Stable isotopes in daily precipitation at Dome Fuji, east Antarctica

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Stable isotopes in ice are the most familiar index of temperature in ice core study and the relation between stable isotopes in deposited snow and temperature has been studied in many previous studies. However, observations of stable isotopes in precipitation (not deposited snow) were few. Stable isotopes in precipitation during the wintering during 2003 at Dome Fuji, east Antarctica were analyzed in this study. Precipitation samples were collected at the height of 2.5m from the surface nearly every day. Total amount of precipitation is 28 mm water equivalent, which coincides with surface accumulation measured by the stake network near the station. Stable isotopes show clear seasonal fluctuation correlating with air temperature. The minimum values of oxygen and hydrogen isotopes are about -80 and-600 per mil, respectively, which are the lowest values observed ever. Since precipitation events occurred in warmer condition, precipitation weighted air temperature (-48 degree C) was warmer than the arithmetic annual average (-55 degree C). Although it has been controversial whether changes in precipitation seasonality might affect isotope-temperature relations in glacial and inter-glacial periods, this study supply the observational fact of the present days at a deep coring site in Antarctica.