



Modeling the hydrodynamics of a wetland under strong anthropic pressures (Torbiere del Sebino, Italy)



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Issue and Study Site

Eutrophication and role of the internal banks layout, which changed over time.

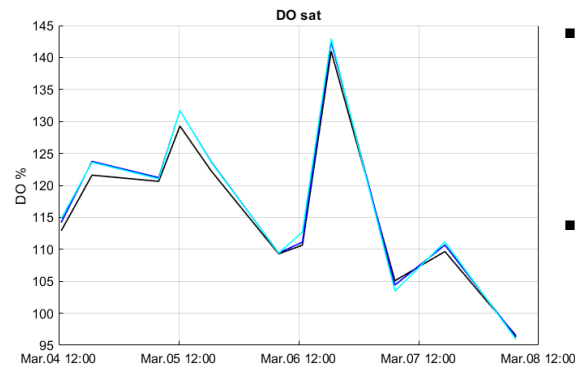


Was the choice of demolishing the banks positive or negative for the management and water quality of Torbiere?

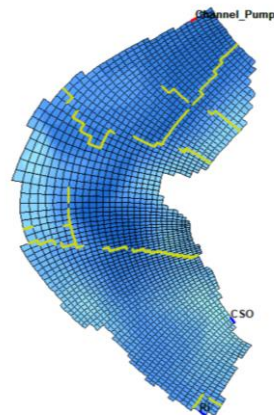
Methods

Monitoring of relevant physico-chemical variables:

- Installation of new instruments for monitoring of water level, temperature and conductivity in Torbiere.
- Monitoring the affluents (discharge, temperature, conductivity).



- Spot measures of Dissolved Oxygen, Turbidity, and Chlorophyll-a proxy
- Nutrient balance for affluents.

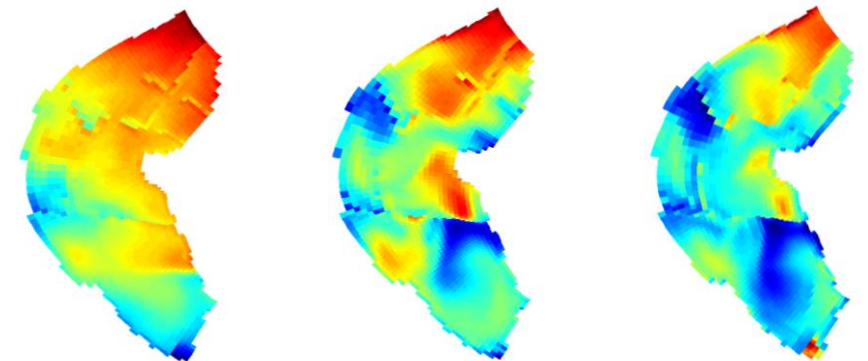


Modeling Torbiere:

- Application of a 3D hydrodynamic model: use of Delft-3D, an open source, finite difference package.
- Simulations of simplified scenarios to assess the role of 1) the wind, 2) the main affluent, 3) the banks.

Preliminary Results

- Wind blows sediments against the division banks, changing the bathymetry of the system and leading to spatial changes in temperature.
- Wind is the most important driving force for the inner circulation of Torbiere. It establishes a setup of up to 3 mm. Velocity profiles show a change of direction between surface and bottom layers.
- Oxygen shows a daily pattern with lows in the early morning and peaks in the late afternoon. This is attributed to the rate of photosynthesis of algae.



Future

- Comparison between the present situation and the one of 1980 by changing the layout of the banks.
- Construction of a drifter with GPS to measure flow velocities to calibrate and test the model.
- Modeling of possible remediation measures e.g. the restoration of the banks.