



Landslides in tectonically active areas and their influence on sediment supply to basins: examples from Southern Italy

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Landslides are a key mechanism of sediment delivery from hillslopes and can produce volumes of sediment that are potentially significant for basin stratigraphy. In tectonically active areas, landslides are highly sensitive to tectonic and lithological boundary conditions, but this sensitivity and the impact that landslides have on the overall sediment supply from catchments remain largely unquantified.

Here we use a combination of DEM analysis and fieldwork to quantify the distribution and volumes of landslides along the strike of active normal faults in Southern Italy, where fault throw rates and lithology are well constrained. We then explore the geomorphic, tectonic and lithological variables controlling landslide occurrence. Additionally, we compare the landslide distribution with the transient incision that is affecting footwall channels as a result of active normal faulting. Finally, we quantify the grain size distributions (GSD) supplied by landslides across different lithologies and landslide types, and we compare them with those being supplied by bedrock weathering.

Our results show that landslide frequency is highly influenced by lithology and the amount of incision experienced by the catchments, and that landslides supply on average GSDs that are 50% coarser than those supplied by the weathering of the same lithology. Landslides triggered during landscape adjustment to tectonics therefore have a significant impact both on the volumes and grain sizes of sediment exported to neighbouring basins, and the development of transient stratigraphy.