

# Seasonal and interannual change in mercury sequestration at Dome Fuji, Antarctica

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The total mercury concentration ( $Hg_T$ ) was determined with high precision in snow pit samples collected every 2.5 cm down to 2 m, covering ~27 years (1983-2010), at Dome Fuji in East Antarctica. This high-resolution data provide new information on seasonal and interannual change in mercury sequestration rate and factors affecting it.

The  $Hg_T$  ranged between 0.20 ( $\pm 0.02$ ,  $2\sigma$ ) and 5.20 ( $\pm 0.05$ )  $pg\ g^{-1}$  with variations at seasonal and interannual time scales. The mean mercury sequestration rate was estimated to be  $3.1 \pm 0.1\ pg\ cm^{-2}\ yr^{-1}$ , slightly higher than the previous estimate at Dome Fuji [1]. By comparison with sulfate concentration,  $\delta^{18}O$ - $\delta D$  and deuterium excess profiles, the seasonality was characterized by summertime maxima in  $Hg_T$ , even though the peaks were not always exactly in phase. The enhanced mercury sequestration may be related to the active photochemical dynamics of mercury in summer [2]. We ascribe the interannual change to the variation in the atmospheric circulation over Antarctica that regulates the meridional transport of aerosols containing oxidant precursors, continental dust, moisture and heat, each of which is thought to play a role in the mercury dynamics on the Antarctic Plateau [3].

[1] Han et al. (2011) *Mineral. Mag.* **75**, 972. [2] Brooks et al. (1998) *Atmos. Environ.* **42**, 2877-2884. [3] Han et al. (2011) *Bull. Korean Chem. Soc.* **32**, 4258-4264.