Characterization of individual insoluble particles in ice core

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Introduction

The main purpose of this study is to identify individual particles contained in an ice core and trace their sources by the combined use of quantitative energy-dispersive electron probe X-ray microanalysis (ED-EPMA), which is also known as low-Z particle EPMA, and attenuated total reflectance FTIR (ATR-FTIR) imaging. It is capable of characterizing different minerals and their isomorphs even on single particle basis. Totally 606 individual insoluble particles from the ice core collected in the East Rongbuk from Mt. Qomolangma (Everest) were characterized. The particles in four samples, sample A-D, collected from different depths were analyzed.

Samples

Sampling site: The East Rongbuk glacier located on the northern slope of Mt. Everest (28°03′N, 86°58′E, 6518 m a.s.l)

Results

Relative abundance and characteristics of specific samples

Volcanic ashes of Huaynaputina
- andesites to dacitic pumices (SiO2 wt% from 57-67)
- high K-content (Oliver et al., 1999)

Our study reveals that the possibility of encountering a SiO2 particle to that of a feldspar particle in this sample is 34% and 16%, respectively. The possibility ratio of SiO2:Feldspar particles is 34/16 or 68:32 which might be correlated with the reported wt% of andesite to dacite mineral in bulk volume of Huaynaputina volcanic rock. However, when this bulk mineral is dispersed as single particles due to volcanic activity possibility of encountering SiO2 and feldspar particles may remain similar.

Moreover, this sample encounters a large number of particles majoring in K-containing minerals i.e. K-feldspar, muscovite and illite. This results is consistent with the before mentioned report saying the enrichment of K-content observed in bulk mineral analysis of Huaynaputina volcanic rock.

References