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Aggregate stability of soils susceptible to gully erosion

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In the study a problem of gully formation in the Myjava Hill Land (western Slovakia) has been addressed. In the region were an occurrence and historical view of the erosion processes were already published we turn our attention to aggregate stability of materials in which gullies are formed. For aggregate stability measurements we used rainfall simulator method. Aggregate fraction 0.25 – 4 mm was placed (4 g) into a 0.25 mm sieve and exposed to 30 mm of an artificial rainfall with known energy (270 J/m2). Mean value of three replicate measurements was calculated for each sample. In soil profiles where the gullies occur, the highest aggregate stability was found in surface humus horizons (mostly >60%). Considerable less aggregate stability was determined in underlying marls (frequently <25%). Gradually increasing aggregate stability in newly formed humus horizons was found on the slopes of gullies. Distinct difference in aggregate stability in topsoils compared to the underlying marl material can be considered as an important factor of gully formation in this region. Man-made disturbance of resistible surface soil horizons often starts a very strong erosion of underlying marls with visually distinct gullies.