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Simulating tropical river plumes, a set of parametrisations based on macroscale data. Comparison with observations in the Mekong delta region of freshwater influence

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Continental shelves provide about 1.2 sverdrups of freshwater runoff into the global ocean, a major amount of this freshwater being rejected in a latitude stripe included between 20°S and 20°N. Although small compared to ocean currents, this flow can influence ocean dynamics in coastal regions because of the input of low-density water it provides. This is especially true for the world's biggest rivers and this contribution must be included in an appropriate way in Global Circulation Models (GCM) especially when the aim is to model climate variations over long periods. The purpose of this study is to identify the main processes impacting the fate of tropical freshwater runoff onto the shelf for a later inclusion into a global circulation model. Therefore, this study is conducted using only data accessible to global oceanographers. Factors influencing the river plume in a general case are listed, and are included in a coastal ocean configuration of the Princeton Ocean Model. This is achieved either explicitly as for wind forcing, or using parametrisations corresponding to the length and time scales of river plumes physics, as for tides or estuaries. An application case is performed on the region of freshwater influence of the Mekong river (South China Sea). Results exhibit a strong seasonal variability related to the Monsoon wind and river flow regimes of the region. A validation with in-situ measurements made during a campaign carried out in 1997 show a good agreement. Vertical salinity profiles extracted from the model configuration correspond to CTD profiles behaviour established during the campaign. This model configuration also provides a good estimate of sea surface salinity in the

vicinity of the coast of the Mekong Delta.