

# Evolution of the Toarcian-Aalenian in the Tampen Spur Area (Norwegian Continental Shelf) in Relation to the North Sea Doming Event

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9.29.2020 - 10.1.2020 - AAPG Annual Convention and Exhibition 2020, Online/Virtual

## Abstract

The Jurassic period was a time of significant changes in tectonic configurations, paleoceanographic patterns, and paleoclimate in the North Sea of the Norwegian Continental Shelf (NCS). Among these changes, the Toarcian-Aalenian abrupt cooling (~10°C) of the region has been linked to the onset and uplift of the North Sea Dome (NSD). The NSD is a large structural barrier that disrupted paleocurrents and ocean heat transport patterns across the region and its extent has been documented by mapping the Mid-Cimmerian unconformity. Despite our knowledge of the role that the NSD played, specifically in controlling the tectonostratigraphic configuration of the North Sea province of the NCS, our understanding of the effects of its onset and evolution during the Toarcian-Aalenian is poorly constrained. The scarcity of continuous geochemical and sedimentological data within a comprehensive stratigraphic framework is the main reason for this lack of knowledge. To assess the influence of the NSD on the deposition of sediments in the North Sea, this study focuses on the spatial and temporal evolution of the Lower Jurassic Drake Formation within the Tampen Spur Area, Northern North Sea, using 3D seismic, well logs and cores, and geochemical data. The Drake Formation (Toarcian-Aalenian) is restricted to the northern North Sea and generally interpreted as shale intervals deposited in a shallow to deep marine environment. We postulate that any onset of the NSD would have induced geochemical changes in the region that should be preserved in Drake Formation

intervals. These specific intervals were described and sampled for organic and inorganic analyses using core sections from nine wells across the Tampen Spur Area. Even though we are in early stages of analytical analysis, results from this integrated study will provide important insight on the redox conditions under which the Drake was deposited. One of the main objectives of this work is to test whether early onset or pulses of the North Sea Dome can be identified and decoupled using organic and inorganic geochemical data.