Climate Sensitivity of Tree-Ring Width and Blue Intensity of *Larix Sibirica* and *Pinus Sylvestris* in Mongolia

[1]Leah Marshall, [2]Caroline Leland, [2]Laia Andreu-Hayles, [2]Rose Oelkers, [2]Dallas Abbott, Robert Juhl

[1]College of William & Mary, [2]Lamont Doherty Earth Observatory of Columbia University

In Mongolia, instrumental records date back to the mid-1900s, but climatic reconstructions based on tree-ring data extend much further, and can provide information on the full range of climatic variability from centuries to millennia. Here we investigate ring width (RW) and Blue Intensity (BI) records from *Larix sibirica* and *Pinus sylvestris* trees growing in Mongolia to determine if they can provide long-term records of temperature and/or hydroclimatic variability for this region. Second, we assess the climate response in Mongolia to large scale volcanic eruptions, as inferred from tree rings, and compare our inferences with historical data from China. Trees from three sites: *Larix sibirica* from Khorgo Lava (KLL), *Pinus sylvestris* from Shorgoobjyin Davaa (SJD), and *Larix sibirica* from Chuluut (CHU) were analyzed to generate RW and BI tree-ring chronologies for the past several hundred years and climate sensitivity for each parameter and site were assessed. As expected, the xeric sites, CHU and KLL, show high sensitivity to summer moisture. At CHU, both BI and RW records display a summer moisture signal, but the signal is stronger in BI than RW. Additionally, both parameters at CHU display a previous summer moisture signal. At KLL, both BI and RW series exhibit a growing season moisture signal, with RW showing the strongest sensitivity. At SJD, RW shows an early summer mixed temperature/precipitation signal, whereas BI is predominantly temperature sensitive. Regarding the signal of volcanic events in the studied RW and BI climate-sensitive chronologies, SJD and CHU showed both reduced RW and BI values (inferred dry and cold, respectively) after several volcanic events, including the 1815 Tambora eruption. Overall, the inferred climatic response to volcanic events was not consistent across sites and the historical and tree-ring records did not always agree showing the challenges of integrating interdisciplinary datasets. Evaluations of historic climate changes and impacts of volcanic eruptions over Mongolia are important for assessing recent climatic changes and how future climate conditions and volcanic eruptions can affect vegetation and climate in the region.