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A palaeobathymetric study of the northern North Atlantic

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The Fram Strait between Greenland and Spitsbergen connects the Arctic Ocean and the northern North Atlantic. Today this gateway is about 450 km wide and in average 2500 m deep. It is the only connection between the Arctic Ocean and the world oceans, where dense oxygen rich water is exchanged. Such an exchange has important influences on the climate. A detailed knowledge of the timing of the Fram Strait opening provides a basis for a correlation with past climate changes.

Due to the absence of clear marine magnetic and other geophysical data, a detailed understanding of this region has been difficult until now. Within the last years, the Alfred Wegener Institute conducted several geophysical data sets in order to solve some remaining problems in the Fram Strait and adjacent basins (Molloy, Boreas and Greenland Basin). In this contribution we present a new aeromagnetic data grid, new seismic reflection data and existing gravimetric data that provide new insights into the geodynamic evolution of this area. These data are the basis for estimations of initial opening scenarios, and palaeobathymetric maps. New seismic reflection lines crossing the entire Molloy and Boreas basins show rough basement topography and a deep axial valley. Roughness calculations also indicate ultra-slow spreading rates in the whole area. Using the age information of the aeromagnetic data, the thermal subsidence for oceanic crust corrected for the sediment load fits the observed basement depth reasonably well in the basins.

A compilation of additional seismic reflection and refraction lines in the northern North Atlantic provide information on the crust thickness, the basement depth and

sediment distribution. Based on this information, a model of the evolution of the northern North Atlantic is created. The latest results of this palaeobathymetric study for the Fram Strait and its subsequent basins are shown.