Geophysical Research Abstracts
Vol. 15, EGU2013-11294, 2013
EGU General Assembly 2013

Exploring the potential of sea salt as a proxy for sea ice extent at Antarctic ice core sites

James Levine (1), Xin Yang (2,3), Anna Jones (1), and Eric Wolff (1)

(1) British Antarctic Survey, Cambridge, UK, (2) Centre for Atmospheric Science, University of Cambridge, Cambridge, UK, (3) National Centre for Atmospheric Science, University of Cambridge, Cambridge, UK

Sea ice is both a reflection of, and a feedback on, the Earth's climate; it is also a source of chemically-reactive trace gases that profoundly affect polar atmospheric chemistry. A record of the extent and geographical distribution of sea ice, and their co-evolution with past climate, would therefore be highly valuable, and the hope is that a chemical proxy measurable in polar ice cores could contribute to this. Diatom assemblages in Antarctic marine sediment cores provide robust records of the timings of transitions between permanent sea ice, seasonal sea ice and permanent open ocean at specific sites. However, it remains difficult to piece together the polar-wide, temporal evolution of sea ice, and it is here where ice-core records of sea salt could potentially provide complementary regionally-integrated and long-term information on sea-ice extent. Besides uncertainties surrounding the sources of sea salt reaching ice-core sites, specifically the relative importance of sea-ice related sources compared to the open ocean, the influence that meteorology has on the production of sea salt and its transport to these sites remains uncertain. Here, we present findings from a series of model experiments aimed at quantifying the relative influences of sea-salt sources and meteorology on the flux of sea salt to Antarctic ice cores sites. We compare inter-annual variations in these influences, then in a simple fashion, extend the exploration to glacial-interglacial ones.