

The Serra do Mar escarpment retreat evaluated by DEM modelling, Southeast Brazil

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The Serra do Mar escarpment, in the Atlantic Southeast Brazilian margin, separates, between Santos and Ubatuba, the north-western highlands plateau, up to 1500m high, from a narrow coastal plain. Prominent erosional escarpment is a primary geomorphologic feature of rifted continental margins and its longevity is attributed to erosional processes. Digital elevation models provide data for geomorphological studies in order to evaluate the relief behaviour in response of erosional and/or tectonic processes. To ensure that the relief's statistical properties are meaningful, drainage basins are considered as the study unit. Thirteen basins, draining to the sea, were automatically traced. Their basement lithologies do not represent rheologic variations. Hypsometry demonstrates two basin groups of contrasting behaviour, of convex and concave curves, representing basins where the drainage divide is located at the plateau and basins where it coincides with the escarpment. The length-scale properties of topography, evaluated by horizontal-distance vs variance-of-elevation variograms, suggest the action of channel processes in topography shaping at meso-scales and also at large-scales, mainly for the second group, revealing the tendency of relief's rejuvenation. The first group performs a more advanced stage in escarpment retreat, denoting drainage divide migration inland. The second group basins would pass this evolution stage excepting if uplift movements sustain the present situation, but the rough relief contiguous coast is more consistent with subsidence.