# Palaeozoic carbonates from the subsurface Barents Sea Part I: Buildup distribution, geometry and development

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Carbonate buildups are a key component of carbonate reservoirs and commonly show considerable variability in terms of their scale, facies and seismic expression. It is not uncommon that a single seismic dataset may contain buildups that range in expression from obvious to extremely subtle features, and display variable external form and internal heterogeneity. In order to achieve a more consistent and efficient means of buildup recognition, a research project has compared buildup extraction from six different 3D seismic datasets. The main elements of the resulting volume-based workflow are illustrated here using Upper Palaeozoic carbonate buildups imaged from the Norwegian Barents Sea.

On the flanks for the Loppa High, multiple stages of buildup development characterize carbonate platform development over tectonically active fault blocks. Buildup size, geometry, thickness, relief and distribution changes through time and was controlled by subsidence, positioning of the platform margin and climatic changes. Initial Moscovian buildup development is closely associated with clastic sediments. In the succeeding Upper Carboniferous and Lower Permian, several pulses of buildup development are differentiated. These buildups often grew together into spectacular km-scale polygonal patterns. Although both warm-water *Palaeoaplysina* buildups and cooler-water bryozoan-dominated buildups are organised in polygonal patterns, they separated by a major sequence boundary associated with tectonic rejuvenation of the area. Accordingly they are characterised by different size and geometries.

In the study presented, the overprint of later tectonics demands that seismic multi-attribute analysis and spectral decomposition processes are peformed on unflattened data and data flattened utilising several pre-existing horizons. This is in order to optimise attribute calculation. The use of curvature attributes (independent from horizon based interpretations) and RGB blended spectral decomposition cubes is of paramount importance in buildup detection for the extraction of information related to their internal heterogeneity. Calibration of the buildup-defining attributes with well data provides a high level of confidence on the detail of the extracted body geometries.