

We, Professor Alexander Babanin and Dr Joey Voermans of the University of Melbourne specialise in the physical interactions between the ocean, waves and atmosphere in the Southern Ocean and Antarctic continent. This research is pivotal for the design and safety of offshore and coastal marine engineering structures, and the improvement of weather and climate forecasting models for both Australia and globally.

The Southern Ocean and neighbouring Antarctic sea ice are acknowledged to be among primary drivers of weather and global climate, but are the least studied and understood in physical terms as they are challenging to access given their remoteness and harsh climate. The current lack of understanding of Antarctica within the global Earth system has been made abundantly clear in this year's extraordinary low Antarctic sea ice extent, which no climate model was able to predict. This highlights the urgency in identifying the physical processes that have resulted in this extreme anomaly in order to understand not only its future impacts on Australia's climate and communities, but also its impacts around the world.

The announcement that the AAD is pursuing a cut of roughly 16% of its operating budget is expected to lead to reductions in AAD jobs and Australia's Antarctic activities. In our professional opinion, we believe this will have immediate near-term implications on research and observational capacity, with disastrous long-term impacts that are expected to damage Australia's global reputation as a leader in Southern Ocean and Antarctic studies, knowledge and applied skills.

Our research critically depends on the logistical and staff support of the AAD, both ship-based and on the fast ice of Antarctica, to retrieve observations fundamental to our understanding of the Antarctic Marginal ice Zone (MIZ). The MIZ is a dynamic region that separates and protects the fast ice of Antarctica from the extreme Southern Ocean climate. MIZ research has both scientific and applied importance. Particularly, our research supports, improves and advances MIZ forecasts in use by national and foreign agencies. As it takes years to plan and complete research campaigns in the Antarctic MIZ, and few platforms are available to facilitate such programs, we believe MIZ research will be stalled without the support of the AAD.

It is our view that cuts in research support will have detrimental effects on Australia's leading expertise in Antarctic and Southern Ocean sciences and will cause gaps in critical observational datasets that function as baselines in climate studies for the next few decades. These gaps are irreversible. We expect that this will have broad impact on Australia's international standing and contributions as a country which claims a significant Australian Antarctic Territory and may negatively influence policy and negotiations within the Antarctic International Treaty.