Northern Gulf of Mexico speleothem climate record from 4 kyr to present

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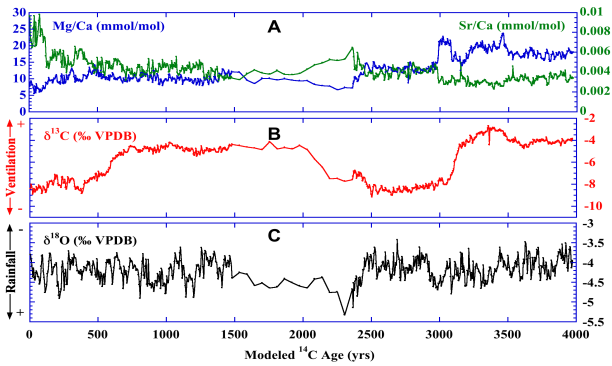
Speleothem stable isotopes are excellent terrestrial archives of contemporaneous climate data, due in part to advances in dating techniques and sampling resolution over the last decade. Recent cave monitoring studies have demonstrated that, under the right conditions, *in situ* calibrations between meteorological parameters, drip chemistry, and modern calcite chemistry atop stalagmites allow quantitative interpretation of those stalagmites [1, 2]. Here we present a calibrated 4 kyr-present speleothem paleorainfall record retrieved from Hollow Ridge Cave (HRC), Marianna, FL, USA.

Speleothem HRC2 was sampled at 0.5 mm (5 yr) intervals for isotopes and trace elements. Preliminary 14C dates indicate that HRC2 grew continuously (0.1 mm/yr) from 4 kyr to 2.4 kyr, and from 1.5 kyr to present (see Figure). HRC2 displays ~1‰ variation in δ18O on 25-50 year cycles, and three major (~4‰) excursions in δ13C which we interpret as changes in ventilation and drip CO2 degasing. Negatively-correlated Mg/Ca and Sr/Ca suggests that source hydrochemistry is controlled by variable mixing between dissolved limestone and dolomite [2]. Constant speleothem Sr/Mg (bedrock mixing) ratios are prerequisite for interpreting $\delta^{18}O$ as simply rainfall amount [2]. Therefore, variations in HRC2 $\delta^{18}O$ represent a combination of rainfall amount, source, and *in situ* PCP that must be teased apart.



[1] Tremaine *et al* (2011) *GCA* **75**, 4929-4950 [2] Tremaine and Froelich (2013) *GCA* **121**, 522-545