SO-CHIC

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Southern Ocean Carbon and Heat Impact on Climate

Reducing uncertainties in climate change predictions

Heat and carbon uptake and storage by the Southern Ocean are key processes due to their strong implication in climate changes or variability. These processes are unclear and the fundamental consequences of them are not even captured by the most sophisticated climate.

SO-CHIC is a highly ambitious project with the aim to unlock understanding of some of the key Southern Ocean processes, which represent the main limitation of the current generation of climate models in their way to represent past and future global heat and carbon cycles. The project proposes to tackle this significant gap in our understanding of the global climate by bringing together old and new observations, along with new specific modelling efforts developed in the different groups within Europe.

www.sochic-h2020.eu
contact@sochic-h2020.eu
@SO_CHIC_EU
so_chic_eu

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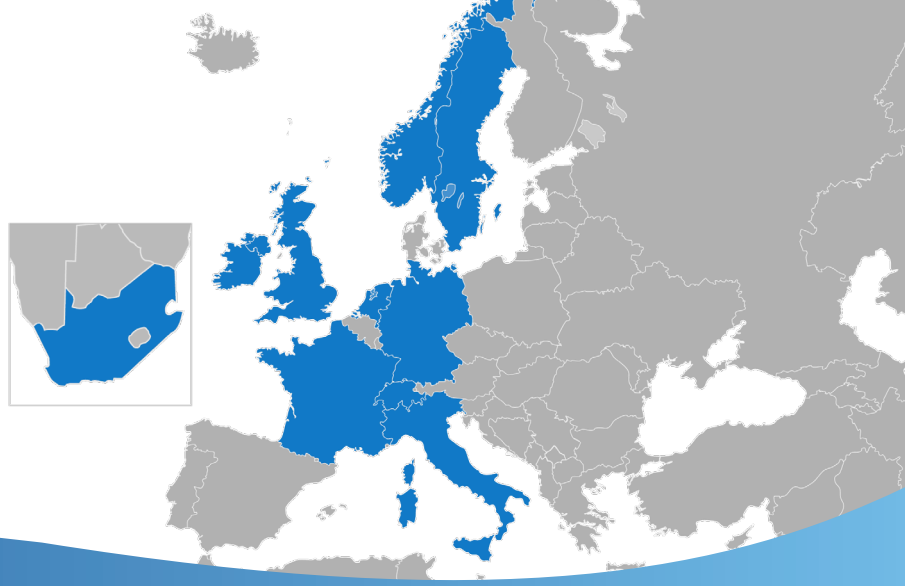
The Consortium

SO-CHIC (Southern Ocean – Carbon and Heat Impact on Climate) – coordinated by Sorbonne Université – connects 16 partners in 10 countries in Europe and South Africa to understand and quantify variability of heat and carbon budgets in the Southern Ocean. The SO-CHIC consortium is composed of 7 leading universities, 2 of the main European Polar research centres, 3 national research centres, 2 SMEs and 1 independent organization focusing on defining major strategic priorities and provision of advice and communication. This complementary and multidisciplinary consortium will investigate key processes controlling exchanges between atmosphere, ocean and sea ice, using a combination of observational and modelling approaches.



Specific Objectives

To initiate a sustained monitoring of budgets of heat and carbon in the Southern Ocean, by quantifying their fluxes at the air-sea-ice interface and estimating interannual variability of heat and carbon storage in the Southern Ocean.

To improve understanding of the spatial distribution and variability of heat and carbon exchanges between the atmosphere and the deep ocean, focusing on the dynamics of the ocean mixed-layer, its relation to sea ice distribution, and on assessing what has caused the opening of the open-ocean Weddell Polynya in 2016 and 2017 (i.e. a large-scale ice-free area within closed sea-ice cover), more than 40 years after its previous occurrence.

To improve understanding of the formation and export of bottom waters in the Bottom Boundary Layer, which ventilate the world's abyssal oceans, and to propose new strategies to represent such key processes, which are major shortcomings of current state of the art climate models.

To identify critical sensitivities in the Southern Ocean climate system that must be correctly represented in models in order to significantly reduce uncertainties in future projections of oceanic heat and carbon content.

To enable free and open access to all data and to maximise impact on the climate report (IPCC), climate services, and climate-model groups.