New Geological Sciences Facilities: CU Boulder Earth Systems Stable Isotope Laboratory

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Focus:

- Measurement of small abundance isotopologues (e.g. carbonate “clumped” isotope thermometry and method development) for numerous modern and paleo-environmental applications

- C,H,N,O,S stable isotope ratios of a wide variety of earth materials for applications, including geology, ecology, forensics, microbiology
Instrumentation

• Gas source, dual-inlet stable isotope ratio MS
  
  – High-precision measurement of small abundance isotopologues
  
  • Primary application: mass-47 of CO$_2$ for determining ancient temperatures of carbonate mineral formation
    – Applications for paleoclimate, tectonics, subsurface fluid flow

Thermo MAT253 Plus with custom designed on-line and off-line vacuum CO2 extraction systems
Instrumentation

• Gas source, continuous flow stable isotope ratio MS
  – Elemental Analyzer:
    • wgt % C, N, $\delta^{13}$C & $\delta^{15}$N of organic matter in sediments, soil, plants and animals; both natural and labeled abundances
  – Headspace Analyzer:
    • Carbonate $\delta^{13}$C & $\delta^{18}$O; Waters – $\delta^{13}$C of DIC; $\delta^{15}$N & $\delta^{18}$O of nitrates/nitrites
  – High-temperature conversion EA:
    • $\delta^{18}$O & $\delta$D of bone, fossils, methane and hydrogen gas, & bulk organic matter, volcanic glass

Thermo Delta V Plus with Gasbench, EA and TCEA
Come up and see the Lab

• Room 345