



## **Large-scale crustal folding as a consequence of weakening by hyperextension and partial serpentinization of the mantle**

E.R. Lundin (1) and A.G. Doré (2)

(1) Statoil ASA, Global New Ventures, London, UK (erlun@statoil.com), (2) Statoil ASA, Global New Ventures, Houston, USA (agdo@statoil.com)

The hyperextended Vøring Basin off mid-Norway experienced large-scale compressional folding between Cenomanian/Turonian and Late Paleocene time, with wavelengths up to c 80 km. This folding took place c 40 m.y. following severe Early Cretaceous crustal extension. The folding involved the whole crust, and possibly the remaining lithosphere. Late Paleocene extension was strongly focused on the anticlines bounding the synclines. Following Early Eocene break-up a number of compressional domes formed along the NW European seaboard, primarily in Middle Miocene time. These Cenozoic folds are also exemplified in the Vøring Basin where they overprinted both Cretaceous synclines and Late Paleocene collapsed anticlines. Consequently, the Vøring Basin is characterized by a series of pronounced vertical motions that locally resulted in deep erosion and sediment reworking. The primary control for the deformation is suggested to be the low strength of the thinned crust and partially serpentinized uppermost mantle. The weakness of the crust/upper mantle is particularly well demonstrated by the post-breakup compressional deformation, occurring c 40 m.y. after seafloor spreading started, when only comparatively low stresses existed. A companion paper (Wienecke & Lundin) reveals the influence of the Youngs modulus of partially serpentinized upper mantle on the strength of the plate.