Geophysical Research Abstracts
Vol. 18, EGU2016-6194, 2016
EGU General Assembly 2016

Magnitude and Recurrence of Submarine Landslides: Active vs. Passive Margins

Roger Urgeles (1) and Angelo Camerlenghi (2)

(1) Institut de Ciències del Mar (CSIC), Geociències Marines, Barcelona, Spain (urgeles@icm.csic.es), (2) OGS Istituto Nazionale di Oceanografia e di Geofisica Sperimentale, Trieste, Italy

Submarine landslides are ubiquitous along Mediterranean continental margins. With the aim of understanding mass-wasting processes and related hazard at the scale of a large marine basin encompassing multiple geological settings, we have compiled data on their geometry, age, and trigger mechanism with a geographic information system. The distribution of submarine landslides in the Mediterranean reveals that major deltaic wedges have a higher density of large submarine landslides, while tectonically active margins are characterized by relatively small failures. In all areas, landslide size distributions display power law scaling for landslides > 1 km3. We find consistent differences on the exponent of the power law (θ) depending on the tectonic setting. Active margins present steep slopes of the frequency-magnitude relationship while passive margins tend to display gentler slopes. This pattern likely responds to the common view that tectonically active margins have numerous but small failures, while passive margins have larger but fewer failures. Available age information suggests that failures exceeding 1000 km3 are infrequent and may recur every ∼40 kyr. Smaller failures that can still cause significant damage might be relatively frequent (failures > 1 km3 may recur every 40 years). The database highlights that our knowledge of submarine landslide activity with time is limited to a few tens of thousands of years. Available data suggest that submarine landslides may preferentially occur during lowstand periods, but no firm conclusion can be made on this respect, as only 70 landslides (out of 696 in the database) have relatively accurate age determinations. The temporal pattern and changes in frequency-magnitude distribution suggest that sedimentation patterns and pore pressure development have had a major role in triggering slope failures and control the sediment flux from mass wasting to the deep basin.