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Influence of snowmelt events on hillslope soil loss in Mediterranean high mountainous environments.

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This study analyzes the influence of snowmelt events on hillslope erosion processes in a high-mountainous Mediterranean basin. Here, semi-arid conditions and high uncertainty of meteorological agents lead to huge yields of both, suspended sediments and bedload contributions. The proposed methodology includes field campaigns of suspended sediments at hillslope scale and the temporal analysis of the snow cover evolution with available images from MODIS sensor. In addition, a physically-based hydrological model was applied to both, the estimation of snowmelt runoff contributions and to validate snow cover derived from remote sensing data. The obtained results showed certain patterns and relationships between snowmelt flows and suspended sediment contributions at different temporal scales (e.g. daily, weekly, etc.). These relationships are consistent with those reported in other works in Mediterranean high mountainous areas, and point to the significant influence of intense snowmelt pulses. The heterogeneity of the different erosive processes within the study area adds complexity to the estimation of these contributions at basin scale. The relatively low measured concentration values (90 mg/L) suggest that the snowmelt contribution to the sediment load could be negligible when compared with other erosion processes (>1200 mg/L from gullying, rill and interill). However, the length of the snowmelt period (1-2 months) and the recurrent annual sequence of these contributions make it advisable not to ignore this process and its influence on dam siltation.