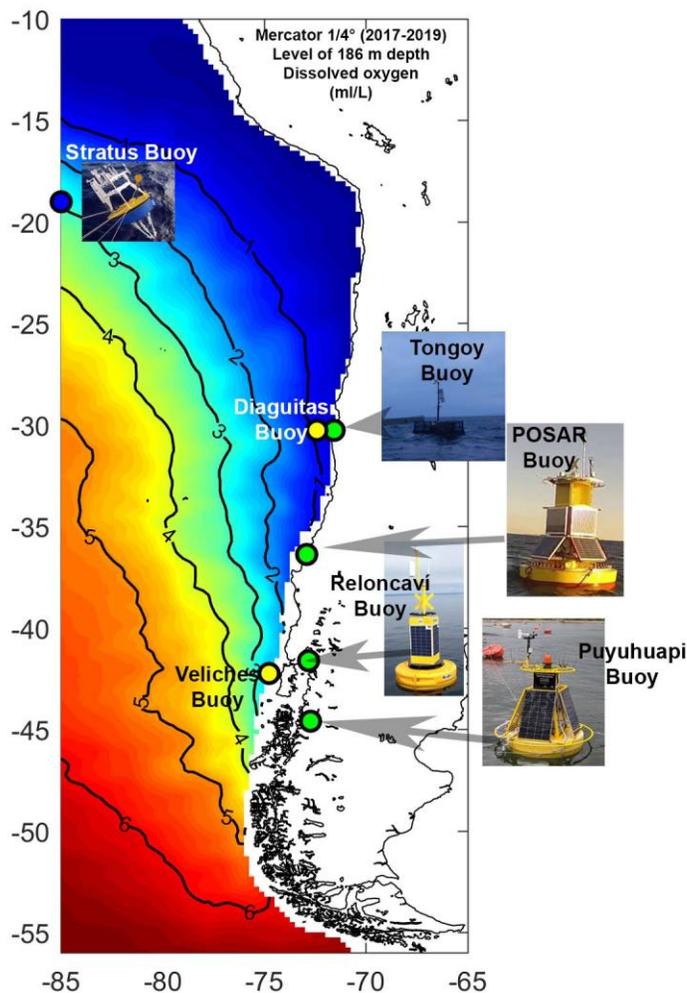


Endorsement request for the project ECCOOS

ECCOOS (“*Enhancing the Chilean Climate Ocean Observing System*”) is a project to be submitted to ANID (Chilean NSF) in response for a call for proposal for “big equipment”. Its main objective is to develop and maintain during 5 years a network of 6 surface buoys along the coast of Chile in order to enhance research capabilities in marine science in Chile in particular and in the South Eastern Pacific as a whole. ECCOOS will acquire 2 news surface buoys fully-equipped (currents, temperature, salinity, atmospheric parameters, pH, Oxygen) and deploy them off Coquimbo (30°S) and off Chiloe island (42°S), which will complement a network of 4 others existing buoys operating since 2014 and maintained by the partners’s institutions (University of Los Lagos, University of Concepcion, University of Chile, University of Coquimbo, CEAZA). The buoys will deliver data in real-time to the international community following

international standards, that will serve for process studies, model validation and tuning, and for alerting on risks associated to extremes events (e.g. El Niño event, marine heat wave, hypoxia, storms, etc). ECCOOS is based on recommendations from a national report on the requirements for an oceanic observing program for Chile that was released during the COP25 (cf. SIOCC, Propuesta de un Sistema Integrado de Observación del Océano Chileno, <http://www.minciencia.gob.cl/comitecientifico/documentos/mesa-oceanos/18.Oceanos-SIOCC.pdf>) and is viewed as a keystone for starting its implementation.



Map: ECCOOS observing network (green and yellow dots): Existing buoys (green dots) will be complemented with pH sensors. The location of the STRATUS buoys is indicated by a blue dot.

As expected outcomes relevant to CLIVAR goals, ECCOOS will contribute to:

- a better understanding the dynamics of regional coupled air-sea modes along the coast of Chile and the oceanic teleconnection along the coast of Chile associated to the tropical (e.g. ENSO, PDO) and high-latitude (e.g. SAM) climate variability
- a better understanding of ocean mass and property transports and their relationships to the Pacific climate
- a better understanding of regional impacts of climate variability and changes (sea level, ecosystems, extreme events, etc)
- the development of a sustainable observing system, with connection to the TPOS2020 program; ECCOOS is in particular viewed as a leverage for expanding the network to the tropical region in liaison with the Eastern Pacific Task team of the TPOS2020 program.
- Facilitate the development of regional research projects with key partners that are linked to the recommendations of international observing program. In particular ECCOOS will be instrumental in helping in the development of a pilot program on the equatorial and coastal wave guide, as recommended in the TPOS2020 report. ECCOOS is also motivated by the need to reduce model biases in this region and it will favor interactions with operational oceanography centers to develop regional oceanic Reanalysis.
- ECCOOS is well aligned with actions promoted by international observing programs (e.g. Global Ocean Observing Systems (GOOS), the Joint Commission for Oceanography and Marine Meteorology (JCOMM), , ARGO, TPOS2020) to expanded observation for accurate documentation and prediction of ocean changes, and for improved understanding of its causes and consequences of ocean deoxygenation and acidification, especially in Eastern boundary upwelling systems that hosts very productive ecosystem and are imbedded in oxygen minimum zones.

Extended abstract:

Ocean warming, ocean acidification, deoxygenation and changes in biogeochemical cycles are already impacting a large number of processes that regulate global climate and the structure and functioning of marine ecosystems. Under different future GHG emission scenarios, an increase in the strength of the observed impacts is projected for all the world's oceans, being particularly intense in the eastern South Pacific, the Eastern Boundary Upwelling Systems (EBUS), and sub-Antarctic regions. All these changes put at risk, and will threaten, a multitude of benefits and services that oceans provide to human society. Chile, as one of the ten countries worldwide with the largest maritime territory and with a great socio-economic and cultural dependence of the ocean, is extremely vulnerable to any of the future impacts of climate change (CC). Consequently, there is an urgent need to strengthen and implement CC adaptation responses to reduce the climate risks to which Chile is exposed. Rapid adaptation pathways and ocean solutions, consistent with the Sustainable Development Goals and the Paris Agreement, need to be developed and implemented with a participatory, adaptive and integrated perspective. This urgently requires in particular enhancing and improving in situ observational capabilities of climate-ocean processes along the Chilean coast based on the evolving technology in order to better predict the ocean

and atmospheric states. This is viewed as a prerequisite for gaining confidence in ocean and climate model predictions, and provide the science-based products that is needed for designing appropriate management and adaptation plans and moderate the impacts of extreme events. Currently, Chile has a precarious and despair ocean observation system, composed by 5 openly available oceanographic platforms resulting of individual efforts of specific national academic and research institutions. Enhancing the Chilean Climate Ocean Observing System (ECCOOS) is an urgent task to reduce the current knowledge gaps about the climate and ocean processes and their future changes in the South Eastern Pacific. ECCOOS attempts to improve the surveillance and monitoring of the climatic, oceanographic and biogeochemical conditions to provide real-time information about the atmospheric-climate-ocean state and the health of the multiple ocean and coastal ecosystems. Additionally, this information is crucial for the development of the environmental warning-alert systems that Chile needs for reducing climate risks and future disasters. ECCOOS will address these tasks under a collaborative and coordinated vision by incorporating 6 well recognized academic-research institutions in the field of climatology and oceanography. This will be achieved improving the capabilities and performance of the existing network by incorporating two buoys, standardizing with similar sensors to enhance its robustness, and facilitate data calibration and stocking with spare sensors to avoid data gaps during equipment calibrations. The main objective of ECCOOS is to provide real time data, high-quality information based on international standards, and to allow an uninterrupted data accessibility. This new and key information, currently still missing, will profit the most relevant users and policymakers from public, private and non-governmental organizations at national and international level that have a close relationship with the oceans, their services and benefits. ECCOOS also aligns with recommendations of the international programs such as TPOS2020.

Participants:

Participants' name	Institutions
Laura Ramajo (PI)	CEAZA
Orlando Astudillo	CEAZA
Boris Dewitte	CEAZA/LEGOS
Ivan Perez	Universidad de los Lagos, Puerto Montt
Pamela Fernández	Universidad de los Lagos, Puerto Montt
Patricio Diaz	Universidad de los Lagos, Puerto Montt
Rene Garreaud	Univ. of Chile
Laura Farias	Univ. of Concepcion/IMO
Diego Narvaez	Univ. Of Concepcion/IMO
Martín Jacques Coper	Univ. Of Concepcion/IMO
Marcel Ramos	Universidad Catolica del Norte, Coquimbo
Luis Bravo	Universidad Catolica del Norte, Coquimbo
Práxedes Muñoz	Universidad Catolica del Norte, Coquimbo
Jaime Letellier	IFOP
Ana Maria Molina	Fundación MERI
Sonia Español	Fundación MERI