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Evidence for Deep Anaerobic Biodegredation Associated with Rapid Sedimentation and Burial in the Beaufort-Mackenzie Basin, Canada

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Summary

Formation waters of the Beaufort-Mackenzie Basin, Arctic Canada, show a broad range of salinity and water chemistry but no systematic relationship with depth. Three main water types are defined, paleo sea-water, freshwaters related to a gravity driven flow system, and low TDS – high alkalinity waters. High alkalinity waters are isolated in overpressured fault blocks characterized by rapid sedimentation and burial. The high alkalinities (up to 9000 mg/L) are interpreted to be related to in situ CO_2 generation through anaerobic methanogenesis during burial. The dominant control on biogenic gas generation appear to be maximum burial temperature rather than the modern temperature distribution, consistent with the paleopasteurization model.