MERCURY IN THE SWEDISH MOR LAYER — LINKAGES TO MERCURY DEPOSITION AND SOURCES OF EMISSION

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Abstract. The report deals with data from 363 Swedish mor samples. The following parameters are discussed: Hg-, organic and Se-concentrations and Hg-quantity in mor, Hg- and S-deposition from Swedish and continental emissions (point sources and diffuse emissions) and precipitation. The results are focused on mean, geographical variations, statistical correlations and calculations to get first insights and order of magnitude data on the linkages between the Hg-contamination of the Swedish mor layer and the various sources of Hg-emissions. Southern Sweden is significantly influenced by continental Hg-emissions. Several previously unknown domestic discharge sources of Hg have been identified. The total amount of Hg in the Swedish mor layer has been estimated to be about 615 t. East Germany, United Kingdom, West Germany and Poland seem to have contributed with the largest continental emissions of Hg entering the Swedish mor layers. The countries which early started to build up their industry probably are responsible for greater Hg-contamination than indicated by our figures, and vice versa. If no measures are taken to reduce the emissions, the present contamination will continue. Then, the 'burden of guilt' ought to be redistributed so that a higher proportion of the Swedish Hg-contamination would be linked to continental discharges since considerable reductions have already occurred as regards Hg-discharges from large Swedish sources. The problems with elevated Hg-levels in the mor layer and, at the end point, the high concentrations of Hg in lake fish in Sweden, will remain far into the next century.

1. Introduction

This work has been carried out within the framework of the 'Liming-mercury-cesium' project. The general background of the project has previously been presented by Håkanson (1986). The basic aim of the work is to evaluate the best approach using liming and other ecologically-acceptable measures to reduce Hg- and Cs-concentrations in fish as well as the risk of blacklisting which today threatens about 10 000 Swedish lakes (Håkanson et al., 1988). In this context, it is also very important to get better insights to the various sources of the Hg-pollution, so that the underlying causes to the Hg-problems can be tackled and not just the symptoms. This paper is based on a more comprehensive work, previously presented in Swedish by Nilsson et al. (1989). Here we will try to extract results of general interest and minimize discussions on individual lakes, methods of sampling and analysis, statistical methods, literature references and specific Swedish matters.

The objectives here are to attempt in quantitative terms and in maps to describe the deposition of atmospheric Hg in Sweden using Hg-data from mor, and then to link this picture to different types of discharge sources. The focus is not on
Fig. 1. Geographical sites of the 363 mor samples.