Development of the seasonal forecast system for the interannual sea-ice variability using CICE5 model

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In this study, using the CICE5 model, the initialization technique based on the nudging scheme is developed to assimilate the PIOMAS monthly sea-ice thickness(SIT), OISST daily sea-ice concentration(SIC), and OISST daily SST. And the nudging scheme for each SIC categories to reduce the bias of sea-ice variables is developed. By assimilating the sea-ice variables and SST, the mean bias in the initial condition is significantly reduced. Moreover, the prediction skill using the dynamical sea-ice model is also improved. The prediction skill is evaluated by hindcast experiments initialized at late spring and melting season(Mar-Sep). Comparing prediction skill of SIC predicted by nudging system and control experiment (only atmospheric forcing), nudging system shows a higher skill in sea ice concentration and extent, even though the simple nudging scheme is utilized. This implies that the sea-ice variables are well initialized in the developed dynamical prediction system to lead skillful forecast of the interannual sea-ice variation.