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CAESIUM-137 IN SEDIMENTS OF THE NORTHERN BALTIC SEA SINCE THE CHERNOBYL ACCIDENT

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The sea most affected by the Chernobyl accident was the Baltic Sea, since the first radioactive clouds from Chernobyl travelled to the north and caused a high deposition over the Scandinavian region. Because of the closed nature of this sea, its small volume of water and its restricted exchange of water with the North Sea, the levels of caesium-137 in this sea have remained the highest in Europe (Povinec et al., 1996).

Soon after the deposition of the Chernobyl fallout on the surface of the Baltic Sea, sinking of fresh fallout nuclides through the water layers was quite rapid. After the initial fallout situation, several factors affected the concentrations of radionuclides in the water body, e.g. sea currents, mixing of water masses, river discharges from the drainage areas, sinking in the water column and deposition on the bottom (Ilus et al., 1995).

The distribution pattern of Chernobyl-derived caesium-137 in the terrestrial drainage area of the Baltic Sea was very uneven and the highest deposition values occured in the areas surrounding the Gulf of Bothnia and Gulf of Finland. Correspondingly, the highest caesium-137 concentrations in bottom sediments occured in these Gulfs too, but the scattered nature of its areal distribution was further emphasized as a consequence of river discharges and different sedimentation rates on hard and soft bottoms.

In this paper caesium-137 concentrations in the bottom sediments of the northern Baltic Sea since the Chernobyl accident are considered. Both the vertical and horizontal distribution and the total amounts of Cs-137 per square metre in different subregions up to the late 1990s are discussed. The highest total amount, 116.000 Bq m^{-2}, occured in the Bothnian Sea in 1996.

Revised calculations are made to estimate the total amount of Cs-137 bound to the bottom sediments of the northern Baltic Sea. Earlier inventories were made e.g. by Salo et al. (1986) at the beginning of the 1980s, and e.g. by Ilus et al. (1995) and Kankaanpää et al. (1997) in the early 1990s. This new inventory is based on essentially larger number of sediment data than our previous calculations. Data are compiled from ca. 200 sediment profiles sampled in 1994-1997 (Fig.1). Different sedimentation rates of Cs-137 on soft and hard bottoms are taken into account in the calculations.

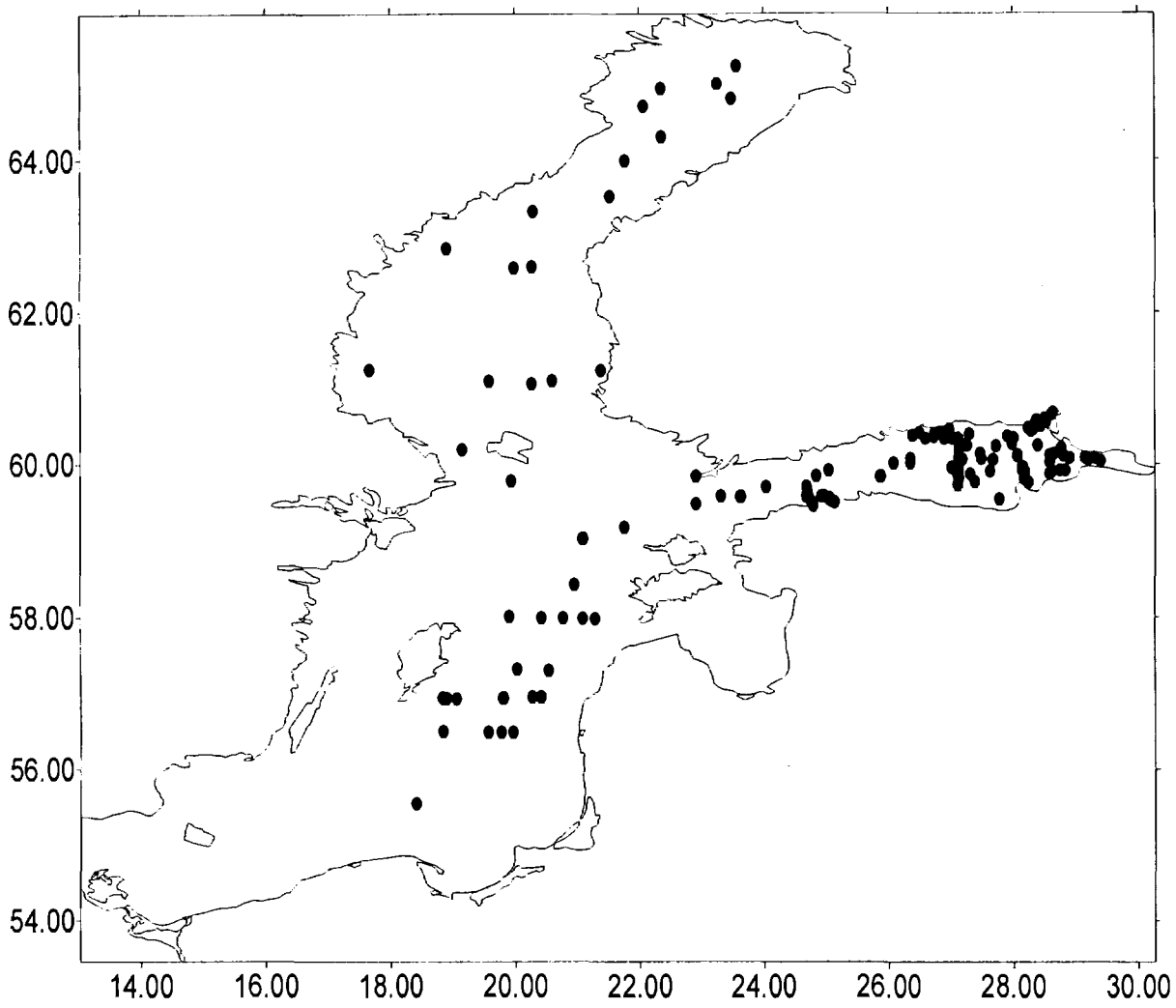

Figure 1. Sampling stations used in the Cs-137 inventory.

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