



# S21H-0602 - Seismic investigation of the dynamics in the upper part of the Ionian subducting slab, Italy



Tuesday, 10 December 2019



08:00 - 12:20



Moscone South - Poster Hall

## Abstract

We located by the non-linear hypocenter location method Bayloc the September 8, 1905 Southern Calabria earthquake, that several investigators identified, on the basis of instrumental data, as the strongest earthquake ever occurred in Italy and for which quite different views exist concerning location, magnitude and the causative process. Our off-shore, ca. 45 km deep location of the event, jointly with macroseismic intensity distribution, seismo-tomographic structure of the subduction zone and other geophysical and geological information taken from the literature, lead us to suggest that the earthquake may have been generated by rupture of the bending zone of the Ionian subducting slab with a seismic event of magnitude as large as 7.5. On 14 July 2018 a magnitude 4.5 earthquake occurred in southern Calabria. It was the only earthquake of magnitude greater than 4 occurring since 1985 in the same area and depth range (30-70 km) of the earthquake of 1905. We accurately re-located the 2018 earthquake and estimated its focal mechanism by the Cut and Paste waveform inversion method. By comparison of hypocenter locations of the two events with (i) hypocenter locations we have obtained for the intermediate-depth seismicity of the last two decades and (ii) the seismotomographic structure of the study region, we infer that the 2018 earthquake occurred in the seismogenic inner core of the subducting slab, while the 1905 one took place at the top of the slab in the zone of maximum curvature of it. Clear necking of the descending slab at depths around 150 km may indicate that the slab is approaching detachment. In this scenario, the upper part of the slab located above the necking zone may be subjected to down-dip extension under its own weight. Down-dip extension of this part of the slab generates diffused seismogenic stress acting in the inner core of the slab (2018 earthquake) and in the elbow zone at the top of it (1905).

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