Suspended particulate matter response to extreme forcings in the Bay of Seine

COLINE POPPESCHI[1], ROMARIC VERNEY[2], GUILLAUME CHARRIA[3]

[1] *France Energies Marines, Plouzané 29280, France.*

[2] *Ifremer, DYNECO, Hydrosedimentary Dynamics Laboratory (DHYSED), 29280 Brest, France.*

[3] *Ifremer, Univ. Brest, CNRS, IRD, Laboratory for Ocean Physics and Satellite remote sensing (LOPS), IUEM, 29280 Brest, France.*

The latest Intergovernmental Panel on Climate Change report of 2023 alerts about an increase in the occurrence and intensity of extreme hydro-meteorological events such as storms and extreme river flows, i.e. drought and floods. Investigating the occurrence of these extreme events in the past 15 years and their impacts on sediment dynamics will provide crucial knowledge for anticipating future trajectories of coastal ecosystems. Time series from in situ observations are analyzed to identify extreme forcings of river flows and waves and examine their impact on Suspended Particulate Matter (SPM) dynamics in a highly turbid coastal area equipped with a high frequency in situ monitoring station at the interface between the Seine Estuary and the Bay of Seine (South of English Channel). Extreme events from two dominant forcings are investigated : extreme river flow forcing events that can transport the Estuarine Maximum Turbidity (ETM) along the Seine estuary and deliver high SPM to the bay; and extreme wave forcing events that can erode the bottom sediment inducing high SPM concentration in the bay. An original detection method is proposed, based on high frequency in situ observations combined with satellite and model data from 2006 to 2019.Extreme forcings are examined through their specific characteristics (high intensity, long duration, season of occurrence, succession of events), their impact on SPM in the coastal environment, and the comparison to mean seasonal dynamics. Extremes are more frequent and intense in winter for both forcings. A proportional relationship exists between SPM and forcing intensity and duration. A weak effect of the succession of extreme events is highlighted, and the occurrence of an extreme wave event often but not automatically coincides with an extreme response in SPM concentration.