Geophysical Research Abstracts
Vol. 20, EGU2018-1840, 2018
EGU General Assembly 2018

Coastal mixing in multiple river-mouth deltas: a case study in the Po Delta, Italy

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Satellite imagery provides evidence of complex mixing dynamics in the coastal zone in front of the Po River Delta, Italy. The interaction between tides and river flow generates 3D recirculation cells in the areas comprised within adjacent river mouths, which enhance the upwelling of salty sea water. Such features form during flood tide phases and are intensified during peak river discharge events, when the advective forces of the river plume are stronger. Through an integrated approach based on the analysis of satellite imagery, in situ field data and a high resolution oceanographic model, representing the whole river-delta-sea system, we investigated the relative contribution of the different forcings in controlling coastal mixing of riverine waters.
The combined use of these tools integrates all available information to improve the understanding of process dynamics and system evolution. This hydrodynamic evidence can be relevant in the definition of the areas of influence and the mechanisms of riverine water mixing in the near coastal zone. This can shed some light, eventually, on characterizing the sediment dynamics, as well as the thermohaline properties of waters in the area, with specific impacts also on the local ecosystems and fishery.