Stable Isotopes Carbon and Oxygen as Geochemical Tracers on the Southwestern Colorado Plateau, Arizona. (S05-kowler225816-Oral)

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Abstract:

Secondary carbonates in Calcids and Petrocalcids on the Colorado Plateau were analyzed for Carbon stable isotope content. Foundational work has shown a correlation in pedogenic calcium carbonate between (1) d13C and photosynthetic pathway of vegetation, and (2) d18O, mean annual air temperature, and elevation. In light of these correlations, interpretation of the carbon isotope record enables the determination of peleoclimate and paleoecology for the soils examined. Soils in the study were found to have formed in a variety of climates, from arid to semiarid, hosting a variety of ecological communities from grassland to forest. Glacial cycles can be detected in the carbon isotope record by determination of ecological and climatic changes across time within and among petrocalcic sequences. The Quaternary marine record shows that most of Quaternary time was glacial; future work can show whether the terrestrial record supports the marine record, in which case the isotope record in petrocalcic horizons would dominantly reflect glacial climate and ecology.

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