Geophysical Research Abstracts, Vol. 8, 06079, 2006
SRef-ID:

Anthropogenic inputs of heavy metals to the Kongsfjord area, Svalbard

L. Vare, T. Shimmield, K. Black and G. Shimmield.

The Scottish Association for Marine Science, Scotland, (lindsay.vare@sams.ac.uk / Phone: +44-1631-559278).

The Arctic region is a seemingly pristine, remote environment, yet there is increasing evidence that it is greatly impacted by anthropogenic metal contamination. The source of contaminants primarily lies outside the Arctic region, with sediments potentially providing a major sink for these anthropogenic inputs.

Heavy metals are attributed to adverse effects on the health of biota and indigenous populations, due to their toxicity and bioaccumulative tendencies within the environment. Two metal contaminants of major concern are lead (Pb) and mercury (Hg). Both are ubiquitous anthropogenic pollutants with elevated concentrations being reported throughout the Arctic environment.

Lead is unique in that the source of lead can be determined by its isotopic ratio. The $^{206}Pb/^{207}Pb$isotopic ratio of western sources of anthropogenic Pb has a value of approximately 1.14, with Eastern Europe and Eurasian sources represented by a higher value of 1.18.

Here we present a novel data set detailing pollutant distribution in the Kongsfjord region of north-west Svalbard. Down core profiles of heavy metal concentrations and stable lead isotopes from the fjord along with a fresh water lake (Lake Ossian) and Brandallaguna, a brackish lagoon near Ny Ålesund, will be presented. Results show varying sedimentation rates between cores, with some metal profiles characteristic of significant anthropogenic input. In the lake large increases in the Pb concentration can be clearly seen, values rising from 15 mg/kg to 40 mg/kg. The lead isotope ratio decreases, indicative of a change in the source of lead associated with the long range transport of contaminants. The fjord in comparison shows a consistently lower Pb concentration, this could result from a high sedimentation rate from glacial inputs and

sediment mixing. Inventories have been calculated and simple isotopic models have been utilised to infer source and pathways of pollutants.