Abstract ID : **59**

Does the Mt. Hunter (Alaska) water isotope record preserve changes to storm tracks and Aleutian Low intensity over the past millennium?

Content

The atmospheric dynamics of the North Pacific and the region's connections with tropical and global climate over the past 1200 years remain difficult to accurately constrain. Existing ice core records in the region point to significant changes in the strength of the wintertime Aleutian Low, storm tracks, and winter and summer hydroclimate through the Medieval Climate Anomaly (MCA), Little Ice Age (LIA), and 20th century. However, there is substantial variation in ice core records from different locations and elevations, and these records have been interpreted in ways that are sometimes in conflict with one another and/or with other North Pacific paleoproxy records (e.g. tree rings, lake sediments). One substantial challenge to reconciling paleoproxy records from this region is that they have different seasonal (winter vs. summer) biases and/or integrate a climate signal over a full year or several years. Here we present the stable water isotope record ($\delta^{18}O$, δD, and the derived deuterium excess; dxs) from the Denali Ice Cores, developed from twin surface-to-bedrock cores collected in 2013 from the Mt. Hunter plateau (3900 m) in Alaska, at seasonal- (warm vs. cold season) to three-year resolution. The cores were sampled using a continuous flow analysis (CFA) system, and dated by glaciochemical annual layer counting. Methanesulfonic acid and magnesium peaks are used to delineate cold and warm seasons and produce a seasonal isotope dataset through the 20th century. The most remarkable feature in the record is elevated deuterium excess through the LIA (1422-1902), with lower values through the MCA (800 - 1258) and the 20th century (1902-2012). We explore source region sea surface temperature, relative humidity, and Bering Sea ice as potential drivers of these dxs shifts. We also observe strong correlation between the strength of the Aleutian Low and the cold-season $\delta^{18}O$ record from 1950-2012, and discuss potential mechanisms behind this relationship and its implications for interpreting the entire δ18O record.

Primary author: KIRKPATRICK, Liam (University of Washington)

Co-authors: OSTERBERG, Erich (Dartmouth College); WINSKI, Dominic (University of Maine); KREUTZ, Karl (University of Maine); INTRONE, Douglas (University of Maine); FERRIS, David; WAKE, Cameron (University of New Hampshire); KOPEC, Ben (University of Alaska Anchorage); MARKLE, Bradley (University of Colorado Boulder)

Presenter: KIRKPATRICK, Liam (University of Washington)

Track Classification: High-alpine ice cores