Workshop PNRA

IMPATTO ANTROPICO

Il ruolo dei progetti PNRA nello studio della contaminazione chimica in Antartide

Marco Grotti, Università di Genova

…a nome di tutte le persone coinvolte nelle attività di campo e di ricerca

6 Dicembre 2023

Outline of the presentation

Chemical contamination

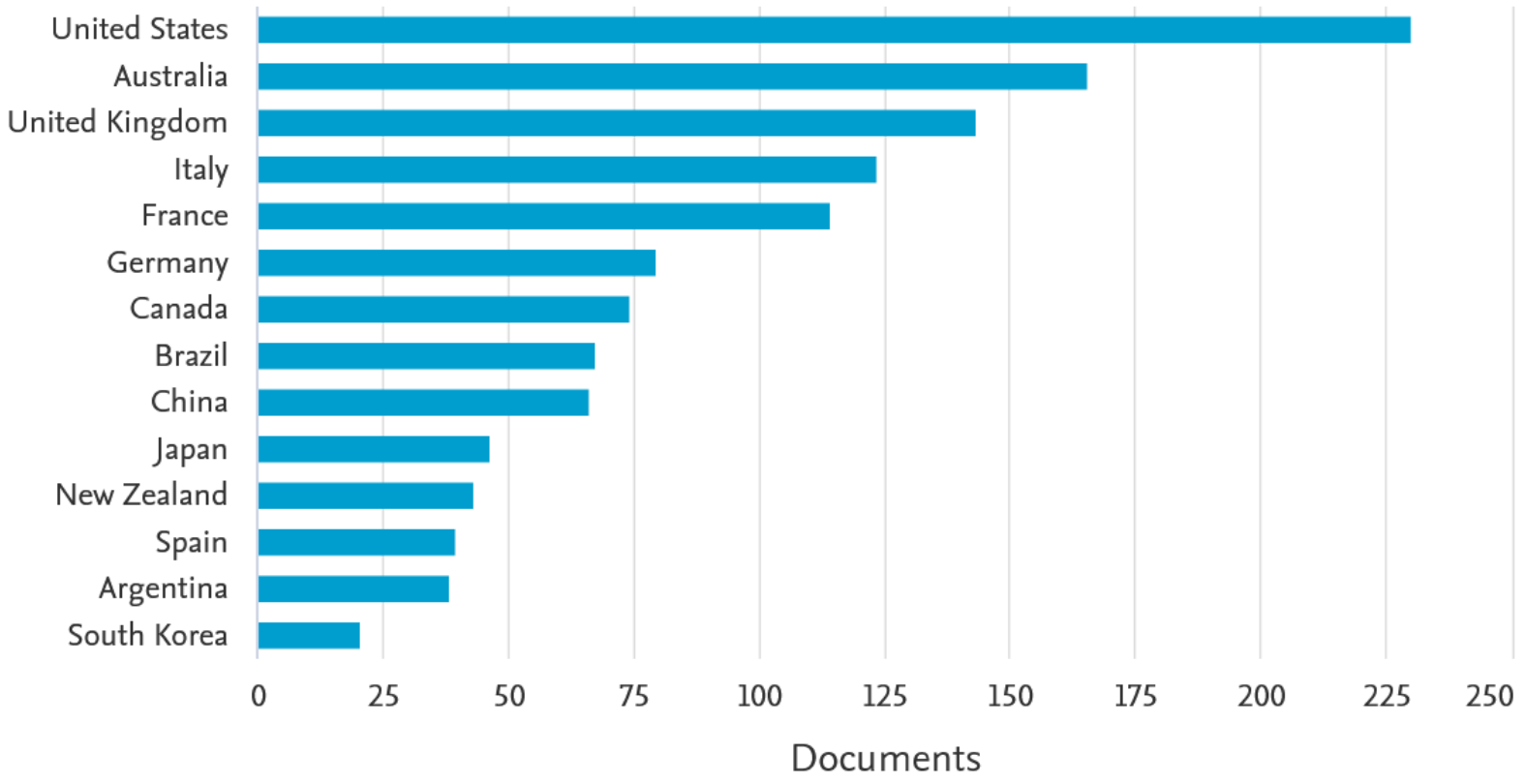
- ✓ Research infrastructures and related activities
- ✓ Tourism and fishing activities
- ✓ Legacy contamination
- ✓ Long-range transport from the Southern Hemisphere

  - ❑ Classical contaminants (metals, PCBs,…)
  - ❑ Emerging contaminants (flame retardants, pharmaceuticals and personal care products, microplastics, nanoparticles,…)

Chemistry of polar environments

- ✓ Assessment of the chemical contamination
- ✓ Biogeochemical cycles of contaminants
- ✓ Chemistry of micronutrients
- ✓ Biomonitoring and retrospective analysis
- ✓ Source assessment
- ✓ New analytical methods and technologies

The role of Italy



Source: Scopus (Publications between 1985 and 2023 selected by “ Antarctic AND Contamination”)

Ongoing research projects

BP 15

ENG

Agenda Item:	CEP 11
Presented by:	Italy
Original:	English
Submitted:	22 Apr 2023

Ongoing Italian projects on the assessment of chemical contamination in Antarctica

https://documents.ats.aq/ATCM45/bp/ATCM45_bp003_e.docx

Ongoing research projects

- ✓ MATISSE - Emerging contaminants in the Ross Sea: occurrence, sources and ecotoxicological risks
- ✓ ROSS'n'ROLL - Ross Sea ecosystem and emerging contaminants: new challenges and potential threats in a changing world
- ✓ IMPACTS - Input pathways of persistent organic pollutants to Antarctica
- ✓ ECOASTRA - Emerging contaminants in Antarctic snow: sources and transport
- ✓ LTCPAA - Long-term measurements of chemical and physical properties of atmospheric aerosol at Dome C
- ✓ SIDDARTA - Source identification of mineral dust to Antarctica
- ✓ PROPOSE - Processes controlling the presence and distribution of pollutants in Ross Sea area

Antarctic ESB

https://bcaa.unige.it

Italian Antarctic
Research Programme (PNRA)

University of Genoa
Department of Chemistry and Industrial Chemistry
Section Analytical and Environmental Chemistry

Versione italiana

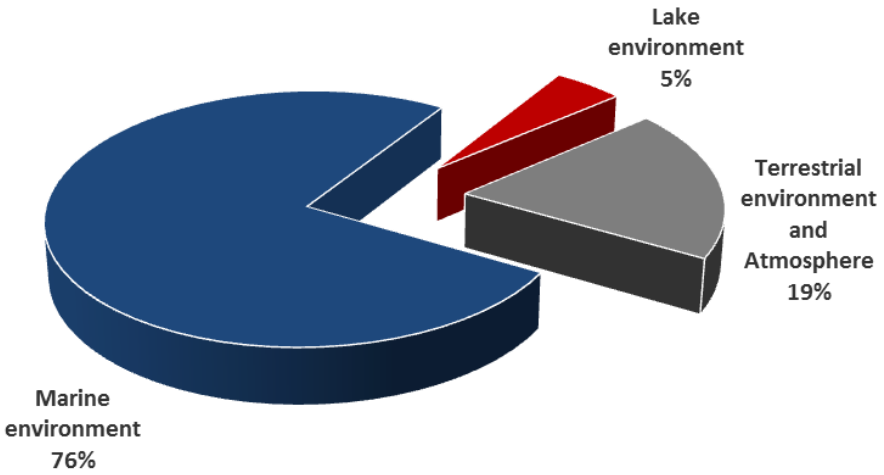
credits

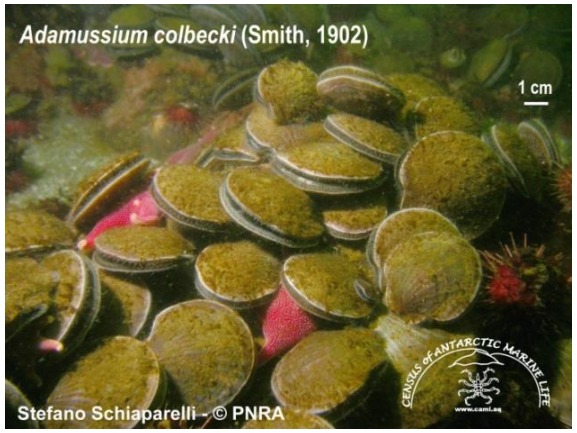
- ✓ Established in 1994
- ✓ Associated to MNA in 2006

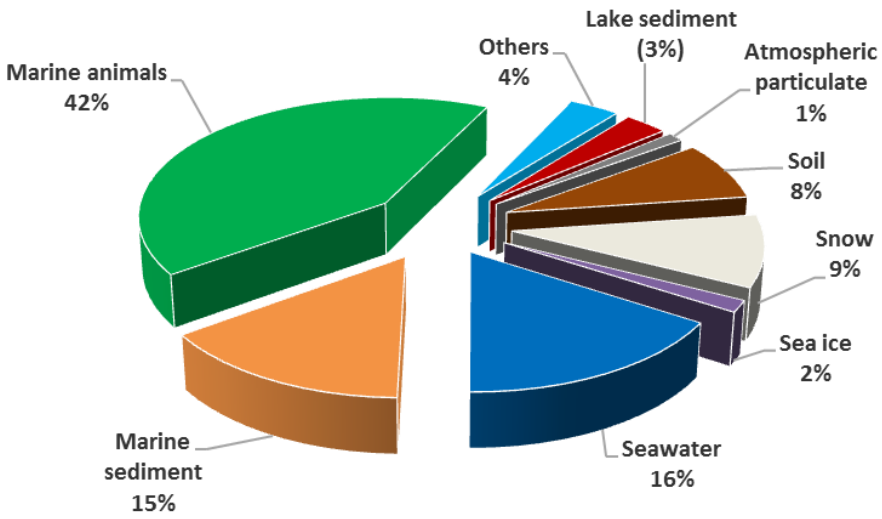
Objectives

- ✓ Retrospective control of the obtained analytical data in the context of the PNRA research projects
- ✓ Retrospective monitoring of the chemical contamination in Antarctica, including new parameters which have not been studied at the time of collection
- ✓ Supply and exchange of specimens, overcoming practical problems due to the sampling in remote areas
- ✓ Chemical characterization of collected samples, providing background levels of contaminants

Samples

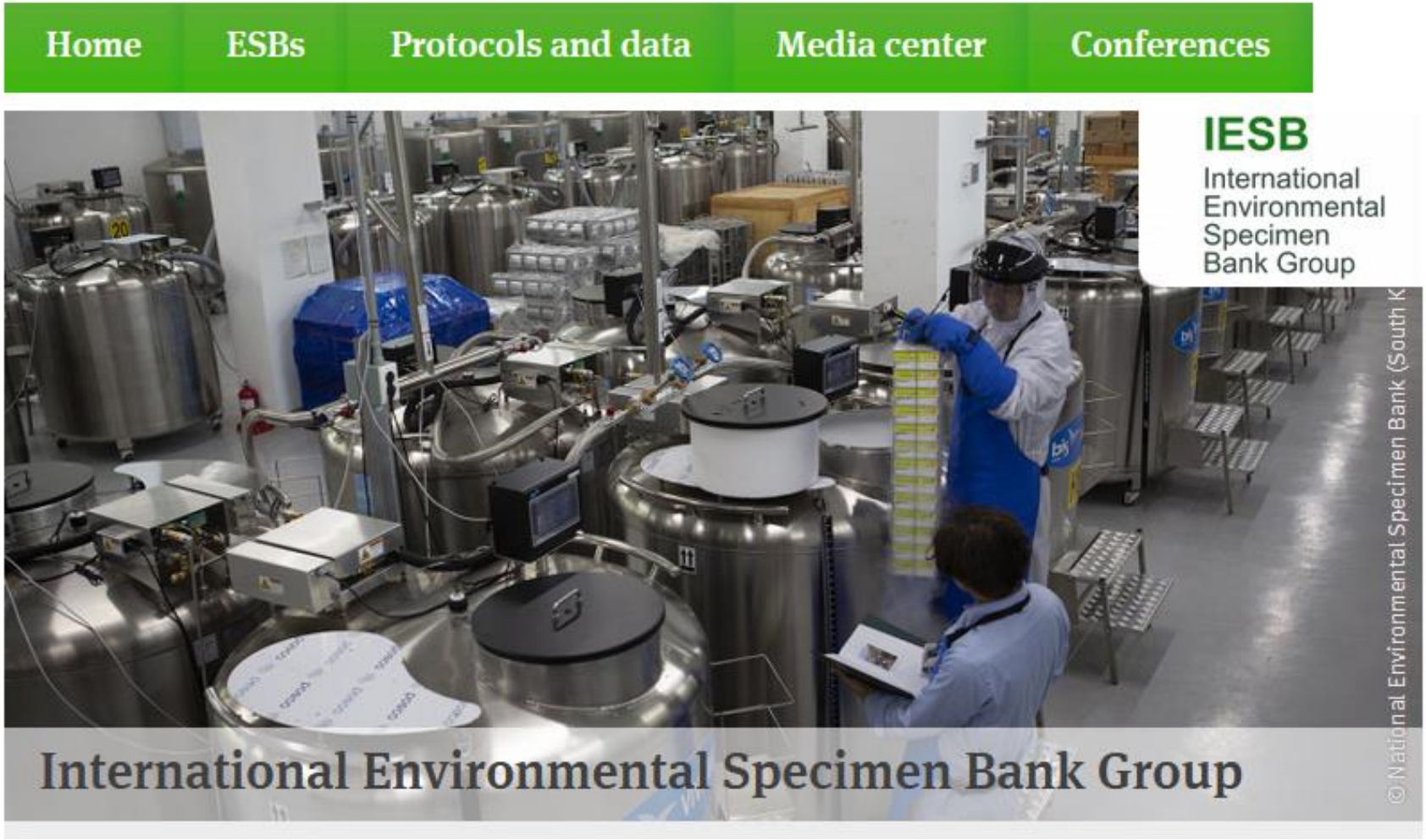

Lake environment 5%
Terrestrial environment and Atmosphere 19%
Marine environment 76%


Adamussium colbecki (Smith, 1902)
1 cm
Stefano Schiaparelli – © PNRA


Marine animals 42%
Others 4%
Lake sediment (3%)
Atmospheric particulate 1%
Soil 8%
Snow 9%
Sea ice 2%
Seawater 16%
Marine sediment 15%


Stefano Schiaparelli – © PNRA

International network



International framework

- ✓ SCAR Strategic plan 2023-2028 (Q52-Q53-Q74-Q75)
- ✓ SCAR-ATCM (ATCM XXXI IP097; ATCM XXXII IP069; ATCM XL IP022; ATCM XLIII/IP021; ATCM XLIV/WP011; ATCM XLV BP015)
- ✓ SCAR-Working groups (ImPACT, PLASTIC)
- ✓ Antarctic Monitoring and Assessment Programme
- ✓ EU-PolarNet & EU-Polarnet 2 (EPRP, White Papers)
- ✓ International Polar Year 2032-2033

ATCM: Antarctic Treaty Consultative Meeting, EPRP: European Polar Research Programme

Future challenges

- ✓ Improve ways to use scientific information effectively and the speed of decision-making (Chown 2012)
- ✓ Improve the efficacy and representativeness of the protected areas (Shaw 2014)
- ✓ Build-up a structured sample and data collection of environmental contamination across Antarctica
- ✓ Harmonization of the procedures
- ✓ Bipolar view
- ✓ From assessment to mitigation of the impact

S. L. Chown et al., Science 337 (2012) 158-159, J.D. Shaw et al., PLOS Biology 12 (2014) e1001888

Thank you for your attention