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Analysis of topography and relief as a function of the tectonic - geomorphologic evolution of the Eastern Alps

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Alpine topography and relief vary regionally (Frisch et al., 1997), even on the scale of tens of kilometers. The causes of these differences are the aim of this work that is based on a geomorphological study of the eastern Alps. Earlier investigations on the topography of the Central Alps (Rosenberg & Garcia, 2013) show, by using 50 km, 75 km, and 100 km swath profiles, that the relief northward of the Insubric Line increases westward, whereas the relief southwards of the Insubric Line decreases eastward. This trend reflects collisional shortening trends recently observed in the Central Alps (Rosenberg & Kissling, 2013). In this work, we analyse the topography of the eastern Alps from the Brenner Area in the west to the Steiermark Area in the east, based on satellite images and digital terrain models, that cover an area of 36 000 km^2 in the Austrian and Italian Alps. Based on these data, new GIS-aided datasets containing selected relief factors have been derived. These data are set in relationship to the eastward decrease in collisional shortening to test whether the latter trend has a geomorphic expression. In order to assess such a relationship north-south striking profiles, subparallel to the shortening direction and in addition to an E-W profile are investigated. It can be shown that the total relief of 3100 m (500-3600 m asl.) in the west of the working area is more pronounced than the total relief of 2300 m (700-3000 m asl) in the east of the working area. Furthermore slopes have higher amplitudes in the west when compared to the east. In the west approximately 65% of the slope profile show slopes larger than 50° while in the east approximately 40% of slopes are larger than 50° (based on 30 m topographic data). The evaluation of potential influencing factors will be achieved by conducting spatial and statistical data analysis and interpretation and is complemented by local studies investigating the evolution of relief for selected geologic units. Here, morphometrical indices play a major role in order to draw conclusions on the interdependencies of controlling factors (e.g. isostatic uplift, erosion and climate, resistance to weathering) and relief evolution.

[1] Frisch et al. 1997, Tectonophysics, 297,1-15.

[2] Rosenberg and Garcia, 2013, Geophys. Res. Abs. 15, EGU2013-9905.

[3] Rosenberg and Kissling, 2013, Geophys. Res. Abs. 15, EGU2013-ASC-2013-7946.