EFFECTS OF CLIMATE CHANGE AND ANTHROPOGENIC PRESSURES IN THE WATER QUALITY OF THE RIA FORMOSA (PORTUGAL)

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Abstract: The Ria Formosa, a coastal lagoon located in the South coast of Portugal, is a very important ecosystem that supports diverse economic activities in the region. Understanding how climatic and anthropogenic drivers will influence this coastal lagoon is fundamental to guarantee its sustainability. Thus, this study aimed to assess the influence of climate change and anthropogenic pressures in the water quality of the Ria Formosa using a numerical modelling approach. The 3D coupled hydrodynamic-biogeochemical model SCHISM (Zhang et al., 2006) was validated and used to simulate several scenarios of climate change and anthropogenic pressures in the Ria Formosa. Besides a reference scenario (S0), three scenarios were simulated: i) S1 - mean sea level rise of 0.5 m; ii) S2 - increase of the air temperature of 1.68ºC and iii) S3 - increase of 50% of the ammonium and phosphorous loads from the wastewater treatment plants (WWTP) discharging into the lagoon. For the mean sea level rise scenario (S1), results suggest an increase of the salinity near the area of influence of the WWTP. The simulated increase of the air temperature (S2) leads to changes in the water temperature that range from 0ºC to +1ºC. Similarly to scenario S1, the influence of the increase of the nutrients loads (S3) is more significant near the area of influence of the WWTP. Overall, in comparison to the reference scenario minor differences are observed in the trophic index (TRIX) of the lagoon for the analyzed scenarios. The exception are some areas near the WWTP discharges, where the TRIX tends to increase for scenario S3. These results provide further insight about the response of the Ria Formosa to future changes and can support its management.

Key words: Ria Formosa, sea level rise, temperature, nutrients

References:

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