# 4D PHYSICAL MODELLING OF SALT TECTONICS IN SABLE SUB-BASIN, SCOTIAN MARGIN

MacDonald, Cody[1]; Campbell, Clarke[2]; Cribb, Jonathan[2]; Adam, Juergen[3]; Nedimovic, Mladen[2]; Louden, Keith[4]; Kreszek, Csaba[5]

[1]Dalhousie University Department of Earth Sciences, Dalhousie University, Halifax, Nova Scotia, B3H4J1, Canada; [2]Department of Earth Sciences, Dalhousie University, Halifax, Nova Scotia, B3H4J1, Canada; [3]Department of Earth Sciences, Royal Holloway University of London, Egham, Surrey, TW20 0EX, United Kingdom; [4]Department of Oceanography, Dalhousie University, Halifax, Nova Scotia, B3H4J1, Canada; [5]Chevron Norge AS, Karenslyst Alle 2, P.O. Box 97, Skoyen, Oslo, 0212, Norway

Salt tectonic structures of the interconnected Sable, Abenaki, and Laurentian sub-basins at the north-central Scotian margin indicate variable rift-basin geometries and tectono-sedimentary environments with high rates of sedimentation and progradation during the Jurassic and Early Cretaceous. The understanding of the deepwater tectono-stratigraphic framework in this area depends on our ability to accurately interpret the variable depositional systems and corresponding salt tectonic structures in these sub-basins. This study integrates seismic interpretation with analogue experiments to gain insight into the mechanics of thin-skinned deformation and halokinetic sequence stratigraphy in the Sable sub-basin. The experimental setup including salt basin morphology, sedimentation patterns and rates, and initial salt thickness is determined using the GXT NovaSpan survey and other public domain seismic reflection and well data. The initial salt basin morphology is modeled as two rift half grabens. Variable original salt thickness combined with high, shelf-oblique, sediment input in landward salt-withdrawal basins during the Middle Jurassic to Early Cretaceous has caused major salt inflation in the mid to distal salt basin. This inflated salt complex had a positive, pronounced, and irregular topography which resulted in localized depocenters throughout the Early to Late Cretaceous. These localized depocenters of the deepwater slope and basin have led to the development of a confined mini-basin bounded by a salt wall or diapir and an extensive allochthonous salt tongue. A compressional phase is seen during the Late Cretaceous in features such as thrusted packages of rafted sediments over a salt pillow and squeezed diapirs. The next phase of the study will focus on the 3D depositional patterns of the entire north-central Scotian margin to analyze the linked structural evolution of the Laurentian, Abenaki, and Sable sub-basins. Improved understanding of the structurally dynamic depositional system of the Scotian Basin will support future exploration activities in the slope and deepwater basin.