

**Title:**

**Deposition and Diagenesis of Basin-Center Evaporites, Green River Formation**

**Abstract:** (Your abstract must use 10pt Arial font and must not be longer than this box)

The physical and chemical conditions of deposition and diagenesis of the Green River evaporites and associated basin center deposits are controversial. Still unknown is why the principal sodium carbonate minerals in the Green River basin (GRB) (trona, shortite) differ from those in the Piceance Creek basin (PCB) (nahcolite, dawsonite). One possibility is that the PCB nahcolite may be a primary precipitate whereas the GRB trona may have formed during diagenesis. Nahcolite occurs in the PCB as bedded deposits, in places finely layered with halite. Nahcolite laminae are made of microcrystalline chemical "mud" and halite "cumulate" rafts and plates, textures diagnostic of primary precipitation at the air-water interface of a perennial density stratified saline lake. Preliminary study of trona, the dominant sodium carbonate mineral in the coeval Wilkins Peak Member of the GRB, shows that primary depositional features are lacking. Trona consists of randomly oriented radiating sprays and prisms with pore spaces filled with poikilotopic halite cement, all suggestive of a diagenetic origin for the trona and halite of the Green River basin. The Green River trona and nahcolite have paleoclimate significance because the equilibrium assemblage of sodium carbonate salts depends on atmospheric  $p\text{CO}_2$ . Nahcolite, formed at the surface of a perennial saline lake in contact with air, suggests formation in equilibrium with atmospheric  $\text{CO}_2$  and that the early Eocene atmosphere had elevated  $p\text{CO}_2$ , at least 1125 parts per million by volume (ppm).

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