Supplementary Materials

Table S1. Water levels root mean square errors (RMSE) in the Tagus estuary - comparison between data from 1972 and the model results. The unbiased RMSE (U-RMSE) are also presented. See Figure 6 for the location of the stations.

Station	RMSE (cm)	U-RMSE (cm)
Cascais	3.8	3.7
P. de Arcos	4.3	3.1
Trafaria	10.6	7.8
Lisboa	6.9	3.3
Pedrouços	5.0	3.4
Cacilhas	3.8	3.5
Seixal	5.5	5.0
Montijo	8.2	4.6
Cabo Ruivo	8.8	4.3
Alcochete	7.4	7.2
P. Sta. Iria	8.7	6.8
Ponta da Erva	7.3	6.9
V. F. de Xira	15.4	11.2

Table S2. Water levels root mean square errors (RMSE) in the Ria Formosa - comparison between data from 2017 and the model results. See Figure 11 for the location of the stations.

Station	RMSE (cm)		
	May/2017	Sep/2017	Oct/2017
Bruce	7.3	8.5	6.6
Cais Comercial Faro	6.7	5.6	5.9
BFO	5.8	7.6	8.2
Tavira	5.4	7.7	9.0
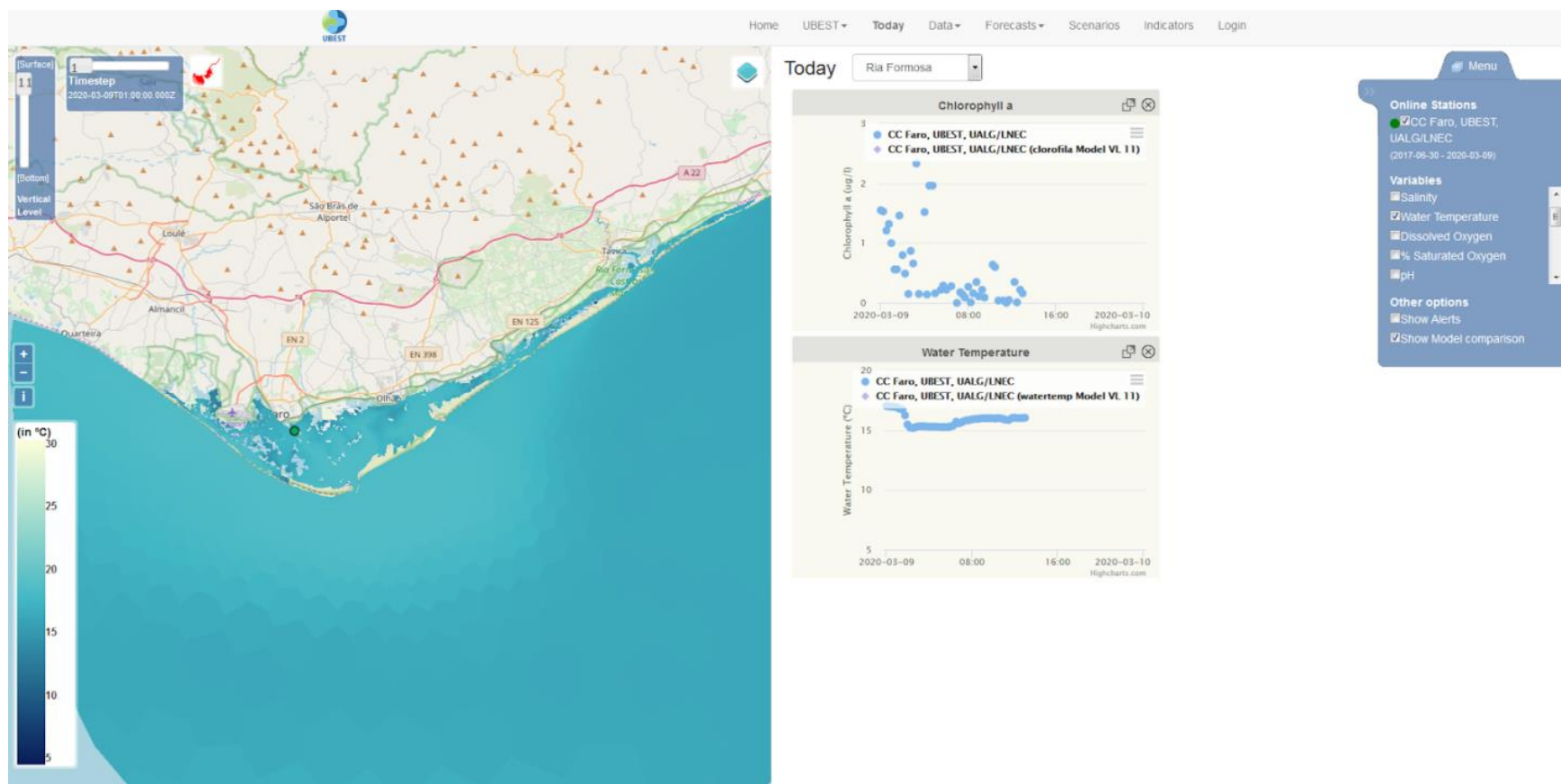
Figure S1. 'Today' dashboard for Ria Formosa: access to maps of model forecasts (e.g., water temperature) and to real-time field data (e.g., chlorophyll a and water temperature); the user can select the variables and features to be shown by navigating on the menu on the right.
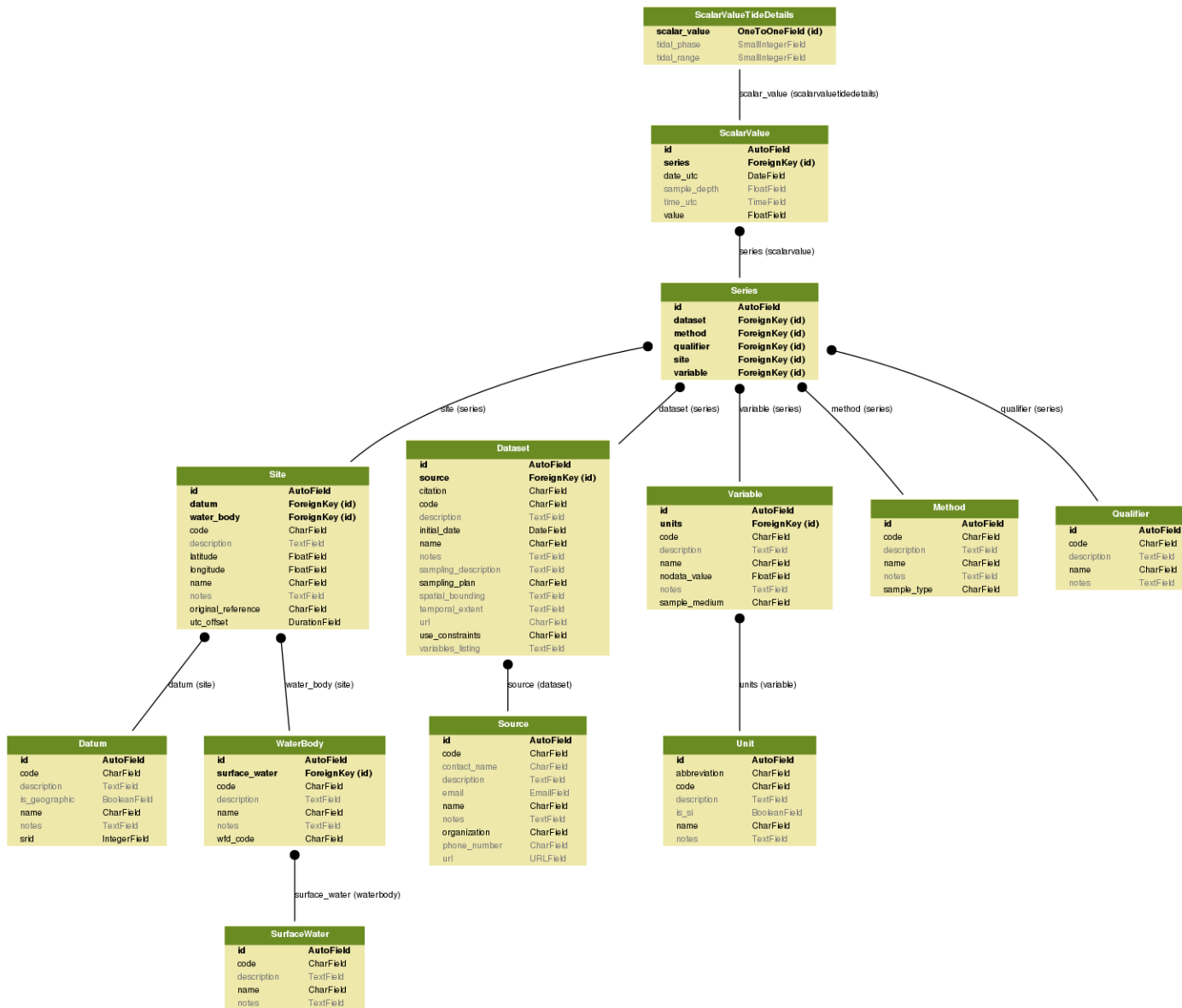
Figure S2. Data Model schema of the repository: detail of the entity-relation model diagram.
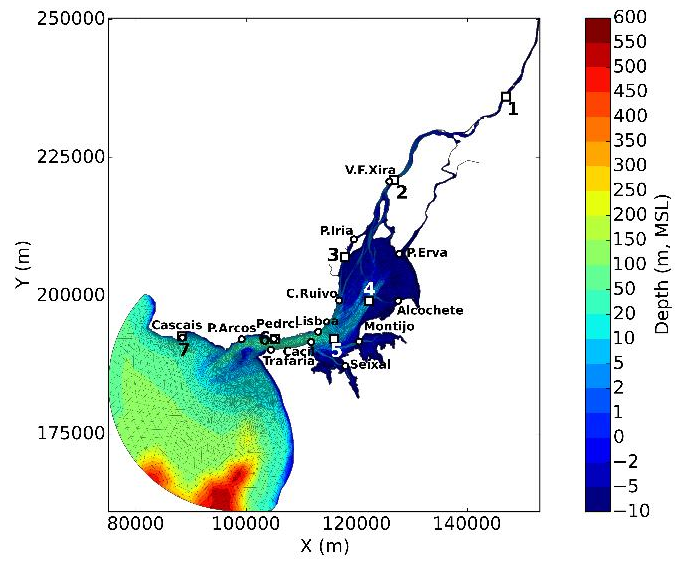
Figure S3. Tagus estuary: model domain and bathymetry rela-tive to mean sea level (MSL); location of the sampling stations (circles - water levels data; squares - water quality data).
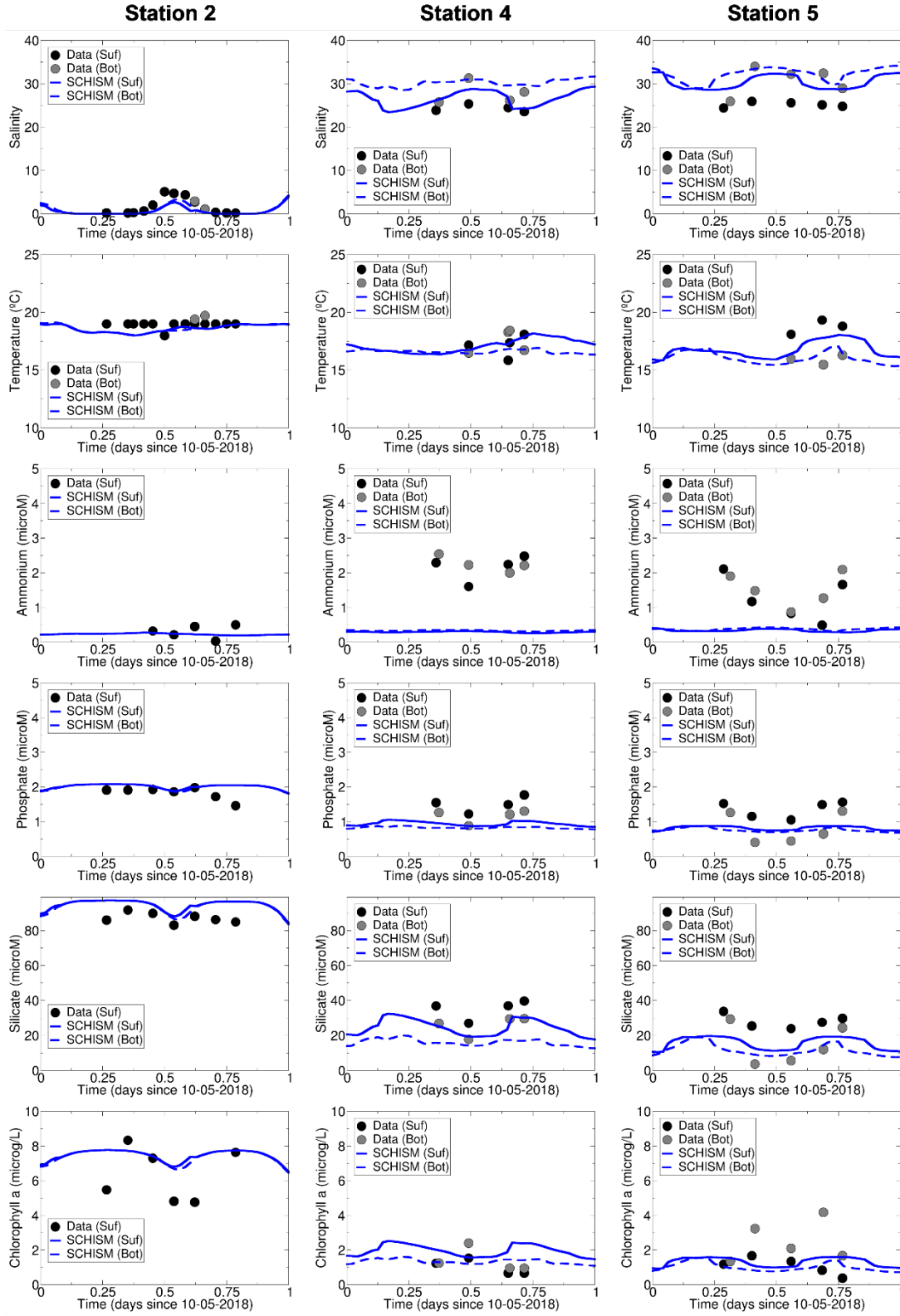
Figure S4. Spatial variation: observed and simulated salinity, water temperature, ammonium, phosphate, silicate and chlorophyll a in the Tagus estuary during the May 2018 field campaign at stations 2, 4 and 5 (Suf – surface, Bot – bottom).
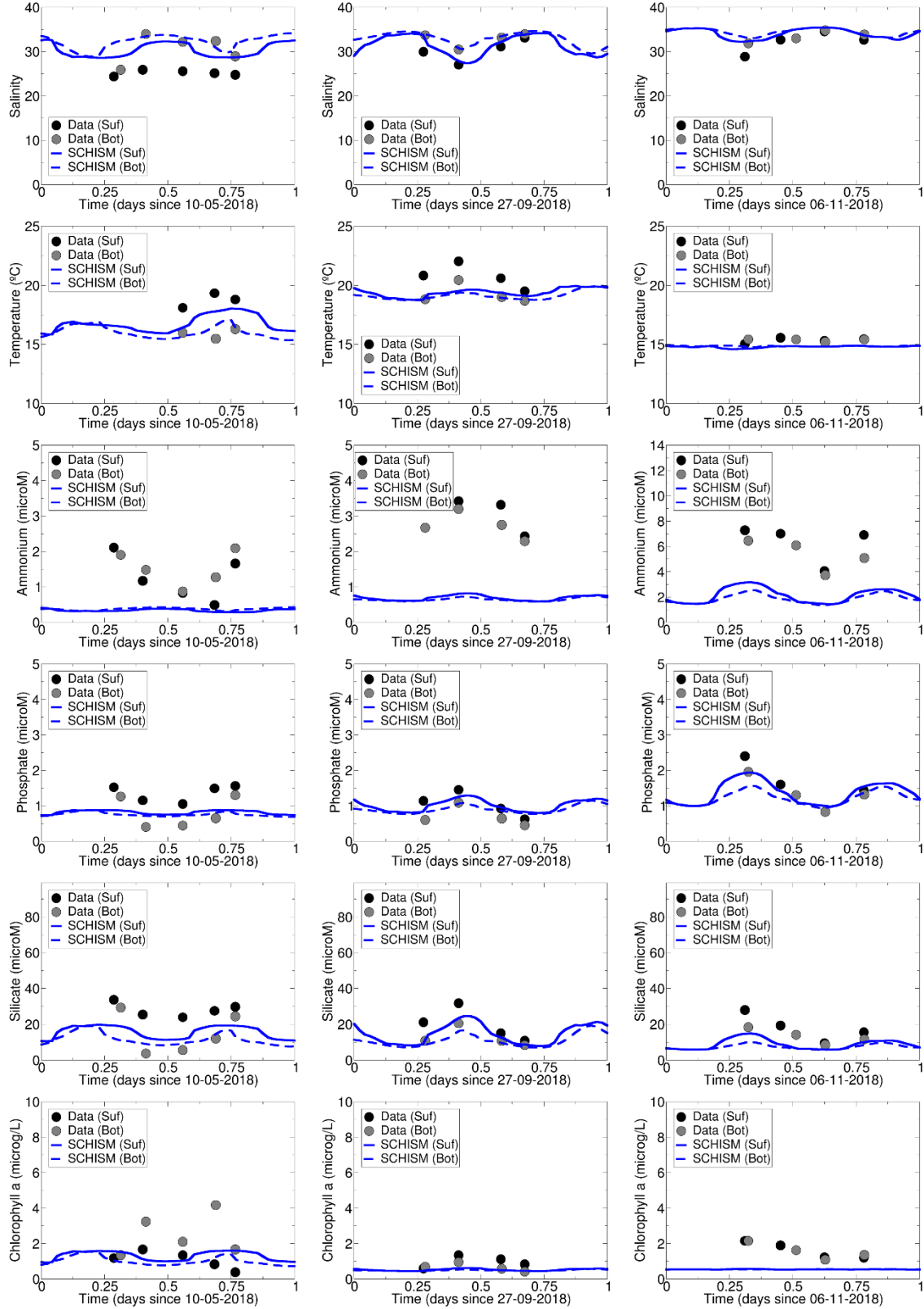
Figure S5. Seasonal variation: observed and simulated salinity, water temperature, ammonium, phosphate, silicate and chlorophyll a in the Tagus estuary during the May, September and November 2018 field campaigns at station 5 (Suf – surface, Bot – bottom).
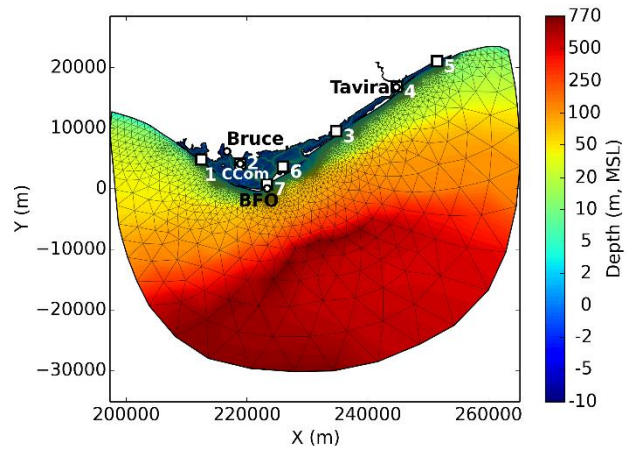
Figure S6. Ria Formosa: model domain and bathymetry rela-tive to mean sea level (MSL); location of the sampling stations (circles - water levels data; squares - water quality data).
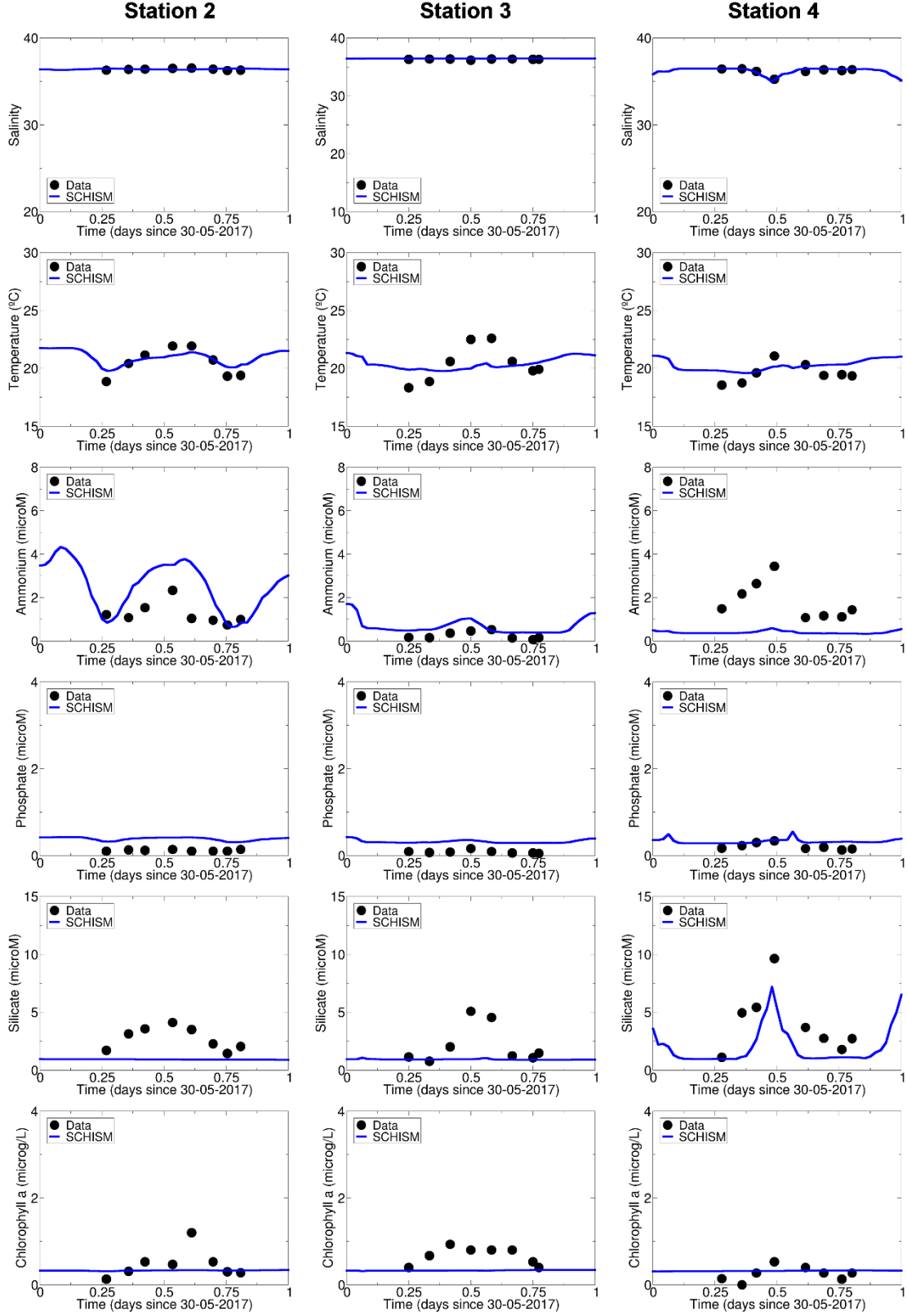
Figure S7. Spatial variation: observed and simulated salinity, water temperature, ammonium, phosphate, silicate and chlorophyll a in the Ria Formosa during the October 2017 field campaign at stations 2, 3 and 4.
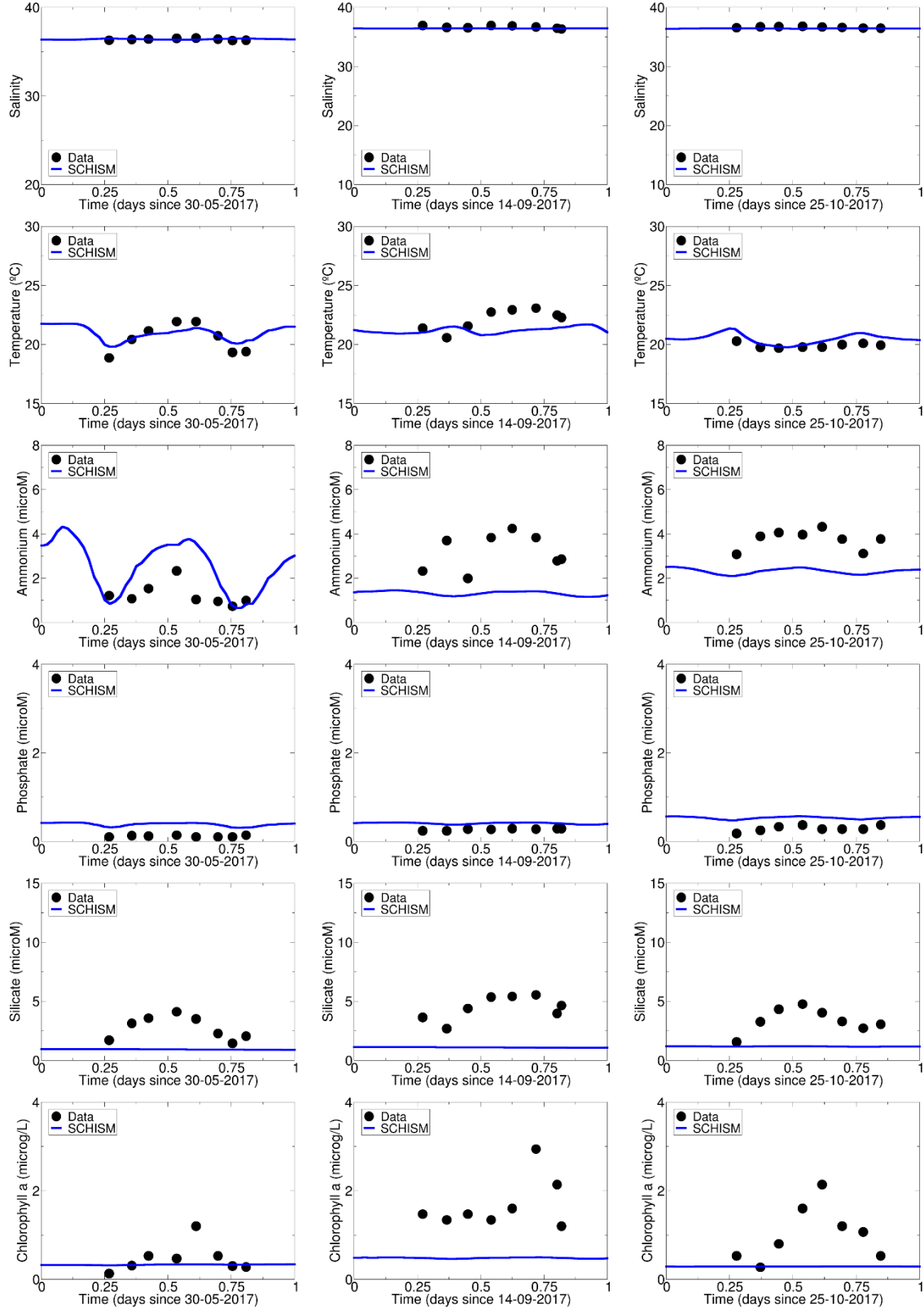
Figure S8. Seasonal variation: observed and simulated salinity, water temperature, ammonium, phosphate, silicate and chlorophyll a in the Ria Formosa during the May, September and October 2017 field campaigns at station 2.