# Dynamics of turbidity currents influenced by tidal flows in submarine canyons

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Turbidity currents are gravity driven currents, with a higher density than the ambient fluid due to suspended sediment. These flows represent the most efficient sedimentary transport process from continent to deep sea environments and can occur everywhere, mainly on the continental slope where the sediment is the most unstable. At these depths, turbidity currents should not be influenced by surface currents as tides. However, it has been found sedimentary features at depth not reach by surface currents but which could be associated to tides, as ripples, hummocky cross-stratification or cross lamination. The hypothesis to explain the presence of tidal sedimentary features at great depths is that tidal flows could influence turbidity currents via internal tides. The objectives of this study are to investigate the impact of the tidal flow on turbidity currents, especially in submarine canyons where both turbidity currents and internal tides are active. To examine the influence and exchanges between these flows, a model of multiple-layer shallow water equations is used. The data obtained will be tested by flume experiments and compare with in-situ measurements. If this hypothesis is verified, that could bring the light on the large disparity of the turbidity current presence in submarine canyon. Rhythmite structure in turbidites could also be explained by this fluid interactions.

Keywords: Turbidity currents, Tidal flows, Submarine canyon, Sediment transport processes, Numerical model, Flume experiments

 