

Stable lead isotopes as geochemical tracers in remote air of the Atlantic

T.M. CHURCH¹ AND A.J. VERON^{1,2}

¹College of Marine Studies, University Delaware, Newark, DE, USA (tchurch@udel.edu)

²CEREGE UMR CNRS 6635 –Universite Aix- Marseille III Europole Med. FR (averon@cerge.fr)

Introduction

The continental emission of trace metal pollutants to the atmosphere is eventually advected to the remote ocean areas. The metal lead contains three stable isotopes (206, 207, 208) derived as terminal end products of the natural U and Th decay series. Thus sources of the lead emissions have continentally distinct signatures according to nationally utilized sources, but with transient changes according to the changes in economics and emission controls. The phasing out of leaded gasoline first in North America (70's) followed by Europe (80's) has resulted in large-scale reductions of lead in the North Atlantic atmosphere. This has allowed lead to be used as a proxy in time and space for identifying the sources and changes of continental metal emissions to the Atlantic.

Discussion of results

Stable lead isotopes have been monitored in atmospheric aerosols and precipitation at Bermuda over the past decade. This long-term record documents both seasonal and decadal changes in emission sources and intensity to the North Atlantic atmosphere. Here the lead stable isotopes can be used for the identification and quantification of the atmospheric trace element sources. Documented by proxy is the scavenging and resulting deposition of trace elements to the Atlantic Ocean. Thus the lead atmospheric signature in time and space has served both atmospheric and oceanic geochemists as a tool to resolve changes in the proportion of trace element deposition to the remote Atlantic Ocean.

Retrieval of Asian dust amount over land using ADEOS-II / GLI near UV data

M. KUJI, N. YAMANAKA AND S. HAYASHIDA

Nara Women's University, Japan (makato@ics.nara-wu.ac.jp, norina@ics.nara-wu.ac.jp, sachiko@ics.nara-wu.ac.jp)

Asian dust (Yellow sand or Kosa aerosol) is one of the species that may cause transboundary air pollution when it is a severe event. We tried to estimate the Asian dust columnar amount around a source region using a near ultraviolet radiometry observation from space: Global Imager onboard Advanced Earth Observing Satellite-II (GLI / ADEOS-II) observation data in spring, 2003 around Taklimakan desert source region inland China. The retrieved optical thickness and mode radius were about 0.34 and 1.75 μm , respectively, at a validation site. They are comparable to the *in situ* observations conducted within the framework of Aeolian Dust Experiment on Climate impact (ADEC) project. The estimated columnar amount around a validation site is about 2.77 g m^{-2} , which seems reasonable as a background situation. The retrieved results should be further validated with a regional model simulation study, and then the method is useful to monitor Asian dust around source regions from space in future.

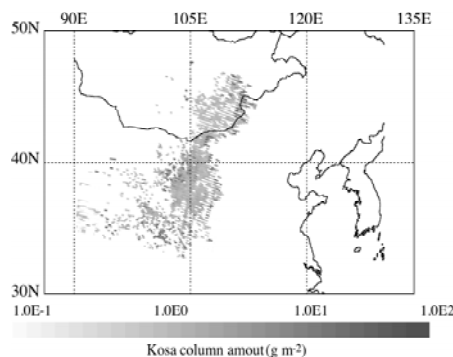


Figure 1: Retrieved columnar amount of Asian dust inland China.

Reference

Makoto K., Yamanaka N., Hayashida S., Yasui M., Uchiyama A., Yamazaki A. and Aoki T., (2005), *submitted to SOLA*.