MEASO18
Marine Ecosystem Assessment for the Southern Ocean

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Effect of ocean acidification on Antarctic marine organisms – a meta-analysis

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Southern Ocean waters are amongst the most vulnerable in the world to ocean acidification and organisms inhabiting these waters are likely to experience damaging effects as a consequence of changes in carbonate chemistry. A meta-analysis was performed to examine the effects of ocean acidification on Antarctic marine biota occupying waters south of 60°S. This showed that ocean acidification negatively affected pelagic (e.g. phytoplankton, krill, pteropods, fish) and benthic organisms (e.g. urchins, bivalves, crustaceans). The sensitivity of phytoplankton to ocean acidification differ among species, with many studies showing that it alters community composition, favouring smaller cells. The few studies of other pelagic and benthic organisms suggest that fertilisation and shell formation is often reduced, and certain developmental stages are sensitive to ocean acidification. Our analysis indicates that Southern Ocean marine organisms are likely to be susceptible to ocean acidification, which may cause shifts in community composition, with implications for ecosystem services in the future. However there is still much uncertainty with poor spatial coverage, few studies that encompass multiple trophic levels, and levels of resilience and the potential for organisms to acclimate and/or adapt to the changing conditions are largely unknown.

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