

## **SESSION: (B5) Hindcast and forecast quality assessment**

**(B5-07)**

### **Making sense of seasonal sea-ice forecasts**

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With the recent introduction of prognostic sea-ice models into seasonal forecasting systems, routine seasonal sea-ice forecasts that are useful to society are within reach. These are directly relevant for planning marine operations in high latitudes, and scientific evidence is accumulating that they have far-reaching implications for predicting large-scale anomalies of circulation and temperatures. However, current systems suffer from strong biases in the sea-ice state, which are difficult to correct a-posteriori because of their non-Gaussian, non-linear nature. Deficiencies in current sea-ice forecast are often rooted in sea-ice thickness. Here, we make the case that model biases and initialization methods for sea-ice thickness need to be improved in order to make progress with seasonal sea-ice forecasts, and that these improvements need to be guided by innovative satellite observations of sea-ice thickness. We discuss the skill of the recently implemented ECMWF seasonal forecasting system SEAS5 in predicting sea ice, using innovative metrics of integrated ice-edge error and integrated ice thickness error. We find that forecast errors in ice edge and ice concentration can be quantified with high certainty, but forecast errors of ice thickness are much less certain, because observational products and reanalyses have large discrepancies. We illustrate this by discussing experiments where sea-ice thickness has been initialized from observational data sets and conclude that progress with sea-ice predictions requires close collaboration between different communities, in order to improve the fidelity of both earth observations and forecasting models.