

Interactive comment on “Measuring currents, ice drift, and waves from space: the Sea Surface KInematics Multiscale monitoring (SKIM) concept” by Fabrice Ardhuin et al.

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One comment concerns the estimate of current below the surface (the proposed instrument measures the surface one). The first author has worked on how the wave propagation velocity depends on the current vertical profile. I wonder if there is any way to use the wave spectrum and surface current information in this respect. However, possibly a counter argument is that the instrument provides only the (k, θ) spectrum, i.e. a geometrical picture of the situation, with no measured information on its dynamical, implicitly (f, θ) , behaviour.

A larger dwell time than the 30 ms focused on a single footprint would be needed for

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going into a frequency-wavenumber analysis. Still, filtering data at a given wavenumber with the Delta-K technique (e.g. Alpers Hasselmann) may - theoretically - allow the analysis of this shear by measuring the Doppler shift for different Delta-Ks, similar to what was done by Shrira et al. (2001) for HF radars. We have now clarified on page 8 (lines 19-24) the effect of a vertical shear on the measured velocities and our opinion that measuring the shear does not appear feasible.

A possibly more serious one concerns the measurement of the wave spectrum. Figure 5 at page 8 provides a clear perspective of the logical flow of actions and data. It is clear that the availability, hence the measurement, of the $E(k, \theta)$ spectrum is a key point, obviously required, apart from other needs, to estimate the Stokes drift. However, how to measure $E(k, \theta)$ is not detailed and developed enough in my view.

The SWIM approach of Danielle Hauser et al (2017) is cited, but SKIM is a different instrument and its performance should be described in more details.

We have added a few details, and we also refer the reader to Noguier et al. (2018). Without doubling the length of the paper it would be hard to cover the topic. We thus conclude the introduction section with The present paper focuses on currents, and a detailed description of wave measuring capabilities with SKIM will be given elsewhere.

page 18 lines 2 and 16

These sentences have been re-written.

page 20 line 6

This sentence has been rewritten.

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