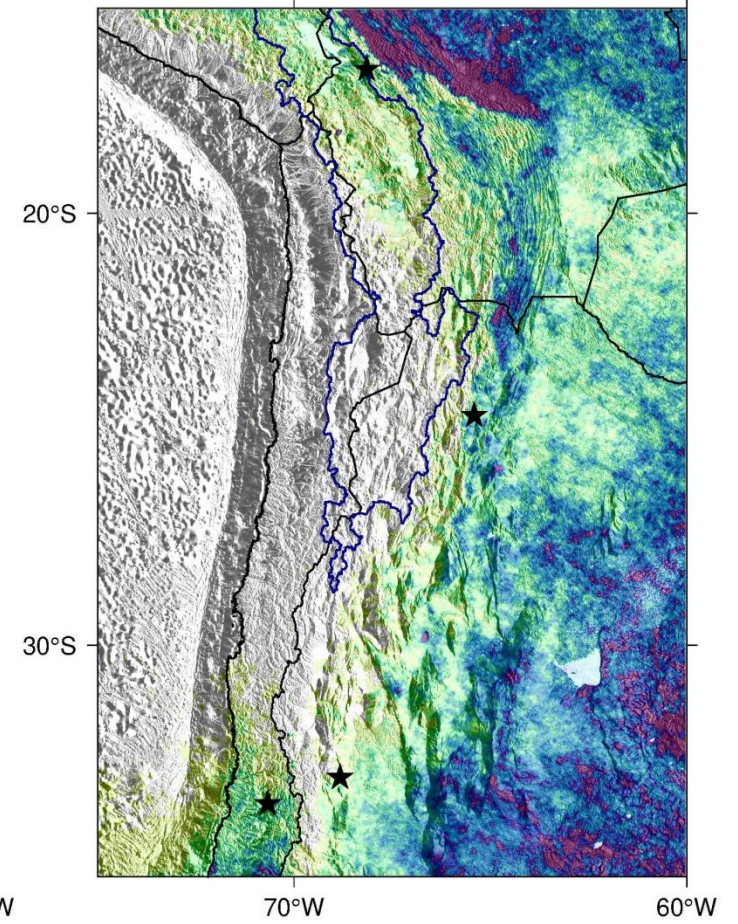
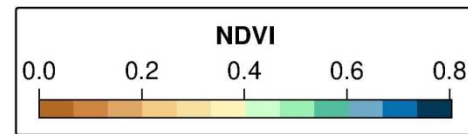
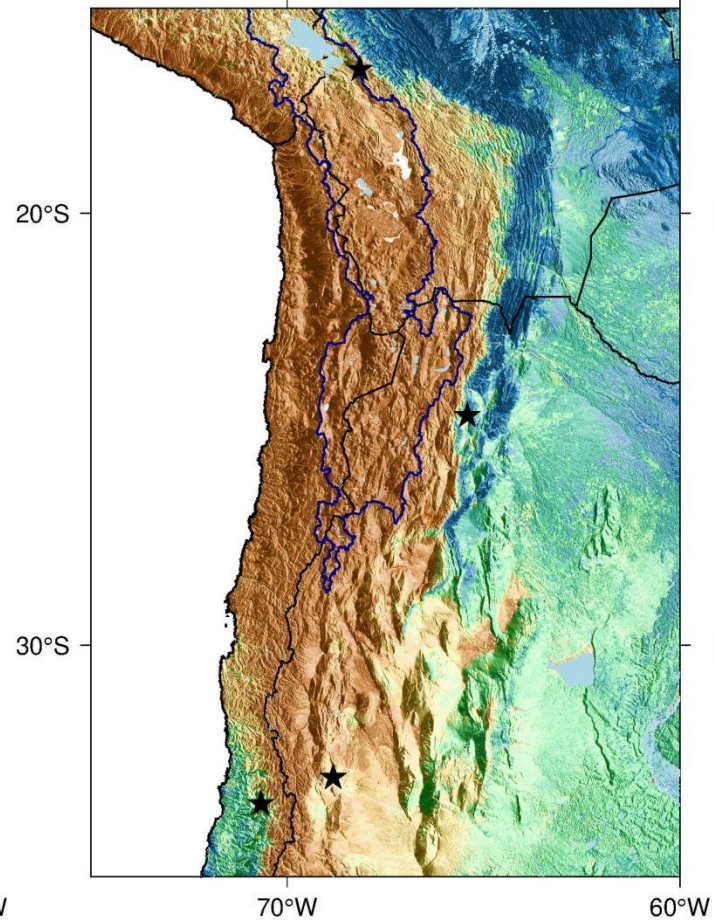
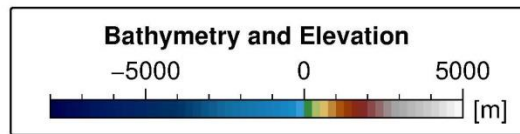
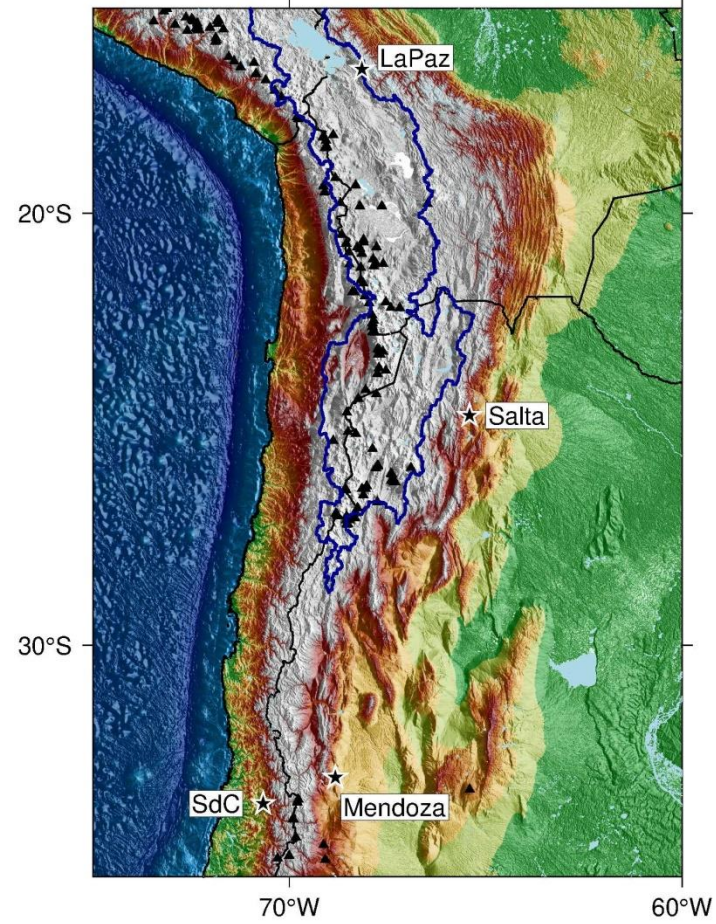


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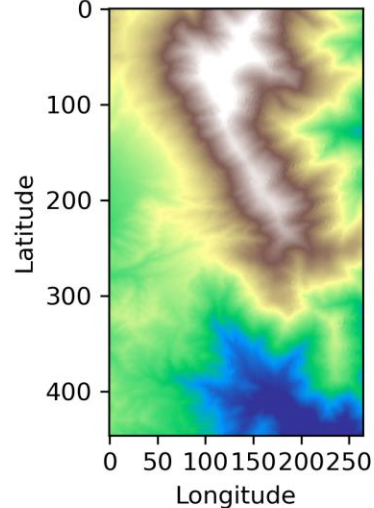


[mohseniaref](https://twitter.com/mohseniaref)

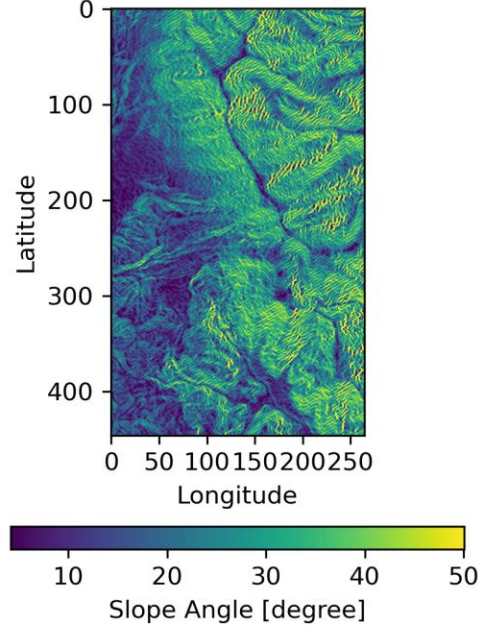
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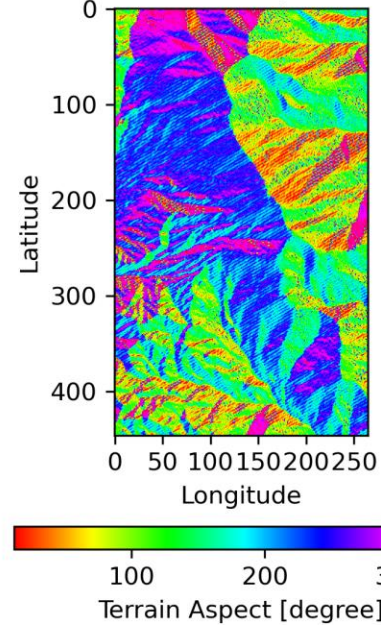
Cerro Malcante (desc-tr10): Height



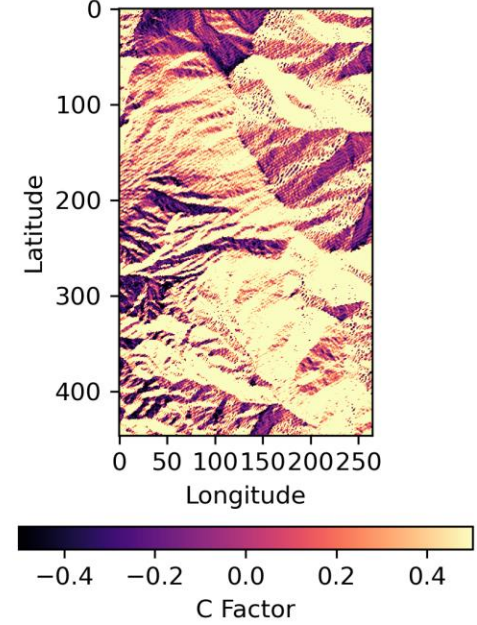
Terrain Slope Angle



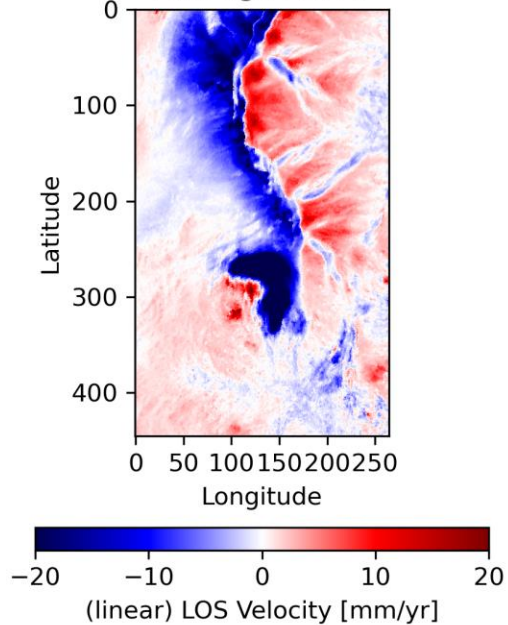
Terrain Aspect



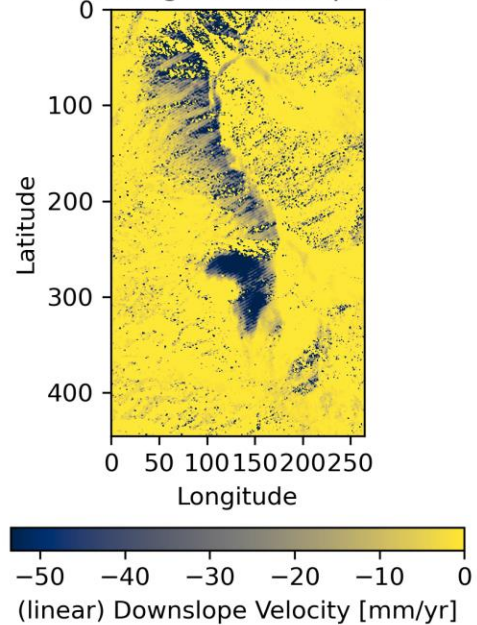
C Factor



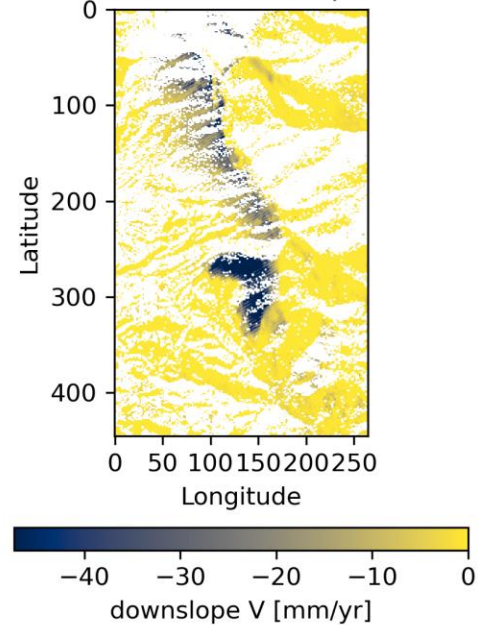
Average LOS V



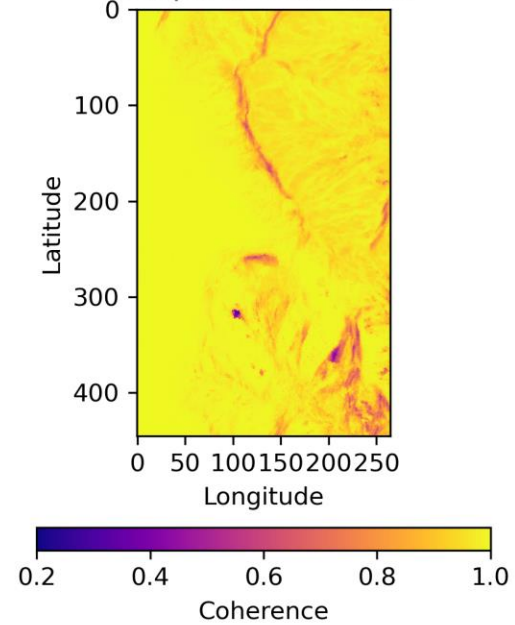
Average Downslope V



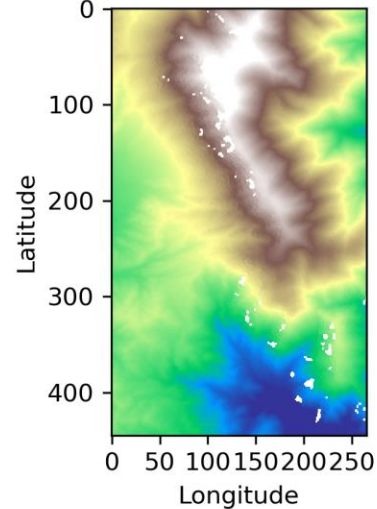
Masked Downslope V



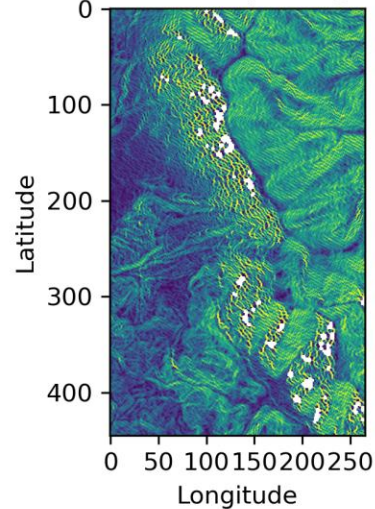
Temporal Coherence



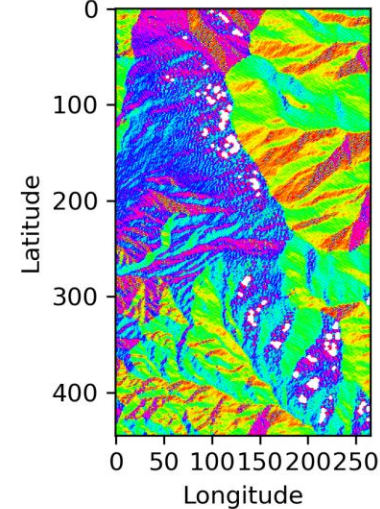
Cerro Malcante (asc-tr76): Height



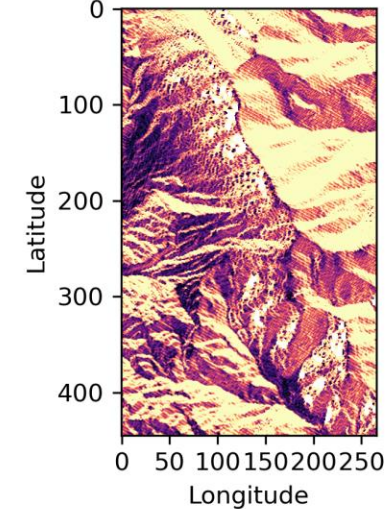
Terrain Slope Angle



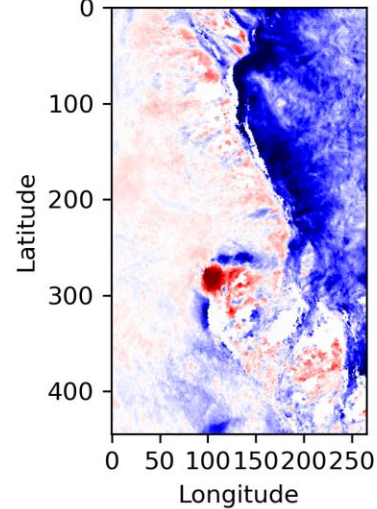
Terrain Aspect



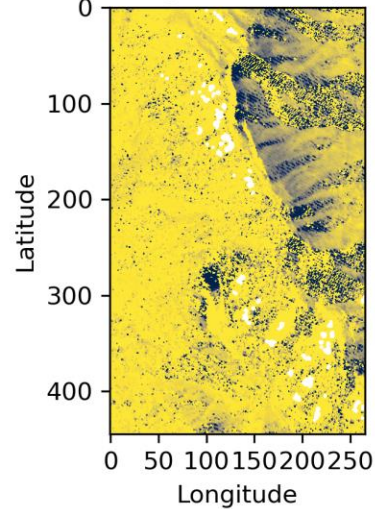
C Factor



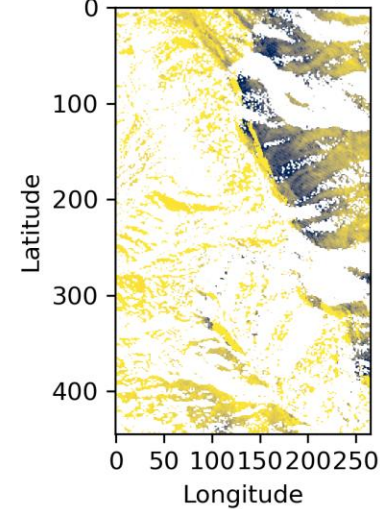
Average LOS V



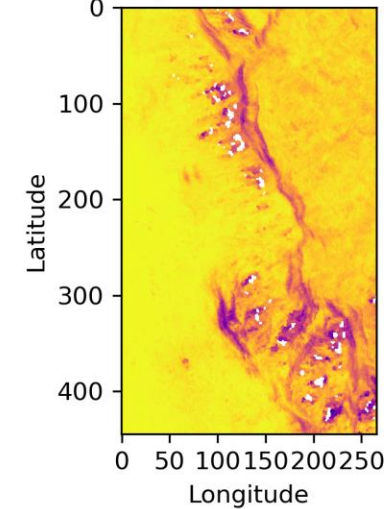
Average Downslope V

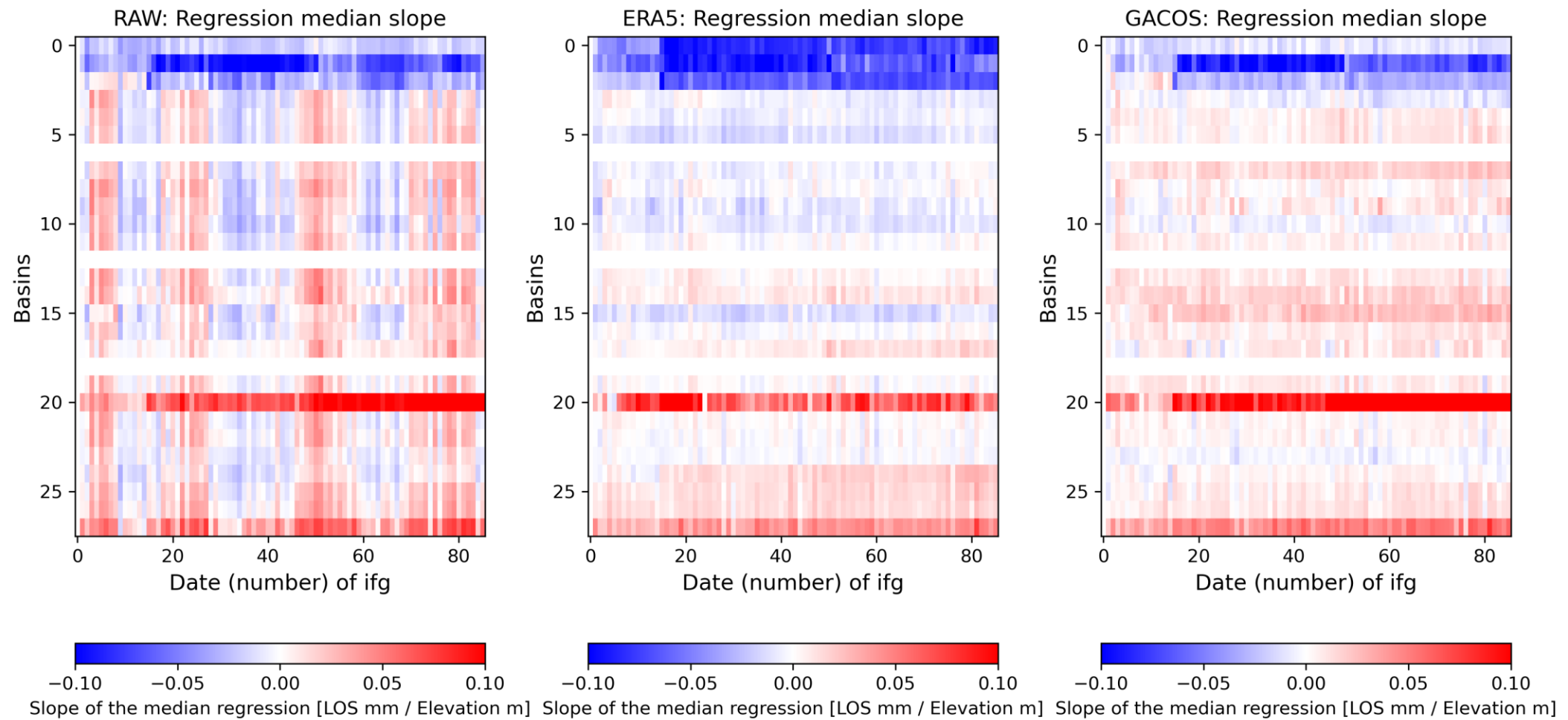


Masked Downslope V

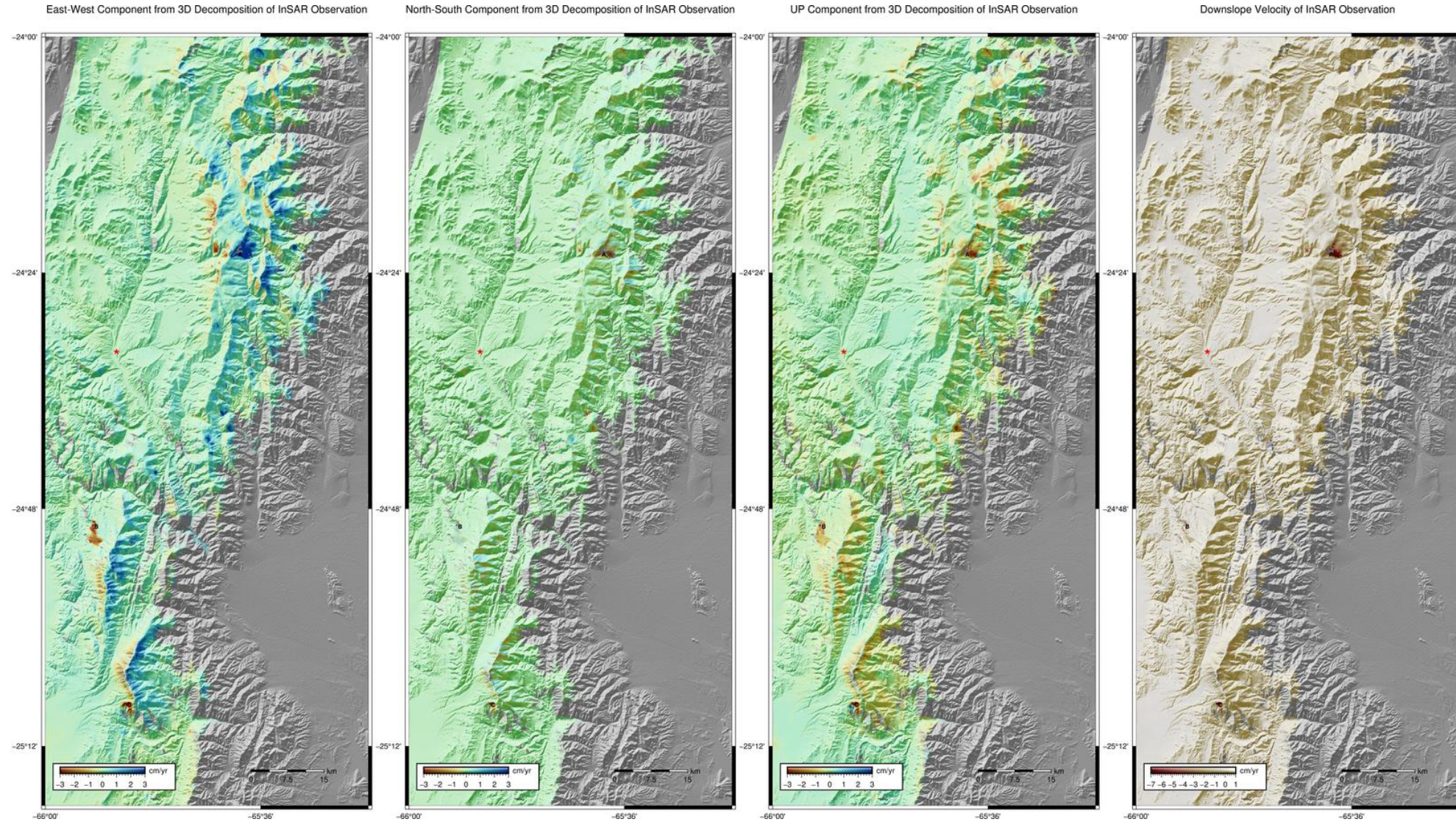


Temporal Coherence



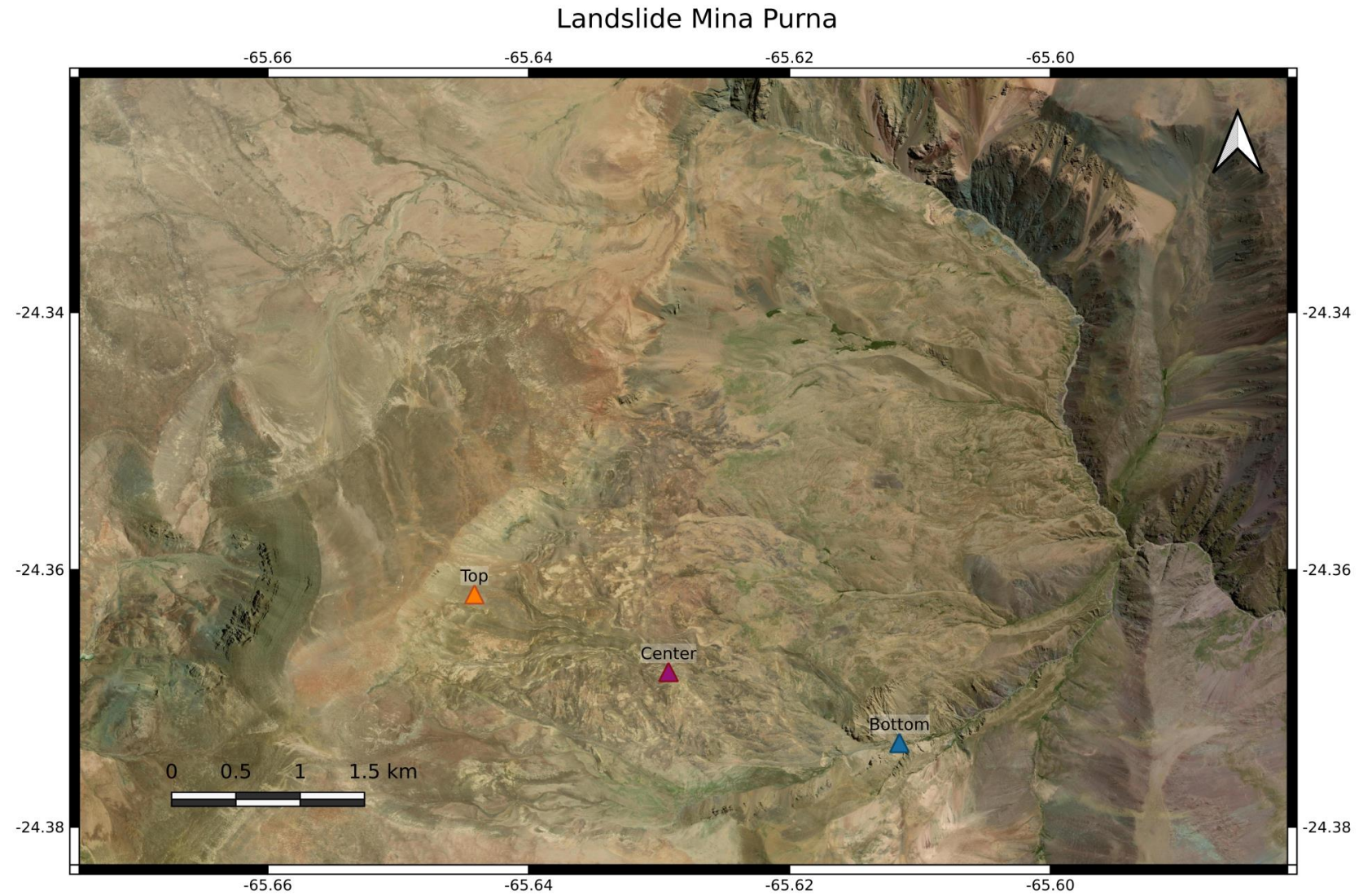
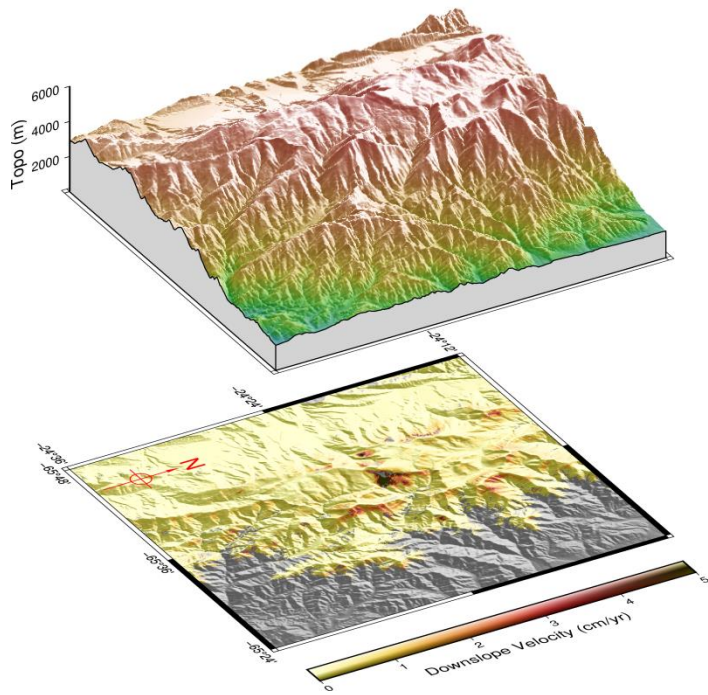


Landslide mapping :3D Decomposition based on (Isya et al., 2019)

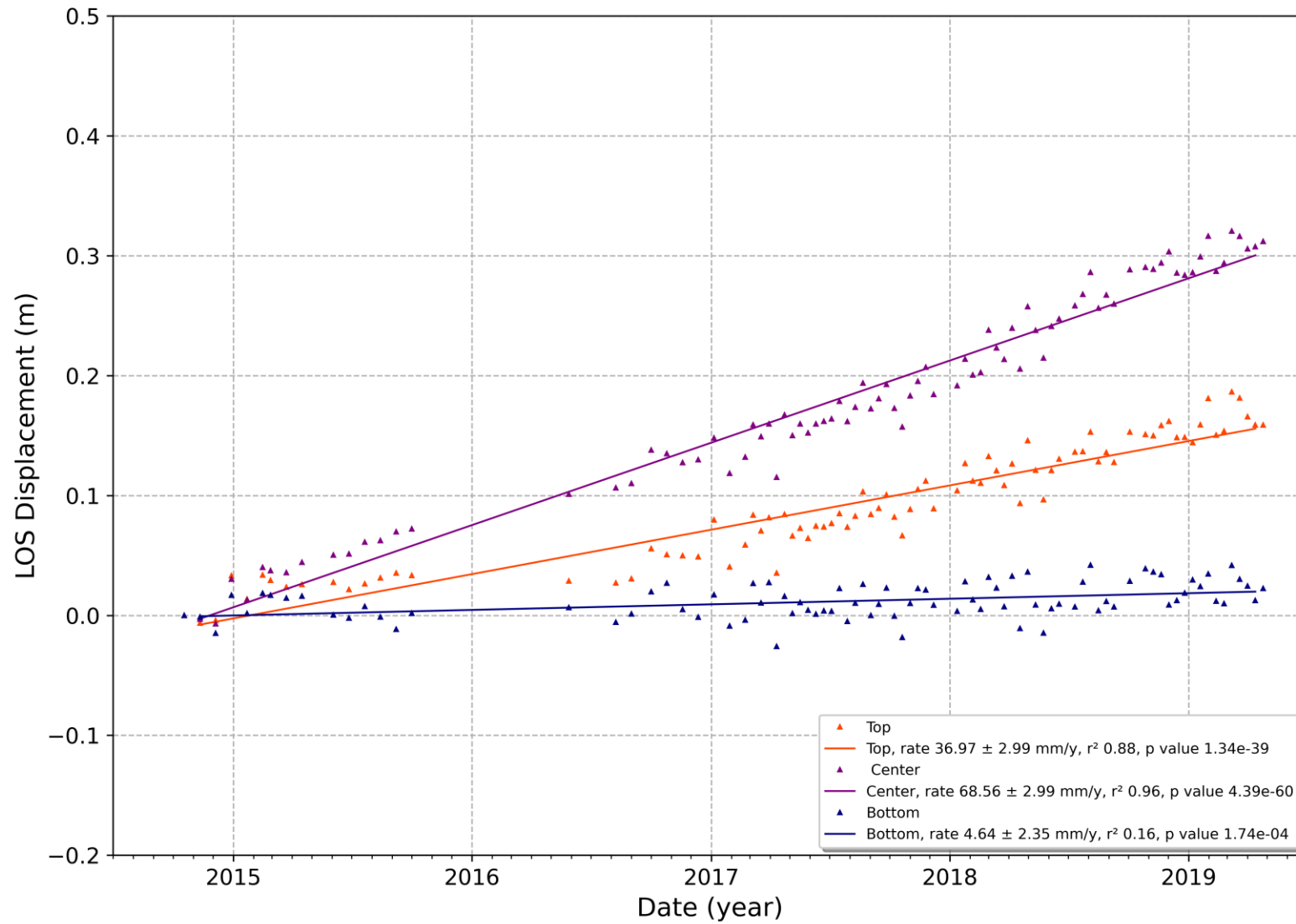


Time Series Analysis

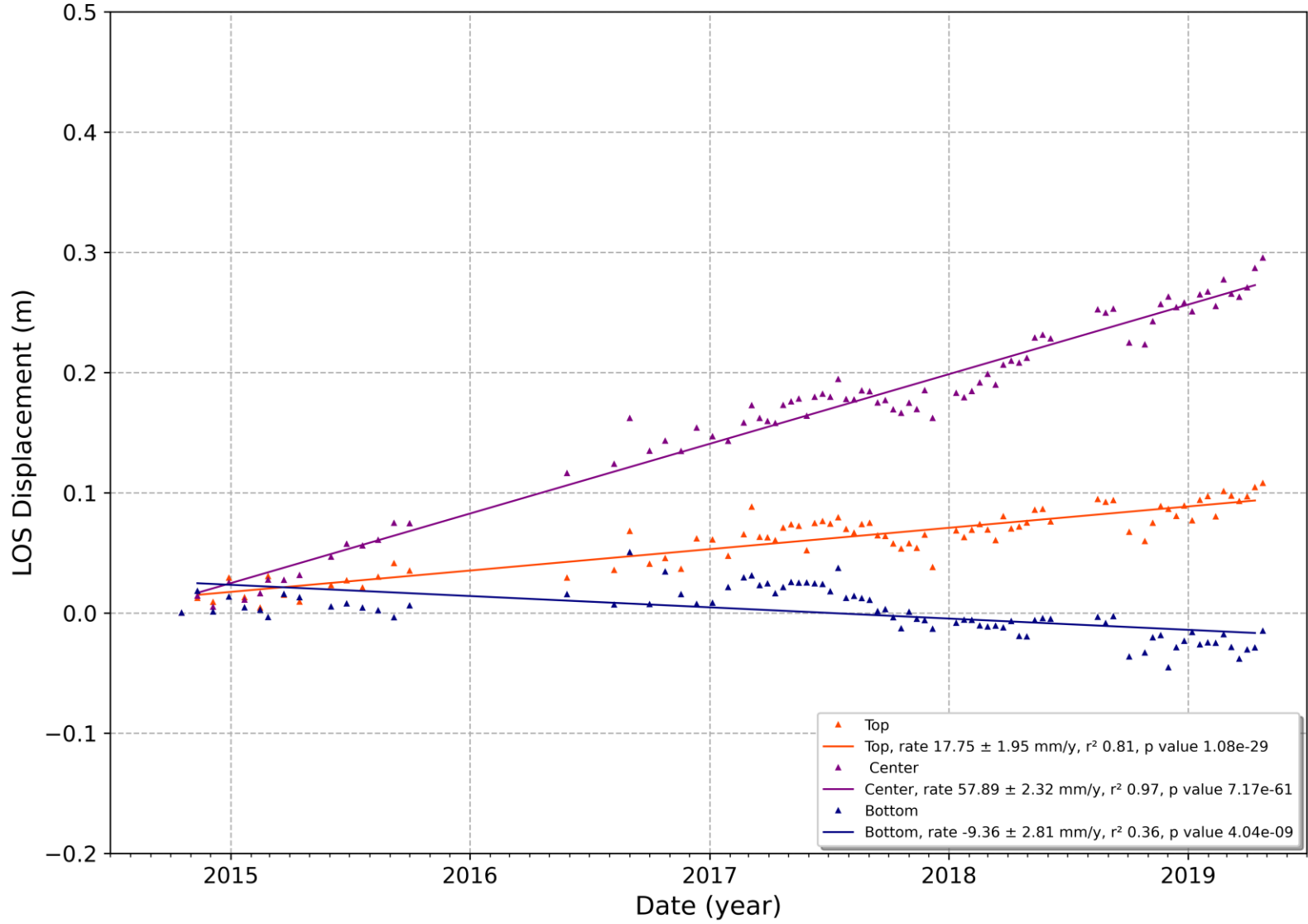
Mina Purna Landslide



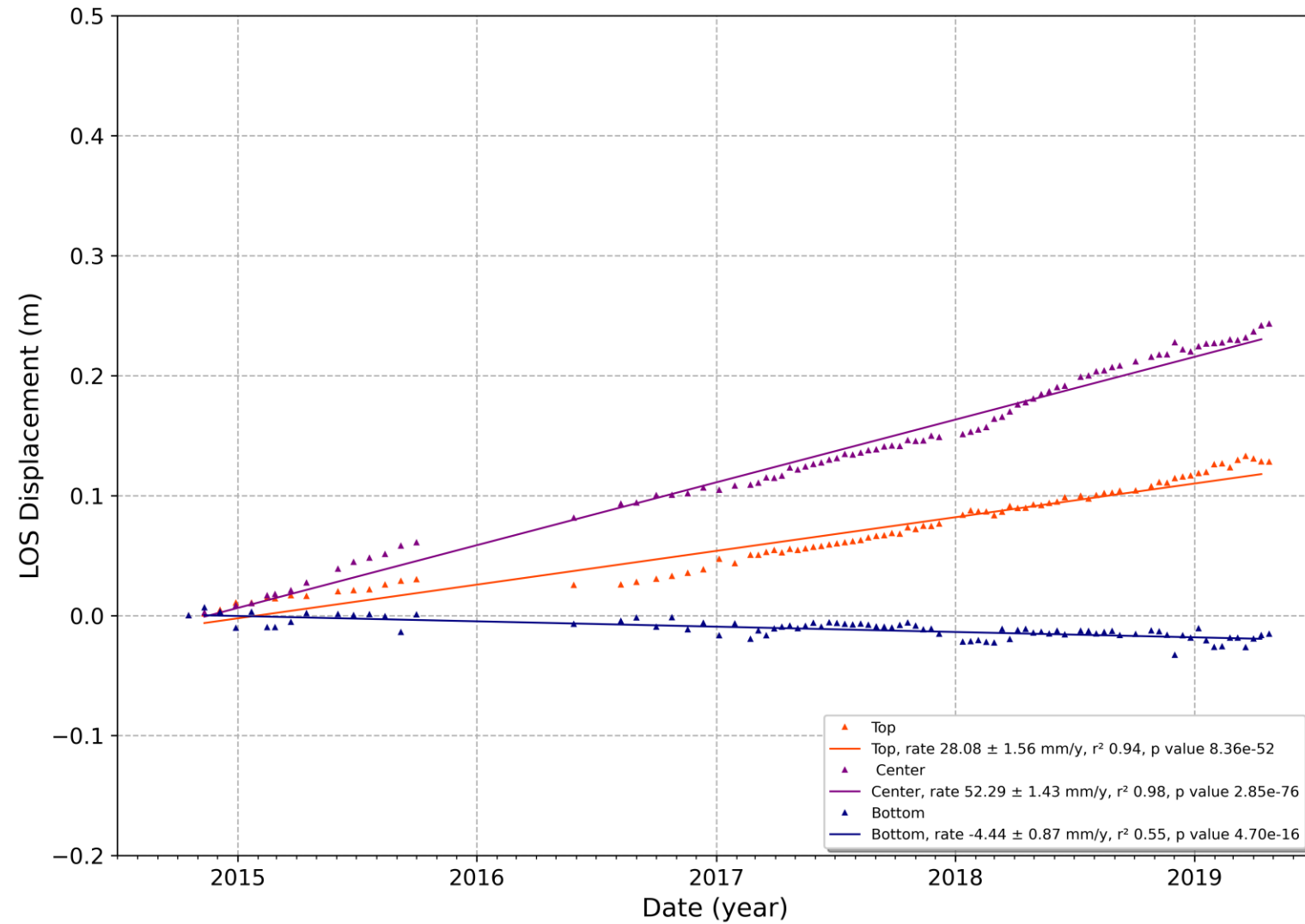
Mina Purna Landslide : deformation time series for SBAS(n=5,2014.10.18-2019.04.25) , descending track 10



Mina Purna Landslide : deformation time series for Sequential EMI (n=5,2014.10.18-2019.04.25) , descending track 10

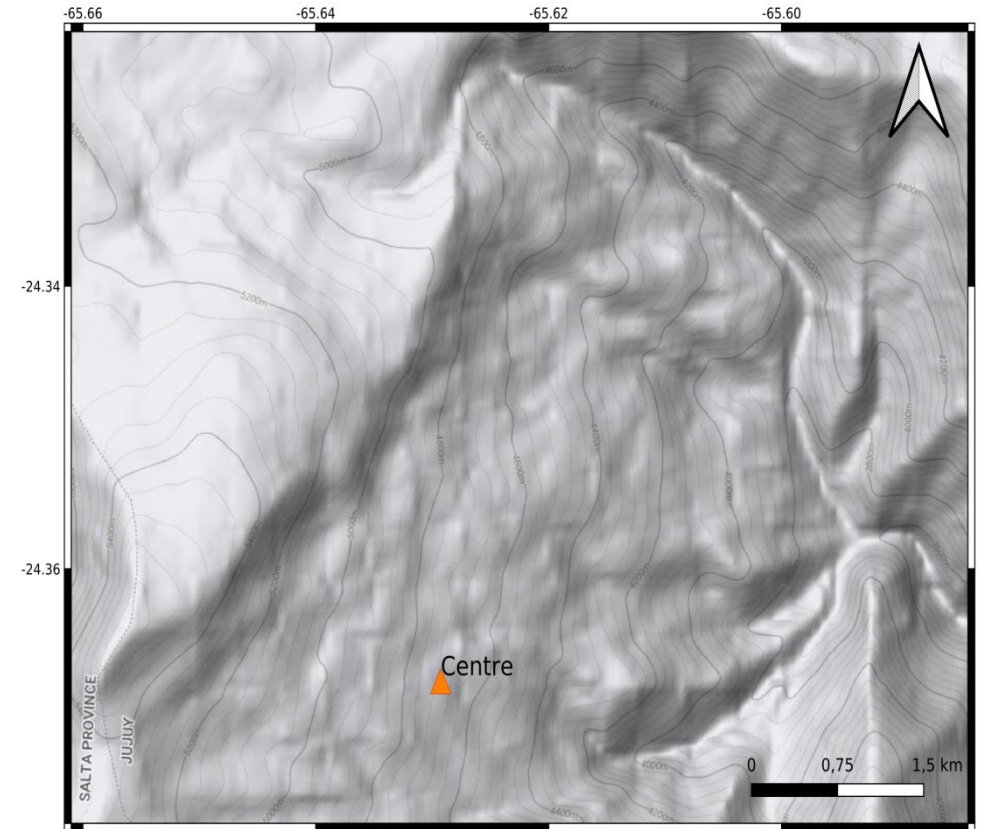
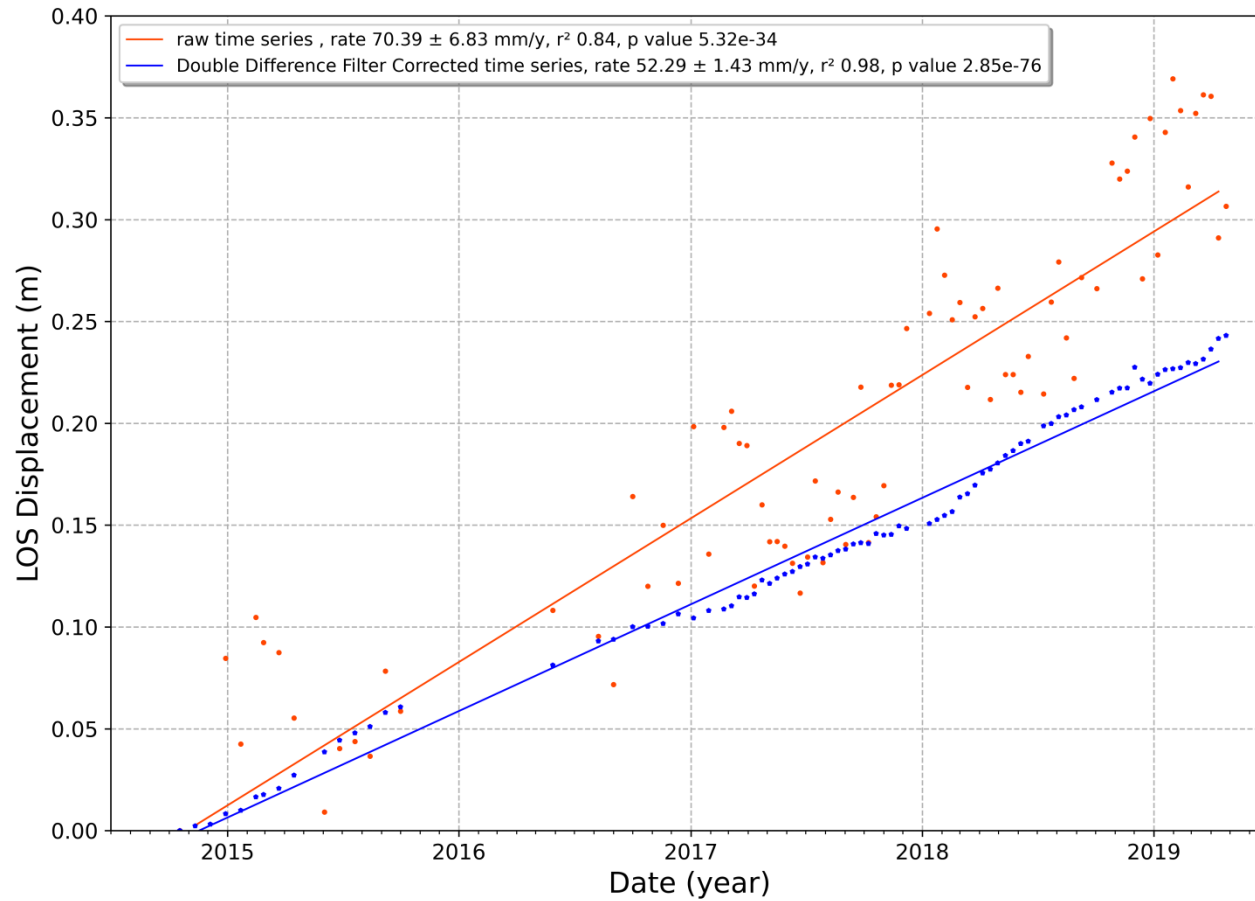


Mina Purna Landslide : deformation time series for Double Filter (n=5,2014.10.18-2019.04.25) , descending track 10



Time Series Analysis

Mina Purna Landslide : deformation time series (n=5,2014.10.18-2019.04.25) , descending track 10



Time Series Analysis

Mina Purna Landslide : deformation time series (n=5,2014.10.18-2019.04.25) , descending track 10

