Review of "Motion-correlated flow distortion and wave-induced biases in air-sea flux measurements from ships", J. Prytherch et al. MS No.: acp-2015-299

1. General Comments

The topic of this paper, correcting eddy covariance estimates of fluxes from spurious ship effects, is highly topical and necessary. Air-sea interaction requires far more study, and direct measurements (such as described) are essential to reduce the community dependence on derived fluxes.

I think the paper suffers from lack of rigour, edging towards the circular, although the detail of the analysis is very good. This may be my relative weakness in understanding of the topic, but I would then argue that if further clarity is needed for myself, then others may feel the same.

The issue (I understand) is that an observed peak in the spectral signal of atmospheric turbulence *may* be spurious due to ship motion, rather than inherent in the flow (e.g. eddies in the air being due to air flowing over waves on the surface). Further, the observed signature is due to the motion of the instrument (bolted to the ship) rather than the moving ship generating additional variable diffluence.

IF this is the overall theme of the argument (and I may be confused) then the argument may be assisted by some re-arrangement of the presentation, some editing, and attention to figures.

Some Instances

1.1 Figure 1. A schematic positioning and flow diffluence field would be most useful here, to introduce the concept (from front, side and above)The photo does not clearly indicate position of sonic back from the bow point.

1.2 Figure 2. Ogive does not offer much relevant information. Far ore useful would be equivalent spectra from the ship accelerometers.

1.3 p 15549 line 18: "these frequencies are associated with platform motion...". This is the hypothesis? Then should not be stated.

1.4 p 15550, line 1

"Motion-scale signal *can* be removed..." (my italic) . Again, perhaps the issue is whether it *is* due to motion and secondarily whether it *should* be removed.

1.5 p 15552: set of processes

Again, not my expertise, but I would think that a large ship such as JCR rock like a see-saw in moderate waves, with a near sationarity at the centre of buoyancy (where the gyro's used to be kept). How much difference is there between the *observed* change flow angle and the pitch of the ship? This information may be in Figure 4 but the presentation is unclear. Perhaps presenting the data as correlation with error of the variables against a single parameter (e.g. sensor height, z_platform), or amplitude and phase (again with error). These data would aid the unraveling of the question.

2. Specific Comments

2.1 p 15547
"Fluxes were calculated over 30 minute periods. " Was any study of varying the integration time to ensure stationarity attempted, especially under differing stability?

2.2 p 15548
"aligned with the mean stream line". Confirm that this sensible even for mean w rotation: for instance, if flow is diffluent (with a mean updraft) do the eddies also align instantly with the new wind vector?

2.3 p 15548 Diffluence was estimated to increase wind flow altitude by "1.3 and 3.2 m". Comment on effect on stability (perhaps with ref to Froude number)

2.4 p 15549 Comment on justification for elimination of "outliers".

2.4 p 15550 Eq 2 "MSC" should be defined early on, e.g. prior to reference to Fig 2.

3. Technical Corrections

3.1 p15550 Eq 2 In general, should a wind velocity (m/s) be corrected with a mix of ship velocity (m/s : OK) and acceleration (not so good)? For example, dividing by w'_true gives alpha_2 dimensionless, but alpha_1 still has units.

3.2 Figure 3. Offset each error bar group slightly in the horizontal so that over-plotting does not mask data.

3.3 Figure 5. Unclear why panel 4 has -ve flux. Clarify caption