

Innovations in Carbonate Geology: 50 Years of Change

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About 50 years ago, a seminal paper classifying carbonate rocks was published and papers on modern carbonate depositional systems began appearing in the literature through research efforts in the Bahamas and elsewhere. However, few papers on carbonate rocks in the Rockies published during the 1960s incorporated these new ideas. Instead, of 118 papers published in *The Mountain Geologist* from 1964 to 1970, the 12 (10%) that focused mainly on carbonate rocks show that carbonate studies in the 1960s used primarily measured sections and paleontology to correlate various “blanket-like” Paleozoic rock units and generate isopach maps.

The decade of the 1970s saw major progress in interpreting Rocky Mountain carbonates. Of the 132 papers in *The Mountain Geologist*, 18 (14%) dealt mainly with carbonates. Not only did petrographic study of thin sections become a key part of many data sets, but documentation of how facies migrated through time became common. Outcrop-measured sections still had their place, but integration of subsurface data expanded and ideas on depositional environments of modern carbonates began appearing. A high point in carbonate interpretation was reached in 1977 with a special theme issue on Upper Cretaceous facies, faunas, and environments in the Western Interior Seaway.

Improved integration of outcrop and subsurface data with petrography and understanding of modern depositional environments continued into the 1980s, but the frequency of *Mountain Geologist* carbonate papers dropped to just 7% (9 of 122). Sequence stratigraphic concepts were being applied elsewhere in the country but not in the Rocky Mountain carbonate papers.

The 1990s *Mountain Geologist* papers on carbonates (14 of 105, 14.3%) covered topics from classic fusulinid biostratigraphy to Mississippian Waulsortian mounds. In the 2000s, carbonate papers dropped to 13 of 124 (10.5%), but sequence stratigraphic concepts were commonly applied, most notably to the lacustrine Green River Formation in Wyoming. Integrating structure and tectonics to interpret carbonate facies also began. This suggests that the next decade will bring new insights into the controls on, and evolution of, carbonate facies relationships.