Campanian-Maastrichtian nannofossil palaeoecology in the Boreal Realm (Stevns-1 well, Danish Basin chalks)

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To date, very few studies have documented the distribution of Campanian–Maastrichtian boreal nannofossil assemblages (Friedrich *et al*., 2005; Sheldon, 2006). A comparison of these studies with our knowledge from the Tropical Realm suggest that nannofossil species did not respond the same way in both realms to climate change. For instance, in the Tropical Realm, cool-water taxa seem to highlight the distinct climatic modes of the Maastrichtian (Thibault & Gardin, 2006, 2007), whereas no changes were noticed in their distribution in the Boreal Realm, with respect to climate change. This suggests that we need to better understand the palaeoecology of latest Cretaceous nannofossil taxa and especially that more data are needed from the Boreal Realm.

Recently, two boreholes (Stevns-1 and Stevns-2) were cored close to the famous K/T boundary section at Stevns Klint (Denmark), in order to investigate the sedimentology, biostratigraphy and geochemistry of the Upper Campanian-Maastrichtian chalk succession (Stemmerik *et al*., 2006; Schovsbo *et al*., in press). Drilled on a palaeo–seafloor high, the Stevns-1 well recovered 456 m of Upper Campanian to basal Danian sediments with 100% recovery. The nannofossil biostratigraphy of this core has recently been investigated by Sheldon (in press, a). A nearly complete biozonation was documented from the Upper Campanian to the K/T boundary, aside from the apparent absence of zone UC18 (Sheldon, in press, a). To date, Stevns-1 therefore represents the first continuous section in northwest Europe through the uppermost Cretaceous and the most expanded section worldwide. It is hoped that its study will constitute a reference in the Boreal realm for extensive biostratigraphy, chemostratigraphy and palaeoceanography. The succession consists of Upper Campanian–lowermost Maastrichtian bioturbated chalk with rare, thin clay beds succeeded by interbedded lower Maastrichtian chalk and marl. The Upper Maastrichtian part comprises almost pure chalk with some intervals of flint-rich chalk and few marly horizons (Stemmerik *et al*., 2006). The Stevns area has been buried to less than 600–700 m during post-Danian time and the lack of extensive-burial diagenetic overprinting makes these sediments highly suitable for geochemical and nannofossil palaeoecological analysis. The sites offer a unique opportunity to document the evolution of boreal nannofossil assemblage distribution with respect to climatic and environmental changes.

This study will focus on the distribution of calcareous nannofossil assemblages in Stevns-1 at two different timescales. At the sub-Milankovitch range, the distribution of nannofossils in marl and chalk will be examined in order to help deciphering the distinct conditions leading to the deposition of these alternating cycles (primary *vs*. diagenetic origin). At the million-year range, the evolution of the distribution of nannofossil assemblages are being compared to that of stable isotopes in order to unravel the palaeoecological response of these fossil organisms to climatic modes in the latest Cretaceous Boreal Sea.

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