

## Development of a field deployable mass spectrometer for hydrological applications

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Hydrological processes research on water source, flow paths and transit times is currently limited by the coarse temporal resolution of the water sampling and analysis protocols, essentially due to the use of lab-based analytical instruments. The development of a field deployable instrument for measuring stable isotopes in water at high temporal frequencies thus is a continuation of past and ongoing efforts that target a better understanding of hydrological processes. This paper presents the development of a field portable mass spectrometer instrument for direct high frequency measurement of  $\delta^2\text{H}$  and  $\delta^{18}\text{O}$  ratios in water. The instrument is based upon the use of a modified Mattauch - Herzog double focusing magnetic sector mass spectrometer in combination with an electron impact ion source and a membrane inlet system. All the components are arranged in a vacuum case having the dimension of 72x27x17 cm. The weight of the setup is about 35 kg. The mass resolution of the mass spectrometer is demonstrated to be better than 2000 that allows  $\delta^2\text{H}$  and  $\delta^{18}\text{O}$  isotopic ratio measurements. Detail of the instrumentation design and the proof-of-concept experimental results on  $\delta^2\text{H}$  and  $\delta^{18}\text{O}$  isotopic ratio measurements of water will be presented at the workshop.