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Insights from the Jan Mayen system in the Norwegian-Greenland Sea: architecture of a microcontinent

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The spatial and temporal evolution of rift systems, especially the interaction between margin kinematics, magmatic, crustal and mantle processes related with the formation of microplates, are questions that regularly animate the debates in the margin community. In this contribution, we present results from a study of microcontinent formation in the central part of the Norwegian-Greenland Sea within a system that involves a complex rifted margins setting and different phases of deformation and continental breakup.
The compilation of vintage seismic reflection profiles with a more recent dataset, combined with detailed potential field analyses and modelling, permitted to revise the basement and sedimentary geometries of the Jan Mayen microcontinent (JMMC). We established an unprecedented detailed structural map of the JMMC that illustrates, among others, the spatial distribution of Seaward Dipping Reflectors (SDRs), the sedimentary units and the post-rift intrusions. The shallow stratigraphy is fairly well imaged and shows a multiphase Cenozoic evolution with alternations of magmatic phases (SDRs building, intrusions) and tectonic phases (high angle faulting, tilting of the main ridges). Our interpretation suggests that the JMMC structure is more complex than the simple, two main blocks described so far in the literature (the Main Ridge and the Southern Ridge Complex). Our model shows six distinct segments that evolved independently through different rifting phases. The new interpretation of the microcontinent architecture is presented in the conjugate margin system and used to update the spatial and temporal evolution of the Norwegian-Greenland Sea region.