

PhD Scholarship offer – Long-term changes of phytoplankton in the Southern Ocean

Faculty: Science and Engineering

School: Earth and Planetary Sciences

Location: Curtin University, Bentley Campus, Bentley (Perth), WA 6102

Supervisor: Prof. David Antoine

Co-supervisors: Prof. Pete Strutton (University of Tasmania, UTas, Hobart) and A/Prof. Alex Sen Gupta (University of New South Wales, UNSW, Sydney)

Start: as soon as practicable, ideally first semester 2022.

Project summary:

The proposed PhD project which is supported by a PhD stipend from Curtin University will use multi-decadal records of satellite observations in search of decadal signals and their connection with Southern Ocean dynamics and large-scale climate drivers (like El Nino/La Nina). Such analyses are necessary to ultimately understand long-term changes in the ecosystem of this key yet remote ocean.

>20-year records of satellite-derived physical parameters (sea-surface temperature, wind speed and sea-surface height) and biological parameters (phytoplankton chlorophyll concentration) are available at the scale of the entire Southern Ocean. These parameters plus outputs of ocean models will be analysed in search of temporal signals and relationships, using statistical and/or machine learning techniques. This information will be used to assess the impact of various scenarios of change in the physical environment on future changes of phytoplankton.

All satellite data sets are publicly available from ESA or NASA archives. Model outputs can be sourced from public data bases and from this project partners.

The activity is part of programs #1 and #3 of the ARC Australian Centre for Excellence in Antarctic Science (ACEAS; see below) which will provide a \$5,000 pa top-up scholarship to the selected candidate.

Context:

This PhD project is affiliated with the ARC Australian Centre for Excellence in Antarctic Science (ACEAS), a national-scale, University-led, international centre focused on helping the world community prepare for climate risks emerging from East Antarctica and the Southern Ocean by integrating knowledge of the ocean, atmosphere, cryosphere and ecosystems, and their interplay. ACEAS will grow to support the activities of around 150 researchers, administrative staff, and students, with exciting opportunities to collaborate across disciplinary and institutional boundaries. Further information on ACEAS is available at: <https://antarctic.org.au>

Selection criteria:

- Honours / Master's degree or equivalent qualification in a relevant area (e.g., satellite ocean colour remote sensing, physical or biogeochemical oceanography, coupled physical-biogeochemical ocean modelling)
- Evidence of emerging independent research work, for example, a thesis with an associated peer-reviewed publication or draft manuscript.
- Excellent skills in processing and analysing satellite remote sensing data sets
- Experience in machine learning techniques
- Excellent oral and written communication skills
- Demonstrated programming skills in a Unix/Linux environment (e.g., use of shell scripts, Fortran, Python, R or Matlab programming)
- Some evidence of capability to collaboratively work within a research team

Other desirable criteria:

- Willingness and ability to travel interstate and overseas.