Isocamp 2019 **CAN TREES?**

Carbon in **A**ged **N**eedles **T**rack **R**esponses to **E**levation and **E**nvironmental **S**tress**?**

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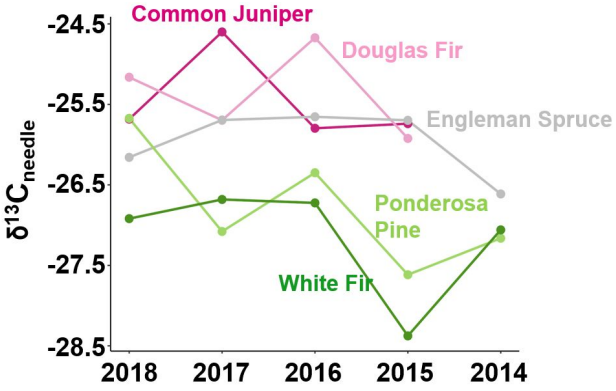
Intro: Periods of low water availability trigger plants to close their stomata to preserve leaf water, resulting in less diffusion of carbon with more ^{13}C is incorporated into the plant tissue during photosynthesis. We want to track these changes in aged conifer needles.

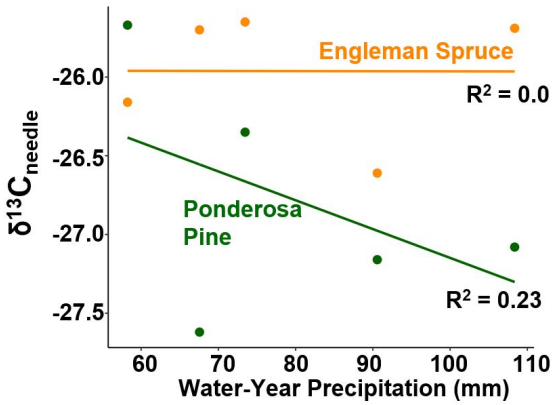
Environmental Stress

Question/Hypothesis: Are certain species more sensitive to changes in annual precipitation and is that reflected in $\delta^{13}C$ data for conifer pine needles? Non-native species (i.e. ponderosa pine) would reflect changes in annual precipitation because they haven't evolved to acclimate to the local environment.

Study design: 5 conifer species; needles collected from lower branches; aged 2019-2014

Results: Ponderosa Pine δ13C had the strongest relationship with interannual precipitation variability and Water-year precipitation explains ~20% of variance.



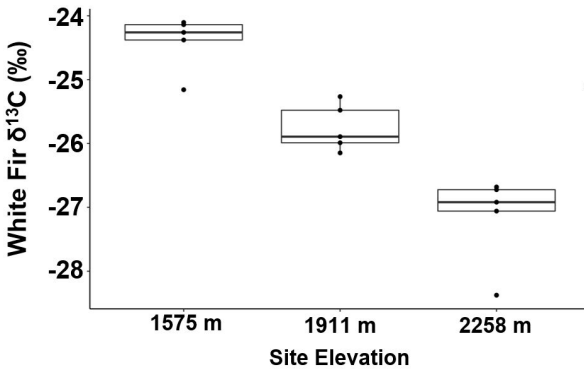


Elevation Stress

Question/Hypothesis: Is elevation reflected in $\delta^{13}C$ data in conifer needles? Trees growing at lower elevations should experience more water stress and will have higher $\delta^{13}C$.

Study Design: White Fir trees at three sites with elevations of 2258m, 1911m, 1575m; needles collected from lower branches; aged 2019-2014

Results: $\delta^{13}C$ values became more depleted as elevation increased, indicating trees experienced more water stress at lower elevations when compared to the same species at higher elevations.



TREES CAN!