

Digital Mapping of fault patterns in the Northern Lofoten Islands and their tectonic significance

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Many offshore basin-bounding faults in the NE Atlantic can be traced onshore where their geometry, spatial characteristics, movement history and textural evolution can be studied directly. In order to fully understand the control of reactivated basement faults on offshore basin development, a geometric and kinematic analysis of both the offshore and onshore components is critical. A digital fault attribute database is being generated for such structures in both onshore and off shore fault zones.

This study, complementary to a NERC Ocean Margins LINK project at Durham, looks at the basement faults exposed in the Lofoten Islands of Norway, which form the eastern margin of the Vøring Basin. A highly accurate digital fault map is being compiled using DTMs, satellite & aerial photography, combined with field data collection using GPS/ Laser ranger technologies, and GIS software. Fault geometry, kinematics, age relationships and outcrop scale fracture maps were constructed in Northern Austvagoya, where major fault structures are well exposed.

Regional lineament patterns, deduced from remote sensed data, show a NE-SW preferred orientation, with N-S and E-W subsets. Preliminary analysis has revealed similar preferred fault orientations at outcrop scale. A variety of fault rock types were observed, indicating multiple phases of movement, while kinematic and cross cutting relationships indicate all fault sets to be contemporaneous. Further detailed analysis of this data shall be carried out, using GIS technologies, to fully understand these relationships, and a comparison to offshore fault patterns then made.