

Ocean acidification in the Belgian coastal zone, a contribution to the BELSPO project “4 decades of Belgian marine monitoring” (4Demon)

Alberto V. Borges(1), Thomas Vandenberghe(2), Francis Strobbe(2), Ruth Lagring(2)

(1) University of Liège

(2) Belgian Marine Data Centre, Royal Belgian Institute of Natural Sciences

The open ocean is a major sink of anthropogenic CO₂, however the accumulation of anthropogenic CO₂ has altered carbonate chemistry in surface waters since pre-industrial times, and is expected to continue to do so in the coming centuries. Ocean acidification of surface waters corresponds to the increase of CO₂ and of H⁺, the decrease of pH, of CO₃²⁻, and of the saturation state of calcite and aragonite, all related to shifts in thermodynamic equilibria in response to the input of anthropogenic CO₂ from the atmosphere. Changes of saturation state of calcite and aragonite call have negative impacts on marine organisms some of which have an important economic value for tourism (coral reefs) or fisheries (shellfish, ...). In coastal waters, other factors in addition to the absorption of anthropogenic CO₂ could also affect carbonate chemistry at decadal time-scales. Atmospheric inputs of nitrogen or sulfur could lead to enhanced acidification, while eutrophication could counter to acidification. In the frame of the BELSPO project “4 decades of Belgian marine monitoring” (4Demon), we compiled available historical data-sets of pH in the Belgian coastal zone. The data-set spans at from 1970 to 2015, and totals > 8,800 values. The emerging pattern from the annual means is an increase of pH from the early 1970's to the mid 1980's, and then a decrease on-wards. This pattern could be related to changes in primary production related to eutrophication and nutrient reduction policies.