



Slab disruption, mantle circulation and the rise of the Calabria-Apennine belt

C. Faccenna (1), T. W. Becker (2), F. Funiciello (1), C. Piromallo (3)

(1) Dipartimento di Scienze Geologiche, Università di Roma Tre (faccenna@uniroma3.it), (2) University of Southern California, Los Angeles USA (twb@usc.edu), (3) Istituto Nazionale di Geofisica, INGV, Roma Italy (piromallo@ingv.it)

The topographic signature in the Central Mediterranean is dominated by the recent uplift of the Apennines belt and the subsidence of the Tyrrhenian basin. To constrain this process, we combined the plate tectonic history of the region, with geological, and tomographic data to present a three-dimensional reconstruction of the subduction history of the Central Mediterranean. We find that the dynamic evolution of the Calabrian slab is characterized by a strong episodicity revealed also by the discrete opening of the Tyrrhenian Sea. The Calabrian slab has been progressively disrupted leading to the formation of large windows, both in the southern Tyrrhenian Sea and in the southern Apennines. Windows at lateral slab edges caused a dramatic re-organization of mantle convection permitting inflow of sub-slab mantle material and causing a complicated pattern of magmatism in the Tyrrhenian region. The rapidly intermittent avalanche of large amount of lithospheric material at slab edges reduced progressively the lateral length of the Calabrian slab to a small finger plunging down into the mantle enhancing the end of the subduction process. By means of laboratory and numerical experiments we test the possibility that topography of the Apennine-Calabria belt is supported by this local pattern of mantle convection..