***Not all rich zones are created equal: Geologic characterization of the Green River Formation in the Uinta Basin, Utah from core description including the new Skyline 16 core***

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To better characterize the stratigraphic heterogeneity of the Eocene Green River Formation (GRF) oil shale deposits in the Uinta Basin, Utah, a new core was drilled in May 2010 (Skyline 16) that captured the entire Parachute Creek member (roughly 1000 feet). During recovery, special care was taken to preserve the core, allowing for a wide variety of future research experiments to be performed on *fresh*, unaltered material. Herein, we highlight stratigraphic relationships displayed in the newly slabbed Skyline 16 core. This core was included in an integrated sedimentologic, stratigraphic, and geochemical study of a four-core, 24-mile transect through the GRF in Utah, which shows that Lake Uinta evolved in three phases:

1) a freshwater rising lake phase below the Mahogany zone,
2) an anoxic deep lake phase above the base of the Mahogany zone, and
3) a hypersaline lake phase within the middle and upper R-8 zone.

High-resolution (~5-10 foot spacing) elemental analysis (X-ray fluorescence) was employed to help define these lake phases and provide composition data for use in oil shale extraction development as well as other scientific experiments. The individual organic-rich (R) zones found in the Uinta Basin record changes in lake environment, resulting in very distinct sequences of oil shale that differ dramatically between each organic-rich interval. For example, the R-4 and R-5 zones in Utah are characterized by regular, ~10-foot shallowing upward cycles of organic-rich mudstone transitioning to organic-lean dolomitic intervals. This alternation significantly dilutes the available kerogen in these zones, making them less ideal for mining operations, but these zones could still be economic for in-situ technology. Within the Uinta Basin, the upper R-6, Mahogany zone (R-7), and lower R-8 intervals, which record Lake Uinta's rise to its highest level followed by a slow decline, contain a more uniform sequence of organic-rich rocks more suitable for recovery via mining and surface retort.