



The Bay of Bengal : an ideal laboratory for studying salinity

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The Bay of Bengal combines several unique features that make it an excellent laboratory to study the variability of salinity and its potential effects on the oceanic circulation and climate. This basin receives very large quantities of freshwater in association to the southwest monsoon, either directly from rain or indirectly through the runoffs of the Ganges-Brahmaputra and Irrawaddy. This large quantity of freshwater in a small, semi enclosed basin results in some of the lowest sea surface salinities (SSS) and strongest near-surface haline stratification in the tropical band. The strong monsoon winds also drive an energetic circulation, which exports the excess water received during the monsoon and results in strong horizontal salinity gradients.

In this talk, I will summarize several studies of the Bay of Bengal salinity variability and its impacts undertaken in the context of an Indo-French collaboration. In situ data collected along the coast by fishermen and model results show that the intense, coastally-trapped East India Coastal Current (EICC) transports the very fresh water near the Ganges-Brahmaputra river mouth along the eastern Bay of Bengal rim to create a narrow, very fresh “river in the sea” after the southwest monsoon. The salinity-induced pressure gradient contributes to almost 50% of the EICC intensity and sustains mesoscale eddy generation through its effect on horizontal current shears and baroclinic gradients. Oceanic eddies play a strong role in exporting this fresh water from the coast to the basin interior. This “river in the sea” has a strong interannual variability related to the EICC remote modulation by the Indian Ocean Dipole (a regional climate mode). I will also discuss the potential effect of haline stratification on the regional climate through its influence on the upper ocean budget. Finally, I will briefly discuss the performance of remote-sensing for observing SSS in the Bay of Bengal.