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## Differences in Arctic sea ice simulations from various SODA3 data sets

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SODA (Simple Ocean Data Assimilation) is one of the ocean reanalysis data widely used in oceanographic research. The SODA3 dataset provides multiple ocean reanalysis data sets driven by different atmospheric forcing fields. The differences between their arctic sea ice simulations are assessed and compared with observational data from different sources. We find that in the simulation of arctic sea ice concentration, the differences between SODA3 reanalysis data sets driven by different forcing fields are small, showing a low concentration of thick ice and a high concentration of thin ice. In terms of sea ice extent, different forced field model data can well simulate the decline trend of observed data, but the overall arctic sea ice extent is overestimated, which is related to more simulated sea ice in the sea ice margin. In terms of the simulation of arctic sea ice thickness, the results of different forcing fields show that the simulation of arctic sea ice thickness by SODA data set is relatively thin on the whole, especially in the thick ice region. The results of different models differ greatly in the Beaufort Sea, the Fram Strait, and the Central Arctic Sea. The above differences may be related to the differences between the model-driven field and the actual wind field, which leads to the inaccurate simulation of arctic sea ice transport and ultimately to the different thickness distribution simulation. In addition, differences in heat flux may also lead to differences in arctic sea ice between models and observations. In this paper, the differences between the results of arctic sea ice driven by different SODA3 forcing fields are studied, which provides a reference for the use of SODA3 data in the study of arctic sea ice and guidance for the selection of SODA data in the study of sea ice in different arctic seas.