

## **Focus on the Calabrian Arc subduction: interface, edges, break-off and the accretionary wedge**

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The accurately reconstructed geometry of the subduction interface is a crucial element for seismic and tsunami hazard studies that require realistic modelling of future earthquake ruptures.

The Calabrian Arc is a cornerstone in the Mediterranean plate-tectonics puzzle and understanding its geometry and behavior may strongly contribute to estimating the seismic and tsunami hazard in the region. Besides, it has occasionally be blamed to have generated some past large earthquakes and tsunamis, despite it shows no sign of significant seismic activity on the shallow portion of the interface. In addition, significant in-slab seismicity is recorded below 40 km depth and a rate of 1-5 mm/yr characterize the convergence between the two plates involved, Africa and Europe.

An accurate 3D reconstruction of the Calabrian subduction plate interface based on the interpretation of ca. 9000 km of seismic reflection profiles, provided in the collaborative framework between Spectrum and INGV (CA-60), allows us to detail the architecture of the shallow part of the subduction interface (<20 km).

The resulting 3D model images the peculiar features that characterize the Calabrian subduction interface:

- 1) an external flat at 5-8 km depth located under an accreted Messinian evaporites wedge;
- 2) a central ramp cutting between 8-14 km depth with high roughness and lateral variations of the dip angle;
- 3) a deeper flat between 14 and 20 km;
- 4) the overthrusting over the continental Apulia margin in the northern part;
- 5) the Subduction Transform Edge Propagator (STEP) fault system guiding the southeastern propagation of the subduction;

The deeper part of the subducted slab was reconstructed by analysing the seismicity distribution and the available tomographic data and allows us to highlight the progressive development from north to south of the slab breakoff at 100-150 km depth.

The detailed 3D reconstruction allows us to also estimate the rock volume involved in the accretionary wedge building and to compare the geometrical features of the subduction interface with the surficial ongoing processes (i.e. uplift rates) in the Calabrian Arc.