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Assessment of potential nitrate pollution sources in the Marano Lagoon (Italy) and set-up of an environmental monitoring programme.

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The aim of the project is to identify and differentiate the main anthropogenic nitrogen sources present and their impact on the Marano Lagoon (Italy) and its catchment area by applying a combined approach of hydrochemical, isotopic and remote sensing techniques.
The present investigation represents a new study, which, beside the traditional hydrochemical analyses (main ions and nutrients), introduces stable isotopes of nitrate, the stable isotope signature of boron and the stable isotopes of water. The analysis of stable isotopes in the nitrate molecule will be used to differentiate between nitrate coming from agriculture (synthetic and natural fertilizer), airborne nitrate and nitrate from nitrification processes in soils. Boron isotopes will be used to identify the impact of domestic wastewater on the aquatic system. The stable isotopes of the water molecule are useful tracers to calculate mixing ratios between sea and fresh water and the mean altitude of the recharge area of surface water. Moreover, this study represents a very new innovative approach for the investigation of the complex hydrogeochemical processes at the mixing interface between sea and fresh water. In addition to the analytical part, the monitoring programme will also include remote sensing techniques. Remotely sensed data from the satellites Landsat 1 MSS, Landsat 5 TM and Landsat 7 ETM+ will be analysed and processed. This analysis is to assess the multi-temporal and spatial evolution of most superficial algae flora activity and the water temperature of the Lagoon as main indicators of eutrophication and, additionally, to identify the main environmental and morphological changes of the Lagoon since the beginning of the seventies.