

# I CONVEGNO ISTITUTO DI SCIENZE POLARI

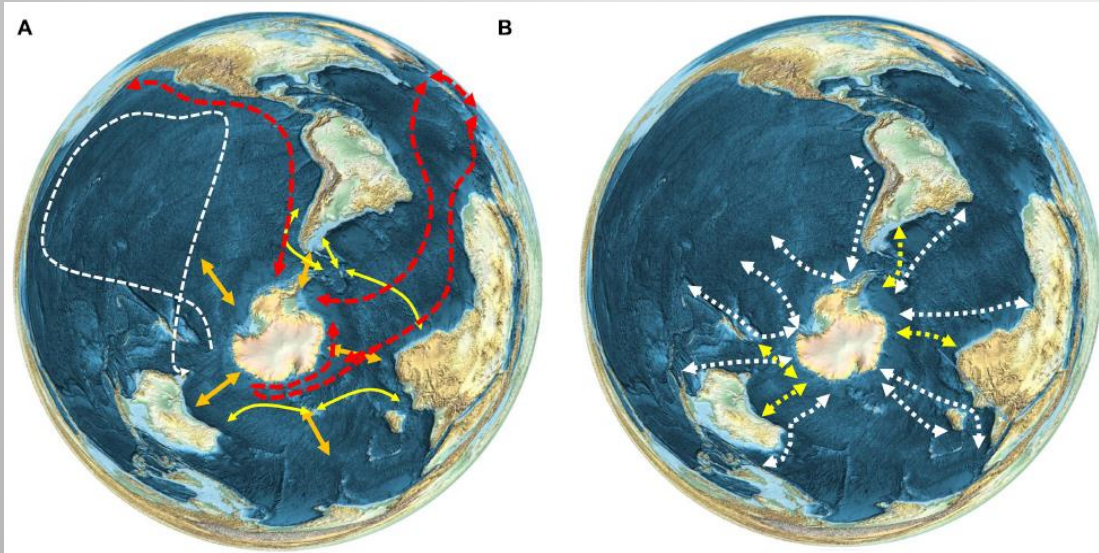
How and to what extent  
contamination of polar marine  
ecosystems can be affected by global  
change and vice versa: a tool for  
preserving and recovering Antarctic  
marine ecosystems.



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- **Antarctic POP research** faces the challenge of quantifying and forecasting the impact of POP contamination in Antarctica
- **Mitigating human influences** in Antarctica has been identified as one of six priorities for Antarctic science
- **Global chemical production** is increasing faster than chemical policy frameworks can respond.
- **Hydrospheric, and biological long-range environmental transport pathways** must also be considered together to LRAT due to an expanding diversity of chemical structures, and therefore chemical behaviours



Pattern of migrations and movement of seabird and marine mammals. Modified from Murphy et al., 2021

**Research Gaps**

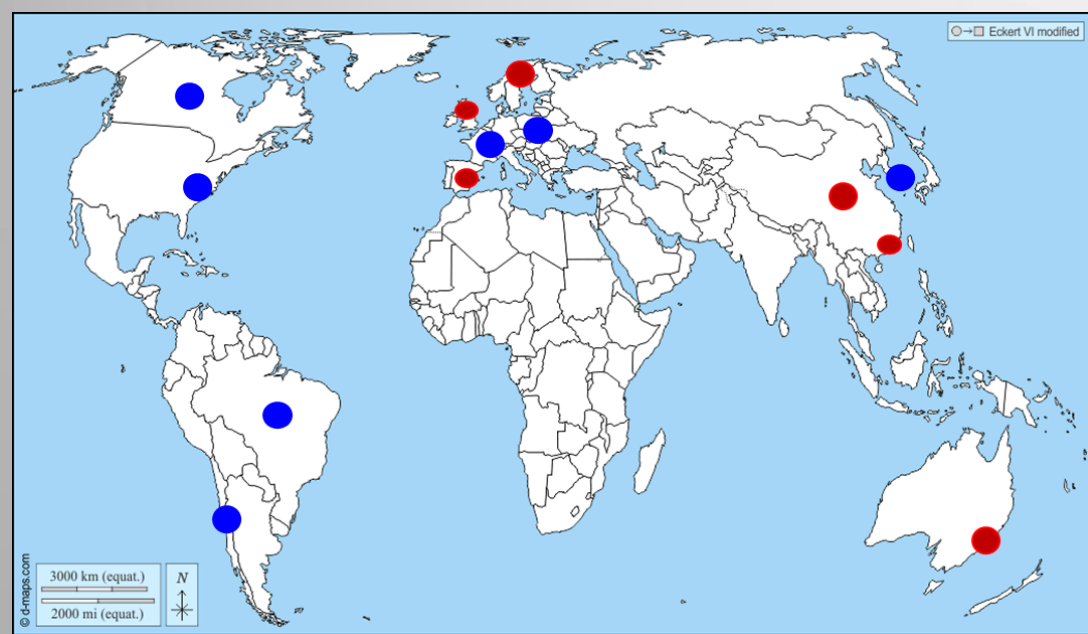
- **Regulated versus ‘suspect’ POPs** in Antarctica
- **Remote vs. local** sources
- **How will climate change impact** POPs contamination in Antarctica?
- **What is the role of hydrospheric and biological transport?**
- **What is the resilience of Antarctic biota?**

# ROSS Sea ecosystem and emerging contaminants: new challenges and potential threats in a changing world

## ROSSnROLL (PNRA18\_00097)

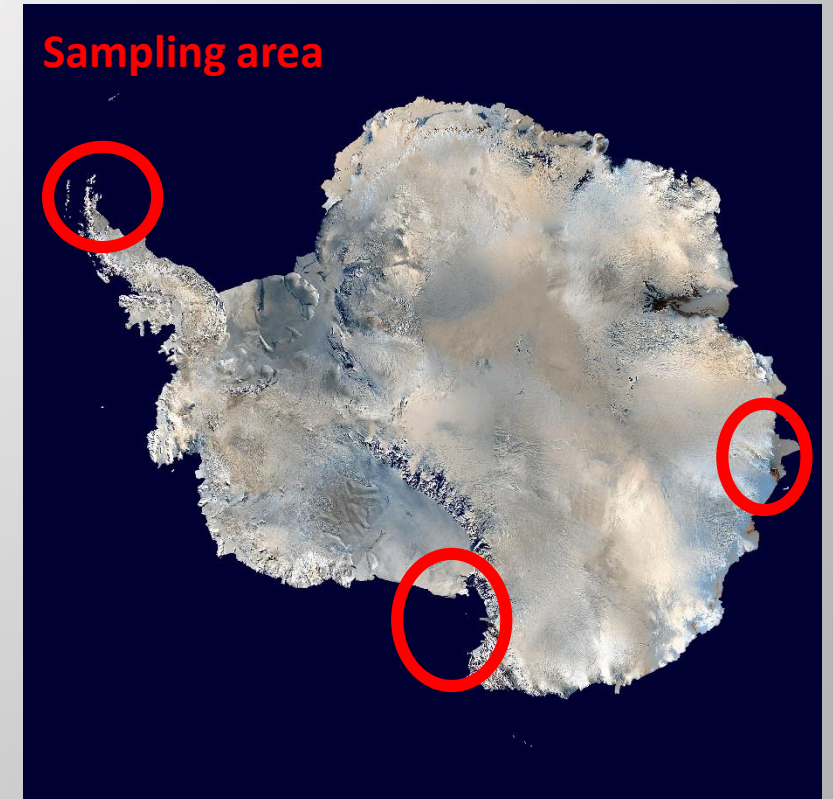
Input Pathways of persistent organic pollutants to Antarctica, IMPACT Group SCAR: an international project to unravel human impact in a changing world

ImpActS (PNRA Call 2019 – B Line)



ROSSnROLL collaborations ImpActS collaborations

These projects aim to start creating a harmonised monitoring network for a robust spatial and temporal trend investigation for both legacy and newly listed POPs.





## From...

Legacy and “of concern” POP occurrence, distribution and bioaccumulation (from sediments/seawater to biota)

## Deepening ...

- ✓ Contaminants transfer from the pelagic to the benthic community
- ✓ Bioaccumulation in resident and migrant seabirds
- ✓ Temporal trends evaluation and secondary emissions (data available from 1995)
- ✓ Correlation between contaminant levels and transfer in the ecosystem to climate and atmospheric parameters
- ✓ Comparison of contaminant levels, profile and distribution in different sectors of Antarctic coasts with different impacts

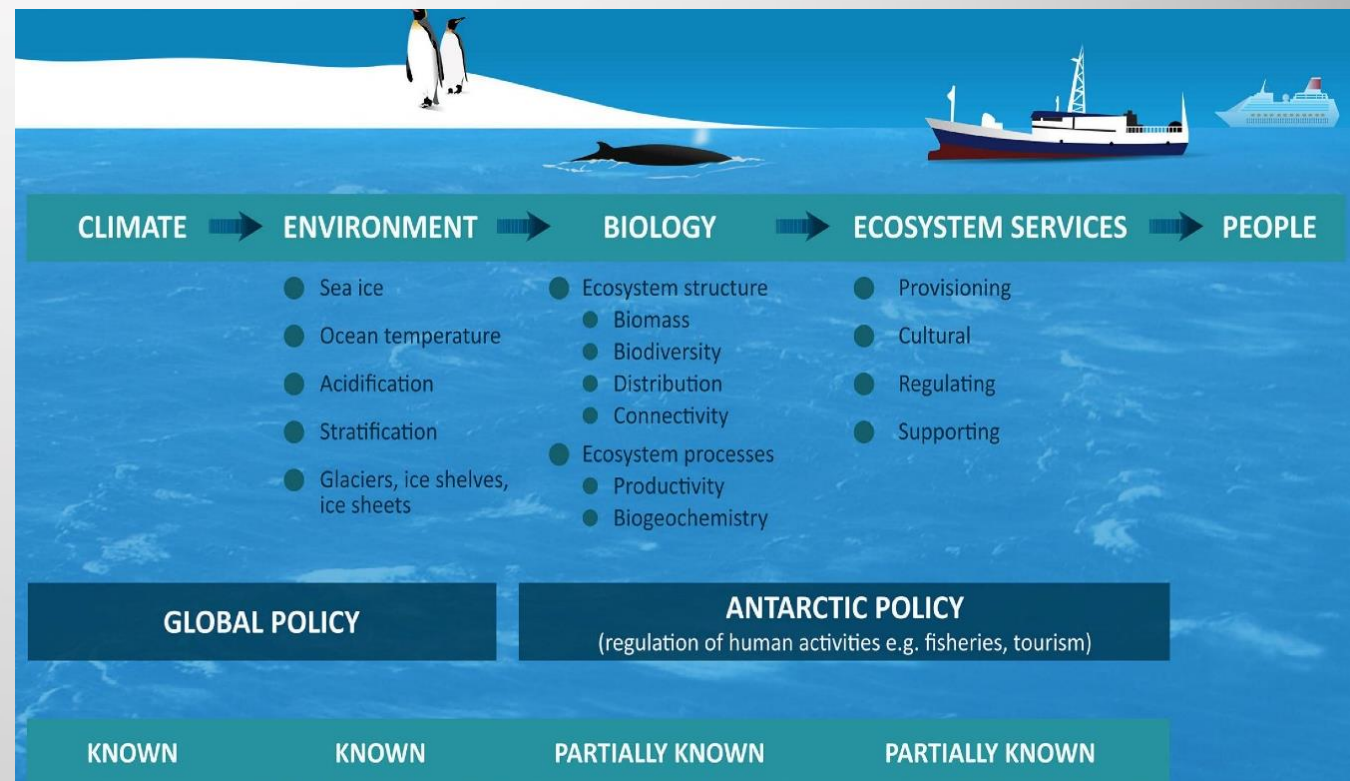
Multi disciplinary  
approach;  
Multi-level  
environmental  
components;  
Different scale of  
observations

Synoptic monitoring of  
the marine sphere;  
Contaminant fate into a  
broader scale;  
Climate modelling scale

# OUR GOAL

## A comprehensive toolbox:

- ✓ for evaluating the distribution and accumulation of targeted and untargeted pollutants in different Antarctic ecosystems, identifying “hotspots” where species ranges are to be most sensitive to climatic variability.
- ✓ To provide strategies for managing POPs as a part of a realistic, integrated, ecosystem-based approach, to support resilience and adaptation of these ecosystems to changes, preserving their ecosystem services that are a fundamental point for a sustainable development.



Modified from Cavanagh et al., 2021



*Grazie per  
l'attenzione*