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Abstract of the SCAR Lecture: Southern Ocean Acidification

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Southern Ocean Acidification

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The pH and carbonate system of the Southern Ocean is changing as a consequence of increasing uptake of carbon dioxide (CO₂) in response to rising atmospheric CO₂ concentrations. This process, termed ocean acidification, may significantly impact ocean services. The climate service that the Southern Ocean provides in absorbing atmospheric CO₂ may be compromised as the oceanic sink is weakened and a larger proportion of future CO₂ emissions remain in the atmosphere, exacerbating global warming. Secondly, the ecosystem service potential may be changed through a deregulation of the order of biological systems in the ocean, challenging present ecosystem productivity, richness and biodiversity, and potentially leading to local extinction of keystone species.

This presentation will describe the changes in carbonate chemistry observed in recent decades across the Southern Ocean and deliver the latest simulations of future ocean acidification under different CO₂ emission scenarios. We will demonstrate the highly regional nature of Southern Ocean acidification, with some areas undergoing little change while others indicate changes that exceed those reported elsewhere in the global ocean. We will additionally show how various Southern Ocean species respond to these future acidification scenarios under controlled experimental conditions. Factors that can be impacted include reproductive health, organism growth and physiology, species composition and distributions, food web structure and nutrient flow. Finally we will summarise key findings from the SCAR Ocean Acidification report.