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Interactive comment on "The postmonsoon carbon biogeochemistry of estuaries under different levels of anthropogenic impacts" *by* Manab Kumar Dutta et al.

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In the present study, large spatial extent has been covered which includes Hooghly River and other rivers of Indian part of Sundarban. My comments regarding the present study are as follows: 1. From the sampling strategy (line no. 150 to 153), it is apparent that only one-time discrete sampling has been done in all the sites in duplicate, whereas from the third objective of the study it is clear that the authors had the aim to quantify and characterise the air-water CO2 flux for the post-monsoon season. The authors concluded "During post monsoon, the entire Hooghly-Sundarbans system acted as a source of CO2 to the regional atmosphere." How can it be concluded (even quali-

tatively) from such discrete data without performing at least one complete diurnal sampling at each site within post-monsoon season, while four months (October, November, December and January) are generally considered as post monsoon season in this region? 2. The study area and sampling locations are quite similar with the recent work of Akhand et al. (2016). Moreover, the third objective and one of the conclusions of the present study is also very similar to the Akhand et al. (2016). For example, the authors stated, "The entire Hooghly-Sundarbans system acted as source of CO2 to the regional atmosphere with $\sim$17 times higher emission from the Hooghly compared to Sundarbans", whereas one of the key findings of Akhand et al. (2016) is "River-dominated Hugli Estuary emits 14 times more CO2 than the marine-dominated Matla Estuary". Surprisingly, despite of such degree of similarity between two studies, there is no comparison of data with Akhand et al. (2016) and not even mentioning of Akhand et al. (2016) in the present work. 3. Reviewer 2 already mentioned that line no. 455 to 460 are self-contradictory. I want to add that I agree with the authors statement that in the estuarine water of Sundarban, an important source of CO2 is mangrove sediment pore-water exchange during tidal pumping. This fact is also well established from the diurnal dataset of Akhand et al. (2013) and Akhand et al. (2016) in Sundarban. But, it is not clear to me, how this phenomenon can prove the exogenous origin of CO2? Moreover, except Hooghly and its distributary Muriganga, all other rivers (Saptamukhi, Thakuran, Matla, Gosaba and Bidya) in the Indian part of Sundarban have lost their original connections with the Ganga because of siltation and their estuarine character is now maintained by the monsoonal runoff only (Cole and Vaidyaraman, 1966). So, the central part of Sundarban (which comprises a major part of Indian Sundarban) experiences lack of freshwater (Chakrabarti1998; Mitra et al. 2009). Hence, the source of the exogenous nature of CO2 input in the Indian part of Sundarban needs more clarifications. 4. In line no. 479 to 481 authors stated "FCO2 measured for the estuaries of Sundarbans was markedly higher than global mean FCO2 ($\sim$63 μ mol m-2 d-1) observed in mangrove creek and other similar estuaries (Call et al., 2015)". Reviewer 2 already correctly identified that the value should be $\sim$63 m mol m-2d-1. It might be

a typo by the authors, but it may convey wrong message to the global audience about Sundarban's mangrove surrounding water. Because, one of the key findings of Akhand et al. (2016) is that the fCO2 (water) value of the Matla, a mangrove dominated estuary of Sundarban, is at the lower end of the reported data from other mangrove ecosystems of the world. Biswas et al. (2004) also found that the Sundarban's mangrove dominated water is acting as a sink for atmospheric CO2 for all the four post monsoon months, while sampling in the three river-mouths. Also see Rosentreter et al. (2018), where they estimated world average flux of ∼57.5 mmol m-2 d-1 of CO2 from the mangrove surrounding water, and also commented that the CO2 efflux from the estuarine water of Sundarban is much lower side than the world average even sinks for atmospheric CO2 in some cases.

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