

## **Between Greenhouse and Icehouse - paleobathymetry of the Southern Ocean at the Eocene/Oligocene Boundary**

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### **Abstract**

The Eocene/Oligocene Boundary marks a significant turning point towards today's climate. The opening of the ocean gateways of the Drake Passage and the Tasman Gateway enabled the formation of the Antarctic Circum Polar Current, reshaping the distribution and flux of ocean currents worldwide. During the transition from latest Eocene to the early Oligocene, the climate changes fundamentally from a post greenhouse climate to an icehouse climate, with the establishment of a vast continental ice sheet on the Antarctic continent.

To be able to understand this period of relatively abrupt and dramatic climate change, the boundary conditions of modeling efforts targeting, for example, the past ocean circulation or the development of the ice sheet need to be enhanced. One of the major uncertainties within those models is the lack of detailed paleobathymetric grids, which include the dynamic of the sedimentary cover as well as the development of structural obstacles such as oceanic plateaus and ridges.

We will present the first results for the deepest time slice of our series of paleobathymetric grids of the Cenozoic Southern Ocean. Previous publications rely mainly on outdated datasets or disregard the sedimentary cover. Our sediment distribution maps of the Eocene/Oligocene boundary are based on all available reflection seismic data of the Southern Ocean, the Antarctic and its conjugate margins of South Africa, Australia, New Zealand and South America as well as the results of deep ocean drill sites. By focusing on this specific time-slice, we can target questions, such as the shape of the initial Southern Ocean and the influence late-stage volcanism on oceanic plateaus on the sedimentation.

**Keywords:** paleobathymetry, Eocene/Oligocene Boundary, Southern Ocean