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**The influence of paleo-bathymetry on total organic carbon distribution tested in the Cretaceous****Hammerfest Basin, Barents Sea**

- Stochastic paleo-bathymetry reconstructions
- TOC distribution models for end-member paleo-bathymetries
- Nonlinear uncertainty propagation from bathymetry to TOC models

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**Abstract**

In basin modelling and petroleum system analysis geometries during deposition of sediments (paleo-water depth) and distribution of organic matter are initial parameters used for further interpretation or modelling. This paper presents an approach, combining backstripping with a probabilistic forward sedimentary model to calibrate paleo-water depth (PWD). The stochastic PWD results serve as an input for organic facies models and the study demonstrates how PWD will influence models for total organic carbon distribution in a sedimentary basin. For the Late Cretaceous Hammerfest Basin, mainly shelfal to upper bathyal bathymetries (average PWD values vary between 118 and 318 m) result in average total organic carbon (TOC) varying between 0.47 and 5.24 wt% across the basin. For the different models basin averaged TOC values are similar but vertical and lateral distribution pattern change significantly, especially towards the shallow end-member PWD. The results indicate that PWD uncertainties propagate non-linearly into source rock distributions.

**1. Introduction**

Redistribution of mass on the earth's surface is mainly guided by local directions of slopes, set up by the existing topography and bathymetry (e.g., Allen, 2009). Together with understanding the coupling

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