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**Carbonate Porosity Control by Aluminosilicate Distribution: Finnmark Carbonate Platform (Pennsylvanian-Permian), Offshore North Norway**

The entirely subsurface Finnmark carbonate platform shows wide variation in porosity both in vertical sections and laterally within given stratigraphic units. The most prospective reservoir interval consists of shallow-water facies forming a hierarchy of small shoaling-upwards cycles within larger cycles. Porosity is strongly layered and is thus controlled by cyclic variations in lithology and depositionally controlled diagenetic responses. Maximum porosity development occurs above the largest-scale (second-order) sequence boundary, rather than below it, as might be expected for porosity control by dissolution below an unconformity.

Fluid inclusion data indicate that burial cements formed from a stratified column of high-salinity brine (increasing with depth from 3 to 6 times seawater salinity), possibly reflecting a series of reflux events at major lowstands during the depositional history. This stagnant pore-water system is apparently favorable for porosity preservation and is very different from the scenario of gravity-driven meteoric-water cementation that has effectively destroyed porosity in many other shallow-water carbonate platforms.

No evidence is observed for the creation of significant late secondary porosity during deeper burial. Most porosity is either primary or is related to dissolution or dolomitization near the depositional surface. Burial diagenesis consisted mainly of gradual infilling by cements. The vertical porosity profile correlates inversely with bulk-rock alumina content, reflecting both (1) low potential for eogenetic porosity creation in clay-rich carbonates and (2) sourcing of burial calcite cement from sites of chemical dissolution (stylolites) activated by depositionally concentrated aluminosilicate minerals. This relationship between porous intervals and lower alumina content is well known from sandstone reservoirs, so it should be no surprise to find the same basic process also operating in carbonates.