



Brittle extension since Early Cretaceous times across the Norwegian Margin from balanced profiles

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To understand the extensional development since the Early Cretaceous we performed 2D structural restoration and balancing of three profiles across the Norwegian passive volcanic margin. From section balancing individual tectonic events could be differentiated and the amount of brittle extension has been quantified. The structural restoration was performed with the software 2DMove applying the line-length and equal-area balanced-method and backstripping. The sections consist of depth converted line-drawings including the following stratigraphic interfaces: The Base Pleistocene, Base Pliocene, Top Miocene, Top Eocene and Top Paleocene, the Base Tertiary, the Base Maastrichtian, two Campanian horizons, the Top Albian and the Base Cretaceous. Structural restoration for every horizon in the section and the amount of extension for each section has been determined. Major extensional phases have been found for the Late Jurassic/Early Cretaceous boundary, for the Albian, for the Cenomanian and for the Cretaceous/Tertiary boundary. The accommodation space created by extension of the brittle upper crust is small, the horizontal extension reaches 10km-15km for profile lengths of c.222km-302km. This implies stretching factors of 1,04 -1,05. If we calculate the stretching factors from the present thickness of the crystalline crust indicated by the seismic data, we obtain much higher values. Assuming that the pre-extensional crust had the same thickness as the one preserved today along the Norwegian Margin coast (~35km), we obtain stretching factors of 1,3-8,5 from the ratio between the present-day and the initial thickness of the crystalline crust. This indicates that the largest part of the extension of the Norwegian Margin cannot be explained by brittle deformation, but has to be related to deeper seated processes.