



High-Frequency Liquid Water Isotope Analyzer for Hydrological Measurements in the Field

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A field deployable Liquid Water Isotope Analyzer has been developed that is capable of quantifying $d^{18}O$ and d^2H to better than ± 0.2 permil and ± 0.6 permil respectively on over 125 unknown samples per day (> 1000 injections per day) in the field. Improvements have also been made to enhance ease-of-use and facilitate field deployment, including an automated sampling system for natural waters. The instrument was deployed for 4 contiguous weeks in the H. J. Andrews Experimental Forest Long Term Ecological Research site in Western Oregon where it was used for real-time measurement of the isotope ratios of precipitation and stream water during three large storm events. We were able to document fine scale changes in rainfall composition and damping effects in the stream channel continuously through these periods. These preliminary applications show proof-of-concept of the new field analyzer—a device that will ultimately provide hydrologists with insight into water flow dynamics with unprecedented frequency over long time scales.