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How climate change threats water resource: the case of the Thau coastal lagoon (Mediterranean Sea, France)

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The latest reports of the intergovernmental panel on climate change explained that the Mediterranean regions are especially vulnerable to the impacts of climate change. These latest are expected to have strong impacts on the management of water resources and on regional economies. The aim of this paper is to discuss impacts of climate changes on the Thau case study in relation to the evolution of water balance, water uses and adaptation to climate change.

The Thau coastal lagoon is located in the Mediterranean coast in south of France in the Languedoc-Roussillon Region. Economic activities are diverse from shellfish farming, fertilizers industries to agriculture and tourism. However, tourism and shellfish farming are of major importance for local economy. If tourism is mainly turned to the Sea coast, shellfishes grow within the lagoon and rely on water quality.
Previous studies have demonstrated the link between the coastal lagoon water quality and inputs of freshwater from the catchment. Thus, changes in rainfalls, runoff and water balance would not only affect water uses but also water quality.

Climate changes projections are presented following the implementation of 4 downscaled climatic models. Impacts on water balance are modelled with SWAT (Soil Water Assessment Tool) for 2041-2070 compared to the 1971-2000 reference period. The decrease of precipitations and water balance will impact discharges and thus decrease the freshwater inputs to the coastal lagoon.

A study of water uses conducted in interactions with stakeholders within the Thau area has permitted to assess both current and evolution of water uses. It has revealed local water resources are depleting while water demand is increasing and is planned to continue to increase in the really near future. To prevent water scarcity events, mainly due to the climate change context, the Regional authorities have connected the catchment to the Rhône river to import water.

The conclusion of this study is while expected impacts of climate changes on the Thau system were expected to be linked to water balance depletion in the catchment, the main threats are now linked to the impact on water quality of the introduction of the Rhône river waters within the system.

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