

## **Spring Deposits of the Wilkins Peak Member, Green River Formation, WY, USA: Possible Solute Source for a Sodium-Carbonate Factory**

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The Wilkins Peak Member (51.1 – 49.6 Ma) of the Green River Formation, Greater Green River Basin, Wyoming, USA, is a giant saline lake deposit with abundant sodium-carbonate evaporites (trona) and oil shale. The solutes from which the Wilkins Peak Member chemical sediments formed are interpreted to have been derived from low-temperature weathering of bedrock in the drainage basin. However, lake margin spring mounds may have influenced the paleolake water chemistry and solute balance during this time. These mounds are composed of calcium carbonate, dolomite, and chert that form meter scale structures of travertine with coated grains. Some mounds are highly brecciated by hydrofracturing with quartz filled fractures that contain two-phase fluid inclusions, which are similar to features found in modern hydrothermal springs in the East African rift, Kenya. In this study, detailed petrography of the spring mounds will be investigated, along with their relationship to Wilkins Peak Member lacustrine sediments. Measurements of  $^{87}\text{Sr}/^{86}\text{Sr}$  isotopes in the spring deposits (dolomite) and surrounding lake carbonates will constrain the relationship between spring and lake deposits and how much spring inflow contributed to the lake solute balance. Microthermometry of fluid inclusions in fracture-filling quartz will determine paleo-spring fluid temperatures and salinities. These results will be used for paleolake mass balance calculations testing spring vs. surface river water solute sources. Spring discharge during deposition of the Wilkins Peak Member may have impacted lake productivity, stratification, the preservation of organic matter, and ultimately the quality of the oil shale in the Greater Green River Basin.