

Interactive comment on “Air-Sea Fluxes of CO₂ and CH₄ from the Penlee Point Atmospheric Observatory on the South West Coast of the UK”

by M. Yang et al.

Anonymous Referee #1

Received and published: 1 April 2016

The manuscript focuses on the air-sea flux of CO₂ and CH₄ using EC data. In particularly marine EC data of CH₄ are previously mainly non-existent making the work highly interesting and worth publishing. There are, however, some major problems needed to be addressed before publication. The manuscript is very long, includes many different components and would benefit from being significantly shortened. The new and unique aspect of the manuscript is the marine CH₄ fluxes and the paper would benefit from a much narrower focus. The CO₂ analysis gives some numbers of the CO₂ exchange, but as the water-side measurements are very limited and their representativity for the EC data highly questionable, this aspect of the paper does not bring much additional information compared to existing literature on air-sea CO₂ exchange. The authors con-

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clude that the site is suitable for long-term high temporal resolution measurements of air-sea exchange. For such a conclusion a much more thorough analysis is required. The site might be suitable for air-sea exchange representing coastal conditions, how representative the data are for undisturbed non-coastal air-sea exchange is not clear from the present analysis. Some more specific questions: Section 2.1: For EC measurements also the upwind topography is of importance, it is not clear from the text or figures how steep the topography is north of the site or how this might influence the measurements. Section 2.2: The reason for the bias correction of the Windmaster Pro is very unclear and need to be explained. Section 2.3: Is the signal dried in the Picarro (how does the low pressure of the Picarro exhaust give a dry signal)? Page 11: How is the wave field influenced by the coast and how would this influence the drag coefficient? Page 13: SST measured very far away and there is no information at what depth the SST is measured. SST at this distance is probably not very representative for the flux footprint and this will most likely have a large impact on the bulk calculated sensible heat flux in Figure 5. Page 14: "different atmospheric dynamics" what does this refer to? Page 17: The 10 fold greater detection limit estimated by Peltola compared to the present study is explained by the higher variability over land than over sea. To me the variability over sea (in Figures 10 and 11) also seems relatively large.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, doi:10.5194/acp-2015-717, 2016.

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