



Tectonic control on intra-basin subsidence within the Sophia Basin, Arctic Ocean

D. Winkelmann

Alfred Wegener Institut for Polar Research

With increasing sea-floor coverage of high-resolution bathymetry, the principles of geomorphology can be applied to the marine realm. The semi-enclosed Sophia Basin north of Spitsbergen has been mapped by high-resolution SWATH bathymetry and examined for its tectonic framework. The morphological interpretation is based upon the deformation of the main slide debris of the Hinlopen/Yermak Megaslide serving as a semi-planar geomorphic marker. Two intra-basin areas exhibit significant subsidence during the last 30.000 years. Maximum subsidence are 2,8 m/kyr. in the SW Sophia basin. Along the Littke Channel (NE Sophia Basin) calculated maximum subsidence rates vary between 11,3 and 17,5 m/kyr. but are less reliable due to the complex nature of the geomorphic marker. Both areas are related to normal faulting along uplifting Mosby and Polarstern Seamounts. The complex pattern of uplift, subsidence and areas of apparent little or no tectonic movements is best explained by a strike-slip regime on an elongated deep-seated fault zone. This fault zone is related to the Continent-Ocean-Transition Zone and the two-directional extension field of an up-doming moho. The reconstructed subsidence marks this abandoned rift as more active than previously thought.