



1 Are anthropogenic induced changes in nutrient ratios of the Ebro influencing the ecosystem of the Catalanian coast?

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The Ebro river is the main contributor of terrestrial water to the Catalanian coast, Spain. In order to understand systemic shifts in the river system induced by altering anthropogenic activity (i.e., nutrient release) the environmental monitoring data of the past 20 years of the Ebro were analysed. Results show that the system underwent a significant change in nutrient concentrations and water quality, starting in 1995. Specifically, the stoichiometric ratio of dissolved N/P rose from about 22 to 68 (average; peak values as high as over 200) due to a sharp decrease in phosphate concentration. This was accompanied by lower levels of PCO_2 and biological oxygen demand (BOD) and an increase of annual minimum content of dissolved oxygen.

To understand the possible impact of this systemic change, these results have to be interpreted in the light of the outcome of former studies evaluating the nutrient influence of the Ebro river on the Catalanian coast.

A study based on sampling in 1997 showed that the nutrients transported by the Ebro has an influence on nutrient concentration and phytoplankton activity more than 20 km away from the river mouth. Before the 1995 system change nitrogen was seen as a limiting factor because N/P ratios were mostly below 20 along the Catalanian coast. It was suspected that this nitrogen limitation caused dinoflagellate blooms.

From this, it is concluded that the system change in 1995 is probably influencing nu-

trient limitations in coastal waters. In addition, future efforts by Spanish agencies to reduce nitrate in agriculture within the Ebro Basin may lead to yet another significant shift in elemental nutrient ratios with consequential influence on the coastal ecosystem.