



Linking glaciation and carbon cycle perturbations at the Eocene/Oligocene boundary

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One of the most dramatic perturbations to the Earth system during the last 100 million years was the rapid onset of Antarctic glaciation near the Eocene/Oligocene boundary (ca. 34 million years ago). The shift to an icehouse world was accompanied by a prominent deepening in calcite compensation depth. Compelling evidence suggests changes in the global carbon cycle (as opposed to changes in continental configuration) as the most likely cause of this fundamental reorganisation of global climate. However, the precise mechanism responsible for the shift is a subject of ongoing debate. We simulated a number of competing hypothesis put forward to explain the Eocene/Oligocene perturbations using a global biogeochemical box model which, in addition to the ocean carbonate system, also includes two different phytoplankton groups and nutrients. Our model suggests that a shift in global CaCO_3 sedimentation from shelf to deep ocean basins had played a crucial role in this climate reorganisation event.