



A seismotectonic model from the strain field of Africa

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Using ~100 available permanent GNSS stations we compute a velocity field to obtain the current strain field in Africa. GPS stations with short data span (>2.5 years data span) and monument/equipment instability are excluded for the estimated velocity field. Although significant gaps of geodetic stations still exist, particularly on the Central and North (include Sahara) Africa, the aim is to produce reliable velocity solutions and evaluate the strain velocity field across the African continent with respect to the latest global reference frame (ITRF2008). We consider in our geodetic data analysis the uncertainties related with the temporal correlations between the daily solutions of stations (computed using HECTOR). The geodynamic characteristics of the African plate and its complex sub-plate distribution are better constrained with the increasing number of GNSS permanent stations in Africa (our latest angular velocity model for the three major tectonic units uses a total of 37 solutions: NUBI: 25; SMLA: 07; VICT: 05). The occurrence of recent large intraplate and interplate earthquakes and volcanic activity in Nubia and Somalia combined with the results of geodetic networks contribute to a better constraint of the kinematics along plate boundaries. The comparison between the geodetic strain rate with the seismic strain release along seismically active plate boundaries permit us to observe the existence of zones of localized active deformation with geodetic rate larger than seismic moment rate. Regional studies also show negligible seismic activity in zones with active faults and where the internal plate deformation estimated with geodetic strain fields is significant. This work is prepared in the framework of the IGCP Project 601 – “Seismotectonics and Seismic Hazards in Africa”.