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Handling station position discontinuities in reference frame determination using co-seismic deformations modelling

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One of the major sources of error in reference frame determination comes from the undetected discontinuities in station position time series, particularly in GNSS data. Until now, discontinuities in station position time series due to large earthquakes were usually detected visually. Based on a geophysical modeling, we develop a method to predict the effect of co-seismic deformations on position series. We show here that intermediate earthquakes can also have a significant impact on GNSS station displacements. The predicted co-seismic displacements will be compared to the amplitudes of the estimated offsets in GPS time series in order to assess the reliability of the methods. Finally, we study and outline the interest to rely on such a prediction process for determining long-term velocities and reference frames.