

Ganges-Brahmaputra river discharge, 1993-2008, and its impact on Bay of Bengal salinity

F. DURAND¹, F. PAPA², A. RAHMAN², S. K. BALA³ and W. B. ROSSOW²

¹*IRD, Noumea, New Caledonia*

²*NOAA-CREST, New York, USA*

³*Bangladesh University of Engineering and Technology, Dhaka, Bangladesh*

The Ganges-Brahmaputra flows into the Northern Indian Ocean and is suspected to account for twenty five percent of the total amount of freshwater received by the Bay of Bengal. However, despite recent efforts, Ganges-Brahmaputra discharge estimates and their variations are still scarce and not always available to the scientific community. Using more than a decade of daily in situ river discharge data for both rivers determined at the points where they enter Bangladesh along with satellite altimetry-derived river heights, the present study aims at producing a monthly altimetry-derived Ganges-Brahmaputra river discharge dataset over 1993-2008 for community use. We first establish rating curves between altimetry-derived water levels and in situ river discharges. The comparison of in situ and satellite-derived discharge estimates shows that Topex-Poseidon, ERS-2 and ENVISAT data can successfully be used to infer Ganges and Brahmaputra's discharge. The methodologies are evaluated in various ways and resulting errors are estimated. Ganges, Brahmaputra and their aggregated monthly discharges for 1993-2008 are then presented. In a second part, we assess the impact of Ganges-Brahmaputra discharges variability on Bay of Bengal salinity. To do so, we make use of an ocean general circulation model forced by Ganges-Brahmaputra discharges timeserie. The impact of interannual variability of Ganges-Brahmaputra discharge is strong in the northern part of the Bay (North of 15°N), with excess runoff forcing fresh surface salinity anomalies, and vice versa.

Keywords: Discharge; Bay of Bengal; Ganges; Brahmaputra; Satellite Altimetry; salinity.