A tale of two microbialites – the Late Jurassic extremes: the #9 Limestone beneath the shelf margin delta of the Venture gas field in the Sable Island area versus the Albatross B-13 slope of the Abenaki shelf margin on the Western Shelf, offshore Nova Scotia, Canada

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Carbonates are not like siliciclastics. In fact carbonates, especially modern coral reefs, do not like siliciclastics and their often-associated nutrients. Yet in the Late Jurassic offshore Nova Scotia, the large Sable Island paleodelta and the thick Abenaki carbonate shelf with coral reefs are contemporaneous. Two different shelf morphologies are associated with the respective bodies – prograding ramp for the delta and its thin interbedded limestones versus steep-sloped platform for the carbonate shelf to the west. Microbial mud mounds are common in deeper water and slopes of the Abenaki margin showing a consistent pattern of changes depending on their distance from the Sable Island delta. This is most readily seen in color changes that reflect closely J.L.Wilson's (1975) observation that "sedimentary rocks have three significant colors - dark, light and red"! The slope sediments in the most distal Albatross B-13 are cyclic red and whites and may represent some of the geologically youngest red stromatactis mud mounds that had their acme in the mid-Paleozoic. Slope colors become increasingly dark more proximal to the delta. And within the delta, cores in Penobscot L-30 and South Venture C-62 show both dark colors and limited biotic diversity. The C-62 cores are particularly interesting because they give an independent check on the shelf margin delta model and sequence stratigraphic scenario presented for the Venture gas field by Cummings and Arnott (2005). Changes from a biotically depauparate marl up into a microbial mud mound then an argillaceous sponge reef mound with some stromatoporoids and possible red algae in less than 7 meters reflect a forced regression and falling sea level. This can be fitted well to the published deltaic sequence stratigraphy as long as it is appreciated that the "condensed limestone facies" is actually a distal composite recording of changes in sea levels, nutrient supply and ultimately sediment type that replaces the carbonate as the delta progrades. As well the maximum flooding surface is during the microbial mound stage below the abrupt change across a pyritized hardground upward into laminated black shale. This reflects problematic differences in sequence stratigraphic concepts as applied to carbonates versus siliciclastics. Relative to understanding the Abenaki platform, C-62 core gives insights into the relationships seen only in cuttings and sidewall cores in Queensland M-88 which drilled the slope and basin immediately in front of the Deep Panuke gas field in the Abenaki. M-88 and C-62 also hold some promise to be potential links for correlating and dating the massive carbonates and the Sable Island deltaic si-

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liciclastics. Relative to the thick siliciclastics, it shows the utility of thin carbonates to be sensitive indicators of the surrounding sand and shale sedimentation.