



North Atlantic Ocean deep-water processes and depositional environments: A study of the Cenozoic Norway Basin

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Despite the enormous areas deep-water basins occupy in modern oceans, our knowledge about them remains poor. At depths of greater than 2000 m, the Cenozoic Norway Basin in the northernmost part of the Atlantic Ocean, is one such basin. Interpretation of 2D multichannel seismic data suggests a three-stage evolution for the Norway Basin. (1) Eocene-Pliocene. This time period is characterised by deposition of ooze-rich sediments in a widening and deepening basin. (2) Early-Middle Pleistocene. A significant shift in sedimentary processes and depositional environments took place in the Early Pleistocene. Mass failures initiated on the Norwegian continental slope, and three Early and Middle Pleistocene slide debrites, with maximum thicknesses of 600 m and sediment volumes of up to 25000 km³, were deposited. With ages estimated at c. 2.7-1.7 Ma, 1.7-1.1 Ma and 0.5 Ma, these slide deposits are among the largest identified worldwide, and among the oldest mapped along the entire NE Atlantic continental margin. (3) Late Pleistocene-Present. Since c. 0.5 Ma the Norway Basin has been effected by glacial debris flows, the Storegga Slide and hemipelagic-glacimarine sedimentation. These sedimentary processes were active during a time of repeated shelf-edge ice advances along the NE Atlantic continental margin. This study shows that deep-water basins represent dynamic depositional environments reflecting regional tectonic and climatic changes through time.