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DEPARTMENT:	Department of Geosciences
AREA OF EXPERTISE:	Sedimentology
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DISSERTATION TITLE:	*Sedimentation in the Ritland Impact Structure, western Norway.*

The Ritland crater in Hjelmeland, western Norway, is the third recognised impact structure in Norway. The crater was formed by a meteorite impact probably 500 million years ago. The meteorite was about 115 m in diameter. In the time of the impact, Norway was part of an extensively flattened surface called peneplain surface. The land surface was probably covered by a wide and shallow sea with depth of a few tens of meters.

The crater was buried by sediment deposition over millions of years and later was exposed by uplift and erosion related to mountain building and later glaciations. At present day, it is difficult to recognize the crater as a circular depression, and it is different from pristine impact craters as seen at the Moon or Mars. Nevertheless, a 350 m deep, roughly circular depression of about 2.7 km in diameter can be delineated in the mountainous area of Ritland. The area in the depression is defined by extensive fracturing and breaking of the basement rocks.

The Ph.D. thesis describes the processes by which the crater was filled with sediments and their related depositional environments, as developed over millions of years. The crater infilling started immediately after the meteorite had excavated a transient cavity in the target rock surface. Large, angular, boulder blocks were avalanched down the crater walls as soon as the transient cavity collapsed by gravity and thus forming a crater depression. This happened within just a few seconds. The sea water which was initially pushed back by the impact eventually surged back into the crater. Loose, fragmented impact generated debris transported by the surging water partially in-filled the crater. The crater was finally filled by water, probably within a few hours. Fluid flow within the crater resulted in deposition of relatively fine grained sediments (e.g. sand). The crater gradually became stable over many years and more fine grained sediments (e.g. silty, clay) started to deposit within the crater. Through time, reduced rate of crater wall erosion and a limited input of sediments from outside the crater resulted into stable, sustained suspension deposition of clays for extended periods (millions of years).

By comparing the Ritland crater-infilling succession with other shallow-marine impact craters, e.g. Gardnos, Kärdla, Lockne and Chesapeake Bay, similar depositional processes were observed occurring approximately in the same order in all the craters. However, the thickness and compositional variations of the infilling succession vary according to differences in crater size, rock type and composition of the impact target surface and depth of sea water at the impact site. The Ph.D. work is part of the Ritland project at The Department of Geosciences, UiO.