

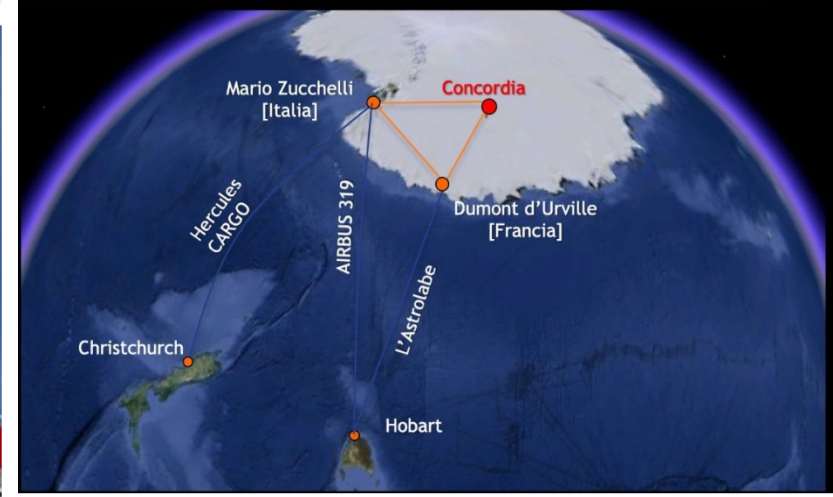
ITALIAN POLAR RESEARCH PRIORITIES



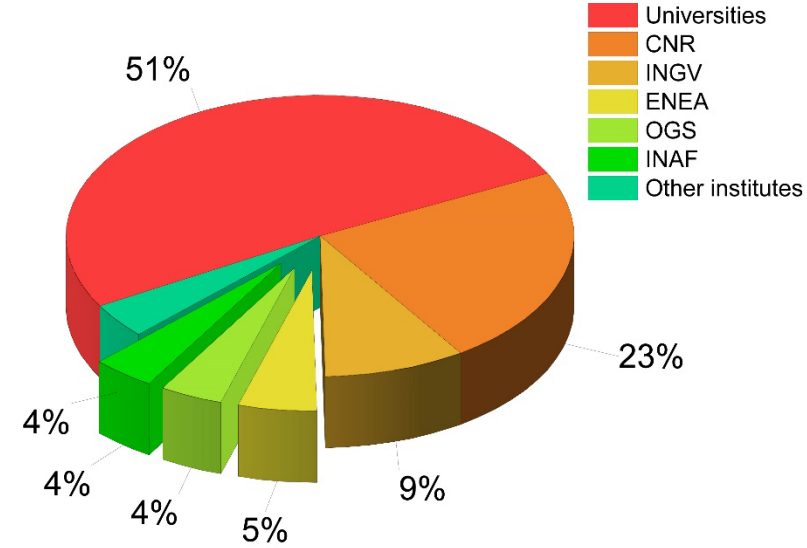
Paolo Montagna
Institute of Polar Sciences



Polar Research Workshop, Washington DC (12th July 2022)



ITALIAN RESEARCH IN ANTARCTICA

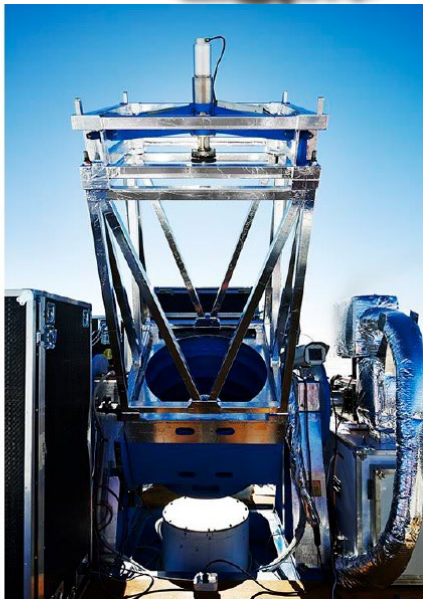
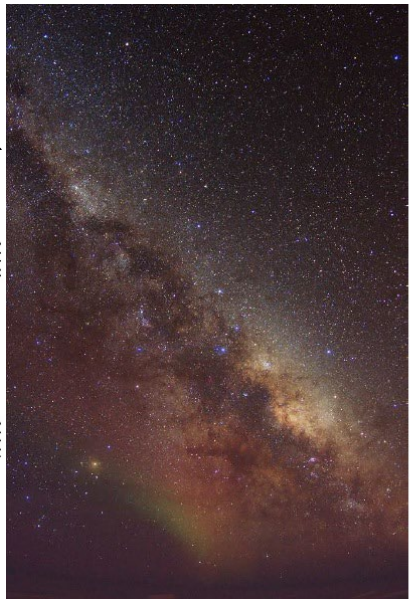
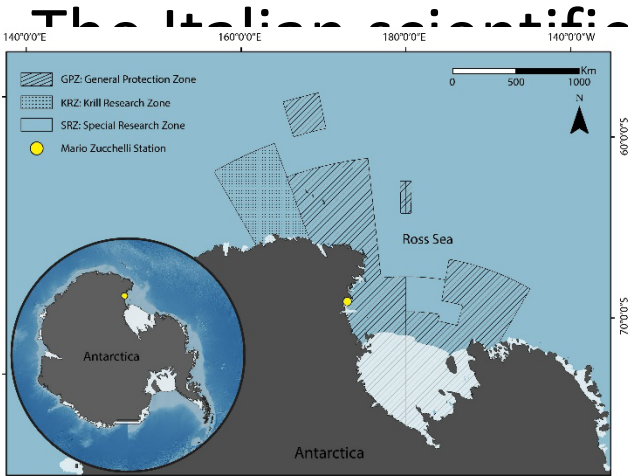


Since 1985, Italy has organized **35 Antarctic expeditions**, with more than 5000 people carrying out research and providing technical-logistic support in the Ross Sea and Antarctic Plateau.

The **National Research Program in Antarctica (PNRA)** was established in 1985 and operates as a funding agency for research in the Antarctic region.

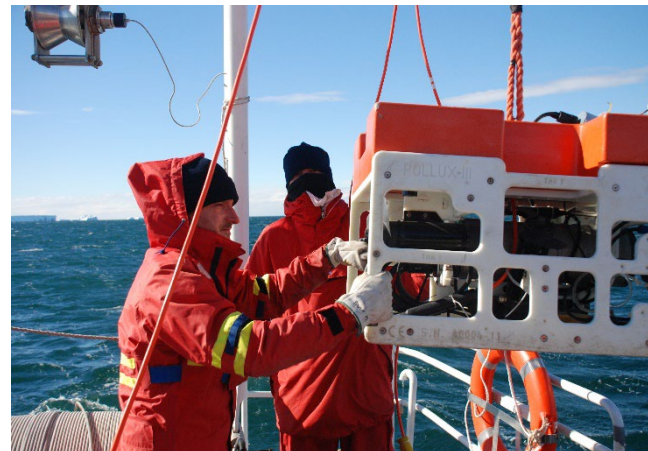
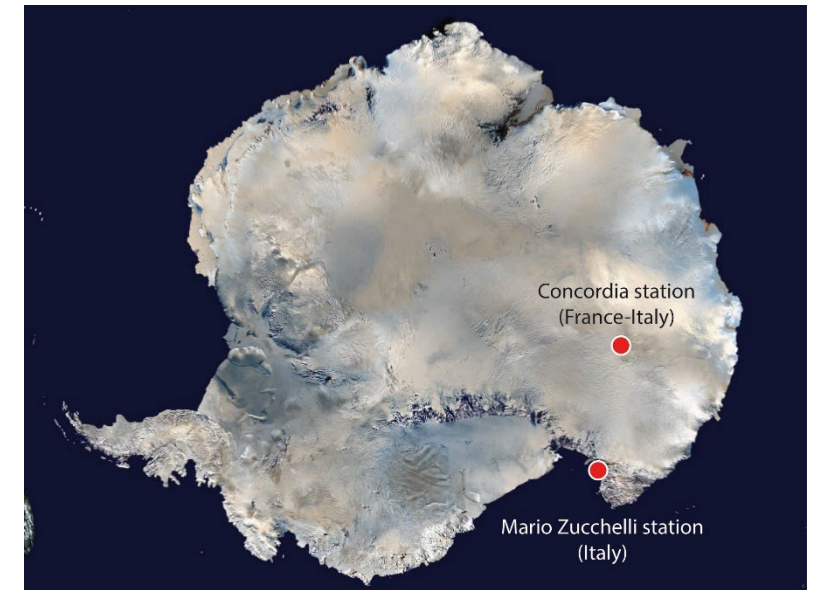
Its main objective is conducting cutting-edge and multidisciplinary scientific research in the Antarctic by rationalizing and optimizing the use of available resources. PNRA closely follows the Strategic Plan of the Scientific Committee on Antarctic Research (SCAR):

- 1) Study the impact of the Southern Ocean and Antarctic atmosphere on a global scale (past and present)
- 2) Understand how, why and where the continental glaciers lose mass (dynamics of the polar ice cap)
- 3) Antarctic Geology (solid Earth dynamics)
- 4) Understand how life evolved and adapted in Antarctica (evolution, adaptation, biodiversity)
- 5) Observe Universe above Antarctica and Space Weather
- 6) Study and mitigate the anthropogenic impacts in Antarctica



Main achievements of the National Research Program in Antarctica over the last 35 years

- **Two scientific stations** (Mario Zucchelli in Terra Nova Bay and Concordia at 3233 m in Antarctic Plateau);
- A **seismological network** in the Antarctic Peninsula (ASAIN);
- Permanent observatories at Mario Zucchelli and Concordia Stations;
- Research infrastructures, including the **Antarctic Interlaboratory System** and **Antarctic repositories**;
- The recently (2019) acquired **research icebreaker «Laura Bassi»**, operated by the National Institute of Oceanography and Applied Geophysics, with a full range of science equipment representing an excellent mobile research facility to investigate the Southern Ocean;
- The recently (2022) acquired **research vessel «Gaia Blu»**, operated by the National Research Council of Italy, with full ocean capability;
- The **airfield at Boulder Clay** in Terra Nova Bay (~ 2000 m already built).



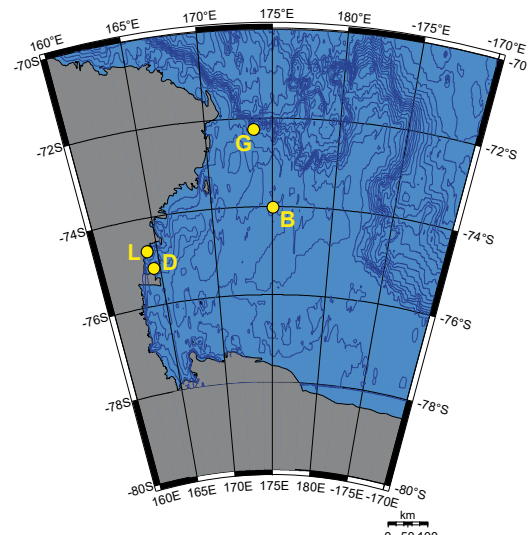
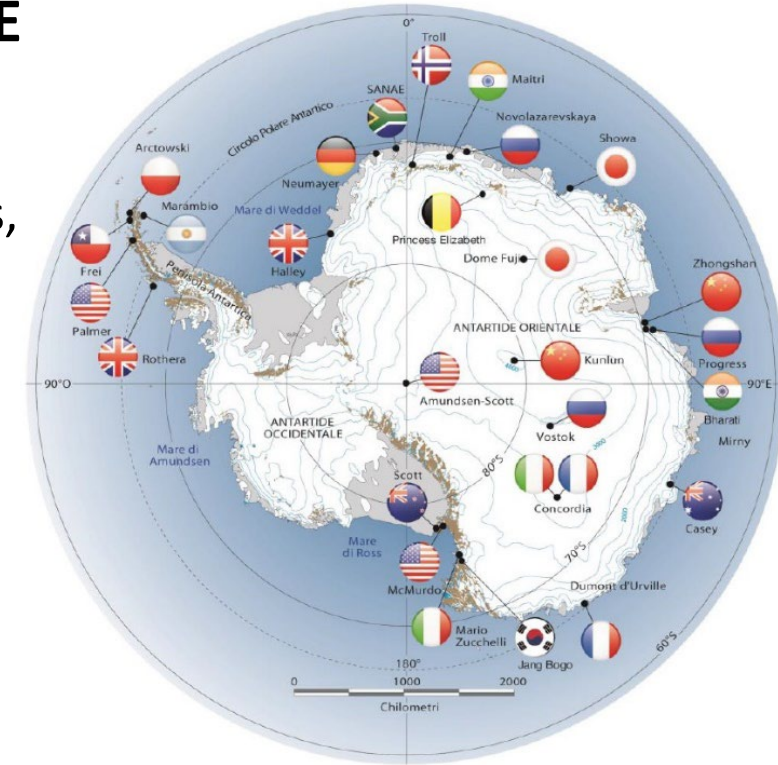
MAJOR INTERNATIONAL PROJECTS

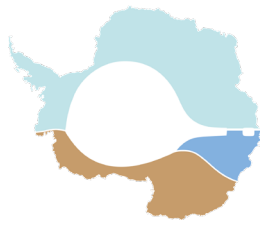
- EPICA and Beyond Epica Oldest Ice
- TALDICE (Talos Dome Ice Core Project)
- EAIIST (East Antarctic International Ice Sheet Traverse)
- Ice Memory
- BOOMeRanG (Balloon Observation of Extragalactic Radiation)
- Cape Roberts Project
- Sale-DC (Subglacial Lake Exploration in Dome C Area)
- ISOIPS (Ice Shelf Ocean Interactions ProjectS)
- IODP (International Ocean Discovery Program) and ICDP
- PAIS (Past Antarctic Ice Sheet Dynamics)
- INSTANT (Instabilities and Thresholds in Antarctica)
- PAGES/Antarctica2k



OPPORTUNITIES TO STREAMLINE THE ANTARCTIC PROGRAMME

- 1) Enhance international collaboration to **share large infrastructures** (e.g. Antarctic stations, research and cargo vessels, airplanes, moorings..), skills, experience, data and numerical models.
- 2) Joint (bi-lateral and multi-lateral) interdisciplinary, multi-year research projects (e.g. Pan-Antarctic project on the large-scale processes in the Southern Ocean affecting the Antarctic Ice Sheet, particularly the rapid disintegration of ice shelves and ice sheet margins → Improve future projections of AIS by investigating ice-sheet-climate-solid earth interactions at different timescales → indentifying tipping points?)
- 3) Researchers mobility among AANCHOR members



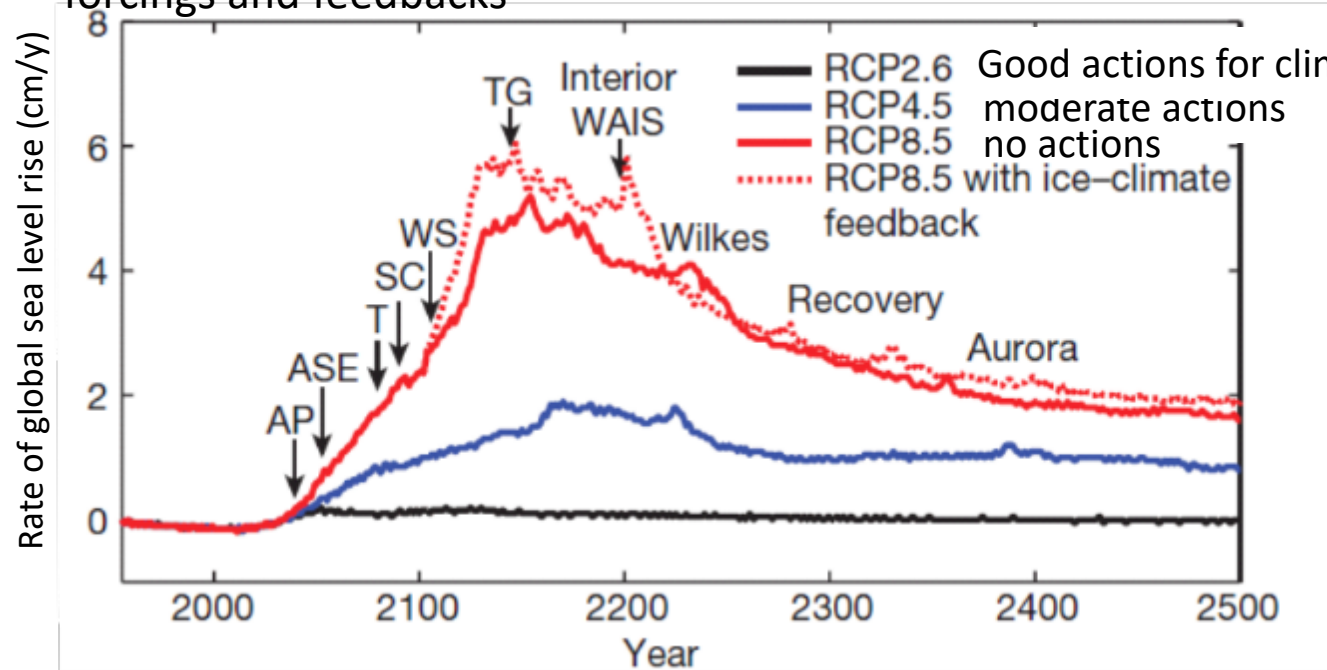


INSTANT
INSTABILITIES & THRESHOLDS IN ANTARCTICA



Can we still prevent large-scale East Antarctic ice loss?

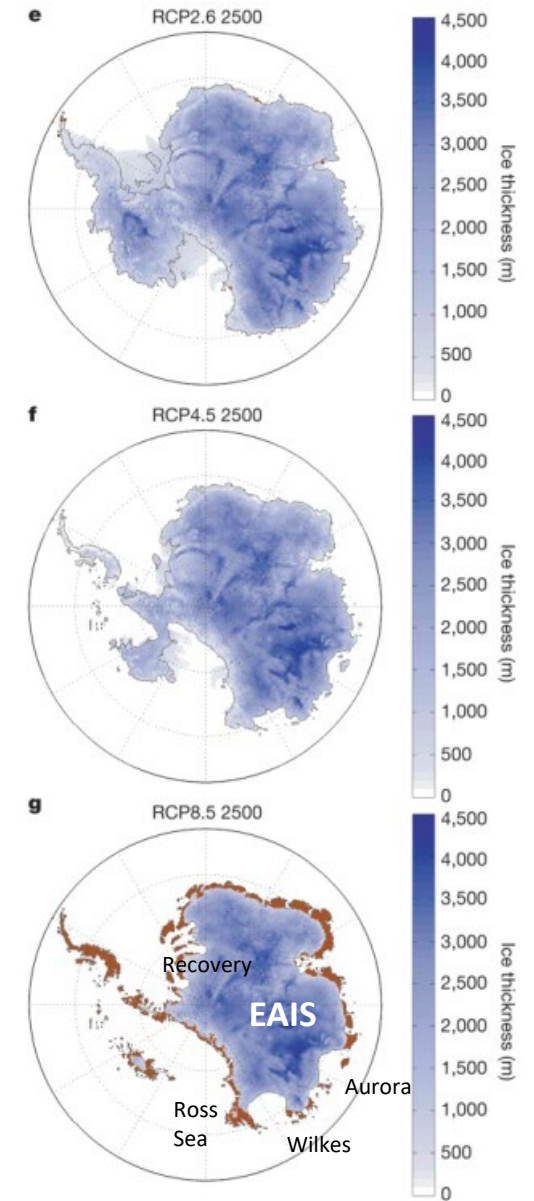
Predictions need continuous monitoring of large areas and past records to identify forcings and feedbacks



West Antarctic Ice Sheet (WAIS)



East Antarctic Ice Sheet (EAIS)



PNRA/COLLAPS - Cook glacier-Ocean system, sea Level and Antarctic Past Stability

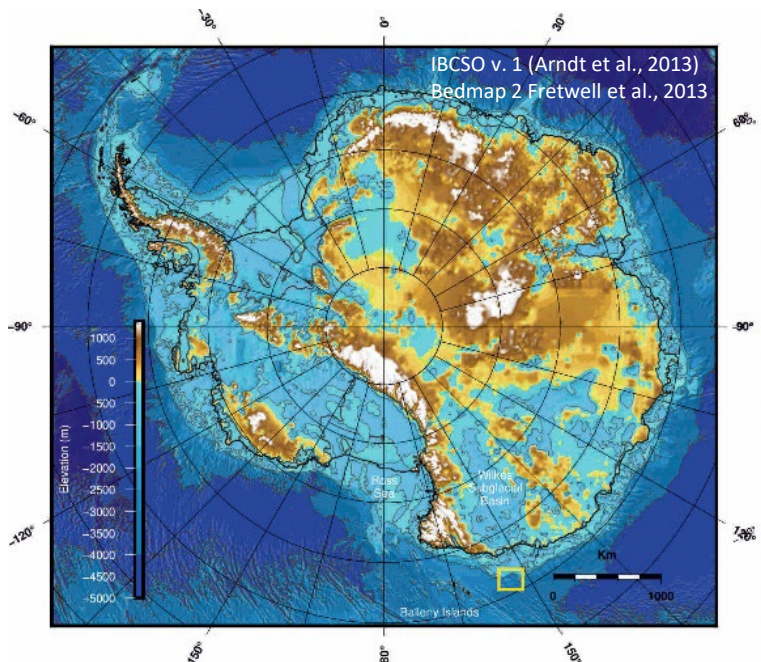
PI: L. De Santis (OGS) ldesantis@ogs.it

Questions

- What is the magnitude of East marine-based Ice Sheet retreated during the warm past interglacials?
- Does and did oceanic circulation influence the stability of the Cook and Ninnis Glaciers today and in past warm periods?

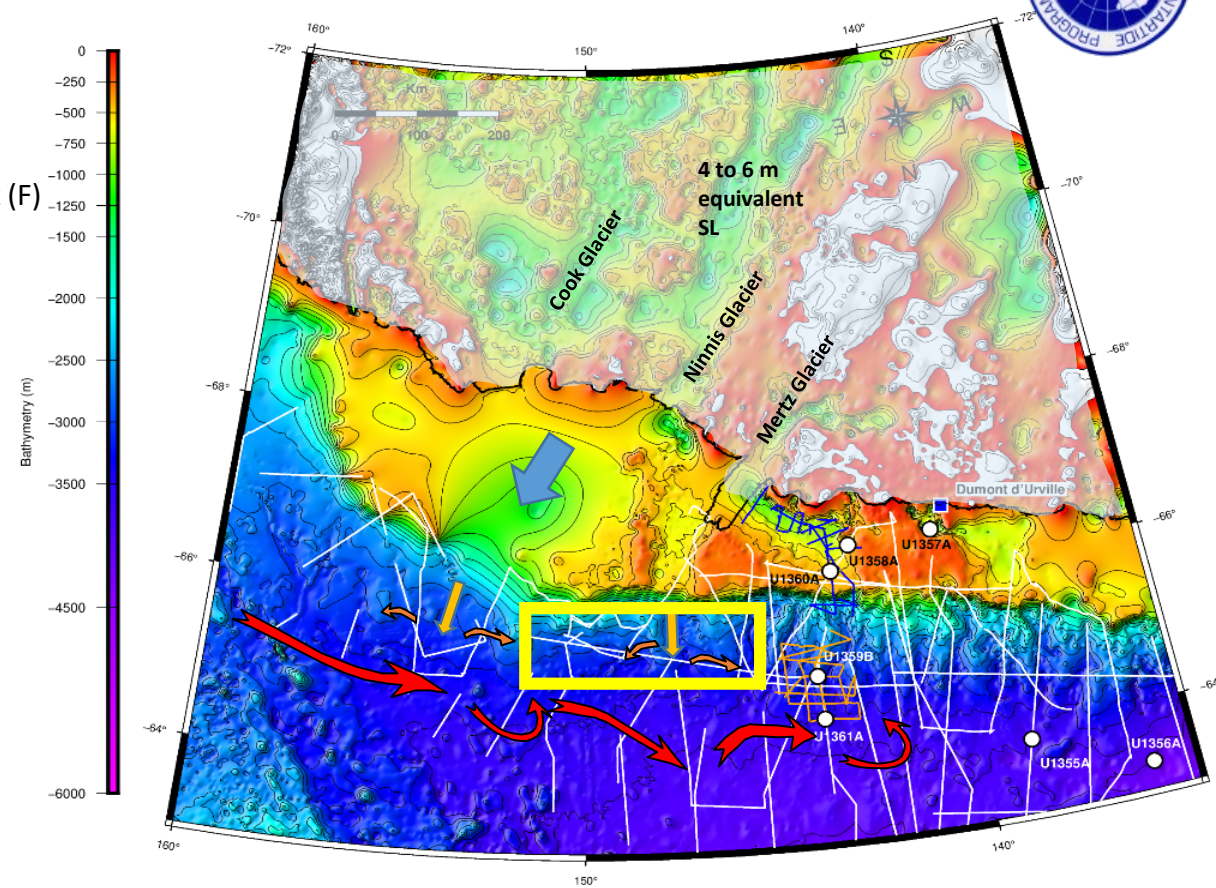
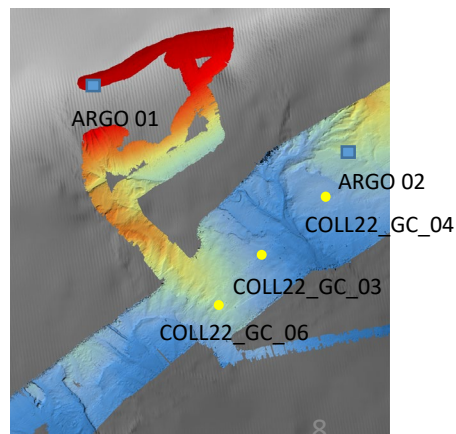
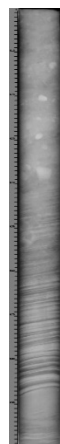
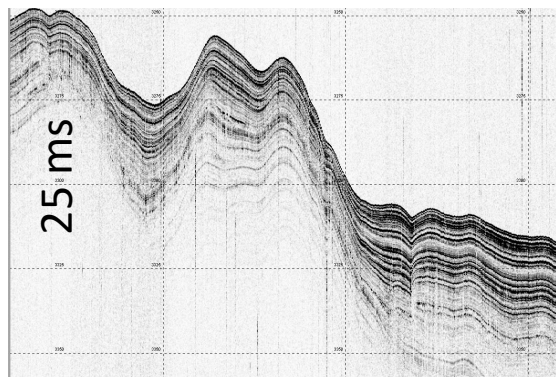


R/V L. Bassi Febr. 2022



Partners

- CNR-ISP (IT)
- INGV (IT)
- ICTP (IT)
- Univ. TS (IT)
- IGE, IPGP, LOCEAN, Univ. Bordeaux (F)
- Univ. Granada (E)
- Univ. Utrecht (NL)
- Univ. of Tasmania (AUS)
- Colgate Univ. (US)
- FSBI VNIIOkeangeologia (RU)



European Project ERC-SYNERGY ICEOLIA

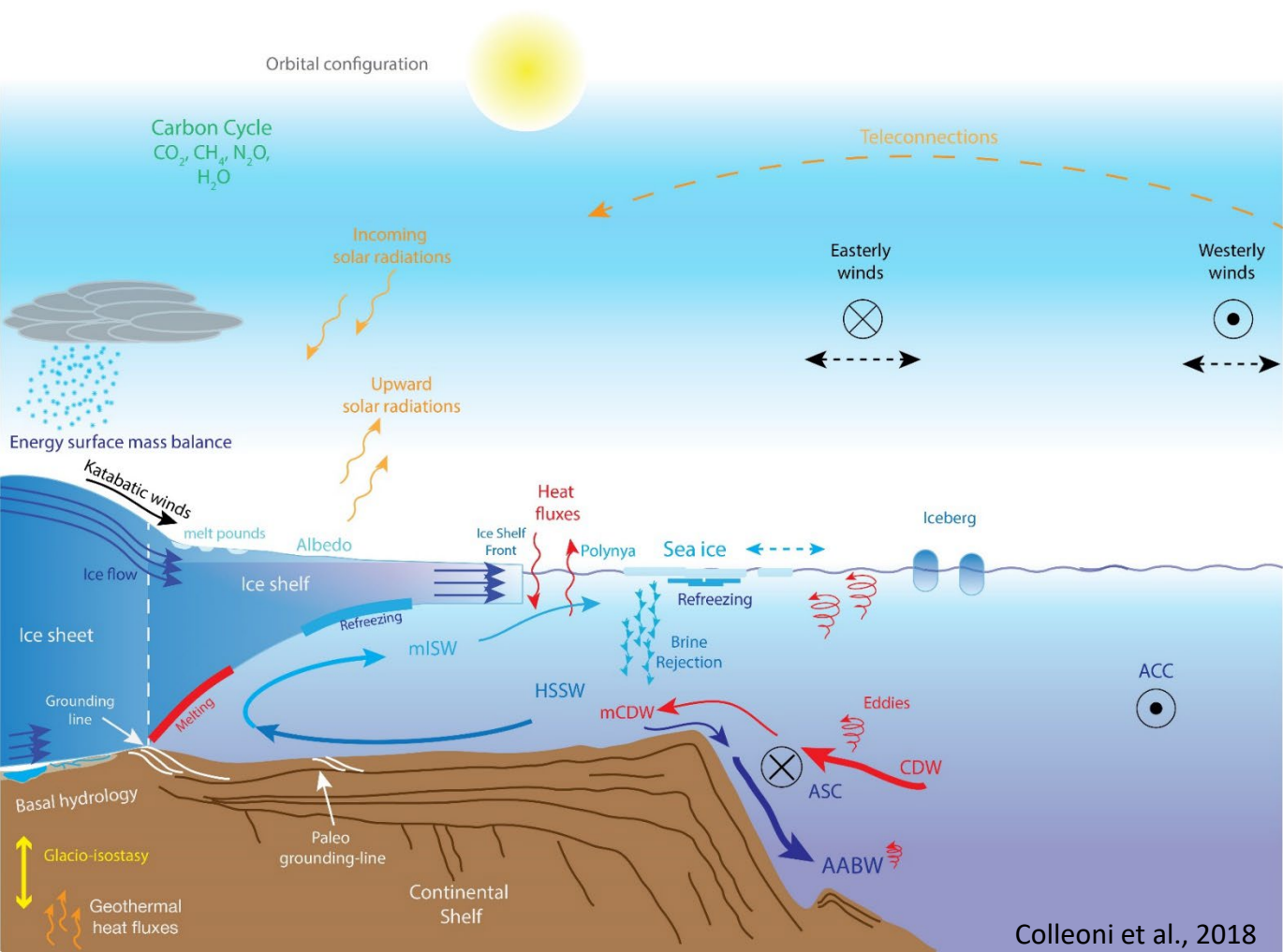
Ice-Earth-Ocean-Life Interplay in East Antarctica

PROPOSAL TO BE SUBMITTED IN 2022

Threat of Ocean and atmospheric warming on one of the most vulnerable sectors of the East Antarctic ice sheet

⇒ importance of observations and modeling at the ice-ocean-bed interface (subglacial, continental shelf and slope), from past to future

- 1) wide ranges of timescale involved in the marine ice sheet instabilities
- 2) Environmental settings



- **Guilhem Baruol** – IGE (Univ. Grenoble, F) - PI geophysicist
- **Laura De Santis** – OGS (IT) PI marine geologist
- **Guillaume Massè** – LOCEAN (Paris, F) - PI oceanographer

- **Main partners**
- Jeremie Mouginot (IGE) & Florence Colleoni (OGS) ice and ocean modelling
- Fausto Ferraccioli (OGS) airborne geophysics

PAIGE: Chronologies for Polar Paleoclimate Archives – Italian-German Partnership

WORKSHOP: Venice April 12-14 2023. Call for ideas open

- PAIGE aims at stimulating the cooperation between the Italian and German polar research communities
- The workshop will prioritise key societally relevant Polar research themes directly proposed by the German-Italian research community

**First PAIGE
Workshop
Bologna Oct 2021
MoU AWI-ISP**

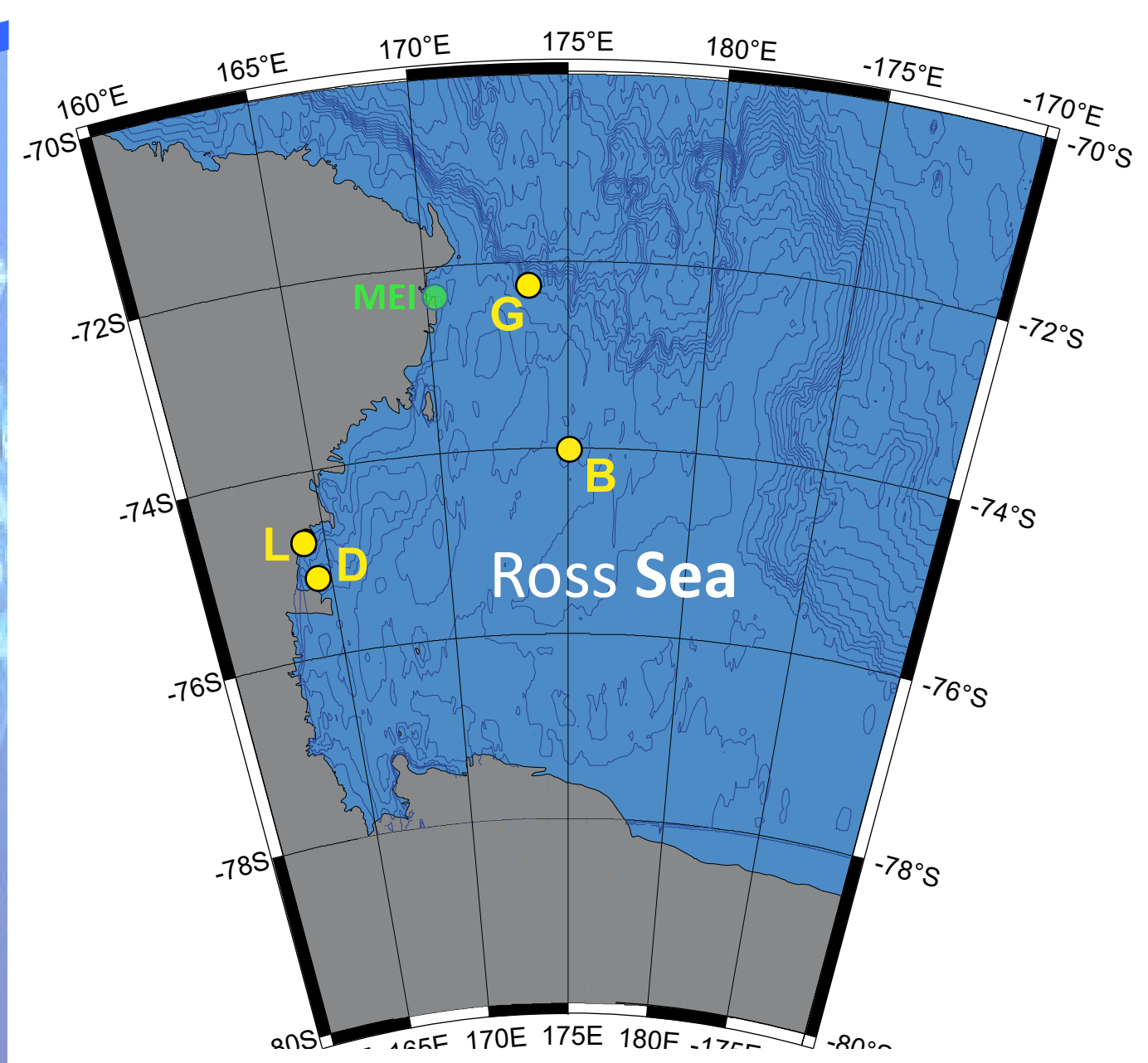


Carlo Barbante - ISP Director

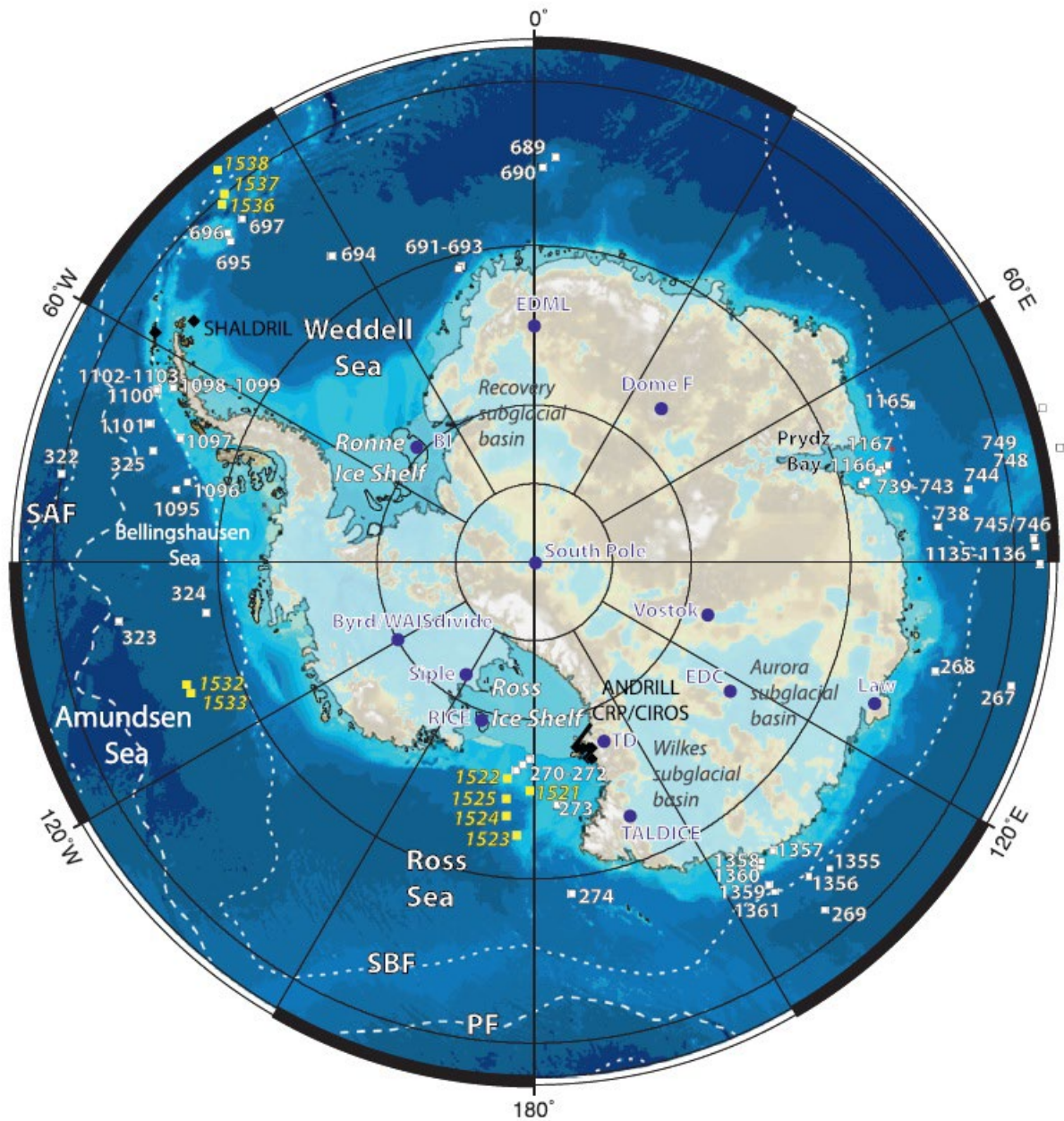
Antje Boetius - AWI Director

See you in Venice (April 2023) and Trieste (September 2023)





Lasagne Project (MEI) and MORSEA, Italian Marine Observatory (<http://morsea.uniparthenope.it/>)



Locations of key climate archives from Antarctica, including selected ice cores (blue circles) and marine sediment cores (white squares, yellow squares, black diamonds), and subglacial topography of Antarctica (Bedmap2; Fretwell et al., 2013).