Variabilité temporelle du recyclage du carbone dans les sédiments des deltas à différentes échelles de temps (de l'heure à la décade): un exemple dans le prodelta du Rhône

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Temporal variability of the carbon cycle in estuaries and deltas is known to be very large and is the main issue for quantifying the carbon cycle in this biogeochemically active zone of the Earth System. Indeed, this variability combines hydrological variation from the river (floods and drought) and the hydrology of the coastal seas (storms, current surge, wind induced circulation, upwelling) wich are both influencial on biogeochemistry. This gives rise to short timescale variability (typically hours to days) which has been poorly documented, and extends to the effect of these variations on biogeochemical fluxes at the seasonal to interannual time scale which has been so far overlooked.

Using *in situ* oxygen microprofiling devices, we have collected a new dataset on organic matter recycling in the Rhone delta and shelf sediments (Northwestern Mediterranean Sea) which covers a wide range of timescales: from hours to decades. The hourly variation is collected using a new benthic station deployed on the sediments and specially adapted to monitor short-term variations such as flood or storms. Water column sensors (Turbidity, Temperature and Salinity) can trigger an oxygen micro-profiler which provides a time-series of oxygen microprofiles over a few days during resuspension or flood events, before returning to its nominal frequency, i.e. one set of profiles per day during a couple of month. The seasonal to decadal timescale is constituted by a set of oxygen micro-profiles measured on an array of stations in the Rhône prodelta and shelf by an *in situ* microprofiler during seasonal cruises over 10 year.

The results show large variability at all time scales, mostly driven by deposition of river material druing floods. Resuspension during storms plays a role over short time scales, but its long-term effect is not apparent on our dataset. The interplay between the variability observed at these two timescales is still being sought but modelling effort is underway to try and unravel the long term effect of short timescale variation in deltaic systems.