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Global aspects and modelling

The human activities impact marine environment and ecosystems not only at local scale or regional scale, by river loading, coastal management or fisheries, but also at global scale.

An example: while CO₂ is released massively in northern developed countries, we are acidifying the whole ocean by CO₂ dissolution in surface sea waters. A study published just yesterday in Nature, by a joint team from 13 labs, had showed that within 3 or 5 decades some key plankton will not be able to form longer their calcareous shell. Particularly endangered are the pteropods living in the Weddell Sea, off Antarctica, a key element there for the food web up to the whales.

Furthermore greenhouse gases as CO₂ induced other cascades from human activities to remote marine ecosystems: by increasing temperature we put lighter waters at the top of the ocean and thus stratified the whole system, and consequently reduce the return flow of deep nutrients that trigger primary production near surface.

In brief, the Earth System behaves as a whole continuum from physics to chemistry and biology, bridging land anthropogenic activities to worldwide ocean environmental problem.

Such big issue implies to restructure the research strategy at international and national level by launching coordinated interdisciplinary programs on Earth System Science. In this context, structuring the European Research Area is a crucial challenge that EUR-OCEANS undertake.