Interseismic fault slip-deficit estimation with open source software and application to the sea of Marmara

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Abstract

The estimation of slip-deficit on faults is an important step in hazard assessment for evaluating the location, magnitude and timing of future, potentially large earthquakes. This requires dense measurements of crustal deformation close to the faults in order to solve the inverse problem.
Here, we present an open source software suite that provides the necessary toolchain from data preparation over problem configuration to uncertainty quantification of involved parameters. These tools provide the flexibility that is needed to setup very particular configurations for various fault systems on Earth. In particular, the underground structure can be 1D-layered and the faults can be discretized irregularly based on the ability of the data to constrain slip-parameters.
We apply these tools to GNSS and InSAR time-series data to estimate the slip-deficit across faults in the sea of Marmara.

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