



EO for Africa Symposium 2024

23 - 26 September 2024
ESA | ESRIN, Frascati (IT)



Dinsar based co-seismic deformation estimation of the 2023 El Haouz earthquake, Morocco

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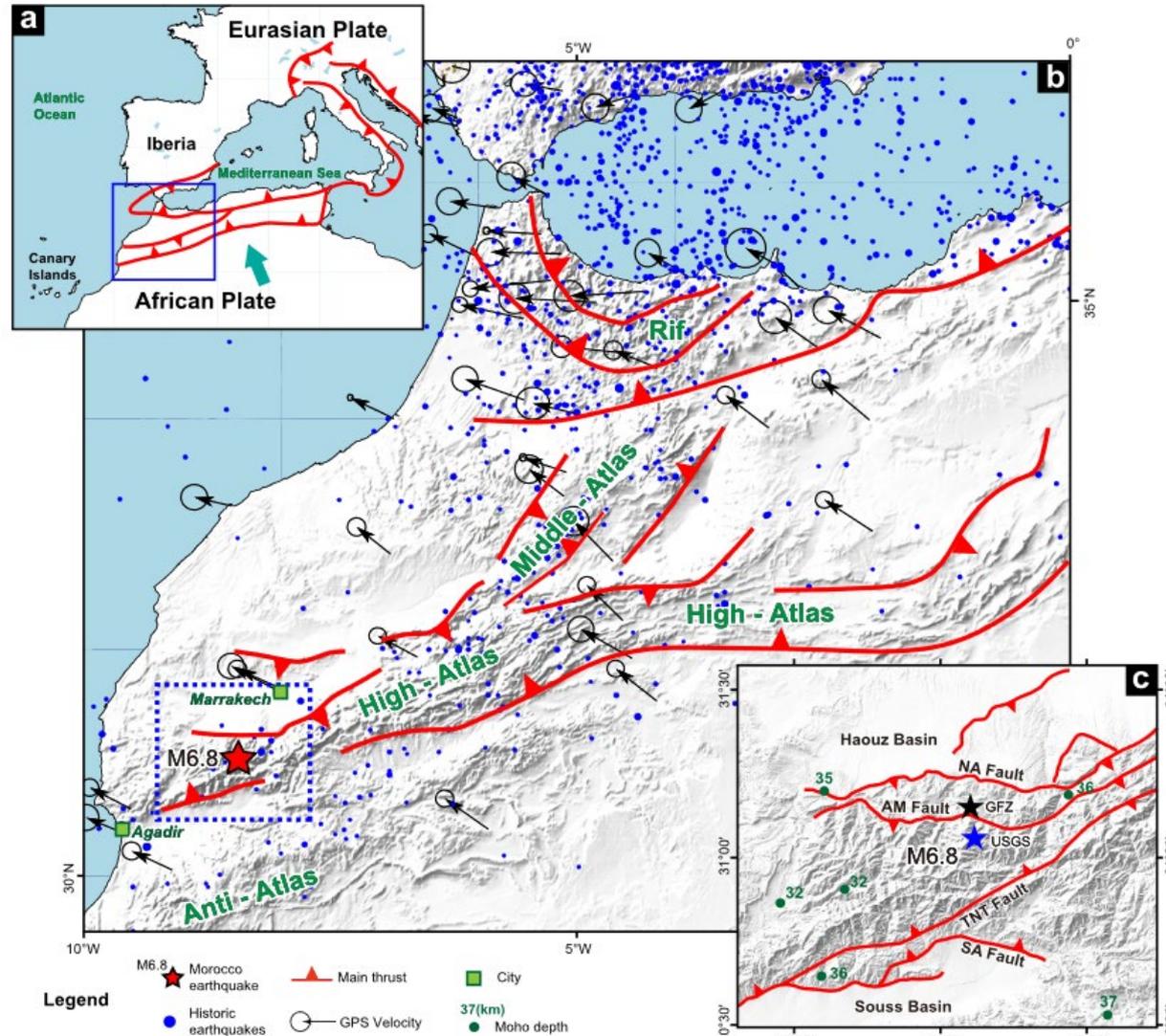


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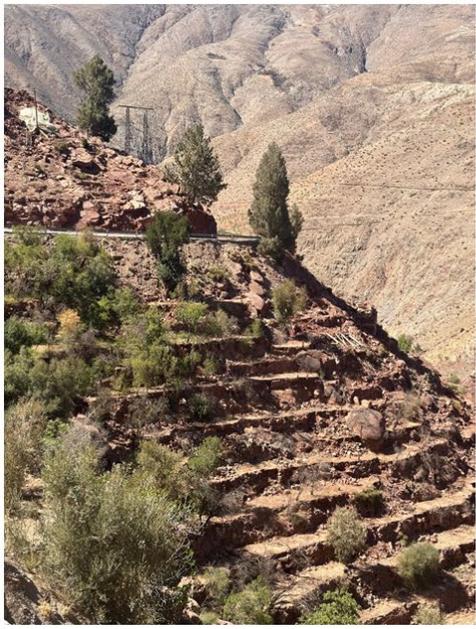
Study Area and Geological Context

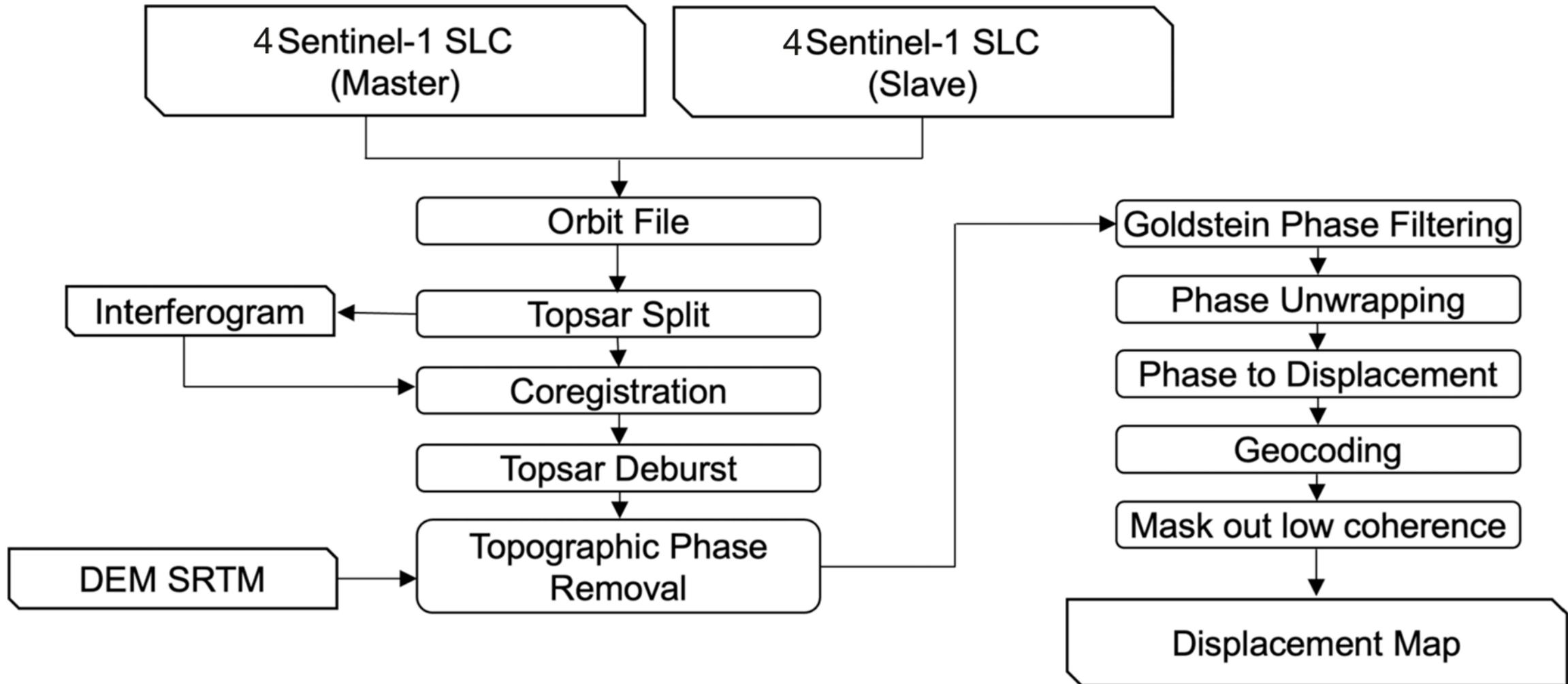


Seismotectonic background of the Mw 6.8 earthquake in Morocco on 8 September 2023 (Huang et al., 2023)



Impact of the El Haouz Earthquake





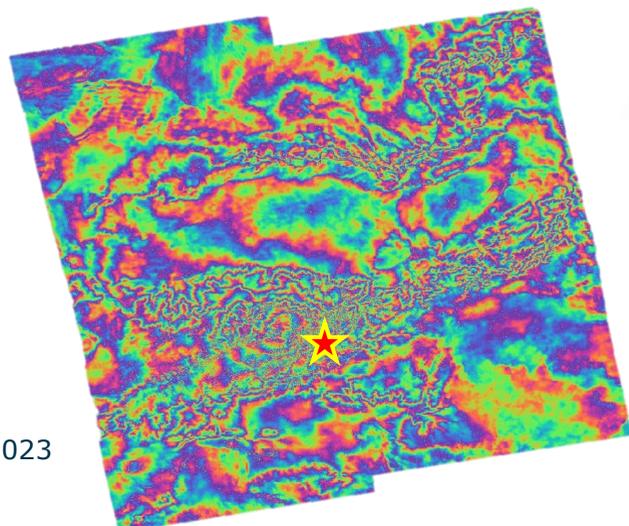
Flowchart showing the DInSAR Method on spatio-temporal ground deformation assessment

Results & Discussion

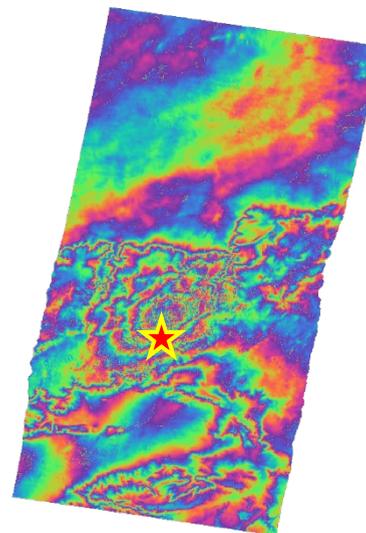
Interferogram Generation



★ Epicenter



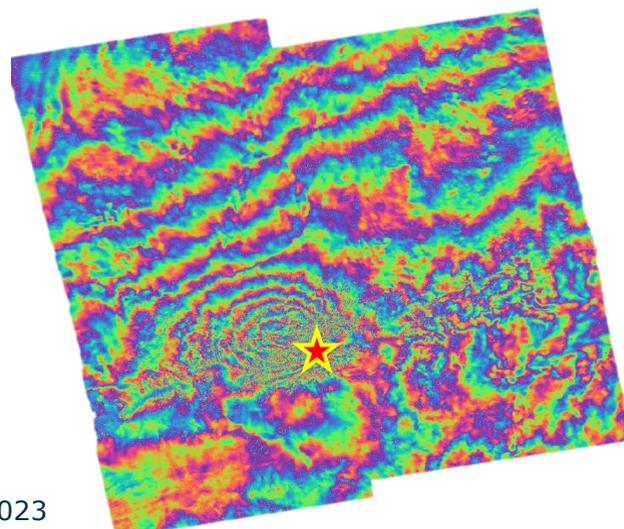
22 Aug 2023 – 27 Sep 2023



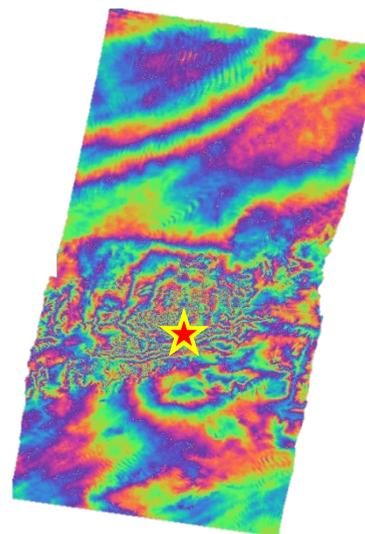
18 Aug 2023 – 23 Sep 2023

Ascending Orbit

Descending Orbit



03 Sep 2023 – 15 Sep 2023



30 Aug 2023 – 11 Sep 2023



Results & Discussion

Deformation Estimation



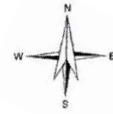
 **Epicenter**

LOS Displacement



Subsidence

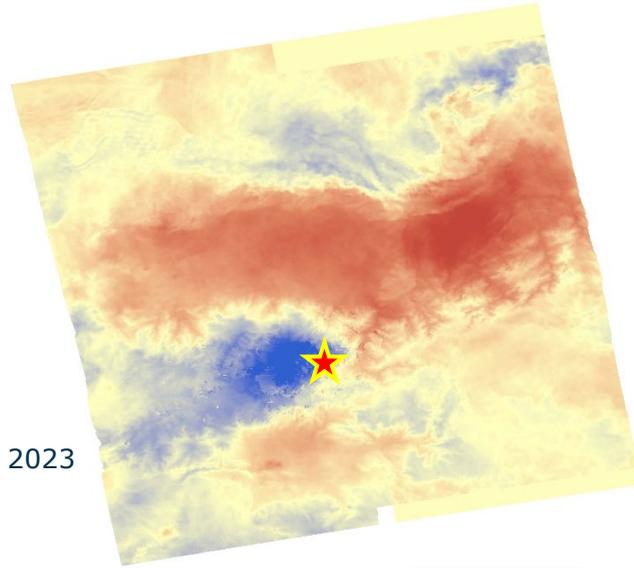
Upward



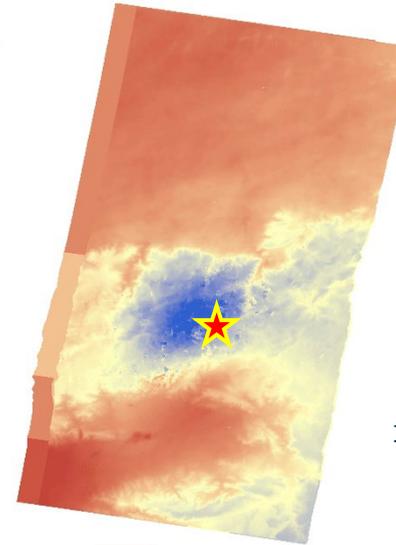
Ascending Orbit

Descending Orbit

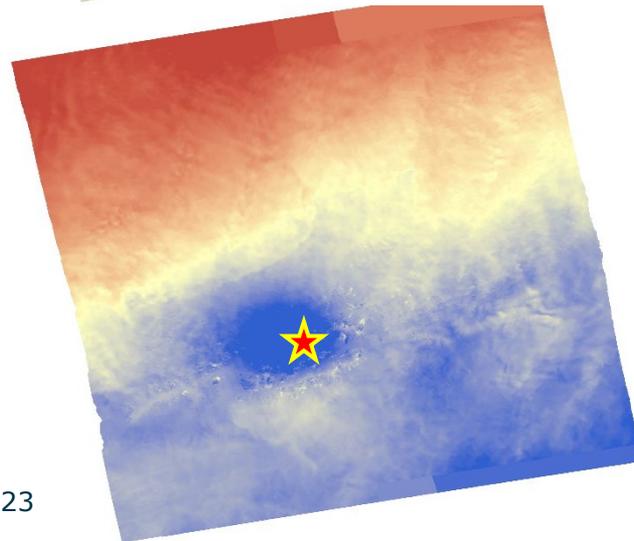
22 Aug 2023 – 27 Sep 2023



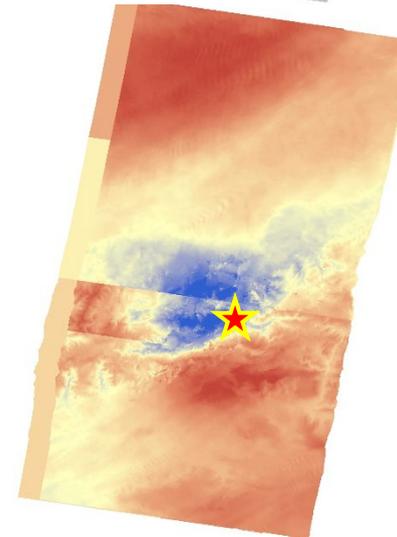
18 Aug 2023 – 23 Sep 2023



03 Sep 2023 – 15 Sep 2023



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Results & Discussion

Tectonic Setting



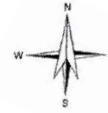
 **Epicenter**

LOS Displacement

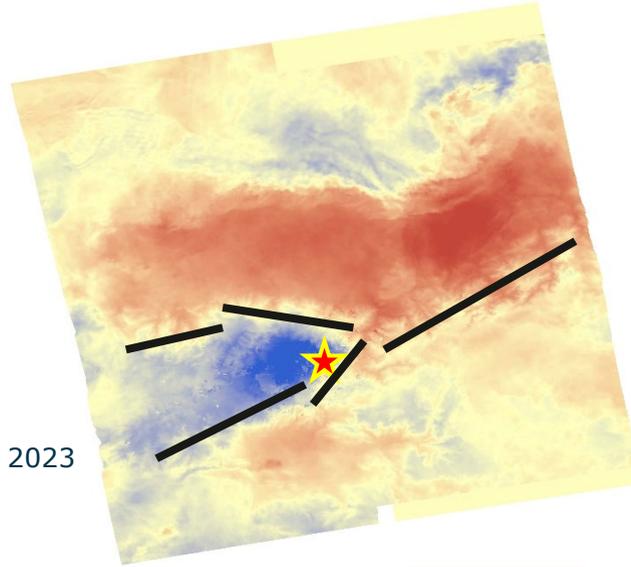


Subsidence

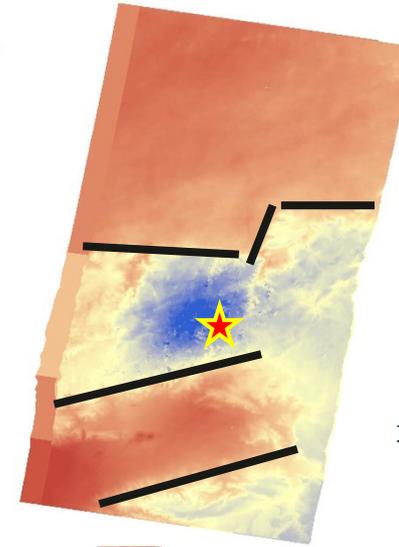
Upward



22 Aug 2023 – 27 Sep 2023

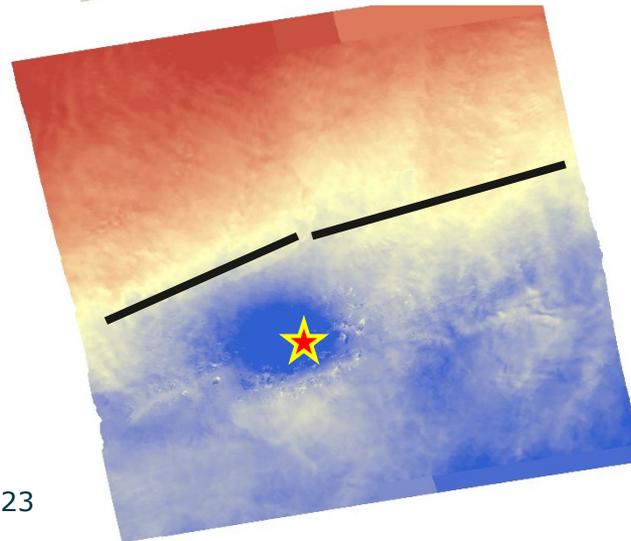


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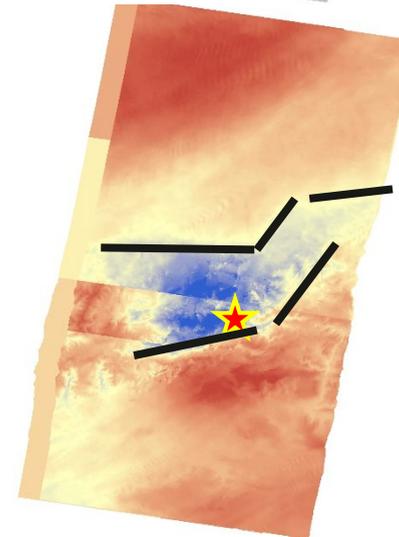
Ascending Orbit

03 Sep 2023 – 15 Sep 2023



Descending Orbit

30 Aug 2023 – 11 Sep 2023

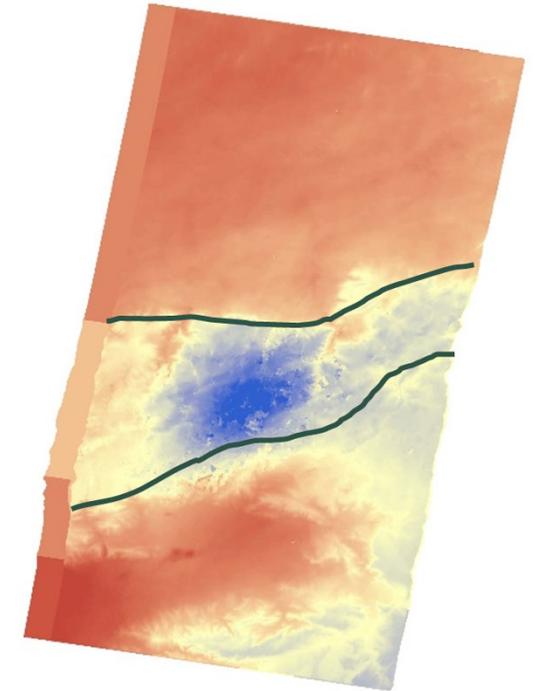
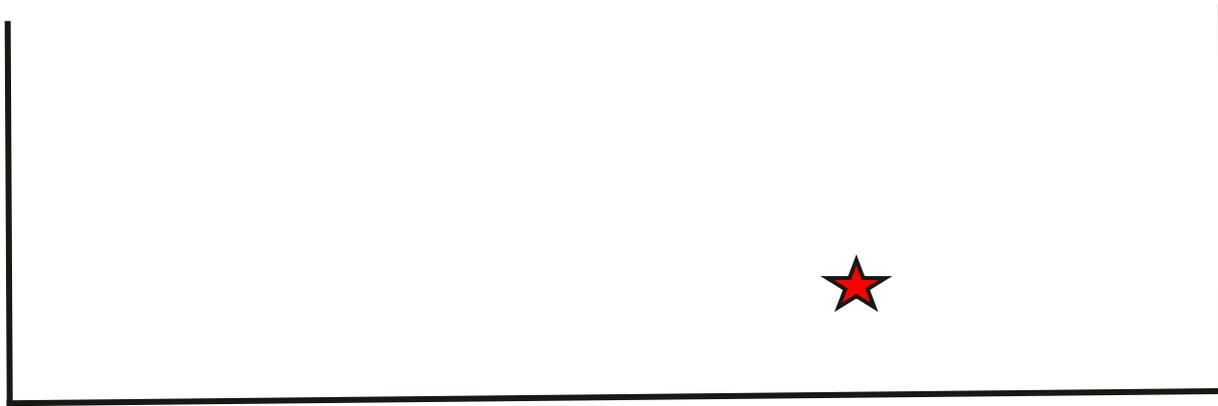
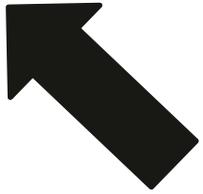


Results & Discussion

Tectonic Settings



North



Conceptual model of the fault system and rupture associated with the earthquake



- The maximum estimated co-seismic deformation was observed near the epicenter, with an upward movement of up to 25 cm in the LOS direction.
- The co-seismic deformation pattern of the earthquake, as revealed by the data analysis, shows a thrust fault mechanism, with the rupture occurring on an ENE reverse fault.
- The findings of this study will provide useful insights for seismologists, geologists, and disaster management experts to improve their comprehension of earthquake dynamics and seismic activity in this region.
- Moreover, there are plans to conduct a more in-depth investigation by employing Multi-Temporal SAR analysis to investigate the relationship between ground deformation and other geophysical parameters, including faults mechanism and slip, crustal stress changes, and aftershock activity.



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Thank you



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