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A SOCIALLY RELEVANT ARCTIC TECTONIC PUZZLE

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The geological evolution of the Arctic region is one of the last unknowns in global plate tectonics. The Arctic Ocean basins, relatively inaccessible to direct sampling, are known mostly from 'remote' geophysical methods. For example, the Amerasia Basin at c. 3800 meters below sea level is virtually unexplored. Its age and spreading history have been inferred from structural and stratigraphic relationships observed on the basin margins. These inferences have not been confirmed by observations within the basin itself. Onshore, the Arctic region comprises remote wilderness areas far from supporting infrastructure and consequently is mapped mostly at a reconnaissance scale; the lack of age control on units, structural fabrics, timing of fold and thrust belts, etc., makes it difficult to correlate geology from one region to another, to extrapolate geology from on-shore to off-shore, or to constrain the development of Arctic ocean basins using circum-Arctic geologic data. Major impediments to unravelling the tectonic and lithosphere evolution of the Amerasia Basin include: i) the scarcity of data coverage in the region, ii) the lack of direct coupling between on-shore geology and offshore geophysics surrounding the Basin and iii) the lack of physical samples from the deeper parts of the basin.

On-shore the Paleozoic and Mesozoic foldbelts dominate the Arctic (figure below) and understanding these features is critical for unravelling Arctic paleogeography and plate reconstructions, as well as for constraining the hydrocarbon potential and mineral resources of the Arctic. I will provide an overview of our current state of knowledge, summarize some important on-going investigations, and identify where research that will allow us to formulate new and better hypotheses related to understanding Arctic evolution should be focused in the future.