Coastal ecosystem transformations since 1800 in a macro-tidal estuarine environment: messages from Bay of Brest sediments

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Résumé

The Bay of Brest (BB) is a macro-tidal estuarine environment that has been exposed to strong anthropogenic pressures over the past decades, especially in the aftermath of World War II, and is here considered as a regional pilot site for addressing coastal ecosystem transformations since ca. 1800. Using sediment cores in 2 different BB areas more or less exposed to marine hydrodynamic processes: 1) Brest harbour at the entrance of the BB and 2) Bay of Daoulas in the inner BB close to the mouth of the River of Daoulas, we aim at deciphering past environmental changes at a high temporal resolution (subdecadal to annual) over the two past centuries.

Working at a local spatial scale (BB) is indeed necessary to address robust correlations between driving forces and environmental changes as previously demonstrated for the inner BB (Bay of Daoulas) with pluridisciplinary studies covering the last 150 years (Klouch et al., 2016; Lambert et al., 2018; Siano et al., 2021). Here, we refine the discussion of three main thresholds (1945, 1965 and 1985) discussed in the above-mentioned studies by completing palynological datasets with higher-resolution analyses (Bay of Daoulas) and inedited information (Brest Harbour), and adding benthic foraminifera analyses to the Bay of Daoulas study core.

Fossilized marine bioindicators (dinocysts and benthic foraminifera) and biomolecular tools (sedaDNA) allow to analyse past changes in protist communities with a mean resolution of 5 to 10 years. In parallel, changes in BB landscapes are investigated using sedimentological analyses and pollen tracers. All sedimentological and paleoecological data are finally discussed at the light of instrumental data (on recent periods) as well as historical chronicles to tackle main forcing factors responsible for coastal ecosystem transformations, trophic changes, degradation of BB's water quality with the recrudescence of toxic algal blooms since the 1980's.

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Mots-Clés: Anthropocene, Bay of Brest, Palynology, Estuarine dynamics, River runoff, Climate variability, Agricultural Policies, Industrial activities