Sea-Ice Modeling in Antarctica with ROMS/CICE

POSITION TITLE: RESEARCH ASSISTANT

RESEARCH PROJECT TITLE: Sea-Ice Modeling in Antarctica with ROMS/CICE

FACULTY NAME & TITLE: PROFESSOR DAVID M. HOLLAND, CENTER FOR GLOBAL SEA LEVEL CHANGE

RESEARCH PROJECT DESCRIPTION

The Southern Ocean plays a significant role in the Earth climate system. At the interface between the atmosphere and ocean, sea ice plays a crucial role in global climate. In addition to modifying the global heat budget by reflecting much of the incoming solar radiation, sea ice regulates the air-sea exchanges of heat, mass, and momentum and therefore modifies the atmosphere and ocean circulation. The nearly 40 years (since November 1978) of the satellite record shows extremely large interannual variability in Antarctic sea ice extent. Overall, this record shows a slight increasing trend in Antarctic sea ice extent up until 2015 (1.5 % per decade), with much more significant increases during 2012-2014, followed by substantial decreases in 2016 and 2017. These gross changes are the result of opposing trends in different sectors of the Southern Ocean. It is clear that different regions and seasons contribute to the total trend, which has made it difficult to establish clear links and there is currently no consensus on the mechanisms controlling this variability. In addition, the Southern Ocean and sea ice around Antarctica continue to be the least sampled regions in the world.

Modeling sea ice is a fast developing field but major biases in sea ice models still exist. Misrepresented sea-ice features affect the predictions of precipitation in southern hemisphere continents, the location of mid-latitude storm belts and the seasonality of large scale phytoplankton blooms and carbon fluxes. It is clear that regional studies are needed in order to understand which mechanisms are important at different time and space scales. We will use the CSLC coupled ocean-ice system (ROMS/CICE), forced with the new high resolution ERA5 reanalysis data (0.3 km spatial, hourly temporal), to examine the regional changes in Antarctic sea ice and their local effects.

RESPONSIBILITIES OF THE POSITION
- Work in collaboration and under the supervision of Dr. Clare Eayrs
- Prepare input data for ROMS/CICE scenarios
- Analyze the data as per the project description
- Write a detailed description of analysis and results
- Co-write a research article detailing the results
- Present the work in local and external meeting and conferences

ESSENTIAL QUALIFICATIONS:
B.SC. in Mathematics, Physics, Meteorology, Oceanography or Computer Science 1st or upper second class degree Proficiency in English, Reading, writing, Listening and Speaking, equivalent to IELTS 6.0

PREFERRED EXPERIENCE / SKILLS:
Experience in working with large Datasets
Programming Skills, Python, Matlab, R statistical Package

APPLICANTS TO PROVIDE:

1. Statement of interest in the position
2. Transcript of degree(s)
3. CV
4. Two letters of recommendation