Optimizing a Continuous Flow Analysis (CFA) System for Water Isotope Research

Noah Brown*, Maciej G. Śliwiński, Lindsey Davidge, Haley Lowes-Bicay,

Andrew J. Schauer, Eric J. Steig

Isolab, University of Washington (*nbrown21@uw.edu)



















Replicate CFA stick melts (unprocessed data)



Approach

- VSMOW-SLAP calibrated reference waters are used to assess performance
- An optimized system should produce an isotope signal that is stable and without significant drift over the duration of a typical analysis day.
- An analysis day is 12 hours of nighttime reference water measurement followed by 12 hours of ice core measurement.
- The memory effect, which is a smoothing of isotope signals as sample water moves through the CFA system, should be rigorously characterized and minimized for proper backcorrection.

Cycling of Reference Waters



Relative Time (seconds)

Derivative of δD vs time during same transition

Conclusions

- The results show that there is no functional impact on memory and stability when using a metal nebulizer versus a glass nebulizer for vaporization.
- The system using a metal nebulizer is much easier to maintain, tune, and reconfigure
- Next Steps: Optimizing our post processing.

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Figure shows unprocessed ice-analysis log. 4 replicate CFA sticks (3 x 3 cm) were cut from Tube #96 of Greenland ice-core "JEMS2" from a depth of 98.56 – 99.57 m. CFA sticks were melted from stratigraphic bottom to top.

