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Discussions

Interactive comment on "A Surface KInematics Buoy (SKIB) for wave-current interactions studies" *by* Pedro Veras Guimarães et al.

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Overview This paper describes the design of a drifting buoy, to measure directional waves using a low-cost accelerometer to obtain 'heave' spectra and the Global Navigation Satellite Systems (GNSS) signal to obtain the directional components of the wave spectra and the ambient current. The paper describes the design of the SKIB system in some detail, then analyses results from an experiment where several buoys are deployed in the Chenal du Four, with strong tidal currents and current gradients, adjacent to a moored Datawell Directional Waverider buoy. The SKIB buoy performance is validated against a SWIFT buoy and stereo-video as well as the Waverider. Then there is a discussion about the high-frequency interaction of waves and currents. General Remarks There is a lot of interesting information in this paper

but there is a need for clarification of its aims. Is it about presenting a new instrument or an application in the Chenal du Four (this seems to be an afterthought), a lot more of the content is about the buoy and other wave measurement systems. The summary and conclusion are very cursory and there are a lot of errors and typos (mainly annotated on the m/s). The paper does not appear to be ideally-suited to publication in Ocean Science, although it falls within the topics described, there are not many papers published on waves and instrumentation. It might be better submitted to Ocean Engineering or to Continental Shelf Research as a follow-up to the Pearman et al. (2014) paper. In order to be accepted it needs major revision. Detailed Corrections 1. In the Introduction, please make clear what the motivation and aims of the study are. It is not clear whether the main aim is to design and test the instrument or gather data on wave-current interaction. The stated intention is 'to capture the response of surface gravity waves to horizontal current gradients, in order to better interpret airborne and satellite imagery of waves and current features'. After listing previous instrument developments, please clarify why it is necessary to develop another buoy. What is the novelty in the work presented in this paper? 2. Section 2 presents standard directional analysis of wave spectra from combined vertical plus horizontal motion, using FFT and co- and quad-spectra. There is some confusion about the nomenclature at the bottom of page 3 (lines 23 onwards). What are termed the 'moments of the directional distribution' are usually referred to as the angular harmonics, which can be derived only for the first 4 terms (Longuet-Higgins et al., 1963). This section needs correction. A good reference is the COST 714 book (2005) which shows the various ways of deriving a directional distribution and the limitations due to observation systems. It is usual to separate the 2D frequency-direction spectrum into two parts multiplied together: a frequency distribution and a directional distribution (frequency-dependent) based on some simple pattern such as cos2s. However none of this is new. Check also lines 13-18 on p 10. 3. In section 3.2 there are a lot of acronyms for the electronic components which should be defined or identified as trade names. 4. In section 3.2 can the authors clarify the cost of the basic SKIB-STM system. Is this system

accurate enough - later it is clear that SKIB-SBG is better (NB please standardise how this is referred to – SKIB IMU is also used). 5. In section 3.3 the upper limit of the useful frequency range is 0.8Hz, this is not really extending the frequency range to high frequency as claimed but rather similar, especially since the frequency range for directional parameters is limited to 0.5Hz. 6. Section 4 describes the results from a short deployment in October 2015. Figs 4 and 5 refer to September 2016 and should appear in section 3. 7. Section 5 'Summary and conclusions' is far too short and superficial. 8. Standardise the way of referring to the Datawell Directional Waverider – it is variously referred to as Datawell, Waverider etc. 9. In Figure 7 the colours would be more usefully applied to identify different buoys – this would require changing Fig 6 also.

Please also note the supplement to this comment:
https://www.ocean-sci-discuss.net/os-2018-45/os-2018-45-RC1-supplement.pdf

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