

Abstract

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Halogenated tracers and studies of deep and intermediate waters in the Nordic Seas. Department of Chemistry, Analytical and Marine Chemistry, Göteborg University, SE-412 96 Göteborg, Sweden.

Halogenated tracers have been used in different studies of the oceans. Sulphur hexafluoride (SF_6) has been utilised as a deliberately released tracer in an experiment in the Greenland Sea and has also been investigated as a transient tracer in the Southern Ocean. The group of chlorofluorocarbons (CFC-11, CFC-12, CFC-113 and CCl_4) was studied as transient tracers, mainly in the Nordic Seas. The use of tracers and their sources are discussed and the analytical method for determination of SF_6 is described in detail. A comparison between these five compounds as transient tracers are made and general conclusions are made for which periods the different tracers are useful in the dating of water masses.

The tracer release experiment in the Greenland Sea is discussed and results from the experiment are presented in three different works. The sulphur hexafluoride is used calculating the vertical mixing in the Greenland Sea during both summer and winter. It is also utilised together with the CFCs in the investigation of a long-lived eddy in the Greenland Sea Gyre.

The spreading of the released SF_6 inside the Nordic Seas is inspected, with special attention on the East Greenland Current, and the SF_6 together with CFCs are utilised to analyse the contribution to the Greenland-Scotland overflows. The overflow of the Denmark Strait is scrutinised based on data from five different years during the 1990s and variability in composition is discussed.

KEY WORDS: chlorofluorocarbons, CFC, sulphur hexafluoride, the Nordic Seas, Greenland Sea, Denmark Strait

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