Abstract

K. Anders Olsson
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

ISBN 91-628-4808-9