



Intermediate depth seismicity of the Hellenic subduction zone in the region of the Cyclades

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The southern Aegean is one of the most seismically active regions in Europe. The tectonics of the region is dominated by the Hellenic subduction zone. Different seismogenic zones can be distinguished. Seismicity in the upper crust can be observed in the whole region with different intensity. Interplate seismicity is observed in the fore-arc region south of Crete and intermediate depth events associated with the downgoing slab can be followed from the region north of Crete to the volcanic arc.

Good conditions for accurate monitoring of intermediate depth events in the central volcanic arc are offered by CYC-NET, a network of short-period and broadband seismographs operated by RUB, which includes up to 22 stations in combination with the regional stations of the GEOFON and the NOA-network.

The spatial distribution of the intermediate depth events in the area of the Cyclades shows strong lateral variations. The dip of the seismogenic zone to the north is clearly visible but differences in depth and dip between western and eastern part can also be observed. The Wadati-Benioff zone beneath the western Cyclades dips smoothly down to a depth of 100 km while beneath the eastern part it steepens at about 75 km depth and reaches a final depth of about 150 km. Lateral variations in the dip of the slab are corroborated by structural investigations with receiver functions.

Waveform data from stations in the volcanic arc differ from these recorded in the fore-arc. Differences are based on the high attenuation in the volcanic arc. High frequencies are strongly damped in seismograms recorded in the volcanic arc but are clearly visible in the forearc region. Furthermore, positive traveltimes residuals observed in the volcanic arc point to low velocities in the Aegean mantle wedge and negative residuals for stations in the forearc indicate high velocities within the slab.