Modelling the 3D complexities of a subduction interface: the Calabrian Arc (Italy)
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OBJECTIVES

Reconstruct in detail the shallow subduction interface (<20 km)
Constrain the deep part of the slab top surface (40 - 350 km)
Obtain a seamless 3D surface of the Calabrian subduction
Update the Italian database of seismogenic sources

1 Tectonic setting and dataset

The Calabrian Arc forms a one-of-a-kind subduction zone. It features one of the shortest subduction segments (<150 km), one of the thickest accretionary wedges, and the oldest subducted (300 Myr) oceanic crust of the World.

The evolution of the Calabrian Arc is controlled by slab roll-back that started in the Late Miocene (~10 Ma; Dono et al., 2004; Faccenna et al., 2005), due to the opening of the Ionian oceanic crust. The effect of plate convergence on the subduction process gradually decreased since the start of continental collision in Sicily (Late Miocene–Pliocene).

At present, the subduction process controls the south-eastward migration of the upper plate and active faulting within it (Tiberti et al., 2016). Despite a convergence rate of 1.5 mm/a (e.g. Devoti et al., 2011) and significant in-slab seismicity below 40 km depth (Chiarambula et al., 2006), its shallow interface shows little signs of seismic activity.

2 Seismic facies and velocity model

3 Seismic reflection profiles interpretation

Profile 7

Profile 14

4 Subduction interface - shallow part (<20 km)

5 Seismicity distribution

6 Integrated slab model