Geophysical Research Abstracts
Vol. 14, EGU2012-3247, 2012
EGU General Assembly 2012

Production rate and climate influences on the variability of 10Be deposition in Greenland and in Antarctica

U. Heikkilä and A. M. Smith
ANSTO, Lucas Heights, Australia (ulla@ansto.gov.au)

The cosmogenic isotope Beryllium-10 is a commonly used proxy for past solar activity. This is possible because the production rate in the atmosphere is modulated by changes in cosmic ray intensity which in turn depends upon solar activity. After production, 10Be is transported through the atmosphere and deposited to the Earth's surface by either wet or dry processes. The layered snow pack in polar regions permits the chronology of 10Be deposition to be determined. On short time scales (less than a year) 10Be deposition mainly reflects seasonal changes in atmospheric circulation and precipitation, whereas on longer time scales the production rate dominates the variability. In this study we investigate the connection between various atmospheric circulation indices and 10Be deposition in present climate using the ECHAM5-HAM global aerosol-climate model. The North Atlantic Oscillation is an important factor driving precipitation variability in Greenland and also influences the 10Be deposition although there is strong spatial variability. In Antarctica the situation is more complex as the Southern Annular Mode and Southern Oscillation mainly influence precipitation over the southern ocean but not the Antarctic continent. A weak correlation is found between the Zonal wave pattern 3 and snow accumulation on the Antarctic coast. These results allow us to establish a connection between climate variability and 10Be deposition which can be used to filter out climate "noise" during periods of a major climate change, such as the glacial-interglacial changes.