



Human and riverine impacts on the dynamics of seawater nutrient and carbon parameters in Kwangyang Bay, South Korea

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We investigated seawater nutrient and carbon parameters in Kwangyang Bay, South Korea, which has been exposed to significant human influences, in each core month of four seasons for between 2010 and 2012. The survey data were analyzed using multivariate statistics analysis (cluster and factor analysis). As a result, we found that the Seomjin River (the fifth largest river in South Korea) and biological activity, including phytoplankton photosynthesis and bacterial decomposition, were the main factors determining the overall water quality of the bay. However, the impacts of these factors varied both spatially and seasonally, because the factors were linked with the geographical environments and seasonal variations in freshwater discharge. In particular, the Seomjin River was primarily responsible for nitrate, silicate, total alkalinity, and dissolved inorganic carbon, and exhibited a significant impact in the summer. During the past 10 years, nutrient loads from the river and industrial complexes to the bay have decreased. The impacts of this decrease are visible in the phosphate concentration, which has fallen to a third of its initial value. We also examined the potential role of atmospheric nitrogen deposition in nitrogen cycling in the study area.