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Mechanism of salt flux transport in a tidal dynamic delta

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The annual mean combined river discharge from the Ganges-Brahmaputra-Meghna (GBM) riverine system is 100,000 – 140,000 m^3/s (EGIS 2000), draining to Bay of Bengal, covering 83% of total area of Bangladesh, and making Bangladesh delta more vulnerable to both the freshwater and the mixing with sea water. This estuarine environment varies spatially and temporally, over all multiple time scales, due to its funnel-shaped vast river networks, strong tides, and saltwater intrusion. Recent studies reported a drastic salinity increasing at the end of the dry season in the past 20 years (Murshed et al., 2019). Significant salinity intrusion appears from the Sundarbans (over 20ppt in 2015), and then extends inland, which makes salinity a key factor for changing land use and demographic migration.

We examine volume and salt flux transports at multi-river channels where the GBM drains to the Bay of Bengal, using our unstructured-grid Bangladesh-FVCOM model (Bricheno et al., 2016). This realistic simulation of the whole delta has been shown to reproduce the present-day river flow circulation, tidal dynamics, and salinity stratification.

We then summarise results from the detailed hydrodynamic numerical model into a simplified flow budget, to summarise the climate impacts on salt-intrusion in the delta. In this way, we can investigate the mechanism of salt flux transports in Bangladesh delta, and improve our understanding of the controlling processes driving salinity intrusion in this region.