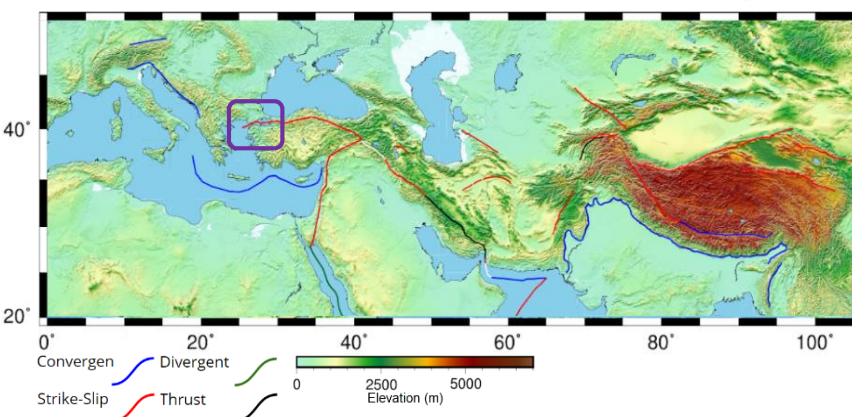
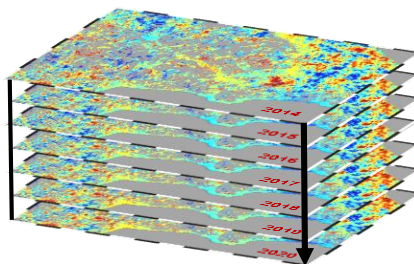
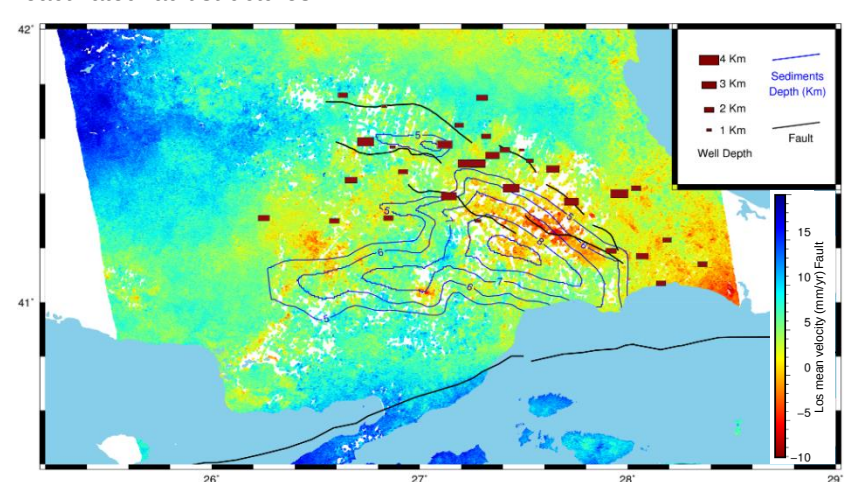


Man-made deformation activity is obscuring and interacting with natural tectonic processes in various places of the world. Here we monitor ground motions associated with faulting, landslides, and man-made activities in the **Marmara** region (western-most section of North Anatolian Fault). Using **GMTSAR** and **StaMPs PSInSAR time-series**, applied to Sentinel-1 TOPSAR data acquired between **2014** and **2020**.

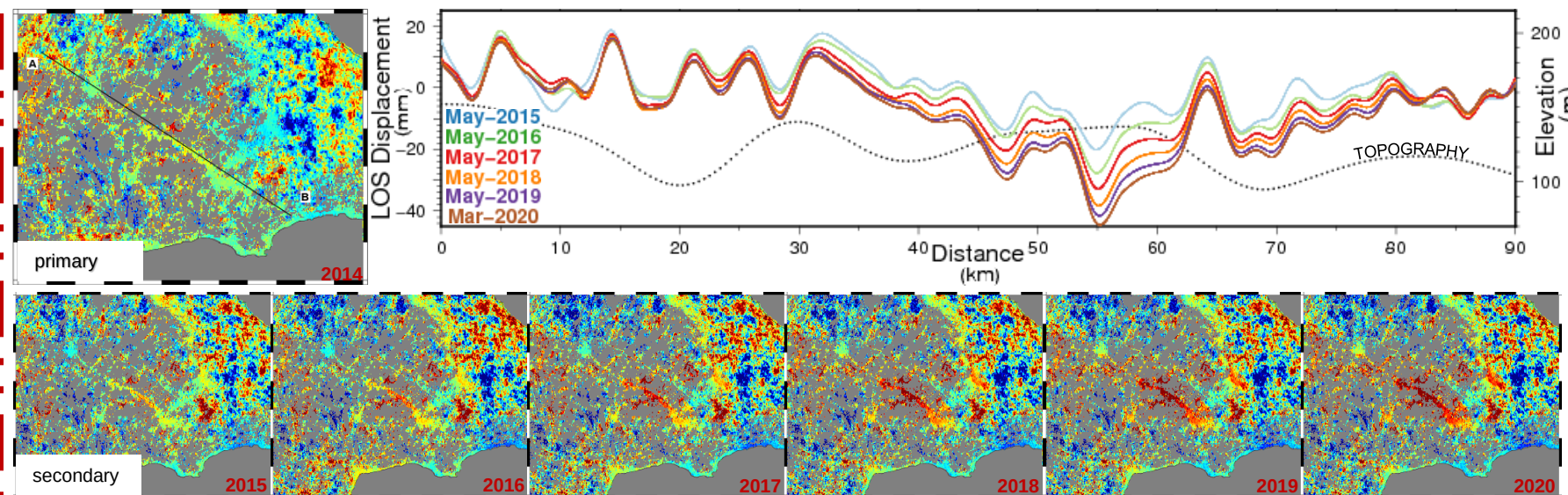
We processed more than 800 interferograms for both ascending (**T131** and **T58**) and descending (**T36**) tracks and can identify a mean 10-mm/yr rate of subsidence in the Thrace region, which is a large elongate deformation zone affecting an area ~15,400km².



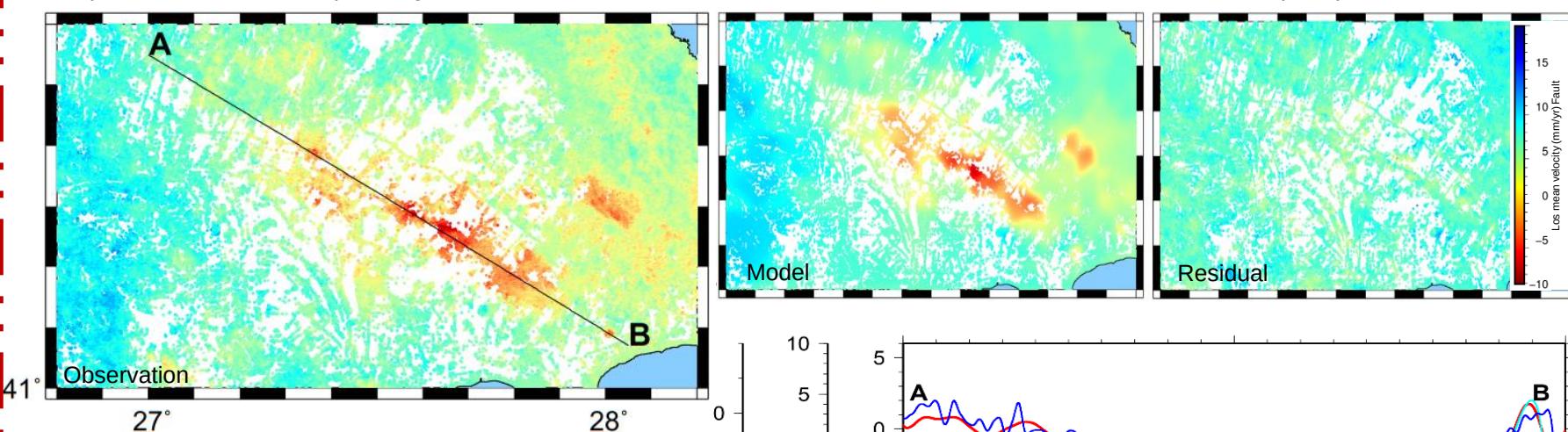
Two plausible mechanisms are elaborated for this deformation; Hydro-reservoir process; such as excessive pumping of groundwater for agricultural purposes, and Natural gas reservoir process; such as gas exploitation and extraction activities. Both of these two mechanisms may closely interact with tectonic activity, earthquakes, or align along reactivated fault structures.



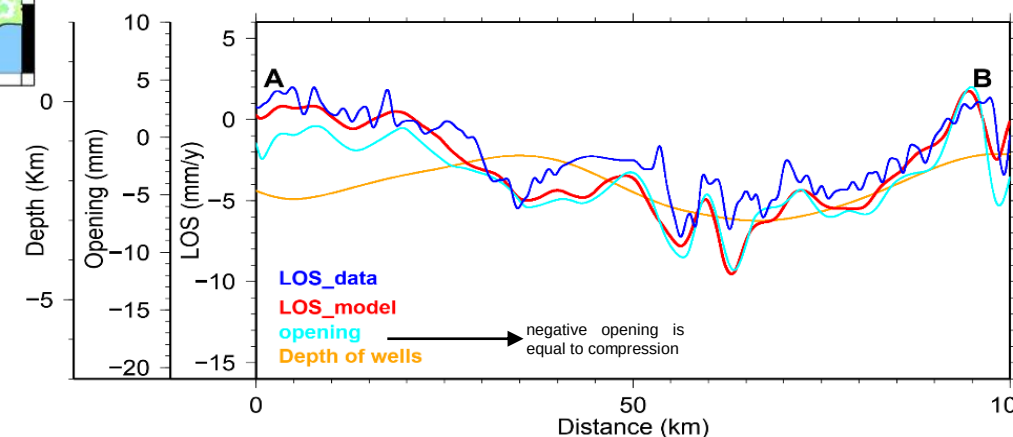
Subsiding area overlaps on faults (Black solid lines) and sediments (blue solid contours) thickness is about 6-8 Km. Because of insufficient information about location of Natural gas production sites* (darkred rectangles) and their depth, a smooth surface with 5Km gridding size fitted to available data in order to model the source of deformation.



After removing **trend** from unwrapped phase values, LOS deformation of all **secondary** unwrapped interferograms are calculated related to **first one (primary)** separately, with reference to Eurasia. Furthermore, **Poly3D** boundary element method is used to model **source of deformation** using an assumptive surface at 2Km depth. **Poly3dinv** inverse model is used to construct the **surface motion** for our model subsequently.



CONCLUSION: Decrease in deformation rate is clear along the profile. This could implies a reduction in the mechanisms that cause the deformation; Hydro-reservoir or Natural gas reservoir process. Despite **Small residuals** between **observations** and our **model** based on **negative opening**, which suggests deformation is likely caused by natural gas reservoir process, we need more information about activities in both mechanisms to find more reliable results.



- 1 Istanbul Technical University,
- 2 Bogazici University,
- 3 Yildiz Technical University,
- 4 GFZ Potsdam,
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