SUPPLEMENT A

CALIBRATION AND VALIDATION

The TELEMAC model has been extensively calibrated, validated, and applied to the Patos Lagoon (e.g., Fernandes et al., 2001; 2002; Marques et al., 2010a; 2010b; 2011). Calibration and validation exercises were carried out before this study to demonstrate the model ability to reproduce the observed environmental conditions with these particular meshes. Calibration and validation tests were carried out for both scenarios with the same initial and boundary conditions set-up. Tests were conducted with the main physical parameters and the best model reproduction was obtained during both simulation periods (from October to November 2006 for the old jetties configuration and from October to November 2010 for the new configuration). The model performance was evaluated by the comparison of modeled and measured data using the Root Mean Square Error (RMSE) and the Relative Mean Absolute Error (RMAE). The performance is classified as Excellent when values of RMAE are smaller than 0.2; Good, when values are between 0.2 and 0.4; Reasonable, when values are between 0.4 and 0.7; Poor, when values are between 0.7 and 1; and Bad, when values are greater than 1 (Walstra et al, 2001). The model calibration tests for both scenarios (Figure 1) resulted in model performances ranging from Good to Excellent for current velocity time series at the surface (old RMAE = 0.31 and new RMAE = 0,07) and bottom (old RMAE = 0.27 and new RMAE = 0.01) António et al. (2020, submitted).

The TELEMAC model validation was also carried out for both scenarios with the same initial and boundary conditions set-up for both simulations and considering the same set of physical parameters that generated the best model performance in the calibration tests (António et al. 2020, submitted). Salinity, sea surface elevation, and current velocity modeling results were compared with field data for the period between October and November 2006 for the old jetty configuration (Figure 2) and October to November 2010 for the new (Figure 3). The model validation tests for both scenarios resulted in model performances ranging from Good to Excellent (See Table 1).

Table 1: Relative Mean Absolute Error results in the hydrodynamic model validation.

PARAMETERS	**Position**	**Old Configuration**	**New Configuration**
		RMAE	**RMAE**
Velocity	Surface	0,17	-
	Bottom	0,18	-
Salinity	Surface	0,06	0,09
	Bottom	0,30	0,05
Sea Surface Elevation	E1	0,02	0,014
	E2	0,08	0,03
	E3	0,27	0,16

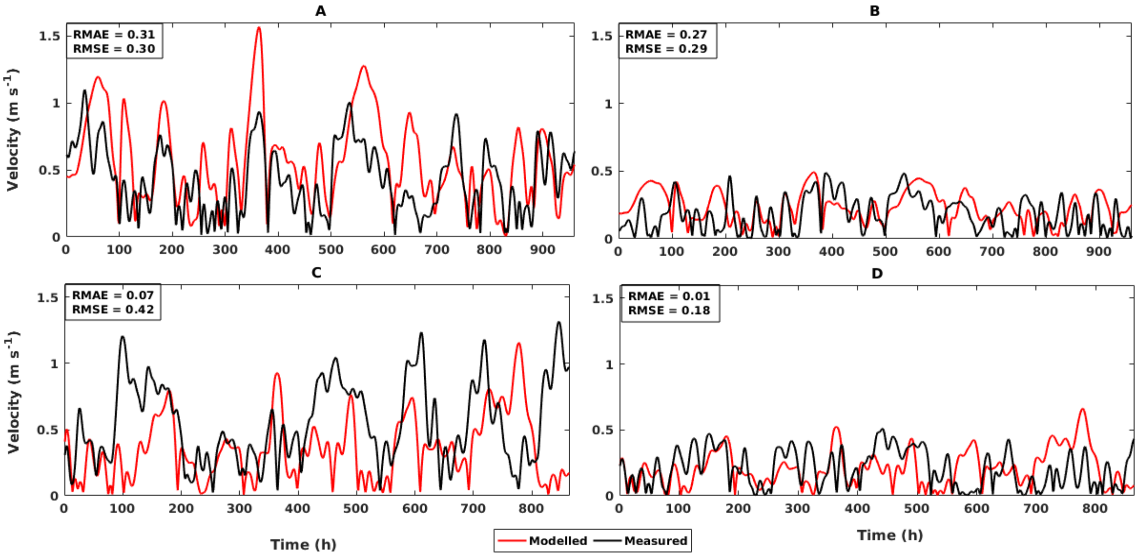

Figure 1: Calibration exercise - comparison between modeled (red line) and measured (black line) current velocity data at the surface (left panel) and bottom (right panel), in old (A and B) and new (C and D) jetty configurations.

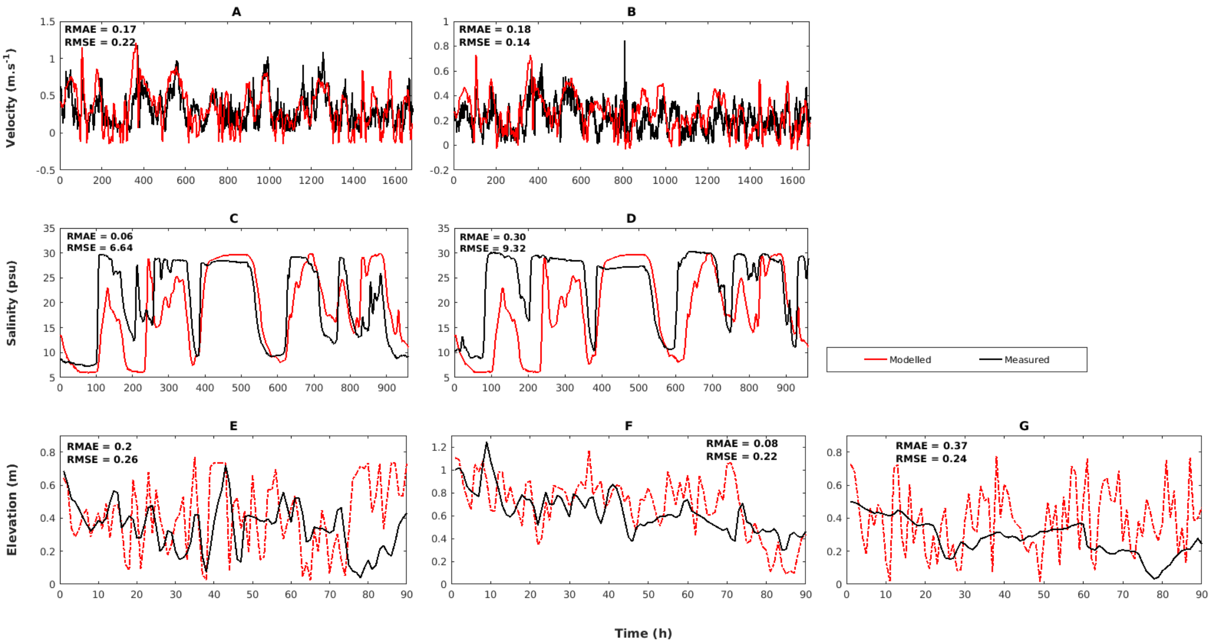

Figure 2: Validation results, comparison between modeled (red line) and measured (black line) current velocity, salinity, and elevation data for the old jetty configuration. Surface velocity (A) and salinity (C) and bottom velocity (B) and salinity (D). (E-G) Surface elevation data for points at E1 (São Lourenço), E2 (Arambare), and E3 (Ipanema).

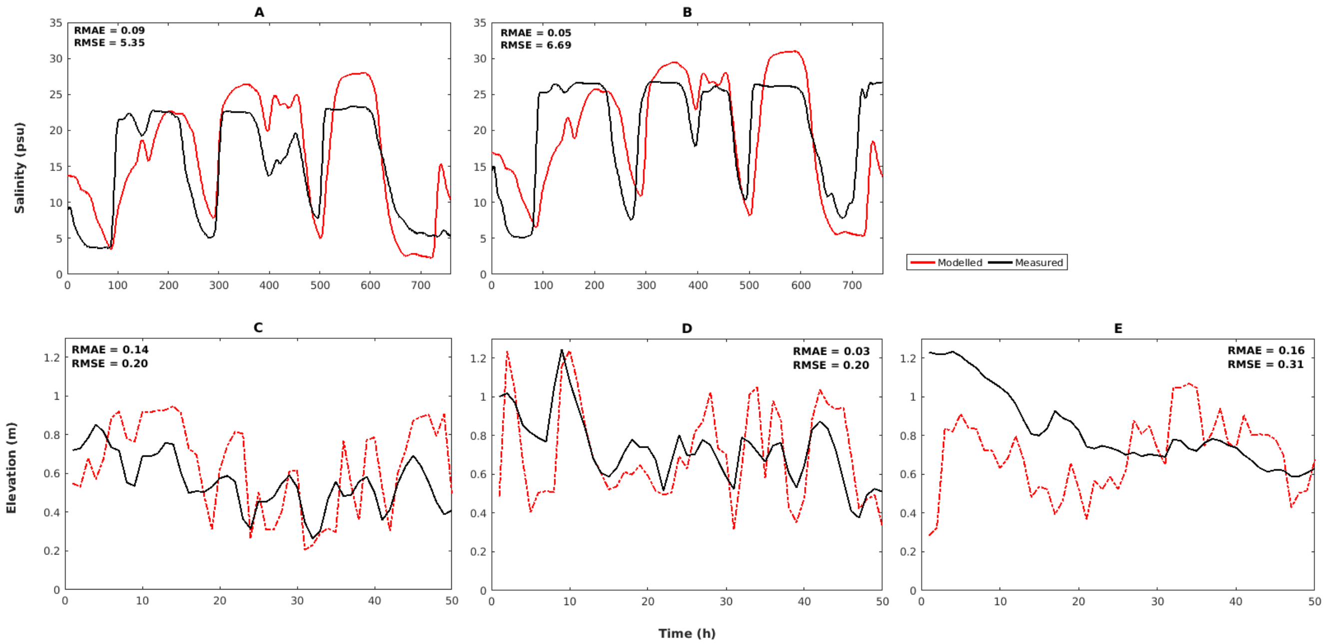

Figure 3: Validation results, comparison between modeled (red line) and measured (black line) salinity and elevation data for new jetty configuration. Surface (A) and bottom (B) salinity data. (C-E) Sea surface elevation data for points E1 (São Lourenço), E2 (Arambare), and E3 (Ipanema), respectively.

SUPPLEMENT B

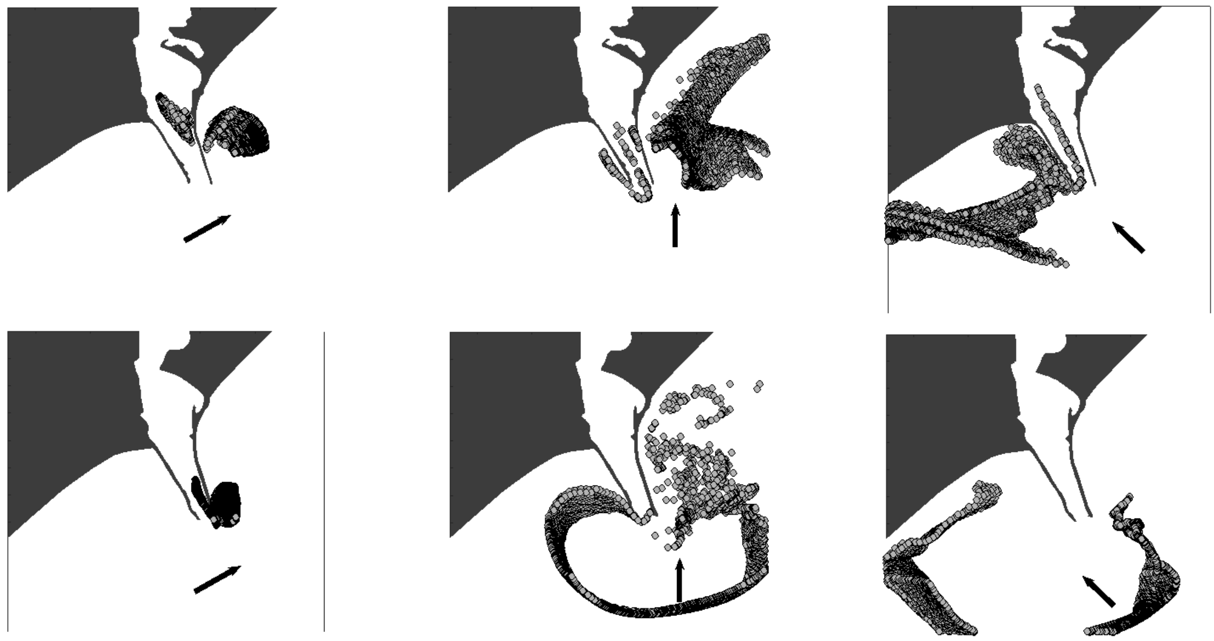

Figure 1: Spatial distribution pattern of larvae during lateral stratification at 1h (A and D), 7h(B and E), 10h (C and F). During the period of low water discharge, considering the SW (A and D), S (B and E), and SE (C and F) wind experiments. Results are presented for the old (top panel) and the new (bottom panel) jetty configurations. The black arrow indicated the wind direction.