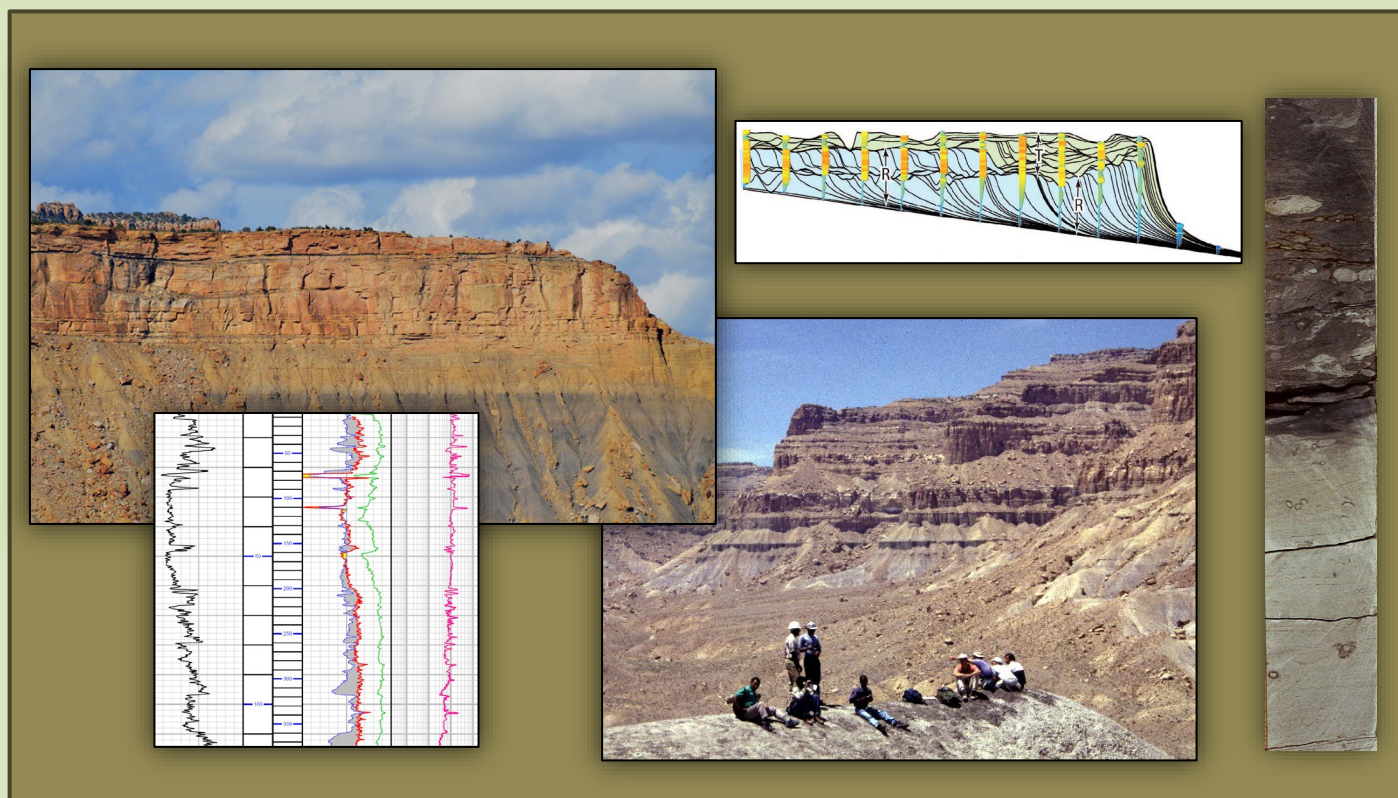


SEPM Research Conference 2023

Are Siliciclastic Parasequences Still Relevant?

9-12 October 2023 – Green River, Utah

Conveners: Howard Feldman, Bruce Ainsworth, Luca Colombera, Rebecca Caldwell



Conveners Conference Report

Report on the SEPM Research Conference 2023: *Are Siliciclastic Parasequences Still Relevant?*

Conveners: Howard Feldman (Colorado State University, USA), Bruce Ainsworth (Santos Ltd., Australia), Luca Colombera (Università di Pavia, Italy), Rebecca Caldwell (Chevron, USA)

The SEPM Research Conference 2023: “*Are Siliciclastic Parasequences Still Relevant?*” took place in and around Green River, Utah, USA, on 9-12 October, 2023. It was a mixed-format conference with two field days and two conference talk days. There were forty-seven attendees in total, from 9 different countries (Australia, Bulgaria, Canada, Italy, Norway, South Korea, Thailand, UK, USA), 17 universities and research institutes, 12 energy companies, and 4 independent consultants.

The venue for the two conference days was the *John Wesley Powell River History Museum* in Green River. Participants were treated to 26 talks on the themes of General Concepts, Quaternary Shorelines, Ancient Shorelines, Parasequences in the Fluvial-tidal Transition and into Nonmarine Strata, Mudstone Dominated Portions of Parasequences, and Modelling Parasequences. The talks included *Keynote Addresses* from Alessandro Amorosi, Diane Kamola, Rene Jonk, and Brian Willis. The Thompson Canyon, Desert Member core was also available for the participants to inspect and discuss in the Museum, as were core photos from the Floy Canyon and Price River C cores (Desert Member and Panther Tongue respectively).

Day 1 of the Research Conference kicked-off on the morning of October 9 in Salt Lake City with participants gathering and driving out towards Green River with a first orientation stop at the classic Castlegate overview section. Howard Feldman, Janok Bhattacharya, Diane Kamola and Brian Willis provided the field leadership on this first day. The group moved on to view Blackhawk fluvial and marine facies and parasequences before spending time at the classic Panther Tongue outcrops around Price and discussing the internal architecture of parasequences. The day rounded-out with an ice-breaker evening session overlooking the Green River.

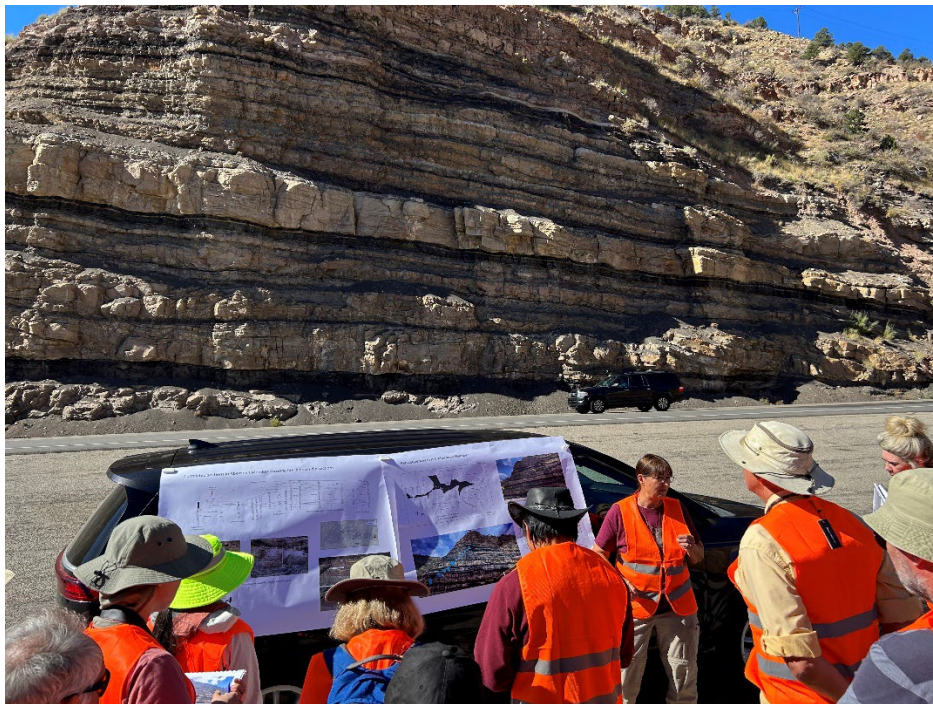


Photo: Day 1 in the field. Diane Kamola talks participants through parasequences in incised valleys.

Day 2 was the first conference talk session day and kicked-off with an introductory talk by Howard Feldman on the evolution of the parasequence concept. John Howell then took the stage to defend parasequences and Janok Bhattacharya described how to distinguish allogenic from autogenic parasequences. Ole Martinsen then took us through some aspects of recent forced-regressive parasequences and the session was closed out by Victorien Paumard illustrating how parasequences can sometimes be recognised on seismic when calibrated by well data. Core viewing and discussions were followed by a session on Quaternary Shorelines led by a Keynote Talk on Holocene Parasequences and the Measurement of Geologic Time by Alessandro Amorosi. John Holbrook then took us through some ultra-high frequency sequences from the Dead Sea, followed by a talk by Simon Lang on the architecture of modern deltas on the arid Western Australian coast. The final talk of the session was by Boyan Vakarelov who discussed the internal hierarchy and scales of mouth-bars. The afternoon session on Parasequences in the Fluvial-tidal Transition and into Nonmarine Strata included a keynote address by Diane Kamola comparing parasequences in highstands and incised valleys. Kyungsik Choi discussed the architecture of inshore tidal flats, whilst Haley Coe detailed rare earth element and critical mineral enrichment in coastal plain deposits. Jen Wadsworth completed the session with a talk on how coals provide insight into sea level changes.

An evening outing for the group to view the Floy Canyon to Blaze Canyon face in the setting sun was followed by the conference dinner at Ray's Tavern.



Photo: Day 2 - Participants inspect and discuss the Thompson Canyon, Desert Member core at the conference venue.

Day 3 was the second field day and the trip was led by Janok Bhattacharya. This day involved a drive to view the fluvial, deltaic and shelf deposits of the Cretaceous Notom Delta of the Ferron Sandstone. The muddy Ferron and internal bentonites were inspected near Steamboat followed by a spectacular road-cut and drainage channel exposing some wave- and fluvially-influenced parasequences. The afternoon involved a walk along the Ferron marine to fluvial transition containing mouth-bars and fluvial distributary channels. The day wrapped-up with a dust storm of biblical proportions whilst inspecting confined and unconfined fluvial deposits close to Highway 24!



Photo: Day 3 in the field. Janok Bhattacharya talks participants through parasequences in the Notom Delta.

Day 4 kicked off with an early morning outing towards Battleship Butte to view the Kenilworth Member shoreface facies change. The low-angle morning sunshine also provided the perfect opportunity for a group photo (see below).

The group then moved back to the Museum for the first talk in the Ancient Shorelines session which was by Clay Jacks on his detailed architectural work on the Panther Tongue deposits. Tuoyu Wu then described the subsurface sequence stratigraphy of the Gallup Sandstone in the San Juan Basin. The power of using a parasequence framework to constrain rock properties was then presented by Suzanne Kairo. Takonporn Kunpitaktakun then described parasequence thickness variations from offshore Malaysia. The session was wrapped-up by Keith Shanley who discussed parasequence control on reservoir development for the Turner and Wall Creek Sandstones in Wyoming. In the following session on Mudstone Dominated Portions of Parasequences, Rene Jonk provided a Keynote Address detailing processes controlling genetically-related stratigraphic successions in mud-dominated systems. Steve Flint then presented a talk on adding the mudstone component to the Grassy Member parasequence story.

A second session on General Concepts then followed with Bruce Ainsworth describing a bottoms-up, automated hierarchical methodology for recognising parasequences. Luca Colombera then detailed an outcrop-oriented machine-learning approach for parasequence recognition. The final session of the conference was on Modelling Parasequences. Brian Willis led the way with a Keynote Address on forward modelling of dual-clinoform, wave-dominated parasequences. Ingrid Arnes then detailed a rule-based methodology for modelling shoreface geometries which was followed by a talk by Agustín Argüello Scotti on the application of the methodology to the Kenilworth Member deposits the group had viewed earlier in the day. The honor of the final talk of the conference fell to Thomas Jerome who discussed capturing high resolution intra-parasequence correlations in 3D models.

A final evening trip to view the Thompson Canyon petroglyph site and the location of the Segó-2 core was a fitting way to conclude the conference.



Photo: Day 4 - Participants pose in front of the classic Battleship Butte outcrops near Green River.



Photo: Jennifer Wadsworth delivers her presentation at the John Wesley Powell Museum.

Final Thoughts and Comments

The field-based days and the multiple dedicated discussion sessions interspersed throughout the talk days encouraged many long and detailed conversations on the current relevance of parasequences. Key takeaways from the discussions were:

- 1) Parasequences are still very much relevant to today's stratigraphers and sedimentologists for multiple pragmatic reasons including: representing one of the building blocks of stratigraphy, defining subsurface flow-units and vertical compartments, and being potentially recognisable across various datasets (outcrops, well logs, seismic).
- 2) It became apparent during the conference that there was still no consensus on the actual definition and/or usage of a parasequence. This is an issue that has hampered the stratigraphic community for many years. Until

resolution can be found, it was recommended that authors of papers or presentations define upfront what definition of a parasequence they are using and if they are tying it to any temporal or hierarchical scale.

- 3) An SEPM Special Publication pulling-together the state-of-the-art on Parasequences and their applications will be one of the outputs of the conference.

Acknowledgements

Special thanks are due to the SEPM Team for all the behind-the-scenes assistance with pulling the conference together; Howard Harper, Michele Tomlinson, Cassie Turley, and Theresa Scott.

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