

Interactive comment on “A Generalized Simulation Capability for Rotating Beam Scatterometers” by Zhen Li et al.

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Referee #1 submitted a detailed review of the manuscript already in the quick-access review phase. Many of the points have already been addressed by the authors when submitting the version of the manuscript now available for discussion. The remaining point is repeated below. As there will be no second review from referee #1, this is the only point which needs to be addressed with respect to that review.

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Open review of Li et al., “Simulation of rotating Ku-band wind scatterometers and wind retrieval performance comparison”

This paper compares scatterometer figure of merits (FoMs) for several different Ku-
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band scatterometer geometries, specifically the rotating pencil-beam SeaWinds on QuikSCAT, and the rotating fan-beam WindRad on FY-3E and SCAT on CFOSAT. The paper purports to develop a unified framework for analyzing and comparing the performance of these systems where, based on the FoMs used, WindRad has the best performance, followed by SCAT and SeaWinds. The authors find that the FoMs are sensitive to the number of the “views” (also referred to as “flavors” in the literature) of the normalised radar backscatter σ_0 . Each “view” corresponds to a different azimuth angle and/or incidence angle and/or polarisation so the set of measurement views span a diversity of azimuth angle, incidence angles, and polarisations. They find that the FoMs improve with increasing number of “views” until a saturation is reached.

Overall, the paper is well written well and clear. A few corrections and additions could substantially improve the paper.

One thing not addressed in the paper is the relationship between the number of views and their diversity. It is not the number of views that matter but their diversity. It should be noted that views that have similar geometry and polarization do not really add to the measurement diversity, and so do not add information to the wind retrieval process. Such measurements can be grouped (averaged) into a “super” view that is treated as a single view without affecting the wind retrieval. In fact, this is frequently done when processing rotating pencil-beam scatterometers: σ_0 measurements with similar views (“flavors” in the QuikSCAT literature) are often averaged to simply processing. For this paper there must be a way to quantify the diversity of the views (other than just using their number). This should be used to investigate how the diversity contributes the FOMs’ value. Bottom line: adding additional views that do not have distinctly different geometry (i.e., that do not really add to the diversity) cannot be expected to improve the wind retrieval. Such additional measurements are essentially only improving the effective SNR of the class (super view) of similar views rather than adding new geometric information need to improve the wind retrieval.

