

## Intercomparison of the Arctic sea ice cover in global ocean–sea ice reanalyses from the ORA-IP project

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**Abstract** Ocean–sea ice reanalyses are crucial for assessing the variability and recent trends in the Arctic sea ice cover. This is especially true for sea ice volume, as long-term and large scale sea ice thickness observations are inexistent. Results from the Ocean ReAnalyses Intercomparison Project (ORA-IP) are presented, with a focus on Arctic sea ice fields reconstructed by state-of-the-art global ocean reanalyses. Differences between the various reanalyses are

explored in terms of the effects of data assimilation, model physics and atmospheric forcing on properties of the sea ice cover, including concentration, thickness, velocity and snow. Amongst the 14 reanalyses studied here, 9 assimilate sea ice concentration, and none assimilate sea ice thickness data. The comparison reveals an overall agreement in the reconstructed concentration fields, mainly because of the constraints in surface temperature imposed by direct assimilation of ocean observations, prescribed or assimilated atmospheric forcing and assimilation of sea ice concentration. However, some spread still exists amongst the reanalyses, due to a variety of factors. In particular, a large spread in sea ice thickness is found within the ensemble of reanalyses, partially caused by the biases inherited from

This paper is a contribution to the special issue on Ocean estimation from an ensemble of global ocean reanalyses, consisting of papers from the Ocean ReAnalyses Intercomparison Project (ORA-IP), coordinated by CLIVAR-GSOP and GODAE OceanView. The special issue also contains specific studies using single reanalysis systems.

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