Geophysical Research Abstracts
Vol. 16, EGU2014-2106, 2014
EGU General Assembly 2014

Interseismic coupling, seismic potential and earthquake recurrence on the southern front of the Eastern Alps (NE Italy)

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The interaction of the African, Arabian, and Eurasia plates in the "greater" Mediterranean region yields to a broad range of tectonic processes including active subduction, continental collision, major continental strike-slip faults and "intra-plate" mountain building. In this puzzling region the convergence between Adria microplate and Eurasia plate is partly or entirely absorbed within the South-Eastern Alps, where the Adriatic lithosphere underthrusts beneath the mountain belt. Historical seismicity and instrumentally recorded earthquakes show thrust faulting on north-dipping low-angle faults in agreement with geological observations of active mountain building and active fold growing at the foothills of the South-Eastern Alps.
In this study, we use continuous GPS observations to document the geodetic strain accumulation across the South-Eastern Alps (NE Italy). We estimate the pattern of interseismic coupling on the intra-continental collision north-dipping thrust faults that separate the Eastern Alps and the Venetian-Friulian plain using the back-slip approach and discuss the seismic potential and earthquake recurrence.
Comparison between the rigid-rotation predicted motion and the shortening observed across the studied area indicates that the South-Eastern Alpine thrust front absorbs about 80% of the total convergence rate between the Adria microplate and Eurasia plate. The modelled thrust fault is currently locked from the surface to a depth of approximately 10 km. The transition zone between locked and creeping portions of the fault roughly corresponds with the belt of microseismicity parallel and to the north of the mountain front. The estimated moment deficit rate is $1.27 \pm 0.14 \times 10^{17}$ Nm/yr. The comparison between the estimated moment deficit and that released historically by the earthquakes suggests that to account for the moment deficit the following two factors or their combination should be considered:
(1) a significant part of the observed interseismic coupling is released aseismically by folding or creeping;
(2) infrequent "large" events with long return period (>1000 years) and with magnitudes larger than the value assigned to the largest historical events (Mw$\approx$6.7).