

# HYDRODYNAMIC MODELLING OF A DATA SCARCE WETLAND AREA IN THE LOWER PARANÁ DELTA



Knowledge about the hydrological regime of wetlands is the key to understand their physical and biological properties. In that light, a data scarce area of 2,500 km<sup>2</sup> consisting of wetlands in the Lower Paraná Delta (Argentina) is modelled with the quasi-2D CTSS8 model in order to capture the interaction between river discharge and moon tides and the resulting hydrodynamics (Figure 1).

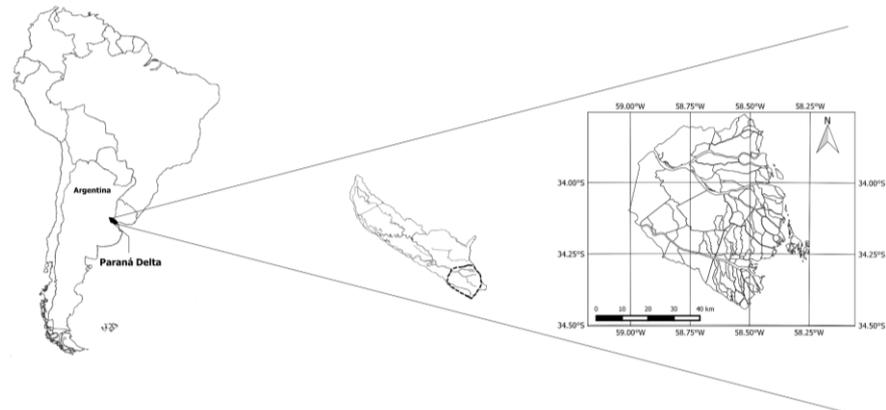


Figure 1. Location of the Parana Delta and the study area with respect to Parana Delta

The water flow equations are discretised with an interconnected irregular cell scheme, in which a simplification of the 1D Saint-Venant equations is used to define the water flow between cells. A new modelling strategy is developed to represent wetlands, the rivers are represented in a 1D river network. The model is calibrated for an average year and the model performance is evaluated for another average year plus an extreme dry three-month period and an extreme wet three-month period. The calibration and evaluation are done based on two water level measurement stations in the middle of the study area (Las Rosas and Carabelitas) and two upstream discharge measurement stations (Zarate and Brazo Largo), all located in the main rivers.

Accurate simulations are obtained for both calibration and evaluation with high correlations between observed and simulated water levels (Figure 2) and simulated discharges in the same order of magnitude as observed discharges. A sensitivity analysis for several wetland parameters show that these parameters are all influencing the water level fluctuation within the wetlands to varying degrees. The new modelling strategy has the potential to accurately simulate river and wetland dynamics for a large area. Measuring wetland water levels would enable a more extensive evaluation of the proposed modelling strategy.

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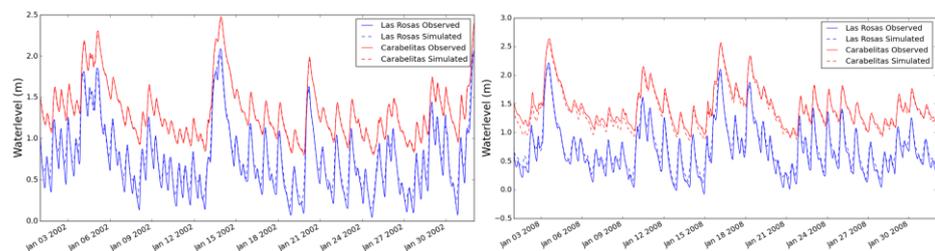


Figure 2. Simulated and observed water levels at two locations during one month in the calibration and evaluation periods