

Supplemental Material, 2021 July Sea Ice Outlook: NASA GMAO

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The following are supplementary figures for the 2021 July SIO contribution from the NASA GMAO. The forecast is taken from a prototype of the next subseasonal-to-seasonal forecast system (GMAO S2S version 3). The model is a coupled version of the Goddard Earth Observing System (GEOS) with half-degree atmosphere and quarter-degree ocean grid spacing. The forecast is initialized with MERRA-2 atmosphere and a prototype of the MERRA2-Ocean ODAS.

The system uses a staggered initialization of five atmosphere-perturbed ensemble members that are started every five days. An additional ten ocean-perturbed ensemble members are started at the end of the month. The forecasts run subseasonally to two months, at which point an automated analysis system sub-sets the ensemble to ten members that continue for the length of the forecast. The system forecasts a September 2021 Northern Hemisphere ice extent of 4.09 ± 0.33 million km².

Figures 1 and 2 show the daily time series of Northern Hemisphere forecast ice extent and volume from each of the ensemble members. Figure 3 shows spatial maps of the ensemble-average forecast ice concentration and thickness, while Figs. 4-5 show the initial conditions for the full-duration ensemble members.

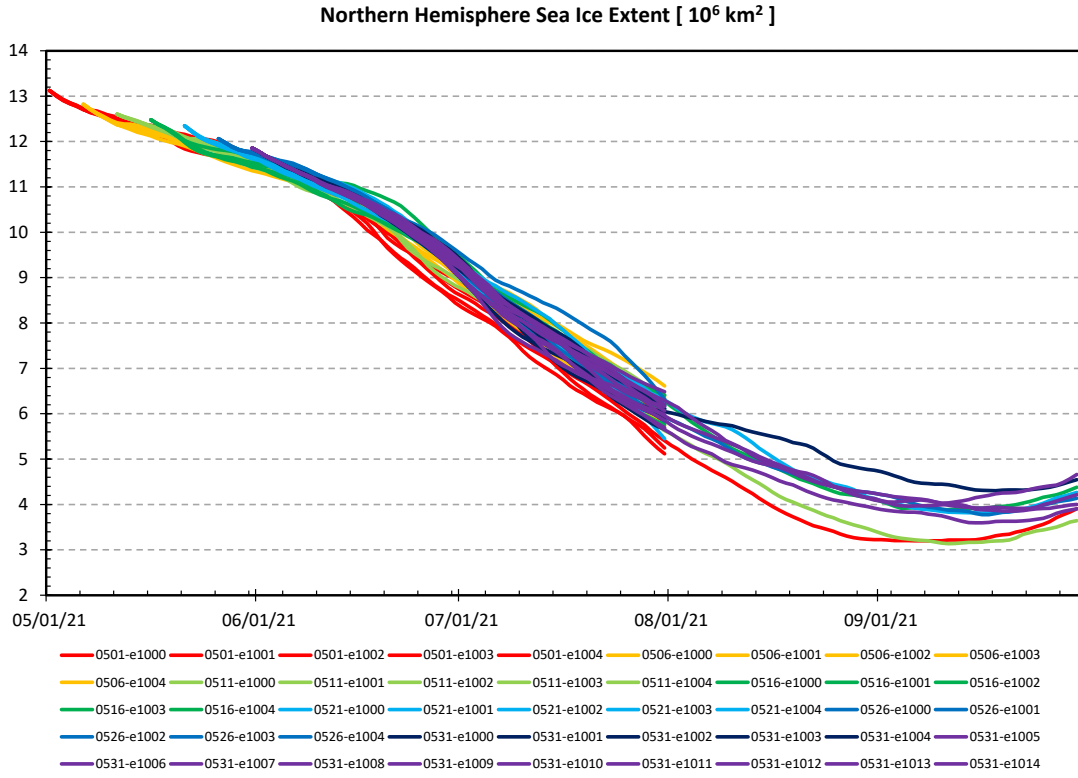


Figure 1. Northern Hemisphere forecast daily sea ice extent, in 10^6 km^2 .

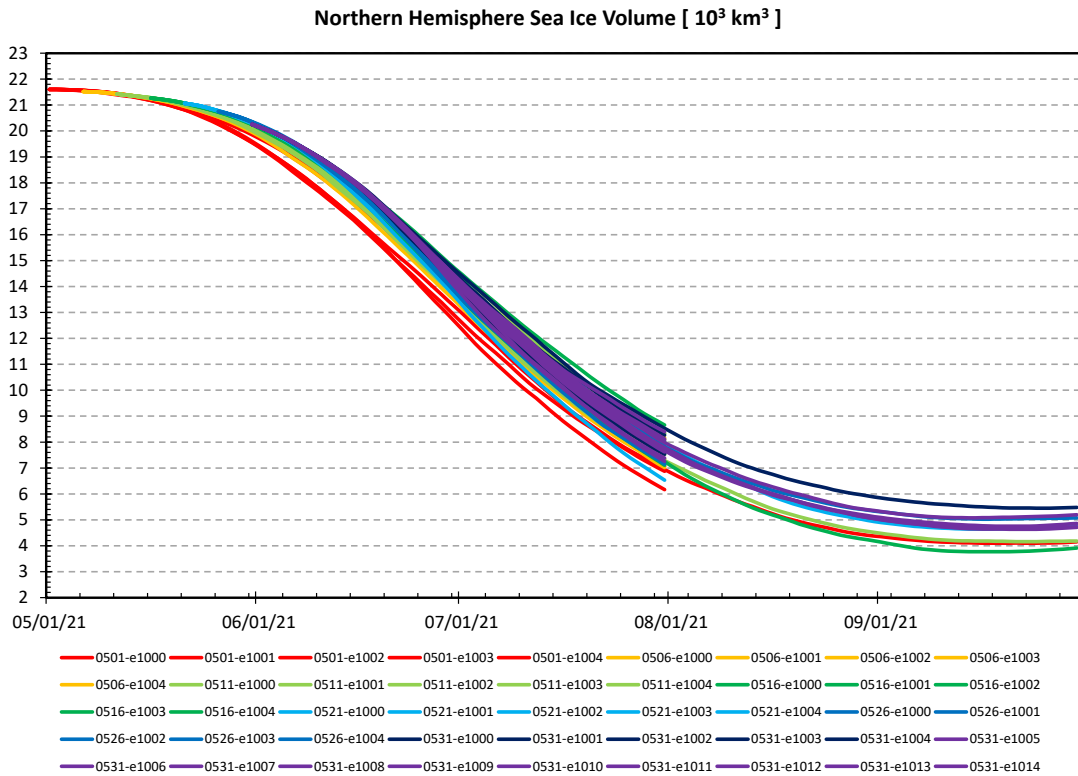


Figure 2. As in Fig. 1 but for sea ice volume, in 10^3 km^3 .

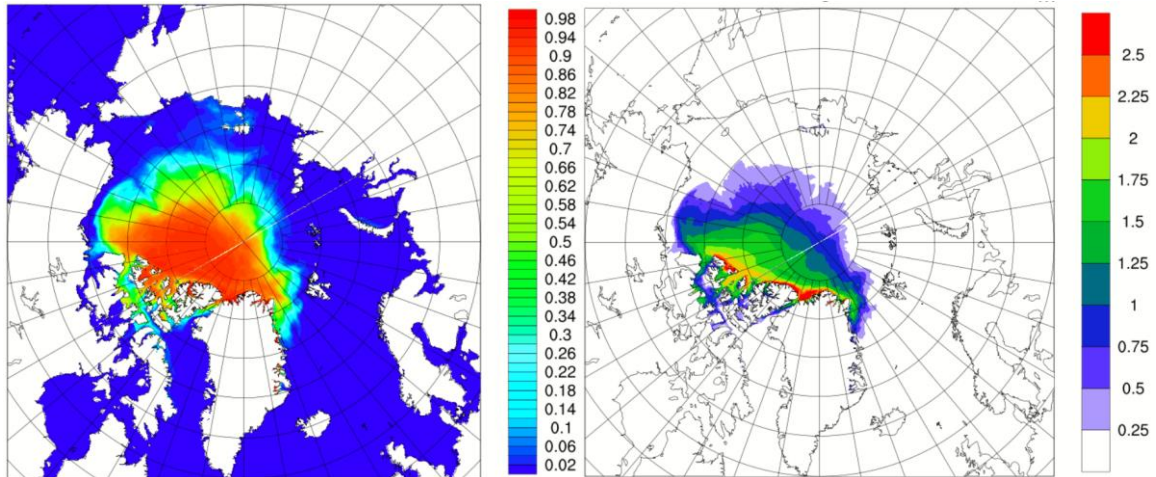


Figure 3. September 2021 ensemble-averaged forecast sea ice concentration (left) and ice thickness (right, in m).

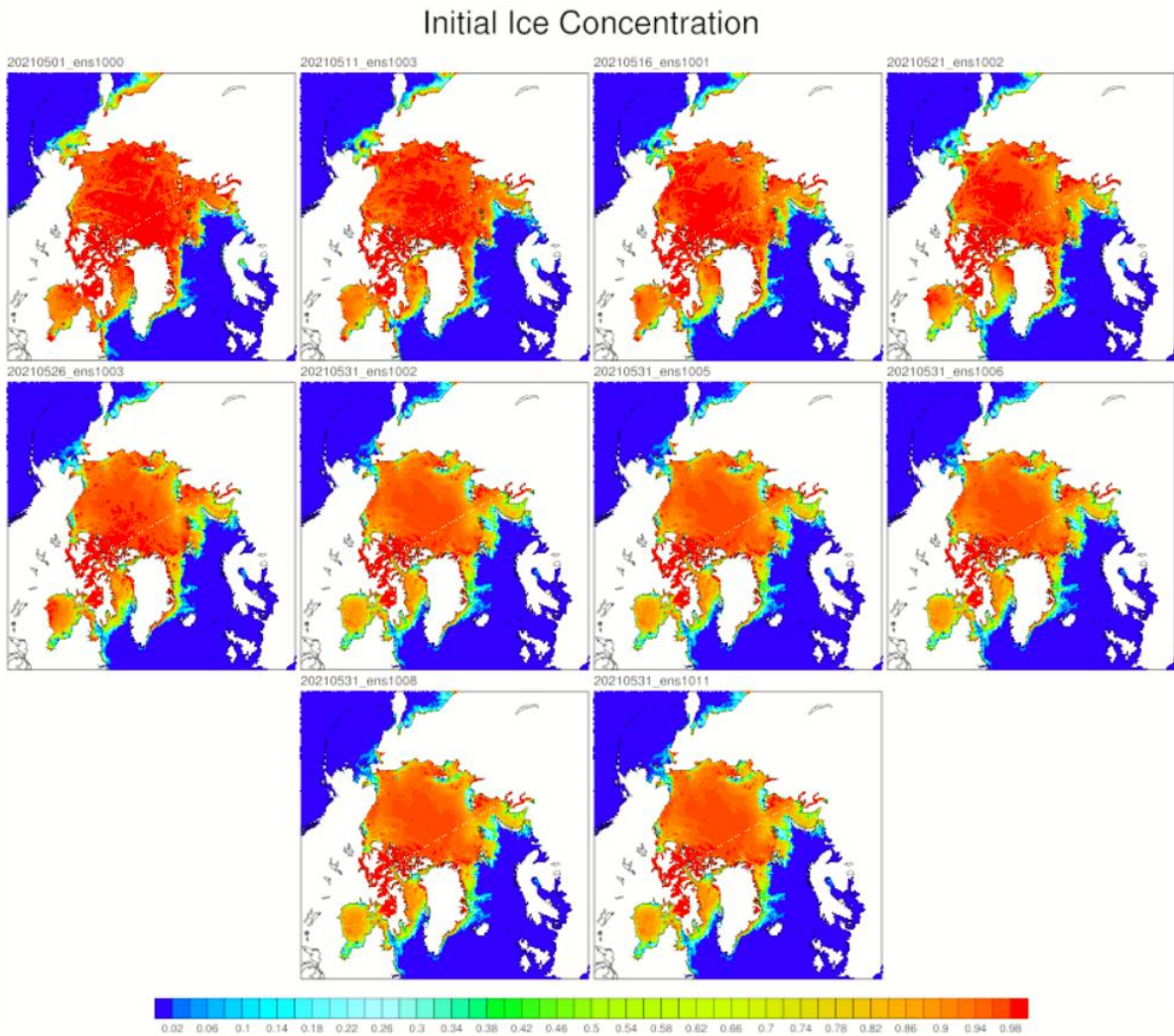


Figure 4. The initial ice concentration field for the ten full period ensemble members. The initial dates are 1-May, 11-May, 16-May, 21-May, 26-May, and 31-May for the last five members.

Initial Ice Thickness [m]

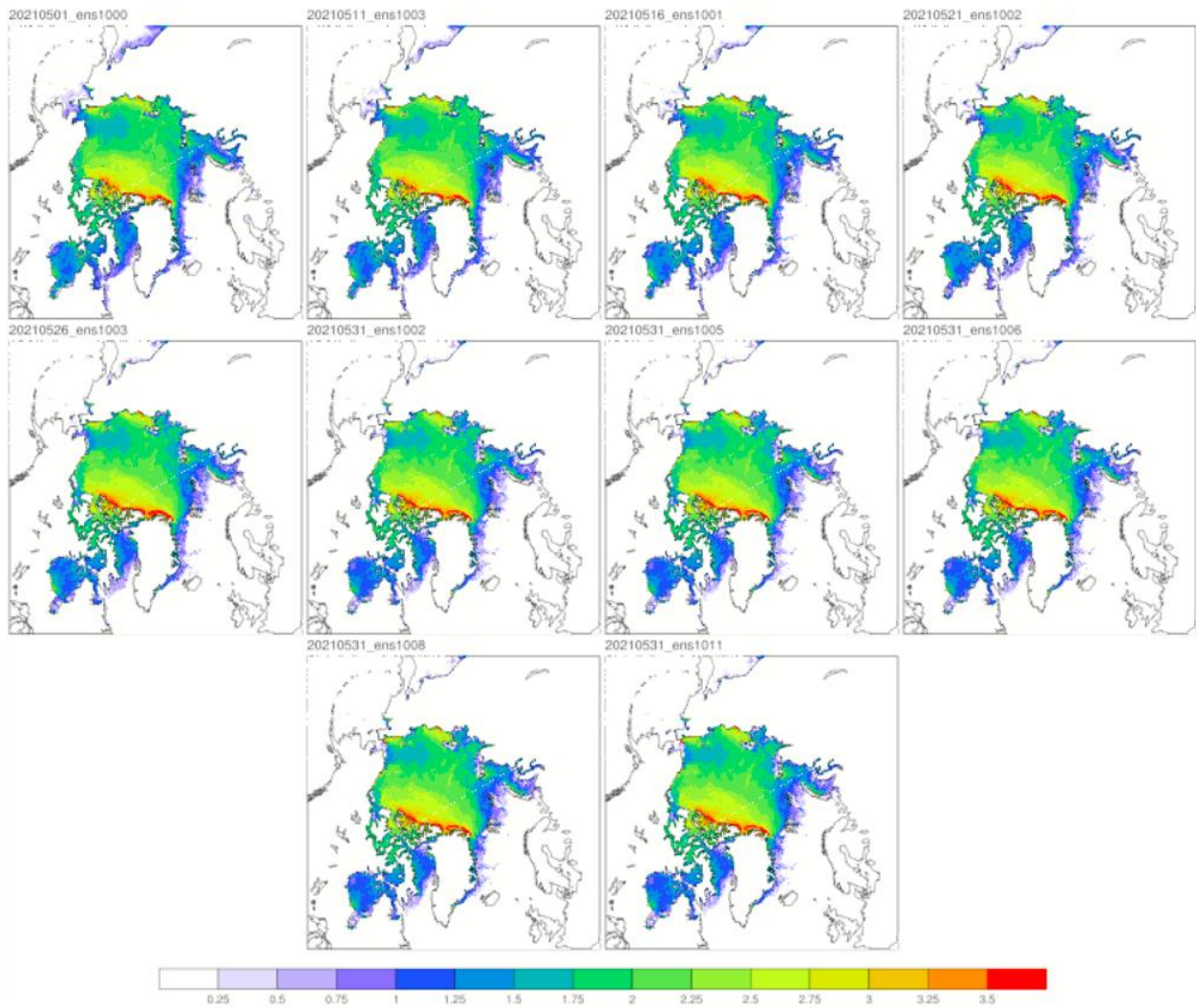


Figure 5. As in Fig. 4, but for sea ice thickness in m.