Geophysical Research Abstracts
Vol. 14, EGU2012-14485, 2012
EGU General Assembly 2012

Stable Isotopes of Ice: the Legacy of Willi Dansgaard

J.W.C. White (1) and S.J. Johnson (2)

(1) Institute of Arctic and Alpine Research, University of Colorado, Boulder, USA, (2) Centre for Ice and Climate, Niels Bohr Institute Univeristy of Copenhagen, Denmark

Stable isotope ratios of ice, D/H and $^{18}O/^{16}O$ are one of the key climate indicators measured in ice cores. These isotope ratios vary with temperature, a relationship based on physical principles backed up by many observations. The combination of these isotope ratios, expressed as the difference between the delta values with $\delta^{18}O$ scaled by a factor of eight, is called the deuterium excess (d=δD-8*$\delta^{18}O$). This parameter varies primarily as a function of the conditions of evaporation of the parent moisture for snow, yielding a signal of ocean conditions measured in the ice. In his classic 1964 paper in *Tellus*, Willi Dansgaard laid out the theoretical and observational basis for using stable isotope ratios in ice cores as paleo-environmental tools. This paper, cited over 2,200 times, and written nearly 50 years ago, is one of the key foundational papers in paleoclimatology, and remains a must read for any student of stable isotope geochemistry. In this talk we will explore Dansgaard's legacy of ice core climatology, with a focus on his pioneering work in using the full temporal resolution of ice cores in Greenland to explore climate change on time scales of years to decades. While Dansgaard began his career applying a clever technique to a novel medium with the goal of simply trying to understand how our planet functions, he early on understood the power of ice cores to inform us about human impacts on the climate system, as well as the power of ice cores to tell us about natural climate variability on time scales of human interest and impact. Dansgaard's body of work is one of the solid pillars on which modern paleoclimatology stands, and continues to inform us today about modern anthropogenic climate change.