Wednesday, May 29, 2019

Petroleum Club of Houston • 1201 Louisiana (Total Building)
Social Hour 11:15 a.m.
Luncheon 11:45 a.m.

Cost: $35 Preregistered members; $40 non-members/walk-ups

To guarantee a seat, pre-register on the HGS website & pre-pay by credit card.
Pre-registration without payment will not be accepted.
Walk-ups may pay at the door if extra seats are available.

If you are an Active or Associate Member who is unemployed and would like to attend this meeting, please call the HGS office for a discounted registration cost. We are also seeking members to volunteer at the registration desk for this and other events.

Kevin M. Bohacs
ExxonMobil Upstream Research Company (retired), now at KMBohacs GEOconsulting LLC
Alessandro Amorosi, Luigi Bruno, Bruno Campo
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Tina M. Drexler
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How Close is Geological Thought to Reality? Insights About Geological Time, Continuity, and Rates of Change Revealed by the Holocene Sequence Stratigraphy of the Po-River–Adriatic-Sea System, Italy

Two fundamental questions confront a geologist when faced with a stratigraphic succession: How much time is represented by the preserved strata? and How continuous was the sediment accumulation? The vastness of geological time is largely beyond human observation and comprehension. Time spans of "just" tens to hundreds of thousands of years may become unfamiliar when moving from modern, observable, and quantifiable depositional processes to the almost incomprehensible series of moments recorded in the rock record.

We enhanced our experiential concept of time based on the chronologically well-constrained Holocene succession of the Po-Adriatic system, Italy. The parasequences of the highstand systems tract are tens of meters thick and locally constitute up to 95% of the total volume of Holocene deposits. The preserved strata, however, represent only a relatively short time interval (a few hundreds of years) and record < 10% of the total time span involved. Early Holocene (9.2 to 7.7 ky bp) transgressive shorelines retreated at a mean rate of ~10 m/y, following a stepped trajectory at the centennial scale. At the transition from aggradation to progradation (ca. 7.0 ky bp), a laterally extensive prograding deltaic body, up to 30 m thick and > 20 km long downdip, accumulated in less than 2,000 years. Both phases involved rates of change up to three orders of magnitude larger than those observed in the last two centuries.

Parasequences of similar size in the rock record are commonly interpreted to have developed at slower rates over longer temporal scales, based on coarser-resolution chronometry and the assumption that stratal thickness equals time duration. However, severe misconceptions can be generated by using the common approach that subdivides an arbitrary thickness of strata into equal parts and durations. In the Holocene succession of the Po Plain, very short periods of very rapid sedimentation alternated with long phases of non-deposition, erosion, or stratigraphic condensation, recorded at bounding surfaces of individual parasequences. The bounding surfaces represent at least 90% of the entire time span of the Holocene and are associated with distinct rock properties.

The highly fragmented nature of the sedimentary record impacts the interpretation of hierarchical stacking of parasequences, time scales of accumulation of ancient strata, and inherent rates of change of alluvial and deltaic depositional systems. We illustrate these consequences by comparing the Holocene Po-Adriatic stratigraphy to older strata, including the middle Pleistocene of the Enza River region, Italy and the Cretaceous Blackhawk and Mancos formations, Book Cliffs, Utah. All of these observations and considerations reinforce a key foundation of sequence stratigraphy: that surfaces are just as significant as the strata they bound…if not more so. ■

Biographical Sketch

Kevin Bohacs ScD FGSA FGS FRGS recently retired as Senior Research Scientist from ExxonMobil Upstream Research Company where he led the application of sequence stratigraphy and sedimentology to mudstones from lacustrine to deep-marine environments. He now operates KMBohacs Geoconsulting LLC. Kevin is an Eagle Scout and earned a BSc (Honors) in Geology from University of Connecticut and ScD in Experimental Sedimentology from Massachusetts Institute of Technology.

He has written more than 100 scientific contributions on the stratigraphy and sedimentology of mudstones, hydrocarbon source and reservoir rocks, and continental depositional systems (lakes, fluvial-floodplain systems, paleosols, coals, and paleoichnology). Dr. Bohacs is the co-author and editor of books on sequence stratigraphy, lacustrine hydrocarbon reservoirs, and field safety. (He is writing a second edition of the field safety book.) He has received many best paper citations and awards (including AAPG Honorary Member and AAPG's Berg award for outstanding research) and served as distinguished lecturer for several societies nationally and internationally. He currently serves as Secretary-Treasurer for SEPM.