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The vertical movement of Karpathos: Competing hypotheses

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Karpathos is a roughly north-south oriented island that emerges between Crete and Rhodes in the forearc of the eastern Hellenic subduction system. It extends for ~60 km to the north of the 40 km contour of the plate interface depth. Further, the northern part of the island is confined to a N-S trending Horst bounded by two large normal faults that shape the seafloor off both, the eastern and western shore. Furthermore, many normal faults, mainly in the north, strike parallel to the Horst and shape the topography onshore. Given the location and the structural configuration of the island, we expect that multiple processes are reflected in both the sedimentary and morphological record of vertical movement. Marine terraces and paleo-cliffs are observed all around the island recording its vertical movements over the last ~1 Ma. Moreover, sedimentary basins in the southern and central parts of the island are excellent archives of long-term uplift interrupted by subsidence over the last ~4.5 Ma. Twenty-five samples were collected at elevations between 1 and ~310 masl. We have gathered six (n=6) age/elevation data-points obtained by Sr-isotope dating, and nineteen (n=19) age/elevation data-points by radiocarbon dating. We explored the likelihood of different hypotheses on what drives the uplift: whether it is driven by upper-crust normal faults, megathrust earthquakes, underplating, or a combination of these phenomena. We present preliminary results on both the temporal and spatial fluctuations of the vertical movement of Karpathos.