



Evidence of non-linear geodetic station motions induced by accumulated co-seismic deformations

Laurent Metivier, Xavier Collilieux, Daphné Lercier, and Zuheir Altamimi
IGN, LAREG, Paris, France (laurent.metivier@ign.fr)

The stress accumulation induced by the plate tectonics along plate boundaries usually releases in earthquake ruptures generating abrupt changes in the position of geodetic stations such as GPS stations of the International GNSS Service (IGS) network. If large earthquakes induce well known discontinuities in geodetic time series that are usually investigated in reference frame analysis, many more earthquakes of small and intermediate magnitudes also induce small changes in station positions that remain usually undetected due to the signal noise and seasonal variations. However if the co-seismic changes induced by these earthquakes are very small individually, the accumulation of such small motions in time may create locally apparent long term non-linear motions in geodetic station positions. Using a geophysical model able to calculate co-seismic deformations, we will show here a few examples of GPS time series that present some anomalous apparent inter-annual behaviors that may be explained by the accumulation of co-seismic deformations. It raises the question of the treatment of such station non-linear motions in reference frame elaboration.