



Linking subaerial erosion with submarine geomorphology in the northern Ionian Sea, Italy

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The supply of sediment from continental sources is commonly suspected to have exerted a strong influence on the development of canyons and other morphological features on the continental slopes, but rarely is the sediment supply known quantitatively to make this link. Here, we outline an area where offshore morphology, in the northern Ionian Sea, may be linked to supply of sediment from subaerial erosion in NE Sicily and SW Calabria. Shelves in this area are very narrow (< 1 km), and the bathymetry shows that rivers and adjacent submarine channels are almost directly connected. Integrated topographic analyses were performed on a merged digital elevation model (DEM) of ASTER data for subaerial topography and multibeam sonar data for submarine bathymetry. Spatial variations in onshore erosion were assessed using a variety of methods, namely: long-term sediment flux from Pleistocene uplift rates, decadal sediment flux from landslides; published long-term exhumation rates from ^{10}Be cosmogenic nuclide concentrations and published recent sediment yields determined using the Gavrilovic Method. Submarine channels associated with rivers delivering larger sediment fluxes have broad channels, high relief and smooth concave-upward longitudinal profiles. Conversely, submarine channels that lie offshore small-flux rivers have straight longitudinal profiles, low relief and steep gradients. Where river catchments supply a greater sediment flux offshore, shelves tend to be wider (~400 m) and submarine channels have gentler gradients. In contrast, where catchments supply less sediment flux, shelves are narrow (250-300 m) and offshore channel gradients are steeper. How morphology varies with tectonic uplift rate was also studied, but we find that, unlike onshore terrains where tectonics is commonly an important factor influencing channel morphology, in the submarine landscapes, sediment flux appears to dominate.