

SEM observation of insoluble particles in an ice core drilled from Grigoriev Ice core, Tien Shan Mountains.

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Ice cores usually contain insoluble particles, such as volcanic ash, pollen and mineral particles, which have been blown on glaciers by wind. Volcanic ash has been used to identify the age of layers and mineral dusts are used as proxies of land surface or climate. Ice cores drilled from mountain glaciers in mid or low latitude areas contain abundant mineral dust. Although the abundance of mineral particles is often quantified with a particle analyzer, the morphology and elemental composition of each particle has not been studied well. In this study, we analyzed mineral particles in the ice core drilled from Grigoriev Ice Cap in Tien Shan in Central Asia, with a scanning electrical microscope (SEM) and classified them based on their elemental compositions analyzed with EDS.

The size of mineral particles in the ice core ranged up to 30 μm in diameter, but was mostly smaller than 10 μm . Based on the elemental composition, 60 - 90% of analyzed particles were Si or Al-rich particles. They are likely to be quartz or feldspar derived from desert surrounding the glacier. The remaining particles were Mg, Fe, or Ca-rich particles. Their abundance varied among the different layers. The variation may be due to different provenance of the particles.