



Seismotectonics of the southern Tyrrhenian area: a case of reorganization of a contractional margin

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Seismological and structural data are used to constrain the tectonic architecture and active kinematics of the Nubia plate compressive margin in southern Italy. In this region, compressional displacements have resumed at the rear of the Maghrebic orogenic wedge since about 700-500 ka and are presently accommodated along a seismic belt in the south-Tyrrhenian area, where a passive margin has developed during late Neogene-Quaternary times. Earthquake data from the south-Tyrrhenian belt are analyzed by using Bayloc, a Bayesian location method. Results show that the seismic belt is segmented and consists in a series of NE-SW- and NW-SE-elongated clusters. The NE-SW clusters are interpreted as high-angle reverse fault zones verging toward the southeast, whereas the perpendicular clusters are interpreted as possible strike-slip fault zones transferring the contractional displacements to advanced segments of the belt in the southeast. Brittle deformations in the Quaternary volcanic island of Ustica are consistent with the geometry and kinematics of the seismic belt as deduced from the seismological data. This belt may constitute an early stage of subduction of the Tyrrhenian oceanic crust beneath Sicily. A similar scenario has been hypothesized also for the westward prolongation of the south-Tyrrhenian belt off Algeria. By integrating instrumental and historical seismic data with tectonic and morphological information, a maximum seismic potential of M 6-7-class is suggested for the south-Tyrrhenian belt. Historical earthquake data and estimates of earthquake recurrence time suggest a multi-fault system behavior for the studied compressional belt. These data may result important for mitigating the seismic and tsunamic hazards in such a densely populated region.