Petrography and characterization of microbial carbonates and associated facies from modern Great Salt Lake and Uinta Basin's Eocene Green River Formation in Utah, USA

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Abstract

Utah contains unique analogues of microbial hydrocarbon reservoirs in the modern Great Salt Lake and the lacustrine Eocene Green River Formation within the Uinta Basin. Characteristics of both lake environments include shallow-water, ramp margins that are susceptible to rapid widespread shoreline changes, as well as comparable water chemistry and temperature that were ideal for microbial growth and formation/deposition of associated carbonate grains. Thus, microbialites in Great Salt Lake and cores from the Green River Formation exhibit similarities in terms of microbial textures and fabrics. A detailed petrographic analysis provides unique insights into these modern and ancient deposits that can be used to determine reservoir characteristics in other microbial carbonate petroleum plays.

Great Salt Lake is a hypersaline lake and carbonate 'factory', containing actively forming microbial mats, stromatolites, thrombolites and associated carbonate grains. Open constructional pores are common within a spectrum of microbial structures. Green River Formation cores display excellent examples of stromatolites and thrombolites that contain primary megascopic pore and microporosity, as well as carbonate grainstones composed of ooids, peloids and skeletal material with abundant interparticle and intraparticle porosity. West Willow Creek oil field produces from a Green River microbial buildup/mound, a feature not currently recognized in Great Salt Lake.

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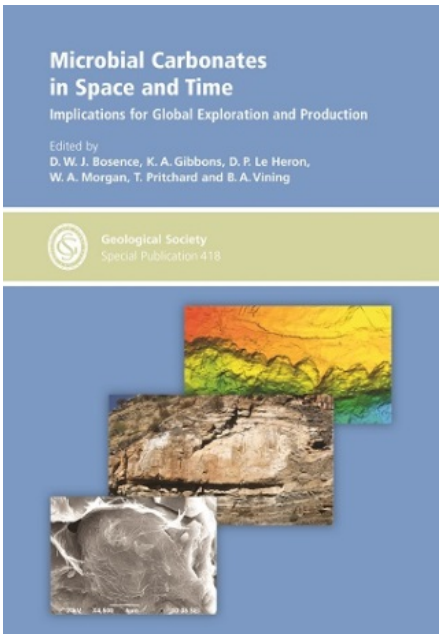

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