Oligocene to Lower Pliocene deposits of the Norwegian continental shelf, with correlation to the Norwegian Sea, Greenland, Svalbard, Denmark and their relation to the uplift of Fennoscandia

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Drainage pattern
One of the purposes of Fig. 3 is to illustrate the locations of the described Oligocene to Lower Pliocene deposits with the topography and present drainage of Scandinavia, and to the topographic map, the shift from greenish to brownish colours takes place at about 800 m elevation.

The highest peaks of the South Scandinavian Dome exceed 2000 m. Here, red lines show generalized river divides, separating major drainage systems. Extensive river capturing has taken place, in particular in the northern part of the dome, where the present water divide has moved to the SE (yellow line).

It is believed that the paleo-drainage to a large extent will control the present drainage, and one hypothesis for the significant movement of the water divide would be a rate uplift of the South Scandinavian Dome.

The compilation shows that the Oligocene sediments in the Northern North Sea were sourced from the western part of the South Scandinavian Dome (blue arrow), in the northernmost North Sea, this sedimentation continued throughout the Oligocene. In that period, a much larger amount of clastic sediments was transported to the southwestern part of the Norwegian sector and to Denmark. This depositional pattern is consistent with a water divide located far to the NW and W on the North Sea. Extensive river capturing has taken place, in particular in the northern part of the dome, where the present water divide has moved to the SE (yellow line).

In the Frida-1 well the sand was deposited at the base of slope in more de-
Summary

This poster synthesizes biostратigraphic and strontium isotopic data from 39 wells and boreholes from the Norwegian shelf, supplemented with data from western offshore Sleipner, one ODP borehole off east Greenland and borehole and outcrop data from Denmark. Emphasis has been placed on investigations of sandy deposits. Most wells and boreholes have been integrated with wire-line log and seismic data. We present an improved stratigraphy and depositional history for the Oligocene to Early Pliocene for the study area with correlations to North-West Europe.

Regional seismic interpretation indicates that offshore West and Mid Norway and along the western Barents Sea margin, progradation of Paleocene-Eocene sediments terminated in the early Oligocene, and the Eocene clinoforms are onlap by Oligocene shales. Lake in the Early Oligocene a possible shift in the drainage divide of West Norway caused a transport of Oligocene coarser clastics to the east towards the Norwegian-Danish basin. Prolonged deltaic complexes developed in the Danish-Norwegian basin (Vade Formation) and off the western margin. In the northern North Sea gravity-flow sandstones were sourced from the Skelbo Platform and some minor input from Fennoscandia. Coarse clastic sediments were deposited in northern West Norwegian, while argillaceous sedimentation prevailed elsewhere, except for the deep-water Norwegian Sea where mainly silicious ooze accumulated until the Early Pliocene.

During the Early Miocene, delta complexes (Ribe Group) prograded southwards into the southeast North Sea. In the western part of the Viking Graben sand-rich gravity deposits of the Skag Formation were sourced from the Skelbo Platform. To the east, in the central part of the basin north of 60°N and in the Central Graben fine-grained sedimentation occurred. Extensive mid Miocene tectonism started at the transition from the Early - Middle Miocene and major compressional features were formed in the Norwegian Sea, while many major faults were reactivated in the study area. Embrional features are observed in the northern North Sea. Norwegian Sea continental shelf and possibly in the Barents Sea margin. The southern North Sea and the Danish-Norwegian Basin subdivide and features are minor or absent in the southern Viking and Central grabens.

In the Late Miocene, a marked relief of the Fennoscandian Shield, accompanied by continued uplift, colder climate and a low global sea level, resulted in a pronounced out-building of coastal plains and delta's all along the Norwegian Sea continental shelf (Molo Formation). During the same period the northern North Sea formed a narrow seaway between deeper water in the Møre Basin and the central North Sea. The strata received large amounts of coarse clastics (Utsira Formation) mainly from the East Shetland Platform in the west, but also from the Snorre/jorden area in the east. Offshore West Norway further to the south, only thin and shaly sections are recorded, while deposition continued towards Denmark and the Norwegian Sea, probably using the drainage systems which were established in the Oligocene. This situation lasted through the Early Pliocene when the global temperature and sea level temporarily rose. The investigation of the large sediment wedge off the Sverdrup Sund flood system shows that the build-up of substantial continental ice on Greenland started in Late Miocene at approximately 7.5 Ma.