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REFERENCE FRAME OF GPS-PPP SOLUTIONS IN MARMARA REGION-TURKEY

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- Displacement/velocity studies are constructed for rigid body displacement and deformation.

Rigid body component (rotation and translation) → frame-dependent

Deformation component → frame-independent.

- The rigid part of the monitored displacements/velocities from PPP is not clear since it is relative to a geocentric reference frame.

- Defining a specific coordinate reference frame in tectonic regions is as important as monitoring the changes themselves.

- Consequently, GPS-PPP and relative positioning results can be compared to see if there is a link between the two methods when it comes to geocentric deformation or velocity frame definition.
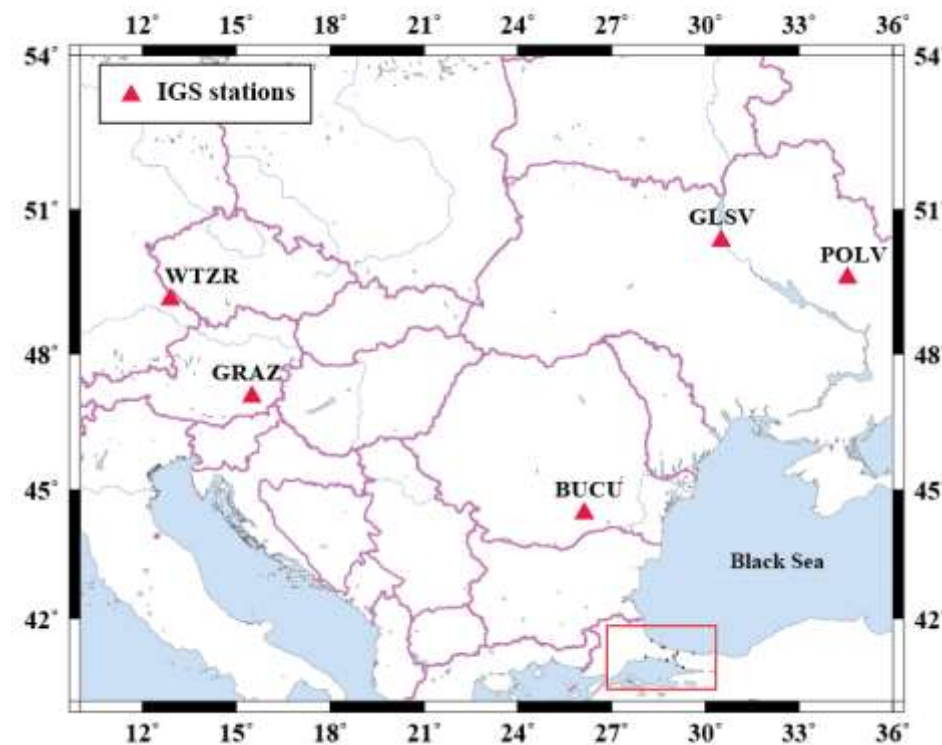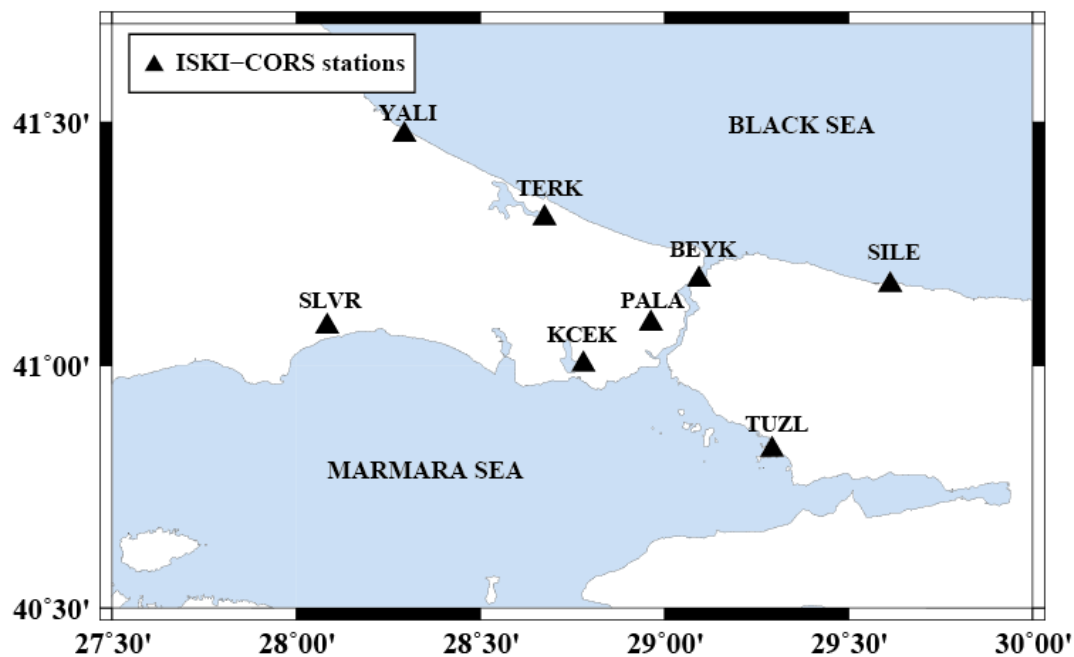
2018 to 2021 DOY 113-119 7 days time-series for each year

APPS and Bernese v5.2

Least Squares Estimation method was used to calculate the velocity values for each point using the linear velocity model given below: (Nocquet and Calais, 2003)

$$x_i(t) + \upsilon_i(t) = x_i(t_0) + \dot{x}_i(t - t_0)$$

Comparing the directions of horizontal velocities resulting from the PPP results is critical for understanding the GPS-PPP solutions reference frame.
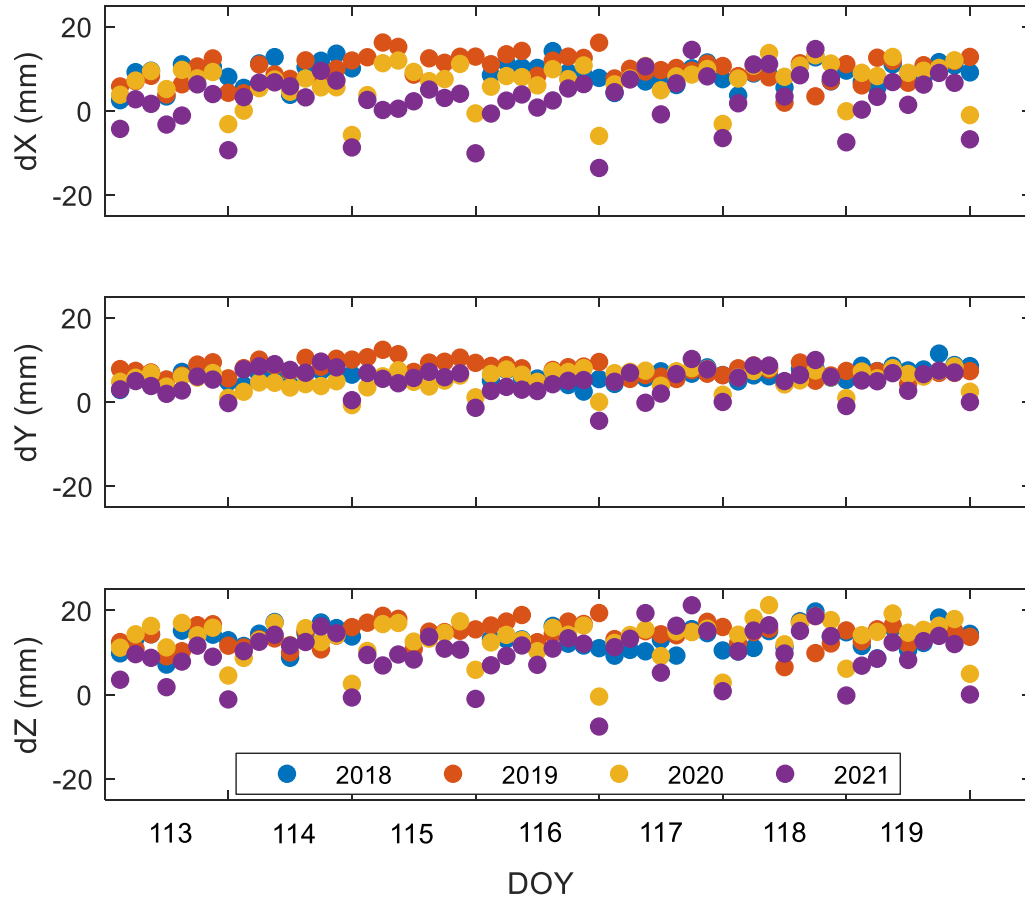
Bernese v5.2 results were accepted as true, and differences were derived in the Cartesian coordinate system.
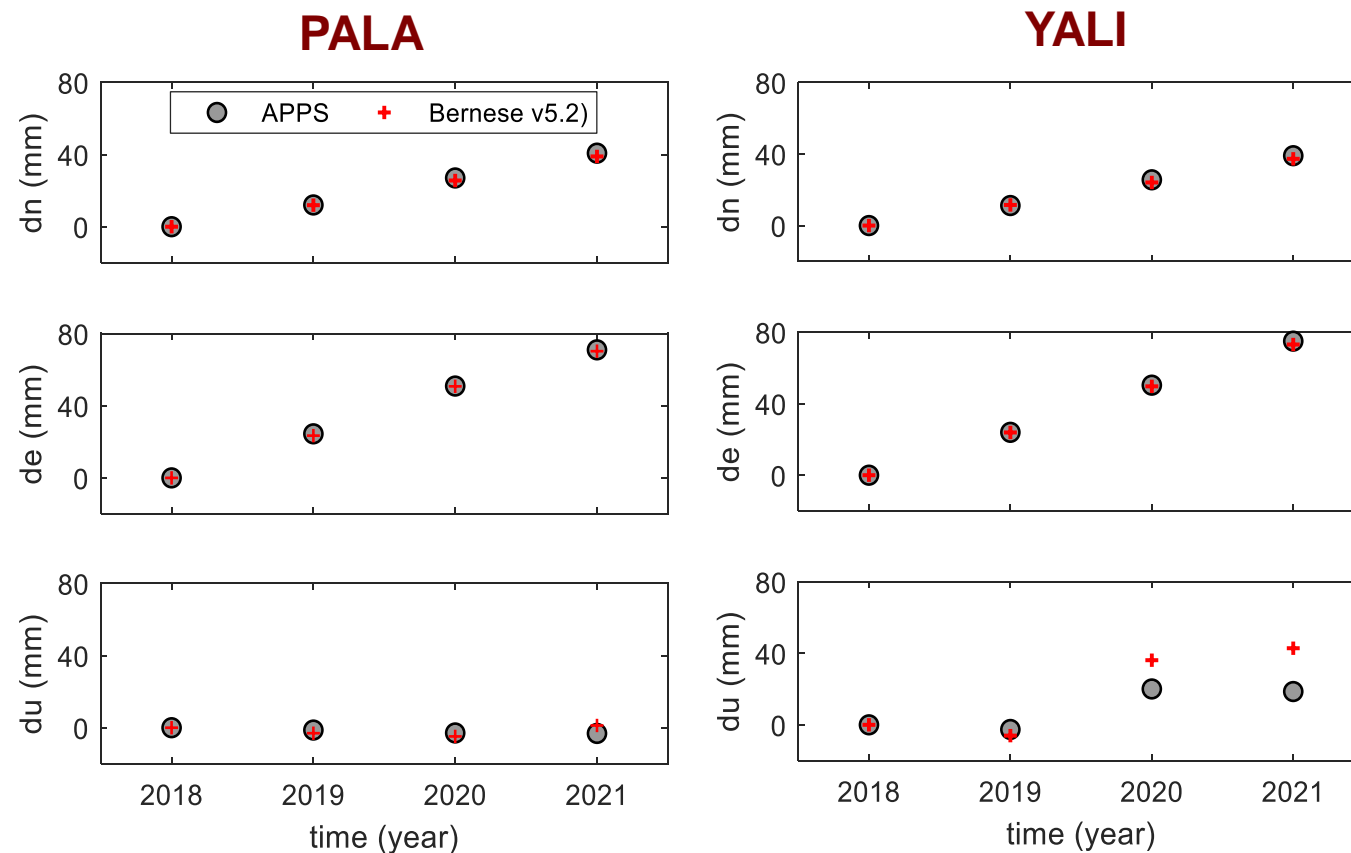
We noted that the differences in the north, east, and up components between the two solutions were insignificant.
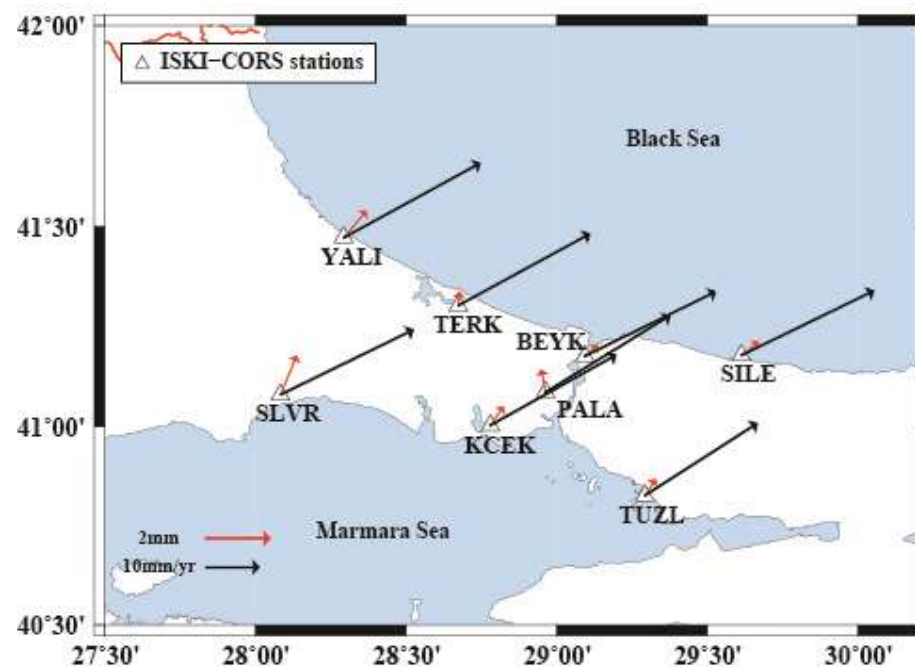
Black arrows show the horizontal velocities obtained from APPS, while red arrows show the differences vectors from Bernese v5.2

- The average values for the differences in north and east components of the horizontal velocity are 0.8 and 0.4 mm/yr.

- Upon averaging the differences, the SLVR station has the highest variation, with a value of 1.5 mm/yr.
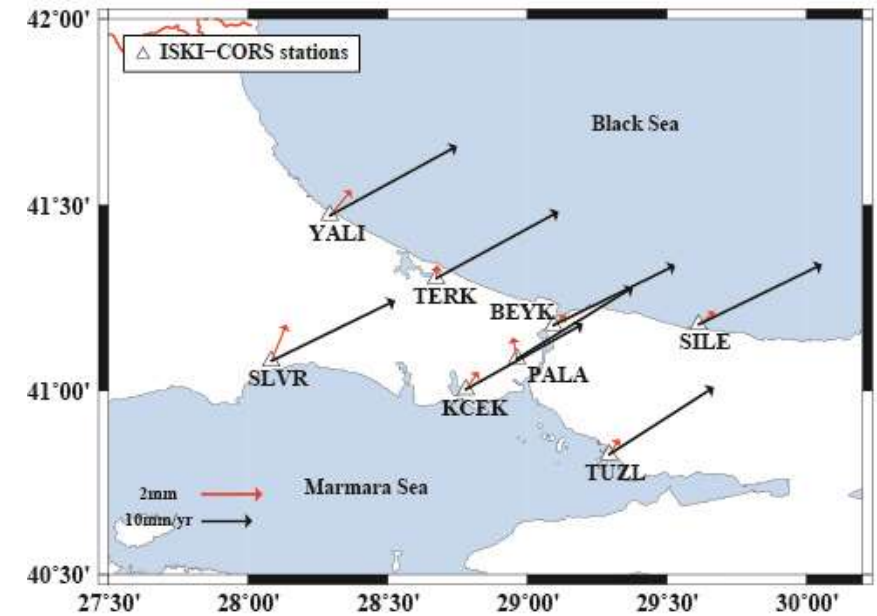
- This comparison will give us an understanding of how the PPP solution works in this region and tell us about the GPS-PPP reference frame for the restricted study area.

- This result demonstrates that the PPP may be used directly to obtain Eurasian-referenced north and east displacement/velocity components as defined in practically all tectonic investigations of the selected region.

- Further research, which will include long-term data from various points in the region, will be thoroughly examined in the context of the PPP solution in this region.

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THANK YOU FOR YOUR ATTENTION

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