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Coordinating biological observations in the Southern Ocean with the Global Ocean Observing System

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The Southern Ocean is a key driver of the global climate system. As changes in climate continue to occur, their cumulative effect will largely affect the physical, biogeochemical and biological environments. To detect and measure relevant changes in marine biodiversity and ecosystems, we need to measure them through time.

The Global Ocean Observing System (GOOS) has been a leading driver for initiation, coordination and globalization of ocean observations, providing advice on physics, climate and biogeochemistry. GOOS physical and biogeochemical Essential Ocean Variables (EOVs) are based on scientific and societal requirements driven by the need to measure climate change and provide weather forecasts. GOOS biological EOVs constitute a series of sustained measurements to assess the state and change of marine ecosystems, address scientific and societal questions and needs, and positively impact society by providing data to help mitigate pressures on ecosystems at all scales.

The subset of biological GOOS EOVs relevant to the Southern Ocean focus on the status and change of prioritised ecosystem components (phytoplankton, zooplankton, fish, marine birds and mammals), and to changes in habitat extent and health (macroalgae), with microbial and benthic variables still being defined.

The Southern Ocean Observing System (SOOS) has proposed a set of 90+ candidate ecosystem EOVs (eEOVs) for several ecosystem properties. Of these, there are 56 potentially related to the GOOS biological EOVs. Through specific sub-variables, the GOOS EOVs link to 33 of these SOOS eEOVs addressing nearly 60% of the potential links. These are mostly related to diversity, distribution and abundance of key species within the benthic and pelagic realms and specific marine mammals and bird species. International collaboration and coordination will ensure that observations in the Southern Ocean contribute to the identified priorities of the global community and in turn profit from global advances in technology and processes for marine monitoring.