

Review of Yang et al., *Air-Sea Fluxes of CO<sub>2</sub> and CH<sub>4</sub> from the Penlee Point Atmospheric Observatory on the South West Coast of the UK*

**Summary and General Comments:** Yang et al present the first eddy covariance measurements of air-sea exchange of methane, a significant advance in the field. The manuscript outlines the detection limit for the flux measurements using a Picarro cavity ringdown instrument. In addition, Yang et al present coincident CO<sub>2</sub> flux measurements to make the argument that the Penlee Point Atmospheric Observatory (PPAO) is a uniquely situated for EC measurements of air-sea exchange in coastal regions.

In general, the paper is well written and is of appropriate length for ACP. The novel elements of this manuscript center around the CH<sub>4</sub> EC flux assessment. I recommend the paper to be published after the authors attention to the following minor comments.

**Specific Comments:**

Page 1 Line 15: Perhaps define quantitatively “reasonable agreement” as this forms the foundation for the argument of PPAO as a site for future air-sea exchange measurements.

Page 1 Line 20: Why are the fluxes listed in order of 15, 27, 18 m.

Page 1 Line 23: I encourage the authors to remove the “~” for the detection limits. This should be a calculation where the detection threshold is defined for a specific averaging time, not an approximation. If there is unconstrained uncertainty, perhaps state an upper limit?

Abstract: The abstract sells short the novel elements of the CH<sub>4</sub> air-sea flux determinations. I encourage the authors to conclude the abstract with a more definitive statement that puts these new measurements in the content of what was known prior.

Page 3 Line 2: The abstract gives the impression that fluxes were determined at a range of altitudes at the same time, however it is clear here, that the range in altitudes also corresponds to a range in sampling periods. This should be noted in some fashion in the abstract?

Page 4 Line 20: More detail on the bias correction should be included here. Is this a general result for all windmaster pro’s? Is the value set by comparison to the G3? Or was this number from Gill?

Page 5 Line 1: Is the 5 slpm, 2m subsampling line still turbulent? If not, how important is this?

Page 5 Line 9: Why is “ambient mixing ratios” in quotations? Presumably this refers to ambient absolute humidity?

Page 12 Line 8: What is the future prospective for making continuous dissolved SW measurements of CH<sub>4</sub> or other gases at this site? This seems critical for the future success of this site. Can this be done at L4?

Page 13 Line 9: Given that the primary focus of this paper is on air-sea exchange in the shelf region, I think it is most appropriate to state here that PPAO is “ ... high temporal resolution measurements of air-sea exchange in shelf regions.”