Impact of Marine Heatwaves over the water column in a coastal ocean: a case study in the Bay of Biscay and the English Channel

GUILLAUME CHARRIA[1], COLINE POPPESCHI[2], AMÉLIE SIMON[3], ANNE GAYMARD[1], MAUD MARTINEZ ALMOYNA[1], NICOLAS SAVOYE[4], CAMILLE LIENART[4], CAROLINE ULSES[5], IVANE PAIRAUD[1], XAVIER COUVELARD[6], SÉBASTIEN THEETTEN[1], JEAN-FRANÇOIS LE ROUX[1]

[1] *Ifremer, Univ. Brest, CNRS, IRD, Laboratoire d'Océanographie Physique et Spatiale (LOPS), IUEM, 29280 Brest, France.*

[2] *France Energies Marines, 525 Av. Alexis de Rochon, 29280 Plouzané, France.*

[3] *IMT Atlantique, Lab-STICC, UMR CNRS 6285, Brest, France.*

[4] *Université de Bordeaux, CNRS, Bordeaux INP, EPOC, UMR 5805, 33600 Pessac, France.*

[5] *Université de Toulouse, LEGOS (CNES/CNRS/IRD/UPS), 31400 Toulouse, France.*

[6] *Shom, 29200 Brest, France.*

Coastal ecosystems are under climate and anthropogenic pressures. Extreme events as Marine Heatwaves (MHW) directly impact environmental conditions necessary to sustain biodiversity in coastal oceans. Recent results showed increasing occurrence and intensity of MHW in the Bay of Biscay and the English Channel based on surface temperature observations.

Combining satellite and in situ observations with recent high resolution numerical simulations, the impact of MHW on the whole water column is investigated to evaluate potential impacts on pelagic and benthic ecosystems. Special attention is given to the last two years, 2022 and 2023, as unprecedent warm years.

The last two decades have been observed (in situ and from satellites) and simulated (using CROCO coastal ocean model with 1km resolution) allowing to identify and characterize MHW (occurrence, duration, intensity). The propagation in the water column of observed heating is investigated with regard to the local dynamics (e.g. tides, constrained shallow waters, river plume dynamics). Depending on hydrodynamical conditions, impacts of MHW on the water column are contrasted and sensitive to characteristics from this type of extreme events. Those first results are designed to pave the way for an assessment of the MHW impact on the coastal ecosystem during the last two decades with a focus on 2022 and 2023.