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FIFTEEN YEARS OF THOUGHT EVOLUTION ON THE SEDIMENTOLOGY AND STRATIGRAPHY OF THE NEOPROTEROZOIC AND CAMBRIAN IN THE SOUTHERN GREAT BASIN: REFLECTIONS ON WORKING WITH JOHN COOPER

A number of watershed discoveries and events punctuate the evolution of how John Cooper and I have come to interpret the sedimentologic, stratigraphic, and tectonic evolution of Neoproterozoic through Cambrian strata in the southern Great Basin, California and Nevada. I began working with John Cooper in the middle 1980s on a senior thesis project that reinterpreted depositional environments of the Lower Cambrian Wood Canyon Formation (WCF) in the Marble Mountains. This had been thought to be a marine sand sheet, but contained evidence better explained as mostly having a fluvial origin. We became increasingly interested in regional correlations from cratonic to miogeoclinal sections in the Death Valley (DV) area, especially because the middle member WCF had been interpreted as fluvial in the 1970s by Paul Diehl. Classical Mesozoic thrusts, such as the in the Clark Mountains, emplace thick miogeoclinal stratigraphy directly on cratonic deposits making correlations quite easy, or difficult, depending on how to handle the sub middle member WCF stratigraphy. In the winter of 1991-1992 we measured and described 17 sections in different ranges, which led to the rediscovery of the presence of the metamorphosed sections in the Kelso and Old Dad Mountains. In particular, the Kelso Mountains contain a stratigraphy, completely intact, from the Johnnie Fm through equivalents of the Carrara Fm albeit much thinner than in DV. This section has proved critical in shaping our ideas on sequence "shingling." A decade-long problem has been dealing with the lower member WCF. What emerged by the dawn of the millennium was the recognition of transitional depositional systems, such as the braid delta, as critical in solving the different stratigraphic problems, and for providing the context of defining a genuine transitional craton margin hinge. Our work has led to the present day interpretation that the depositional environments and sequence packaging for the Johnnie Formation and units above suggest they were laid down in a passive-margin setting, with major unconformities the result of variable subsidence coupled with sea-level change. In coming to our present notions, we discarded many hypotheses, but have shared more than 15 years of rewarding intellectual challenge and friendship.