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PALAEOWEATHERING PROFILES FROM THE NORWEGIAN NORTH SEA, AND THEIR ONSHORE ANALOGUES

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The Utsira High is a granitic basement high located about two kilometers below the seafloor in the Norwegian North Sea. In Mid-Triassic the Utsira High was sub-aerially exposed and deep weathering of the crystalline rocks occurred. From early Cretaceous till recent, the entire Utsira High has been submerged and covered by shallow-marine sequences.

Below the post-weathering sedimentary cover, well-developed granitic saprolites have been identified in drill cores. The fractured and weathered basement rocks show good reservoir properties and are parts of the recently discovered oil fields on the southern Utsira High (Edvard Grieg and Johan Sverdrup fields).

The weathered rocks at the Utsira High are characterized by the dissolution of feldspars and biotite and the precipitation of clay minerals. The alteration features reflect the prevailing geochemical conditions, controlled by e.g. availability of water, topography, lithospheric material, biogenic activity and time. As these factors are not necessarily readily determined from the study of drill cores, the saprolites from the Utsira High have been compared to onshore weathering profiles. In Southern Sweden (Scania) and Denmark (Bornholm) weathered rocks of Mesozoic age, possibly contemporaneous to the weathering sections observed at the Utsira High, have been studied. In Northern Portugal, arenization of the Braga granite has been interpreted to be the result of weathering in a temperate and humid climate. In Georgia (USA), detailed work on the subtropical argillization of the Elberton and Sparta granites was carried out on two well-developed weathering profiles.

The Mesozoic sections from southern Scandinavia (Scania, Bornholm) and recent subtropical Georgia, USA, displayed vertical changes in clay mineral content from 2:1 clays in the lower part to increasingly more 1:1 clays in the upper, well-drained intervals. The same clay mineral evolution was identified in the weathering profiles from the Utsira High, suggesting they formed under comparable conditions.

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T202. Paleosol Case Studies: Resurrecting Ancient Critical Zones through Space and Time
Wednesday, 4 November 2015: 8:00 AM-12:00 PM

Room 345/346 (Baltimore Convention Center)

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