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# Sulphur hexafluoride in an Arctic Mediterranean inverse model

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Water mass transformations in the Nordic Seas and Arctic Ocean form an important component of global overturning. Processes that are believed to contribute to these transformations include heat loss to the atmosphere in the Norwegian Sea, brine rejection during ice formation, convection in the Greenland Sea and the Iceland Sea, and elevated rates of turbulent diapycnal mixing.

Here, a box-type inverse model is employed to improve our understanding of these transformations. The model of C. Mauritzen (1996; Deep-Sea Res. I, 43, 807-836), is used as a starting point, but an updated understanding of the connections between the various sub-basins, and of diapycnal mixing, is included. The inversion also contains a field for the purposely released tracer, sulphur hexafluoride. Strong intermediate level exchange between sub-basins is obtained, consistent with current meter observations. The model results are consistent with the hypothesis that the transformation from inflow to overflow density occurs mostly within the Norwegian Sea. Much of the resulting water masses undergoes significant further modification elsewhere in the Arctic Mediterranean.