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*Supplement of*

# Exploring water accumulation dynamics in the Pearl River estuary from a Lagrangian perspective

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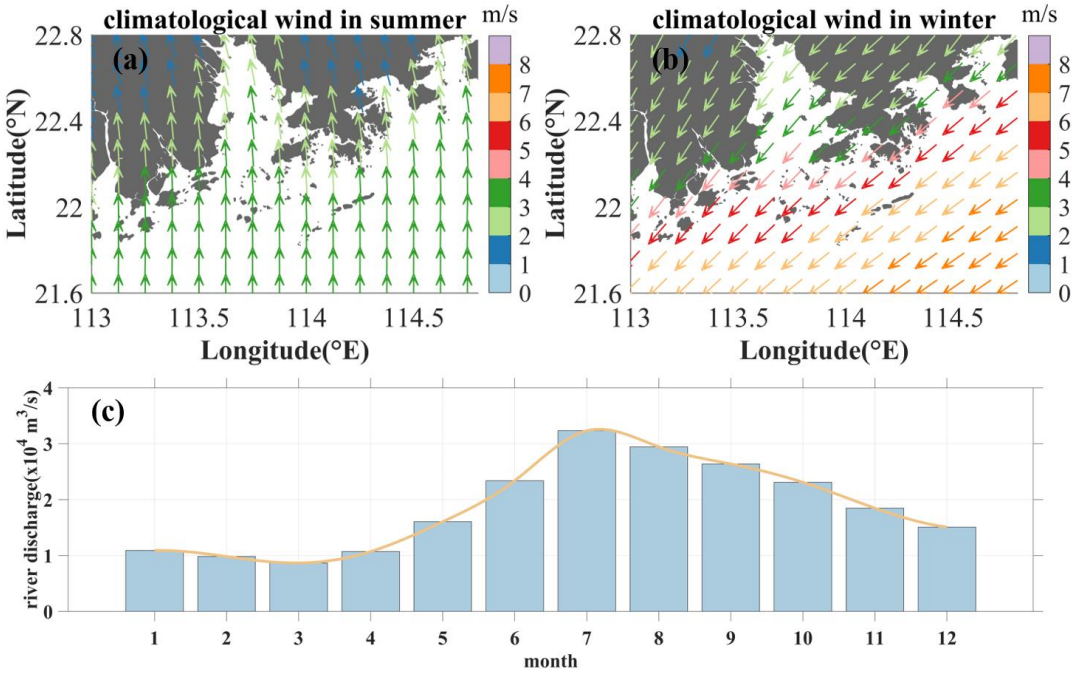


**Figure S1. (a-b) The seasonal mean wind speed (m/s) during summer (June–August) and winter (December–February), respectively. (c) The monthly river discharge in the PRE.**

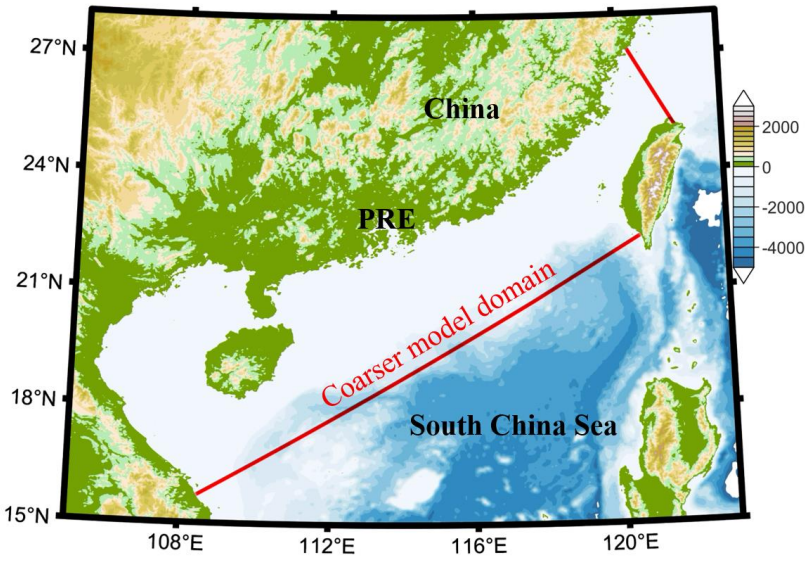


**Figure S2. The domain of coarser model.**

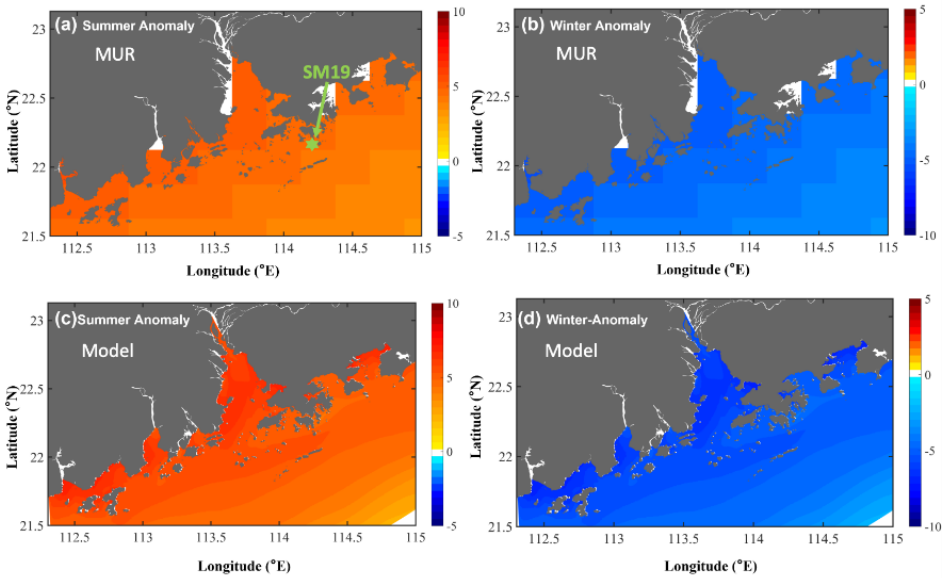


**Figure S3. (a-b) Climatological Sea Surface Temperature (SST) anomaly during summer and winter from Multiple-scale Ultra-high Resolution (MUR) SST reanalysis product from the Jet Propulsion Laboratory (JPL) of NASA (2002-2021). (c-d) are the same as (a-b) but for the model results.**

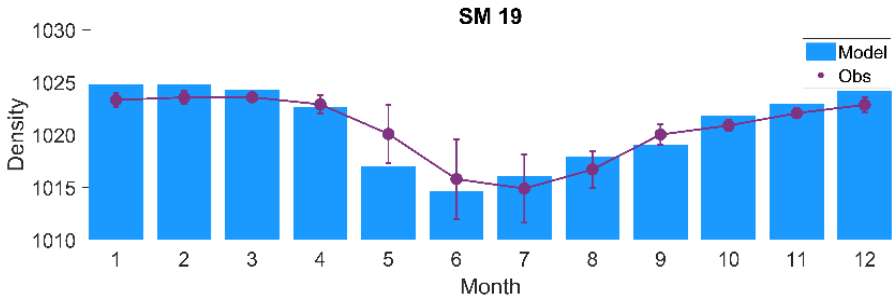


**Figure S4. Time series of the surface simulated and observed potential water densities at the SM19 station near Hong Kong (https://cd.epic.epd.gov.hk/EPICRIVER/marine/?lang=zh_cn). The observed data at SM 19 from 2000-2019 was used to obtain the climatological monthly mean density, and the error bar indicates the density of STDs for each month in 20 years. The location of SM19 is shown in Figure S2a.**

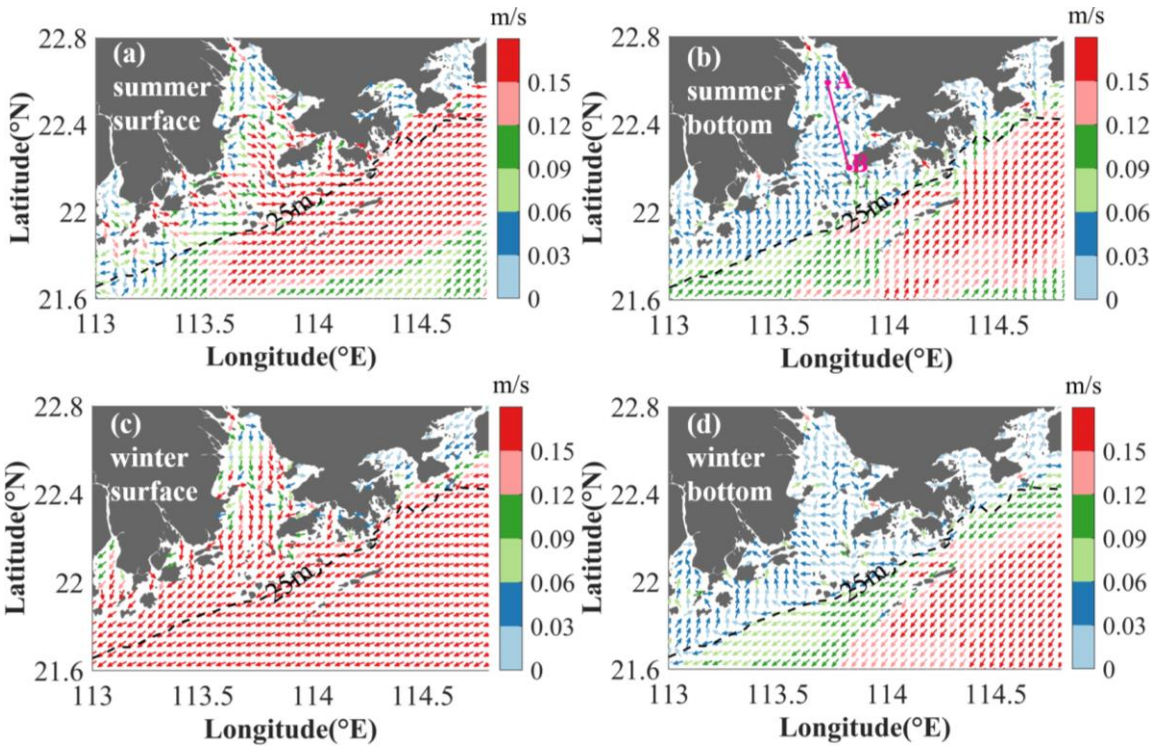


**Figure S5. (a–b) The flow field of the standard case at the surface layer and bottom layer during summertime, respectively. (c-d) are the same as (a-b), but for winter time.**

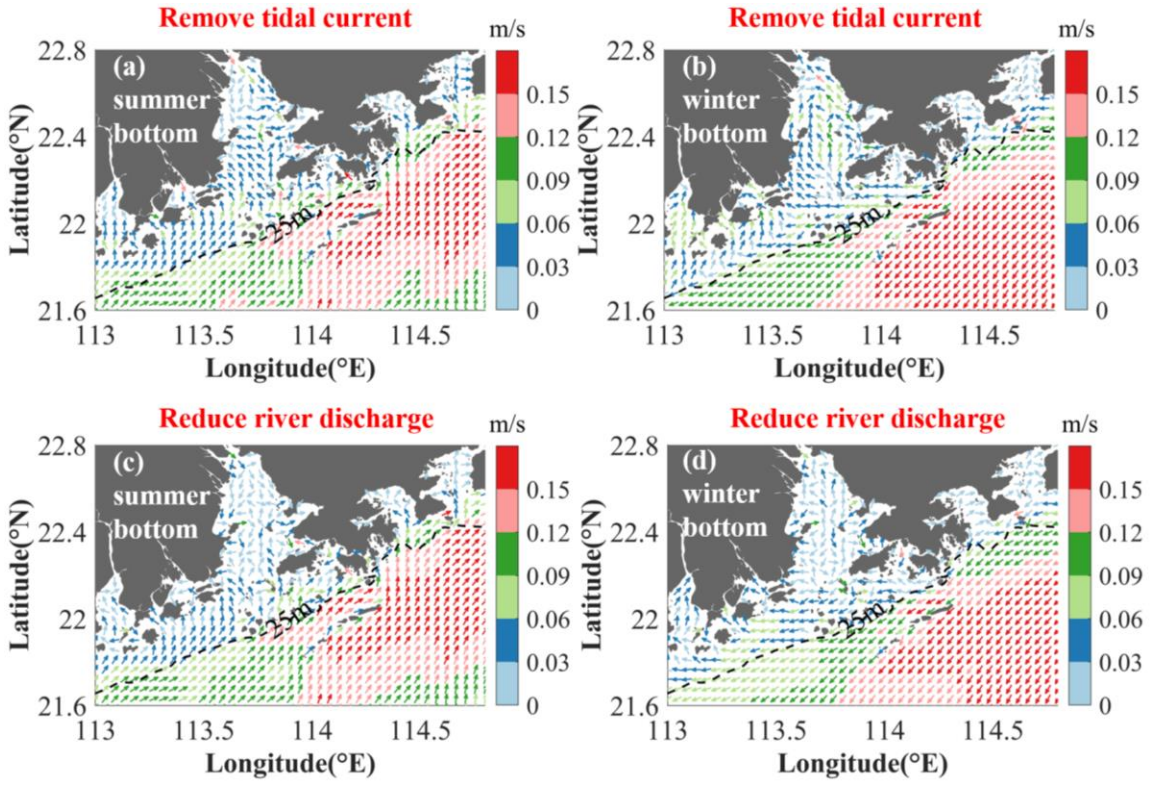


**Figure S6. (a-b) The flow field of removed tidal currents at the bottom layer in summer and winter, respectively. The flow field of reduced river discharges at the bottom layer in summer (c) and winter (d). The color bar represents the magnitude of velocity.**