Distribution and Sedimentary Flux of ^{10}Beryllium, ^{230}Thorium, and ^{231}Protactinium in the South Atlantic Ocean on a Glacial / Interglacial Timescale; a Multibox Model Approach

M. CHRISTL, S. SIEGLE, C. STROBL, S. REUTER AND A. MANGINI

Heidelberg Academy of Sciences, INF 229, 69120 Heidelberg, Germany (marcus.christl@iup.uni-heidelberg.de)

The radionuclides ^{10}Be, ^{230}Th, and ^{231}Pa are widely applied for dating or tracing ocean processes like changes in bioproductivity or ocean-circulation. In particular ^{230}Th is used to normalize the depositional flux of ^{10}Be and ^{231}Pa to correct for sediment redistribution. In this case it is assumed that ^{230}Th does not underlie any significant transport processes in the water column. To test this hypothesis, and to describe the distribution and the burial rate of these radionuclides a three layer multibox model was developed. The Holocene conditions were modeled and the results are compared with datasets from our working group and with data published in literature.

The model derived water concentrations and ^{230}Th normalized rain rates of ^{10}Be and ^{231}Pa are in good agreement with measurement data indicating that the processes of advection and boundary scavenging are sufficient to describe the distribution of ^{10}Be, ^{231}Pa, and ^{230}Th in the Ocean. Furthermore, our model results confirm that in open ocean areas there is nearly no boundary scavenging of ^{230}Th. Whereas in high particle flux areas, as well as in ocean regions with very low bioproductivity this assumption can lead to errors up to 50% in calculating ^{230}Th normalized rain rates.

Volatile halogenated organic compounds distribution in a coastal salt marsh in Northern Germany

O. CHRISTOF, R. SEIFERT, AND W. MICHAELIS

Institut für Biogeochemie und Meereschemie, Universität Hamburg, Bundesstraße 55, D-20146 Hamburg, Germany (michaelis@geowiss.uni-hamburg.de)

Volatile halogenated organic compounds (VHOC) are ubiquitous compounds in our environment. Due to their chemical and physical properties these compounds are of considerable concern for environmental and atmospheric chemistry. Almost all of these compounds are suspected to contribute to the destruction of the ozone layer. Particularly bromine, on a per atom basis, is believed to be 50 times more effective as chlorine in ozone destruction (Kurylo and Rodriguez, 1999). Due to legislated restrictions, concentrations of long-lived halocarbons in the atmosphere have decreased in the last 10 years (Montzka et al., 1999). More interest is concentrated now on short lived naturally produced halocarbons, especially chloromethane and bromomethane. Current estimates show that the emissions of these two compounds do not balance their losses through sinks like oceanic degradation or uptake by soils. Calculations of the global budget show missing sources in the range of 59 Gg a^{-1} for bromomethane and 1,5 Tg a^{-1} for chloromethane. Recent investigation gave evidence, that coastal salt marshes are potentially the largest natural terrestrial source for halomethanes and could close the gap between sources and sinks for the halomethanes (Varner et al., 1999; Rhew et al., 2000; Dimmer et al., 2001).

We present first results of a seasonal investigation from a coastal salt marsh in Northern Germany. The programme included the determination of the VHOC emission from different salt marsh plants and soils as well as the identification and quantification of VHOC in tidal channels that connect the investigated area with the North Sea. Major identified compounds in plant emissions were chloromethane and bromomethane, whereby *Salicornia europaea L.* shows the highest values. In the tidal channels tribromomethane and mixed polyhalogenated compounds like chloroidomethane or dibromochloromethane were the dominating compounds.

References

Butler J.H., (2000), *Nature* **402**, 260-261.

Dimmer C.H, Simmonds P.G., Nickless G. and Bassford M.R., (2001), *Atmos. Environ.* **35**, 321-330.

Kurylo M.J. and J.M. Rodriguez, (1999), ***WMO Scientific Assessment of Ozone Depletion,*** Report 44**.**

Montzka S.A., Butler J.H., Elkins J.W., Thompson T.M., Clarke A.D. and Lock L.T., (1999), *Nature 398*, 690-694.

Rhew R.C., Miller B.J. and Weiss R.F., (2000), *Nature* **402**, 292-295.

Varner R.K., Crill P.M. and Talbott R.W., (1999), *Geophys. Res. Lett.* **26**, 2433-2436.