

Flooding Laurentia: the making of the Cambrian reservoirs of North America

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Summary

Cambrian sandstones of the Sauk megasequence (Sloss, 1963; Palmer, 1981; Derby et al., 2012) are found across much of North America, where they are commonly the first sedimentary unit overlying the Precambrian cratonic basement. Recently, these sandstones have become popular targets for helium exploration and carbon sequestration coinciding with a renewed academic interest in the timing and drivers of the Sauk transgressions. Our understanding of the Cambrian of North America is entering a golden age as we continue drill more cores and acquire more data, building on the extensive outcrop work that has already been done. An understanding of the origins of these sands and the tectonic and climatic controls on their distribution provides a foundational context for reservoir evaluation. Here, I will present a comprehensive overview of the status of knowledge of the depositional setting of Cambrian sandstones on a continental-scale through the lens of a reservoir geologist with experience mapping the Laurentian craton.

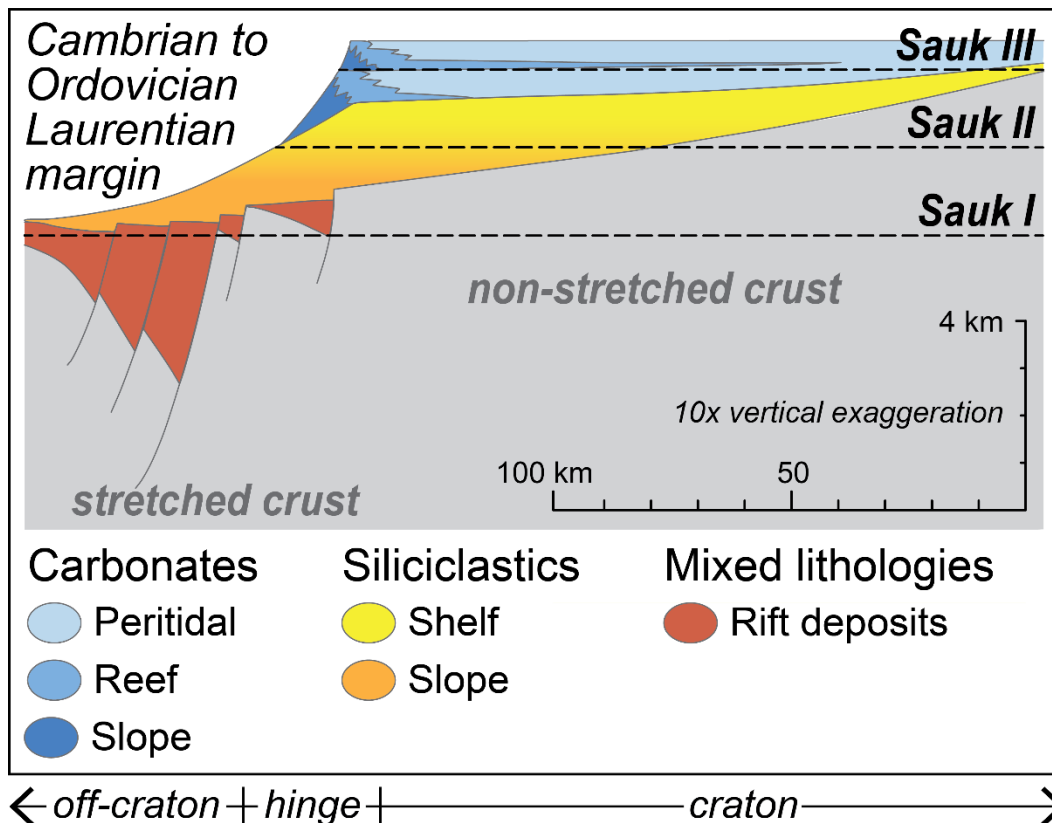


Figure 1: Schematic cross-section of a rifted margin of Laurentia following Rodinia breakup modified from Hoffman et al. (1988).

Theory / Method

Recent geochronology, thermochronology, subsidence modelling, and provenance studies have significantly refined our understanding of the cratonic architecture at the onset of the Sauk transgressions and drivers of base level changes that controlled the thickness and distribution of clastic sedimentation. This presentation will integrate a literature review of the continental- to global-scale processes controlling Cambrian sedimentation in North America with conceptual model development workflows for application to reservoir characterization.

Novel/Additive Information

This presentation links important concepts from the forefront of literature regarding the tectonic and cratonic basement controls compared to climatic controls on continental-scale Cambrian sedimentation to conceptual model development at the reservoir scale. It provides a summary of the current status of our understanding of Cambrian sandstones in the context of exploring them as reservoirs for helium production and carbon storage.

Acknowledgements

I would like to thank my employer, Geofirma Engineering, for their continued support in my pursuit of knowledge on the Cambrian strata of North America. I also thank my coauthors and collaborators on several publications regarding the architecture of the Laurentia craton and rift-to-drift sedimentation (see references below).

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