MFS Reef-Mounds: a record of large accommodation shifts at Maximum Flooding Surfaces

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ABSTRACT
Large carbonate reefs occur in association with maximum flooding surfaces (MFS) of low order sequences. They are reef-mounds, more than 100 m in thickness, yet less than one kilometre in width. Flanks can be fairly steep, dipping up to 45 degree off-mound. The largest reef-mounds occur in the distal areas of the basin. They are overlain and onlapped by deeper-water mudrocks that lie at the base of thick shallowing-upward regressive successions. The mounds stood high above the surrounding sea-floor, yet they were drowned prior to onlapping by younger sediments. Hence the reef-mounds form the culmination of long-term trangressive trends, and the upper buildup surface is the MFS of major sequences. Examples of MFS reef-mounds can be found throughout the geological record on all continents.

In the Sverdrup Basin, Late Paleozoic MFS reef-mounds recorded the transition between recurring phases of compressional or extensional tectonic stress buildup and subsequent phases of passive regional subsidence. Stress buildup phases, which led to crustal deformation, differential subsidence, and faulting, are recorded in the transgressive systems tracts (TST) of low order sequences. Intervals of tectonic quiescence are recorded in the regressive systems tracts (RST). The MFS reef-mounds hence recorded accelerated subsidence and rapid increase in accommodation space associated with the release of tectonic stress. The thickness of the mounds, their deep-water biota, their relatively short time duration yet high sedimentation rates, and their ultimate drowning, point to episodes of basin-wide crustal collapse associated with stress-release events, independent of eustatic fluctuations recorded on a global scale.