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Interactive comment on "Effects of flooding on organic carbon consumption in the East China Sea" *by* C.-C. Chen et al.

Anonymous Referee #3

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This paper studies the influence of fluvial discharge on organic carbon consumption, which is an interesting and important objective, especially in the light of the predicted increase in flooding episodes with climate change. However, I have some important concerns about whether the data and approach in this paper allows meeting this objective.

Methods report that CR was measured with duplicated samples taken from several depths. From both a practical (loosing one sample means having no replicated measurements) and a statistical point of view, two replicates are far too little to measure plankton CR rates. This is a critical variable for this paper, and precision should be at least clearly indicated. (e.g., the slope of the PP:CR relationship derives from three low CR data whose precision is unknown).

Methods should state the volume of samples and sampling depths, as well as time of sampling and temperature gradients during incubations.

The data set includes inorganic nutrients and chlorophyll a concentrations, heterotrophic bacterial abundance, 14C primary production and O2 community respiration, which might be adequate for a purely descriptive accoount of differences in metabolic balances between flooding and non-flooding situations in the ECS. However, this dataset is insufficient to support the discussion in the paper, based on deriving explanatory hypotheses from regressions. The fact that all these variables change after the flood does not imply causative relations, especially when key controlling factors like inputs of organic matter are excluded from the analyses (see also comment about regional differences below). This leads to some unsustained and contradictory conclusions. E.g., the relationship between Chla and heterotrophic bacterial abundance leads to suggesting that bacterial growth is mainly supported by organic carbon produced locally by the phytoplankton (p. 5619), however neither bacterial growth (only heterotrophic bacteria abundance) nor allochthonous organic matter are measured. This interpretation disagrees with the observation of higher bacterial biomass in the non-flood 2009 when Chla was lower. Such conflict is then resolved by the presumed higher protozoan grazing in 2010, however neither protozoan grazing nor biomass were measured. This is too speculative, and the hypothesised importance of microzooplankton would contradict the forthcoming hypothesis (p. 5621) that CR rate was dominated by phytoplankton and/or bacterioplankton, which only derives from the slope of the PP:CR relationship. Altogether, the authors defend that CR is explained from the respiratory activity of phytoplankton and/or bacterioplankton, with the bacterioplankton supported by organic carbon locally produced by the phytoplankton. This thoroughly contradicts the observed heterotrophic situation, with an average P/R ratio of 0.42 in 2010, which "implies that a large amount of (allochthonous) organic carbon was respired by the plankton community into the water column during the flooding period." (p.5623). Which in turns thoroughly contradicts the conclusion that "vigorous photosynthetic processes might be a potential cause of the drawdown of huge amounts of fCO2 in the surface

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water during periods of flooding." (p.5624) (which is only supported by the relationship of fCO2 with Chla, but not with PP).âĂĺ

The comparison of variables between the averages of 2009 and 2010 (Table 1) is difficult because important spatial differences exist each year. These imply large variances in the annual averages and that differences may be non significant (e.g., the discussion about which nutrient controls PP each year is based on mean N/P molar ratios with SD of aprox. 20). As the region influenced by the river is much larger in 2010, it is difficult to know if the differences between mean annual rates result from differences in composition and functioning within this region or from the differences in the total area affected. I would suggest a regionalised analysis based on comparison of data in comparable oceanographic conditions, e.g., areas influenced by the river discharge under flood and non-flood conditions, and then to scale the conclusions to the respective areas affected.âĂĺ

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