

Instrumenting the Conifers: A Look at Daily Tree Growth and Locally Observed Environmental Conditions Across Four Mountain Sites in the Central Great Basin, USA

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Tree growth is often used as a proxy for past environmental conditions or as an indicator of developing trends. Reconstructions of drought, precipitation, temperature, and other phenomena derived from tree-growth indices abound in scientific literature aimed at informing policy makers. Observations of tree recruitment or death in treeline populations are frequently tied to climatic fluctuation in cause-effect hypotheses. Very often these hypotheses are based on statistical relationships between annual-to-seasonal tree growth measurements and some environmental parameter measured or modeled off-site. Observation of daily tree growth in conjunction with *in-situ* environmental measurements at similar timescales takes us one step closer to quantifying the uncertainty in reconstruction or predictive studies. In four separate sites in two different mountain ranges in the central Great Basin, co-located observations of conifer growth activity and local atmospheric and soils conditions have been initiated. These monitoring efforts are undertaken as part of the Nevada NSF-EPSCoR NevCAN transect installations, where a host of other environmental sensors are present. Species include *Pinus longaeva* (Great Basin bristlecone pine), *Pinus flexilis* (limber pine), *Picea engelmannii* (Engelmann spruce), *Pinus monophylla* (singleleaf pinyon pine), *Pinus ponderosa* (ponderosa pine), *Abies concolor* (white fir), and *Pseudotsuga menziesii* (Douglas-fir). Measurements of sub-hourly tree radial length change and sap flow activity are compared with a suite of *in-situ* observations including air temperature, precipitation, photosynthetically-active radiation (PAR), relative humidity, soil temperature, soil moisture/water content, and digital imagery.