

Project Title: WISHES- Water in Stems Have Evaporated from their Sources

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Introduction:

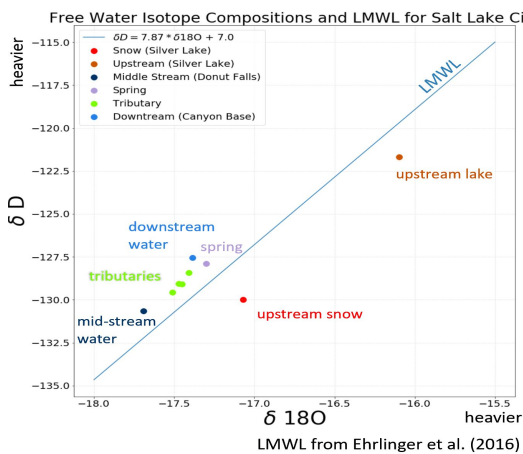
Stable isotopes of water are a useful tools in the study of surface hydrology. Combined hydrogen and oxygen isotopic data provide us with a unique geochemical tool for evaluating the sources and flow paths of surface waters. Isotopic fractionation during evaporation into unsaturated air is a combination of equilibrium and kinetic (diffusion-based) fractionation between water and vapor (Craig and Gordon (1965)).

Hypotheses

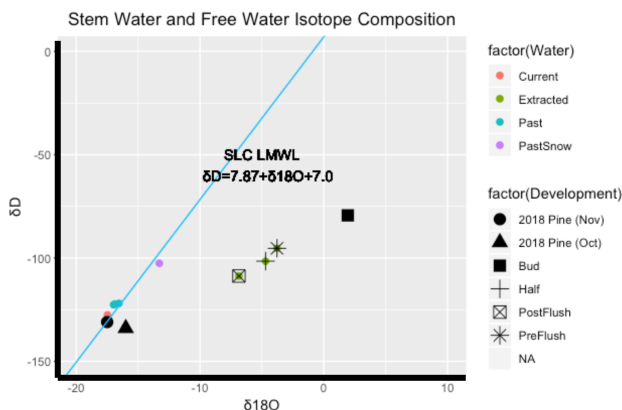
- Both snowmelt and Silver Lake are major sources of water for Big Cottonwood Canyon Stream.
- The pre-flushed stems for the current season contain residual water from the end of the last year’s growing season.
- The post-flushed stems contain snowmelt that is from this year’s growing season.

Methodology: Xylem water from Willow *sp*, Aspen *sp* and Pine *sp* extracted through cryogenic vacuum distillation. Surface water collected from snow and lake water were analyzed with a Picaro.

Results:



- Isotope values for lake water > snow values
- Sampling of locally evaporated water
- Tributaries, spring, and mid- and downstream water all within error
- No significant evaporative loss with distance downstream
- Spring emits current snowmelt



- Stem water for aspen buds show evaporative enrichment
- Stem water for flushed samples show mixing with modern source waters