THE LATE JURASSIC MJØLNIR IMPACT CRATER IN THE BARENTS SEA– DRILLING PROPOSAL.
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Introduction: The Mjølnir impact structure is a 40 km in diameter crater, localized on the Bjarmeland
Platform in the Barents Sea below 350 m of water and 50 to 150 m of post-impact sediments. The impact
happened close to the Jurassic/Cretaceous boundary (about 142 million years ago), in a time when a wide,
shallow (300- 400m deep) epicontinental sea covered the area [1,2,3]. The Mjølnir crater is presently situated
between Bear Island and the mainland Norway. It is one of few, large marine impact structures on the Earth
and one of the very few were crater and proximal ejecta can be correlated [4].

Figure 1. The location of the Mjølnir Impact structure in the Barents Sea is shown on the Bjarmeland Plat-
form between the mainland Norway and Svalbard.

Background: During the last 30 years the Barents Sea and the Mjølnir structure area have been well
mapped geophysically. One shallow core (7329/03-U-01)(121 m) (Figure 1) drilled inside the crater and a
few shallow drillholes in its neighborhood (a few tens to hundreds of kilometers away) provide a fairly good
overview of the main phases of the impact event. Moreover, interesting results have been achieved in
combination with numerical simulations [5,6].

Impacts, particularly in marine environments, can significantly affect Earth’s geological and biological
evolution. However, detailed knowledge of the marine impact cratering process is still limited [4]. Among the
176 terrestrial craters, Mjølnir and its well preserved proximal ejecta deposits are unique; as these ejecta
deposits always remained under water in calm conditions, consequently their preservation is most likely
excellent.

The Barents Sea has been opened for petroleum exploration south of the Bjarmeland Platform. The
development of the Mjølnir research program is consequently carried out in full cooperation with the Nor-
wegian authorities (Norwegian Petroleum Directorate) and the active petroleum industry in the area.

The coring program: One of Mjølnir’s great scientific advantages is the clear correlation between the
 crater and the proximal ejecta, accessible by shallow drilling (<300 meters). Consequently, Mjølnir is an
ideal target for scientific drilling to document ejecta generation and distribution, and the relationship be-
tween a midsize marine impact event and biotic evolution. Moreover, Mjølnir’s ejecta may serve as a strati-
graphic marker to correlate Boreal and Tethyan faunal provinces near the Jurassic/Cretaceous boundary; a
problem that has puzzled stratigraphers for years. Impact- induced tsunami generation, and ignition of or-
ganics and subsequent soot distribution, provide further research opportunities.

The coring is planned for 2011. Financially support has been applied for; possible sources include, the in-
tegrated Ocean Drilling Program (IODP) og International Continental Scientific Drilling Program (ICDP),
Norwegian Research Council (NRC) and the petroleum industry active in the area.

References: [1] Dypvik H., Guðlaugsson S.T.,
Tsikalas F, Attrep M.Jr., Ferrell R.E.Jr, Krinsley D.H.,
Sedimentary Geology, 161, 309 – 337. [5] Shuvalov V.,
Shvalov V. and Dypvik H. (2004).Meteoritics and Planeta-