Statistical predictability of Arctic sea ice volume anomalies: identifying predictors and optimal sampling locations

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In this work, we have studied the statistical predictability of Arctic sea ice volume (SIV) anomalies. First, in terms of identifying best predictors and, second, aiming at spotting optimal sampling locations. To do so, we made use of 6 model outputs, from 3 different models, with 2 different horizontal grid resolution each. The main open questions which drive this research are: (i) What is the predictability skill of different pan-Arctic predictors, such as SIV itself, Sea Ice Area, Sea Ice Thickness, Sea Ice Concentration, Sea Ice Drift, Ocean Heat Transport and Sea Surface Temperature, for predicting pan-Arctic Sea Ice Volume anomalies? (ii) How does model resolution impact the statistical predictability of Sea Ice Volume anomalies (iii) What are the best in situ locations where predictor variables should be sampled in order to optimize the statistical predictability of SIV anomalies? An empirical statistical model, based on the ideas of correlation maps between predictand and predictors, and set up in a Monte Carlo scheme, was built to answer those questions. Preliminary results from the 6 different models outputs suggest that Sea Ice Thickness, Sea Ice Concentration, and Sea Surface Temperature are the best predictors, in that order. Apparently, model resolution does not have large impact on the skill of the statistical prediction and 3 optimal placed locations are enough to explain more than 70% of the SIV variance, though the both the predictability skill and the optimal locations are model dependent.

Oral preference