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27 March 2023

ARC panel examining ARC LIEF proposals

Reference: Letter of support to the ARC LIEF proposal "CPIES 4D mapping of ocean currents in Australian regional waters" by Phillips, Foppert and others.

Dear Madame/Sir

I am writing to support the ARC LIEF proposal by Phillips, Foppert and others to develop an Australian array of light moorings for 4D mapping of ocean currents serving the Australian oceanographic community.

The CSIRO Oceans Group are leading stakeholders in the ocean observations in Australia for climate science, monitoring and impact investigations. The research of our Climate, Atmosphere and Ocean Interaction Program leads the development of Australia's national capability in observing and modelling our atmosphere and oceans and our earth system models to address the challenge of climate change and emission reduction for Resilient and Valuable Environments for Australia.

The Pressure recording Inverted Echo Sounders (CPIES) present a cost effective and robust means of delivering 4-dimensional mapping (latitude, longitude, depth and time) of the ocean in regions of strategic interest to Australia by leveraging transient observations provided by systems like the Argo floats.

The four CSIRO based CIs of this proposal are involved in research programs such as the Australian Antarctic Program Partnership (AAPP) where they have in total a 1.8 FTE allocation per year. The CPIES network proposed here will contribute to the delivery of their research goals in the AAPP. In addition, the CSIRO Oceans group is currently applying for internal CAPEX funds to purchase 4 CPIES instruments which would become part of the Australian CPIES array.

CSIRO is very much involved in experiments that would contribute to success of, and benefit from, this Australian CPIES array. These include the SWOT- Satellite experiment which includes the R/V Investigator 36 days voyage at the end of 2023. During this voyage a tall mooring will be deployed that will become the centre of the CPIES array, thus enhancing the power of the combined experiment. This voyage also will deploy Argo floats, drifters and undertake under profiling observations and CTD sampling of the water column which will contribute information to the CPIES array analysis.

The 36-day voyage has an estimated value of $4.4M and the tall mooring with a large number of oceanographic instruments (including Temperature, Salinity, Dissolved Oxygen, ADCP current profilers and deep current meters throughout the 3600 m of water column) represent worth over $1M in capital items. As a result of CSIRO's involvement in the SWOT-Satellite experiment the CPIES array-based experiments will be able to use the SWOT observations as well as oceanographic samplings to complete the oceanography analysis and impact into heat and carbon pathways into and across the ocean.

The tall mooring instrumentation is of irreplaceable oceanographic value, but very cost intensive to expand. The ship time to deploy and recover the CPIES is embedded in the two RV Investigator voyages (SOTS 2024 and SOTS 2025 at 2 days per voyage valued at 520k$). CSIRO's National Collections and Marine Infrastructure (NCMI) has the capability to support heavy operations like the experiments involving CPIES.

CSIRO's new method for retrieving oceanographic instruments is being commissioned on the SOTS2023 voyage (May 2023) and will greatly assist with the deployment and recovery of CPIES as well as floats, gliders, and other light autonomous instrumentations.

Other research activities that will benefit the CPIE network that CSIRO CIs will contribute to in future years include a research voyage to the Denman Glacier region on board the Nuyina icebreaker and the Antarctic Front and Slope Current experiment planned in the AAPP for the horizon 2026-27. These last two under development experiments are other examples where CSIRO can contribute to and benefit from the Australian CPIES array.

While CSIRO will not directly contribute in-kind FTE for the four CSIRO CIs listed in this proposal, their effort expended on the AAPP activities will support the deployment and use of the CPIES array from this proposal. Also, as highlighted above, CSIRO contributes very significantly to some of the projects that the array will utilise in the coming years.

Best Regards,

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