

## ***Interactive comment on “The Arctic Ocean Observation Operator for 6.9 GHz (ARC3O) – Part 2: Development and evaluation” by Clara Burgard et al.***

### **Anonymous Referee #2**

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This is an excellent paper that advances the field of satellite emulation as a way of evaluating sea ice simulations in Earth System Models. There is one drawback to this study that the authors acknowledge in that they do not use a thickness distribution  $g(h)$ , but instead simulate the mean sea ice state in the coupled model chosen for the research. As a consequence, the observational operator is not able to determine the extent to which thin lead ice of thickness  $h$  is important in representing brightness temperature relative to completely open water. Instead, using the methods presented, it is only possible to state that sea ice concentration is important, whereas satellites ‘see’ the gradation in ice thickness as represented in models with the state variable  $g(h)$ . This is a critical point that perhaps could be made in the conclusion of the paper

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as a potential extension of this work in future studies. Aside from this, the paper was well written, easy to understand, and a technical advance in the field of polar simulation and model analysis.

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