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*Current status and latest developments in modeling,
observations and processes***

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The long climate history of Antarctica and the Southern Ocean

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The South Polar region, specifically Antarctica and the surrounding Southern Ocean, play a crucial role in the climate system. Together, they regulate ocean carbon uptake, store fresh water, host unique ecosystems and provide the engine of global ocean circulation. Over the past 65 million years, this region experienced climates anywhere between much colder than nowadays, to climate states that were much warmer and analogous to those of the future, under various fossil carbon emission pathways. This has led to profound changes in ice volume and thus sea level, but also the development of the unique Antarctic coastal ecosystem, and the latitudinal distribution of heat. Investigating how the South Polar region changed under such different climate conditions can provide clues to how it might respond to future climate change. In this presentation I will highlight oceanographic, climatic and environmental conditions during some key time intervals in the history of the South Polar region, both on Antarctica and in the Southern Ocean. Going this far back in time, one must put the climate changes that one reconstructs in the context of moving tectonic plates, which alter ocean current regimes, and thus distribution of heat and moisture. This will paint a history book of Antarctica and the Southern Ocean that demonstrates how fundamentally different this cold and hostile region can be under different climate states.