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Early Paleogene dinoflagellate biogeography of the Southern Ocean; implications for surface-water circulation.

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New data combined with reviews of previous reports now allow better reconstruction of temporal and spatial Palaeogene circum-Antarctic organic walled dinoflagellate cyst (dinocyst) distribution patterns and comparison with surface circulation patterns resulting from Eocene GCM experiments. Results indicate that the region was characterized by clockwise flowing gyres throughout the entire Palaeogene, with episodes of high sea surface temperatures like the Early Eocene preventing dominance of endemic Antarctic species. In contrast, the Middle to Late Eocene is characterized by an overwhelming dominance of endemic Antarctic and bi-polar taxa, in-line with reconstructed global cooling trends. The Late Eocene deepening of the Tasman and Drake conduits only locally disrupted the established wind driven Eocene surface-water circulation pattern. Progressive cooling and installation of the 'modern' permanent sea ice system is thought to have caused the extinction of the typical Eocene endemic dinoflagellates by Middle Oligocene times. These became replaced by heterotrophic

dominated dinocyst assemblages, including a few new endemic taxa. Future work will focus on absolute sea surface temperature estimations throughout the Eocene, using organic biogeochemical palaeothermometer TEX_{86}. Results of pilot studies on Eocene Southern Ocean sea surface temperatures will be presented.