Impact of an intense long-lasting flood event on the biogeochemistry of the Rhône prodelta sediments: preliminary results

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In river-dominated ocean margins (RiOmar), the delivery of nutrients, sediment, and organic carbon is highly dependent on river dynamics. In the Rhône delta region (Northwestern Mediterranean Sea, France), approximately 80% of sediment deposition occurs during flood events. During these intense and sometimes extreme flood events, water column properties and the geochemistry of underlying sediments are deeply modified. Previous studies have shown how a short and frequently occurring flood event (discharge $>$ 3000 m3 s-1 at the river mouth) can have a major impact on sediment biogeochemistry by altering porewater profiles significantly. Due to climate change, the intensity and occurrence of these flood events will likely increase. How this will affect RiOmars, however, remains uncertain. Between October 22 and December 15 2023, the Rhône delta area was affected by a period of five consecutive flood events. This uncommonly intense period of flood resulted in a cumulative deposition of a few tens of centimetres of new sediment in the Rhône prodelta. The impact of this long-lasting flood period on the sediment geochemistry was investigated as well as its relation to changes in the water column. In addition, the sediment relaxation period after the flood-period was monitored. Biweekly porewater samples were collected between October 2023 and April 2024. Total dissolved inorganic carbon (DIC), total alkalinity (TA), sulfate, and methane (CH4) were measured in the porewaters and the fluxes of oxygen (DO), DIC and TA were determined by the use of incubation experiments. Concurrently, voltametric profiles of iron species, dissolved manganese, DO, and hydrogen sulfide were obtained in the sediment cores and water column properties (DO, salinity, turbidity, Chla) were measured with the use of CTD scanners and AUVs. The constant high discharge of the Rhône river during the flood event resulted in a long-term perturbation of the sediments. In the presentation we will discuss how the perturbation affected porewater species, biogeochemical fluxes, and water column properties.