Geophysical Research Abstracts
Vol. 21, EGU2019-7695, 2019
EGU General Assembly 2019

From in situ data to 3D modeling: understand the suspended matter fate in the estuary - coastal ocean - open sea continuum, from the Red River Delta to the Gulf of Tonkin (Vietnam).

Violaine Piton (1), Sylvain Ouillon (1), Marine Herrmann (2), Patrick Marsaleix (3), Vinh Vu Duy (4), Thomas Duhaut (3), and Florent Lyard (1)

(1) LEGOS, IRD, CNRS, Toulouse, France (violaine.piton@legos.obs-mip.fr), (2) LOTUS, USTH, VAST, Hanoi, Vietnam, (3) Laboratoire d'Aérologie, CNRS, Toulouse, France , (4) IMER, VAST, Haiphong, Vietnam

The Gulf of Tonkin in the South China Sea receives huge inputs of dissolved and particulate suspended matter from the Red River. The river's discharge showed a strong temporal variability over the last decades both in terms of water and matter, from the seasonal to the decadal scales. This variability is associated to factors of natural and anthropogenic origins (dam building, sand dredging, water use, climatic variability, from extreme events (typhoons) to the interannual (ENSO) and long term evolution...). Understanding the functioning and variability of transport and fate of sediment from the Red River to the Gulf of Tonkin is essential in order to assess their impact on sediment erosion and accretion therefore on the evolution of seabed and coastline. Our objective is to understand the influence of ocean dynamics, from the submesoscale to the large regional scale, on this transport and fate and to examine their response to various forcings. For that, we use a combination of coupled modeling tools and in-situ observations.

In-situ measurements were performed in two distributaries at different seasons and tidal regimes. Sampling methods as well as our findings on double Estuarine Turbidity Maxima and tidal-induced salinity intrusion, will be presented. The spectral tidal model T-UGO is used to perform fast test on tidal boundary conditions. Results of the impacts of bathymetry, roughness and friction coefficients on tidal solutions are presented. The hydrodynamic ocean model SYMPHONIE is coupled with the sediment transport model MUSTANG. Simulations are performed over the 2009-2017 period using a varying resolution bi-polar grid refined over the Red River mouth region. Results concerning riverine and ocean dynamics, sediment transport and their variability will be presented, with comparison with in-situ measurements to assess the ability of the models to represent coastline morphodynamics and ocean dynamics.