Supplementary Materials
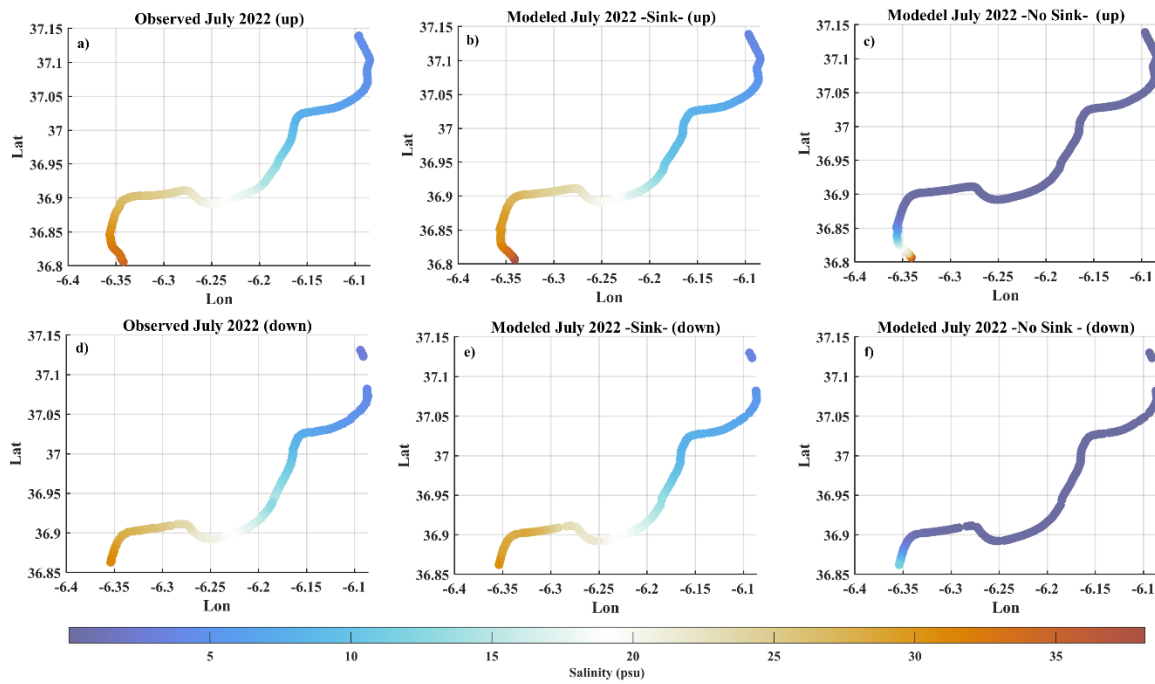
Figure SM1: Salinity concentration maps (psu) of the Guadalquivir River Estuary from the oceanographic campaigns of 19/07/2022 (a, b, c) and 20/07/2022-21/07/2022 (d, e, f). Observations data are shown in a and d. Simulation including water volume reductions are presented in b and e. Figures c and f correspond to model simulation avoiding sinks.
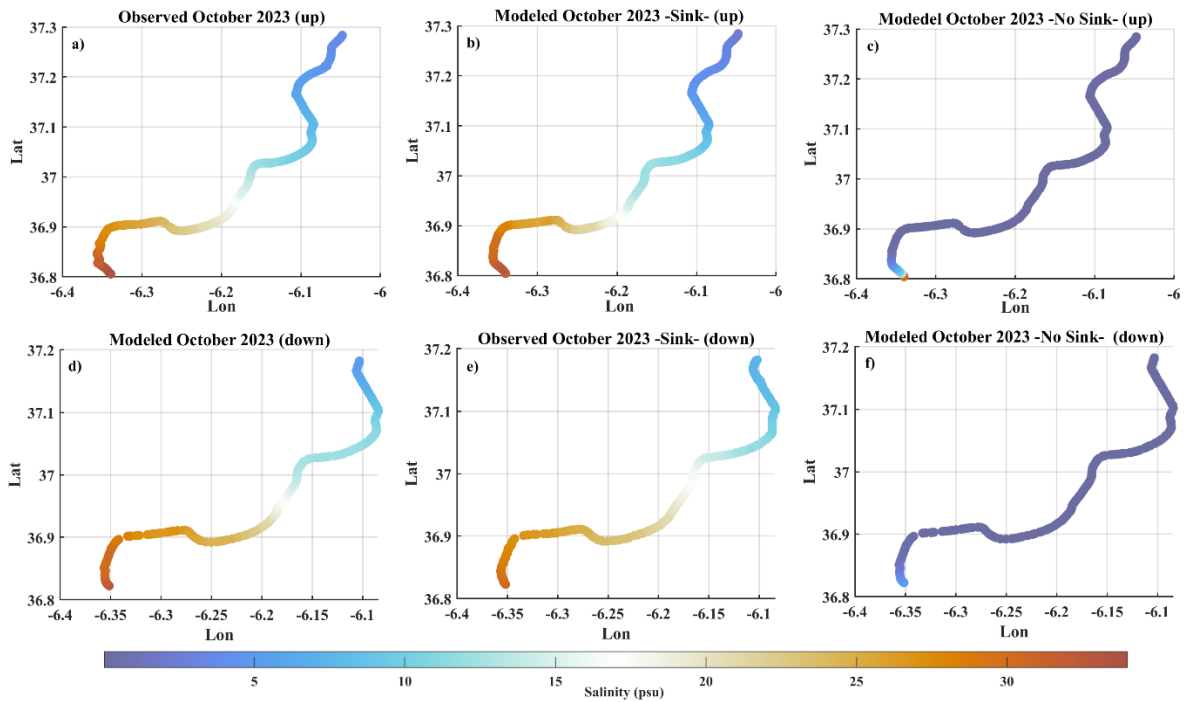
Figure SM2: Salinity concentration maps (psu) of the Guadalquivir River Estuary from the oceanographic campaigns of 17/10/2023 (a, b, c) and 18/10/2023 (d, e, f). Observations data are shown

in a and d. Simulation including water volume reductions are presented in b and e. Figures c and f correspond to model simulation avoiding sinks.
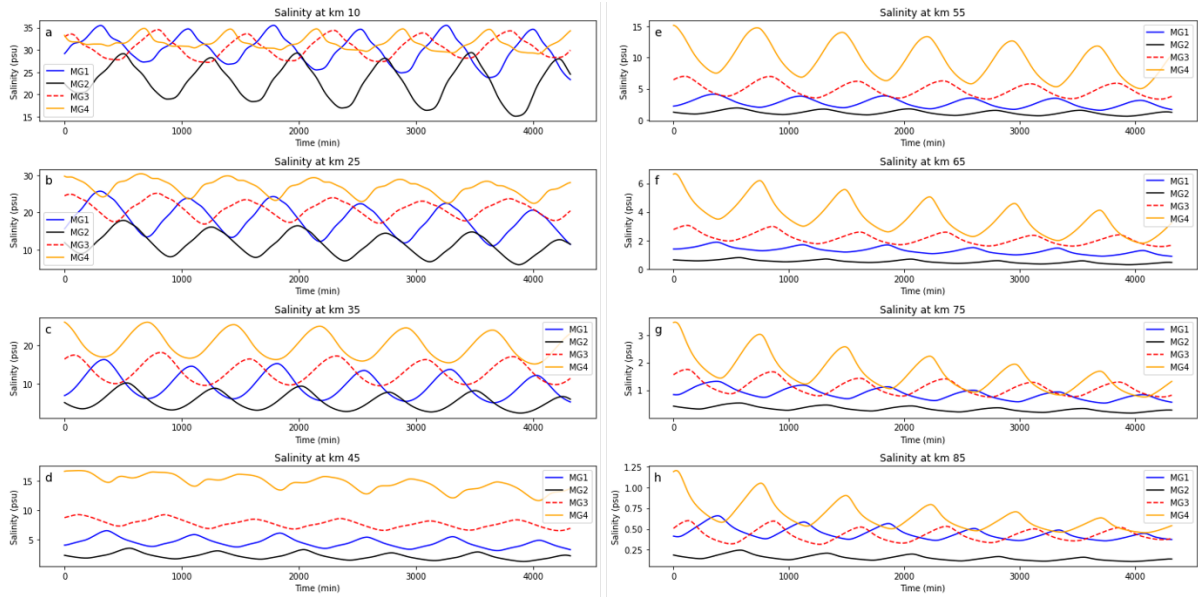
Figure SM3: Salinity simulation temporal variability along the Guadalquivir River Estuary at km 10 (a), km 25(b), km 35 (c), km 45 (d), km 55 (e), km 65 (f), km 75 (g), km 85 (h) for MG1, MG2, MG3 and MG4 oceanographic campaigns.
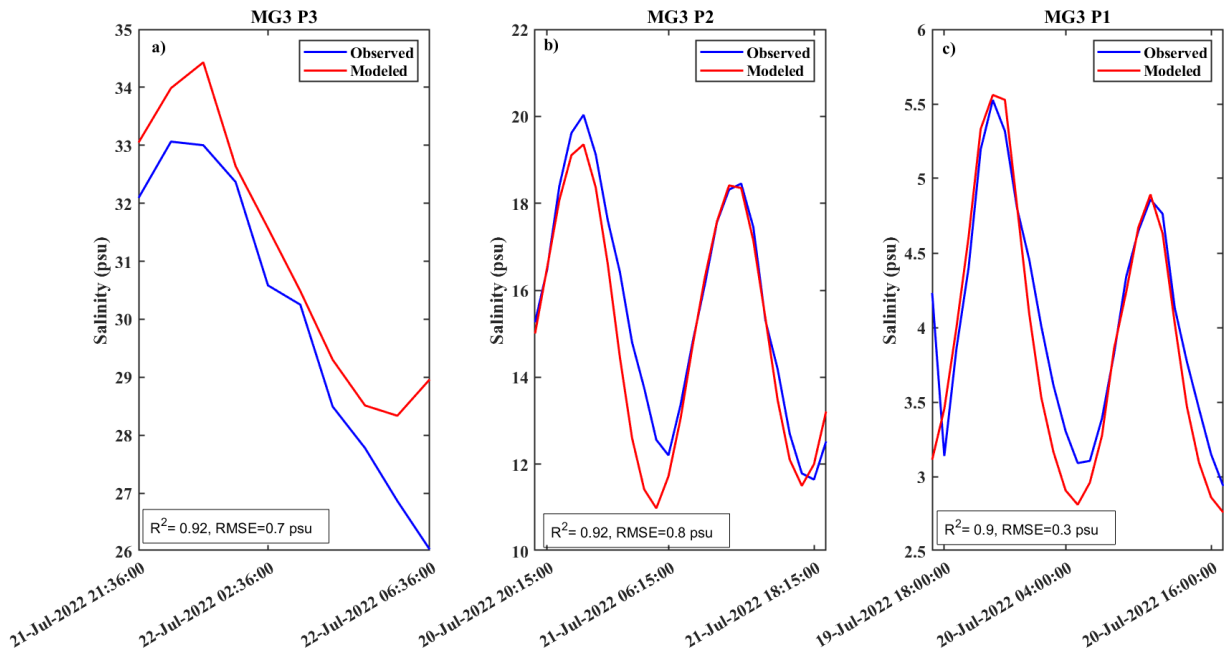
Figure SM4: Temporal variability of salinity (psu) collected at different sample points during 5 days of MG3 campaign.
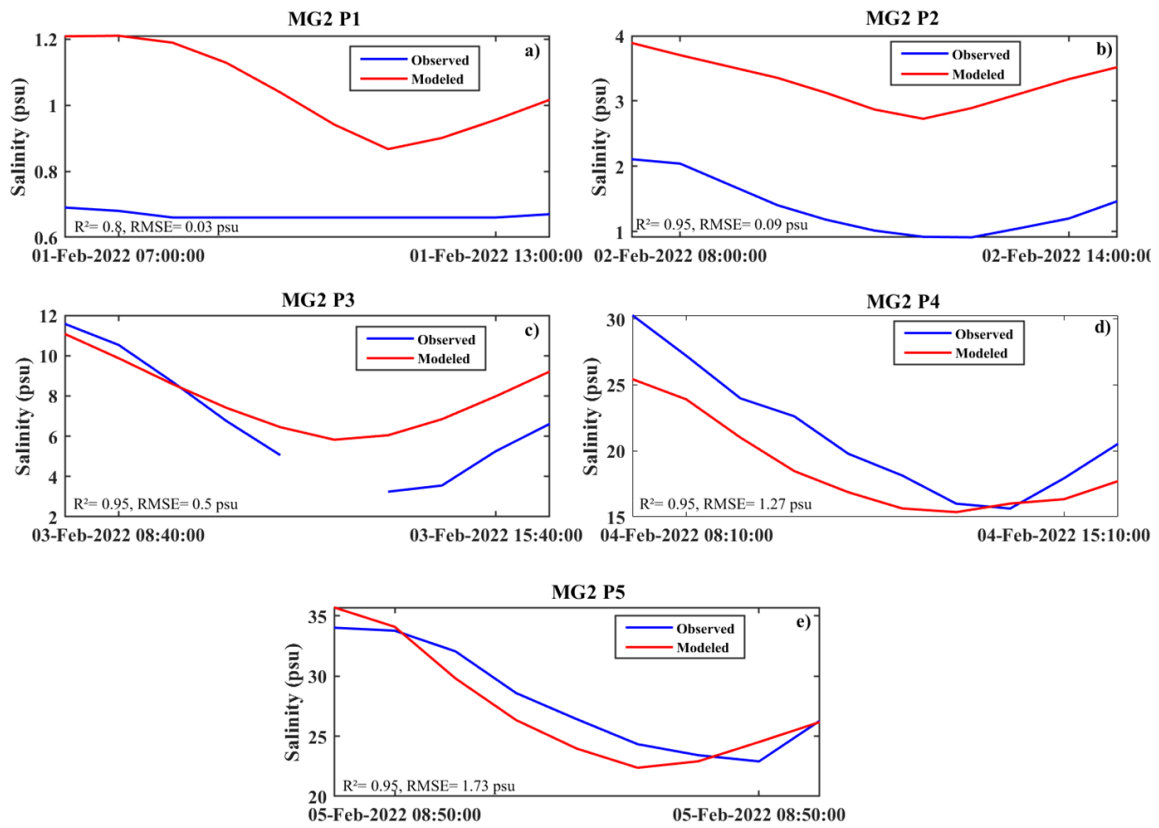
Figure SM5: Temporal variability of salinity (psu) collected at different sample points during 5 days of MG2 campaign.
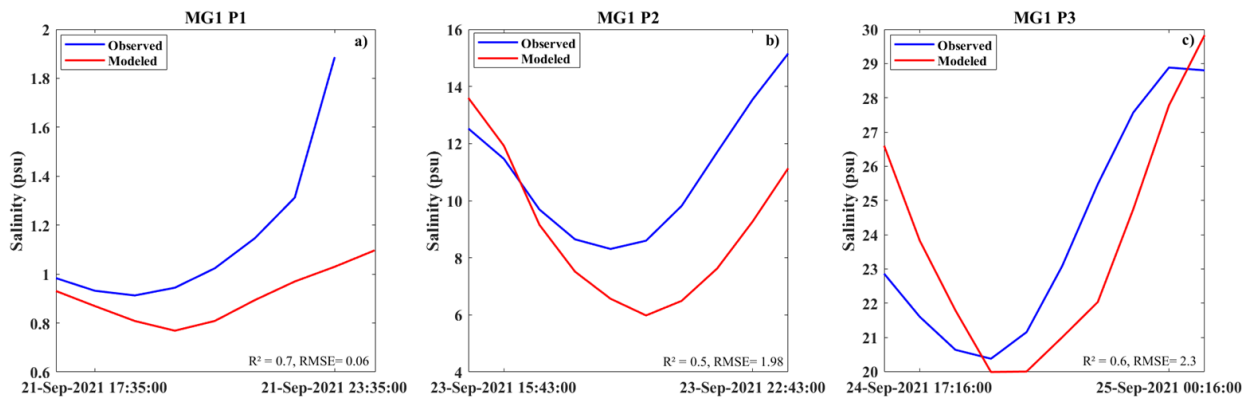
Figure SM6: Temporal variability of salinity (psu) collected at different sample points during 5 days of MG1 campaign.