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Submarine erosion and active tectonics offshore Nice (Southern Alps, France): insights from numerical models

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An interesting approach to quantify vertical motions of the lithosphere is to analyze the rates of sediment transfer from continental areas to deep marine basins. This transfer obeys classical erosion-transport-deposition laws, which carve the topography of the continents as well as that of off-shore domains. The Ligurian Sea between Southern Alps and Corsica is a deep and narrow basin almost closed on its eastern side towards the Gulf of Genova. It has steep off-shore margins and relatively important seismicity compared to the rest of the French territory. The Plio-quaternary sedimentary cover of the North Ligurian margin is thick and shows evidences of frequent slope instabilities also advocating for repeated vertical motions. High resolution bathymetric data reveal large variations of slope distributions across the margin advocating for recent vertical motions. In particular, the eastern part of the north Ligurian margin is characterized by two slope breaks at its top and bottom, indicating faster uplift rates in this area. We present numerical models of on-shore and off-shore surface processes which account for sedimentary transfers from the continent down to the deep marine domain, including sub-marine erosion, in response to localized margin uplift.