

Halogen compositions in kimberlites and their constituent minerals

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Introduction

Studies on the isotope and element compositions in kimberlites will provide important information to estimate chemical environment of the Earth's mantle. We had analyzed major and trace elements in kimberlites from South Africa and China. However, some kind of data about chemical compositions of kimberlites are still lacking. Especially, data of halogen elements are very limited. In this study, we analyzed concentrations of halogen elements (Cl, Br, I) in kimberlites and their constituent minerals from six regions, and considered the characteristics and their origin of each area.

Samples and method

Samples analyzed are 34 kimberlites collected from South Africa, China, Greenland, Brazil, Canada and Russia. For the determination of halogen, we used the pyrohydrolysis method combined with ICP-MS [1].

Results and Discussion

The results show that concentrations of Cl, Br and I in kimberlite samples are higher than those in common ultramafic rocks. Markedly high Br concentrations (>10ppm) are found in some kimberlite samples from China and Russia, while iodine concentrations in some samples from South Africa, Greenland, Canada and Brazil are relatively high (>0.1ppm). The I/Br ratios (about 1×10^{-1}) in kimberlites obtained for South Africa, Greenland, Canada and Brazil are very similar and relatively high, and they are similar to those in chondrite (CI), peridotite and basalt. The I/Br in kimberlites possibly shows the characteristics of halogen in the mantle where kimberlite magmas were formed. In case of Chinese and Russian kimberlite samples, the I/Br ratios (about 2×10^{-3}) are significantly low suggesting that they are associated with materials having low I/Br ratio, which might have been influenced by seawater (I/Br ratio: 1×10^{-3}).

[1] Muramatsu & Wedepohl (1998) *Chemical Geology* **147**, 201–216.

UV-VIS absorbance, fluorescence and concentration of dissolved organic carbon (DOC) of sea-surface microlayer samples collected at Okinawa, Japan

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Introduction

The sea-surface microlayer (SML) covers the ocean surface, and SML has been operationally defined as roughly the top 1 to 1000 micrometer of the ocean surface. SML controls transfer of chemical substances between the ocean and atmosphere, influencing the chemical compositions of atmospheric aerosols that occur in breaking waves. Since solar radiation reaching the ocean surface is relatively strong, compared to the underlying bulk seawater, photochemical reactions on the ocean surface could induce significant chemical changes which in turn change chemical compositions of atmospheric aerosols. This study tries to elucidate the photochemical properties of SML by measuring the UV-VIS absorbance, fluorescence and concentration of dissolved organic carbon (DOC).

Discussion of Results

We collected coastal SML samples around Okinawa Island, Japan. Okinawa Island is located in semi-tropical region and parts of the island coast are covered with coral reefs and parts of the island are heavily affected by human activities. We selected 10 sampling sites representing different environmental conditions, i.e. close to residence area or relatively remote area. We used a glass plate method to collect SML samples, and at the same location and time bulk seawater samples were collected about 10-cm below the surface with high density polyethylene bottles.

Results showed that enrichment factors (EF), defined as ratio between SML and bulk seawater, of absorbance (at 300 nm) and DOC were ca 1.0 to 2.4 and 1.0 to 1.8, respectively. Based on the fluorescence measurements, it is suggested that humic acid-like compounds and aromatic amines were concentrated in the SML, compared to the bulk seawater. We further discuss impacts of human activities on photochemical properties of SML around Okinawa Island.