

## **Discussion on final rifting evolution and breakup : insights from the Mid Norwegian - North East Greenland rifted system**

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In terms of rifted margin studies, the characteristics of the distal and outer domains are among the today's most debated questions.

The architecture and composition of deep margins are rarely well constrained and hence little understood. Except from in a handful number of cases (eg. Iberia-Newfoundland, Southern Australia, Red Sea), basement samples are not available to decipher between the various interpretations allowed by geophysical models. No consensus has been reached on the basement composition, tectonic structures, sedimentary geometries or magmatic content. The result is that non-unique end-member interpretations and models are still proposed in the literature. So, although these domains mark the connection between continents and oceans, and thus correspond to unique stages in the Earth's lithospheric life cycle, their spatial and temporal evolution are still unresolved.

The Norwegian-Greenland Sea rift system represents an exceptional laboratory to work on questions related to rifting, rifted margin formation and sedimentary basin evolution. It has been extensively studied for decades by both the academic and the industry communities. The proven and expected oil and gas potentials led to the methodical acquisition of world-class geophysical datasets, which permit the detailed research and thorough testing of concepts at local and regional scales.

This contribution is issued from a three years project funded by ExxonMobil aiming at better understanding the crustal-scale nature and evolution of the Norwegian-Greenland Sea. The idea was to take advantage of the data availability on this specific rift system to investigate further the full crustal conjugate scale history of rifting, confronting the various available datasets.

In this contribution, we will review the possible structural and sedimentary geometries of the distal margin, and their connection to the oceanic domain. We will discuss the definition of 'breakup' and introduce a first order conceptual model that proposes a combined influence of tectonic and magmatic processes on the outbuilding of the distal, outer and oceanic domains.