



Extension and uplift driven by mantle upwelling beneath the Admiralty Mountains (East Antarctica)

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Northern Victoria Land is located at the boundary between an extended, presumably hot, region (West Antarctic Rift System) and the thick, possibly cold, East Antarctic craton. The style and timing of Tertiary deformation along with relationships with the magmatic activity are still unclear, and contrasting models have been proposed. We performed structural and morphotectonic analyses at the NE termination of northern Victoria Land in the Admiralty Mountains area, where the relationship between topography, tectonics, and magmatism is expected to be well pronounced. We found evidence of two subsequent episodes of faulting, occurring concurrently with the Neogene McMurdo volcanism. The first episode is associated with dextral transtension, and it is overprinted by extensional tectonics during the emplacement of large shield alkaline volcanoes. Upper mantle seismic tomography shows that the extensional regime is limited to regions overlying a low-velocity anomaly. We interpret this anomaly to be of thermal origin, and have tested by means of numerical modelling the role of large-scale upwelling on lithosphere deformation in the area. The results of this integrated analysis suggest that the morphotectonic setting of the region and the magmatism result from upwelling flow at the boundary between the cold cratonic and the hot stretched province (WARS), at work until recent time in this portion of the northern Victoria Land.