Geophysical Research Abstracts
Vol. 12, EGU2010-4938, 2010
EGU General Assembly 2010

Spatial (data and model) and temporal variability of 17O-excess in East Antarctica

Renato Winkler (1), Amaelle Landais (1), Ryu Umuera (1), Cunde Xiao (2), Georg Hoffmann (1), Jean Jouzel (1), Maxwell Kelley (3), and Kotaro Fukui (4)

(1) Institut Pierre-Simon Laplace/Laboratoire des Sciences du Climat et de l'Environnement, Gif-sur-Yvette, France (renato.winkler@lsce.ipsl.fr), (2) State Key Laboratory of Cryospheric Sciences, Lanzhou, China, (3) Columbia University, Center for Climate Systems Research, NASA Goddard Institute for Space Studies, New York, USA, (4) Tateyama Caldera Sabo Museum, Toyama, Japan

For many decades stable water isotopes (δD and δ^{18}O) are used as tracers in earth's hydrological cycle in order to get information about climatic parameters such as temperature and precipitation. In particular, δD and δ^{18}O in ice cores permit to reconstruct the polar temperature of the past. Improvements of the analytical devices made it possible to measure also the δ^{17}O of water with high precision. The combination of δ^{18}O and δ^{17}O leads to the definition of the so called ^{17}O-excess (ln(δ^{17}O/1000 +1)-0.528ln(δ^{18}O/1000+1)) by analogy with the d-excess (δD -8δ^{18}O). It has been suggested that ^{17}O-excess in the ice cores is a more direct indicator of relative humidity of the source region than d-excess and that the combination of the two parameters is essential to reconstruct the past climatic conditions in the evaporative regions.

Here we show new results for the spatial and temporal distribution of ^{17}O-excess in East Antarctica. We especially explore the isotopic composition of the surface snow in remote regions of East Antarctica characterized by very low δ^{18}O (between -60 and -55 permil). Then, we present the record of ^{17}O-excess over the last deglaciation (26 to 8 kyrs BP) in the EPICA Dome C ice core. Interestingly, this ^{17}O-excess record shows a more stable behavior than the one at Vostok. Finally, we compare our results with the spatial variability of ^{17}O-excess in precipitation obtained by the old version of the GISS GCM model.