



## **A major switch in the expression of orbital components as a response to Middle Ordovician climate and environmental change**

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The Middle Ordovician outer shelf section of Steinsodden (Norway) shows exquisite marl-limestone alternations with subtle variations in thickness. The section is very well-dated by conodonts allowing correlation to the Baltoscandian conodont and graptolite zonations, and spans the Dapingian to Darriwilian stages. Here, we demonstrate an unambiguous orbital origin of the alternations, allowing for an astronomical calibration of this important time interval that spans the main radiation phase of the Great Ordovician Biodiversification Event (GOBE). A shift in carbonate sedimentation from precession-dominated in the Dapingian and lower Darriwilian to 405 kyr eccentricity-dominated in the middle Darriwilian is in direct coincidence with an increase in the diversity of Baltoscandian conodonts. The conodont diversification correlates with a similar increase in the diversity of Baltoscandian brachiopods, which in turn, have been shown to coincide with a +1‰ increase in benthic oxygen isotopes. The amplitude of isotopic change and its coincidence to the major switch in the dominance of orbital components reflect a scenario that bears similarities to that of the Eocene/Oligocene boundary transition, suggesting that glaciation could have triggered the main radiation phase of the GOBE.