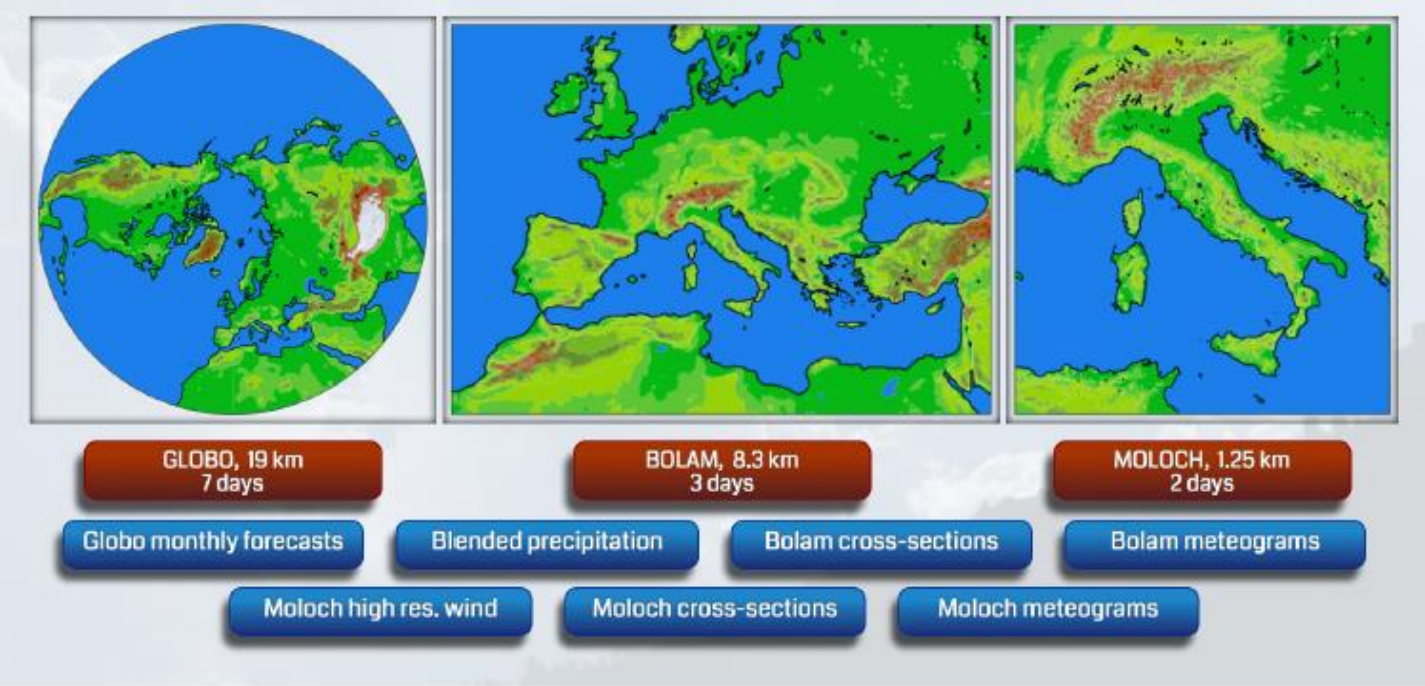
Italian potential contribution to Antarctic RCC network

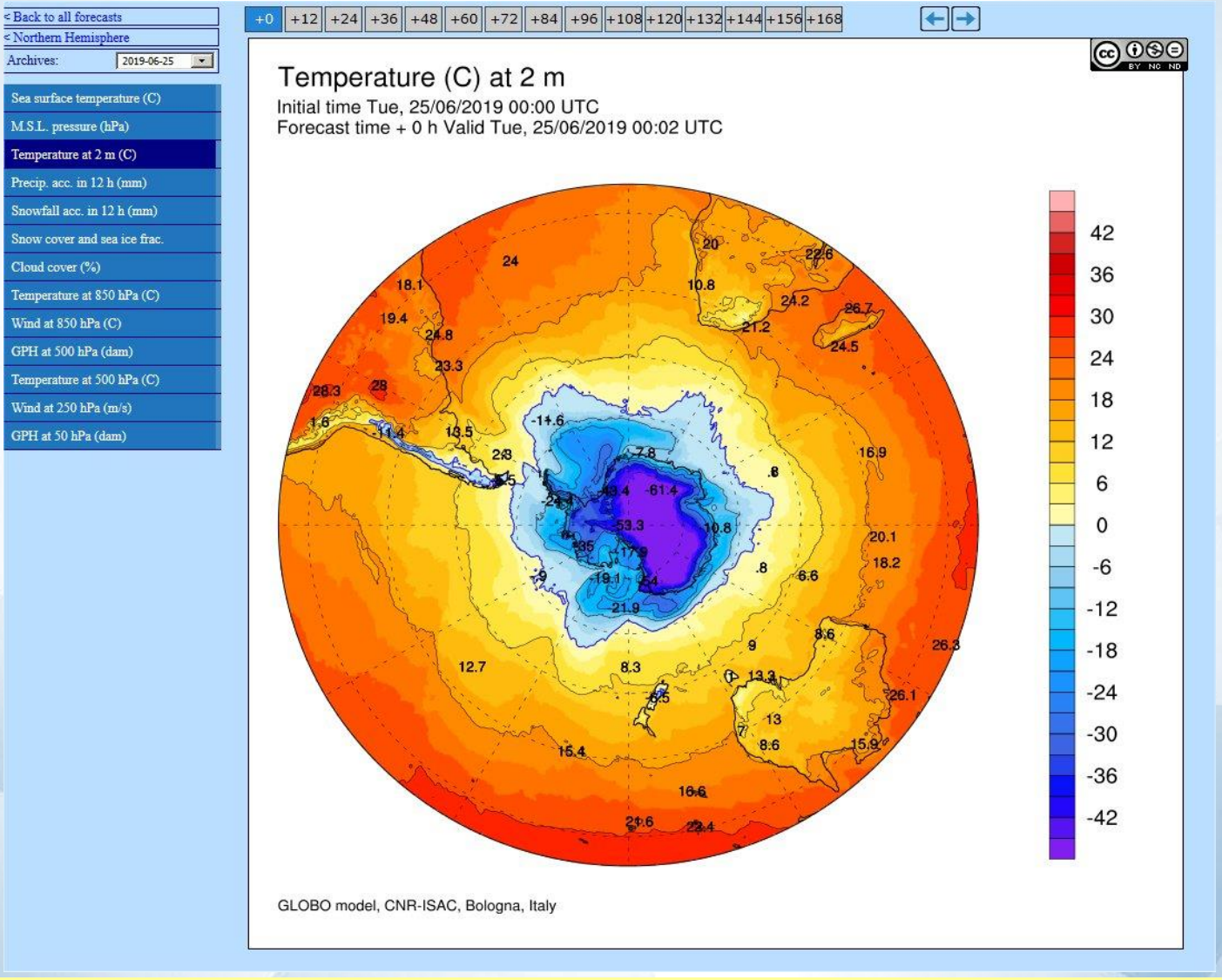
Vito Vitale (ISAC-CNR) on behalf of PNRA community

Southern Emisphere Routine Forecast at CNR-ISAC



GLOBO is a grid-point hydrostatic general circulation model on a uniform mesh in geographic coordinates on the sphere. It shares with BOLAM the equations for the dynamical component and the physical parameterizations. At present GLOBO is run with 1538 x 1026 grid points, implying a grid distance of 19 km in mid-latitudes, and with 60 atmospheric levels and 7 soil levels. An ensemble of lower-resolution GLOBO forecasts is also employed to obtain an experimental **probabilistic (ensemble) monthly prediction** issued once per week (only N.H. now).

more on http://www.isac.cnr.it/dinamica/projects/forecasts/

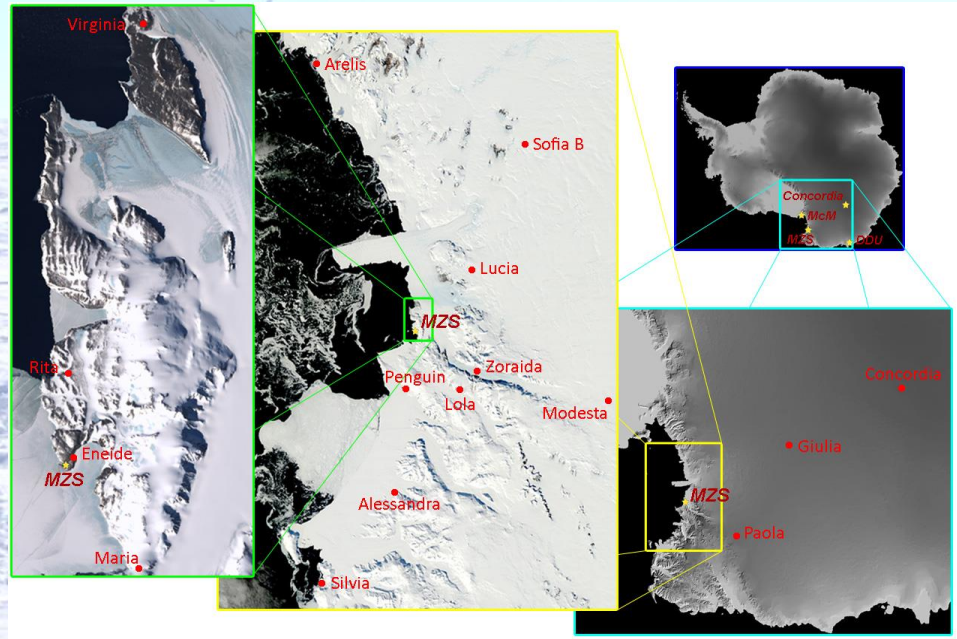


Specific activities of interest for polar regions: a new robust numerical parameterization scheme to represent snow coverage in terms of a dynamic multi-layer element (simulation of snow albedo as well as of snow temperature and density at different depth (**POCHVA**)

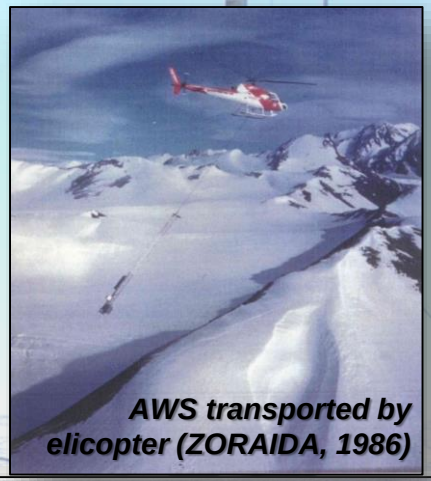
ITALIAN ANTARCTIC METEO-CLIMATOLOGICAL OBSERVATORY (IAMCO)

paolo.grigioni@enea.it

- **15 Automatic Weather Stations (6 WMO, 12 ARGOS, 2 IRIDIUM)**
- **1 Snow drift station (*Driftometer*) and 4 snow depth sensors**
- **2 Radiosounding stations**
- **12 airstrip weather stations**



Observatory AWS distribution map

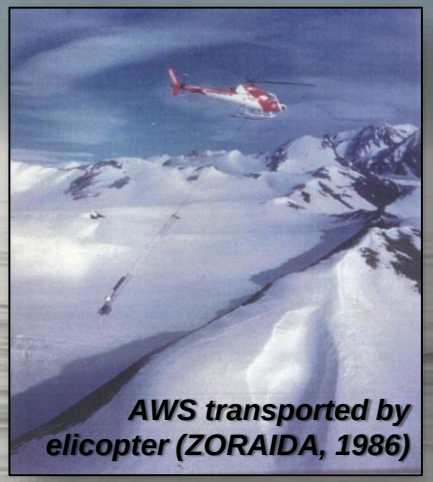


AWS transported by elicopter (ZORAIDA, 1986)

ITALIAN ANTARCTIC METEO-CLIMATOLOGICAL OBSERVATORY

IAMCO contribution to YOPP :

- ***IN COLLABORATION WITH UTA FROM 2 TO 3 RADIOSOUNDINGS PER DAY AT MZS AND FROM 1 TO 2 AT CONCORDIA, DURING S.O.P. CAMPAIGN.***
- ***INSTALLATION OF 2 NEW VAISALA CL51 CELIOMETERS AT MZS AND CONCORDIA.***



AWS transported by elicopter (ZORAIDA, 1986)

IAMCO DATA AVAILABILITY:

PANGAEA.

Grigioni, et al., 2019, Radiosonde and AWS data from Italian Antarctic Meteo-Climatological Observatory during Southern Hemisphere YOPP Special Observing Period, *https://doi.pangaea.de/10.1594/PANGAEA.899643*

IAMCO WEB SITE

http://www.climantartide.it/dataaccess/yopp/index.php?lang=en

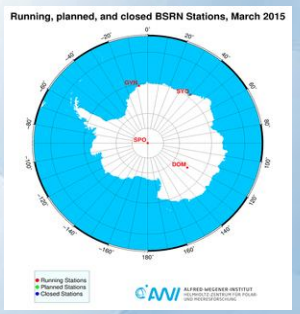
Accurate Surface Fluxes Measurements of Solar and Thermal Radiation (BSRN) at Dome Concordia

WRMC-BSRN
World Radiation Monitoring Center- Baseline Surface Radiation Network

BSRN: Baseline Surface Radiation network ww.awi.bsrn.de

Is a global observatory network providing observations of the best possible quality for short and long-wave surface radiation fluxes in 1 min resolution

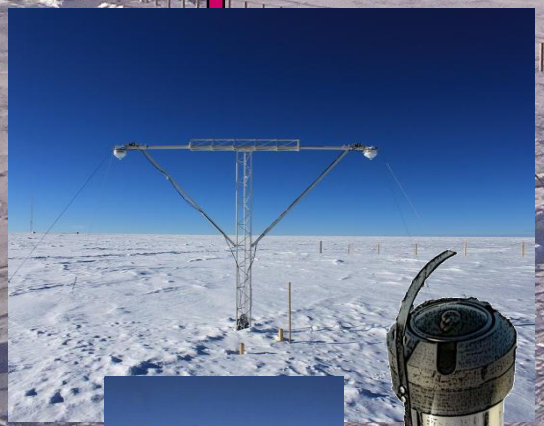
The WRMC is the central archive for all data from the BSRN, since 2008 operated at the Alfred-Wegener Institut in Germany

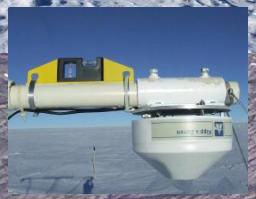


NSF tower LR0330
at 30 meter

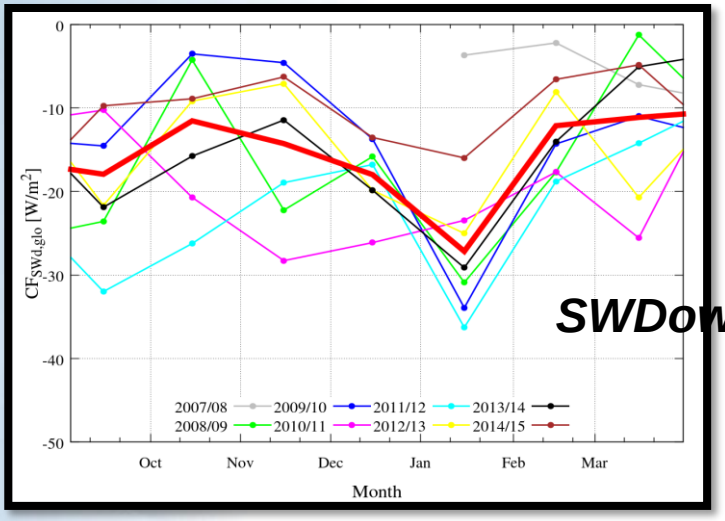
Astroconcordia LR0100
and SPN1 backup solution

Albedo Rack LR0300

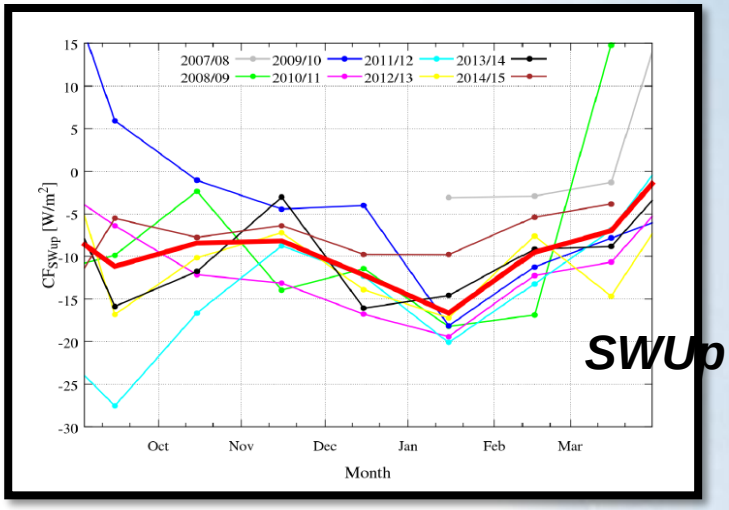




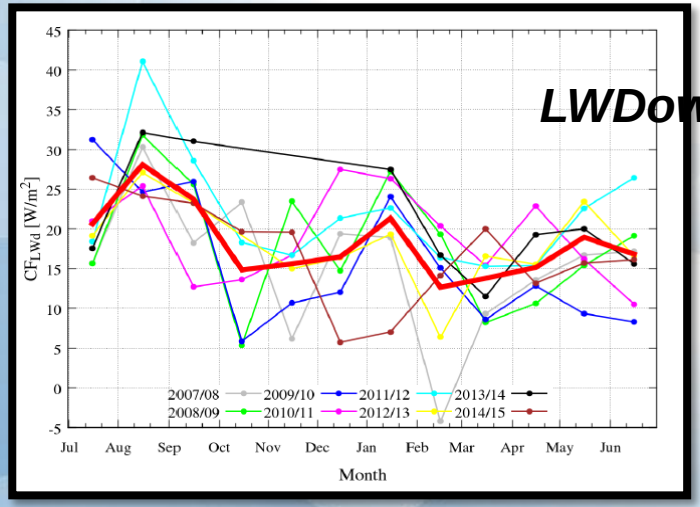
Clouds effects over the Plateau



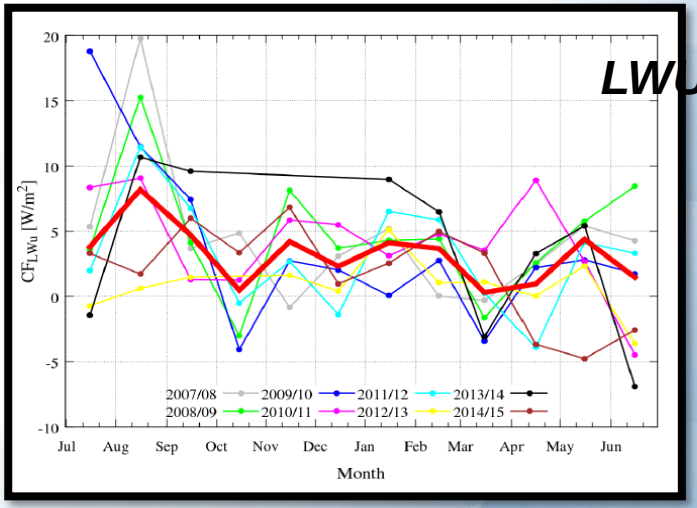
Cloudiness produces a negative effect ranging between –5 and -30 Wm-2



Cloudiness produces a negative effect ranging between -5 and -15Wm-2



The effects appears on average ranging between +10 and +30 Wm-2



The effects appears on average ranging between 0 and +7 Wm-2

Surface-Atmosphere Mass and Energy Exchanges at a Coastal Antarctic site (SAMEECA)

Improve understanding of the surface-atmosphere mass and energy exchanges at an Antarctic coastal site in the Ross Sea through continuous accurate measurements and development/verification of multiscale modelling.

Measurement and analysis of radiation components, atmospheric constituents and energy fluxes, meteorological and micrometeorological parameters, will be implemented jointly by KOPRI, CNR and UNIFI, in a way similar to the collaboration already active in the Arctic.

The project will move along three research lines:

(1) atmospheric boundary layer (ABL) dynamics and surface-atmosphere interaction;

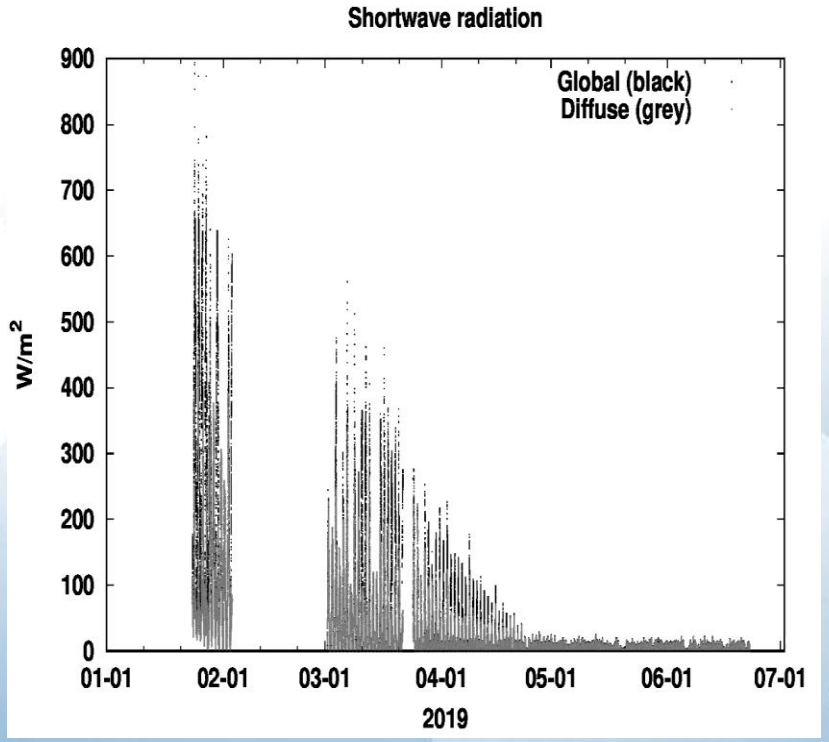
(2) radiative regimes;

(3) processes determining atmospheric composition (aerosol and trace gases).

During January 2019 the following instrumentation was installed in Jang Bogo Station:

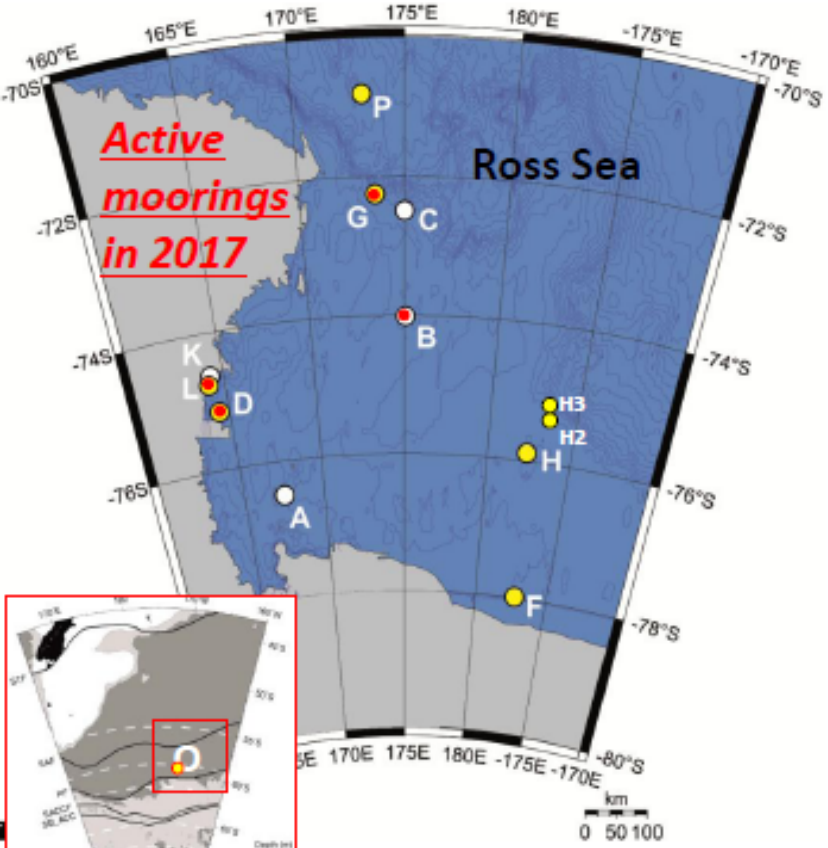
- CIMEL CE318 sun-photometer (columnar AOD)
- SPN1 radiometer (total and diffuse SW radiation)
- PM2.5 aerosol sampler (chemical composition)

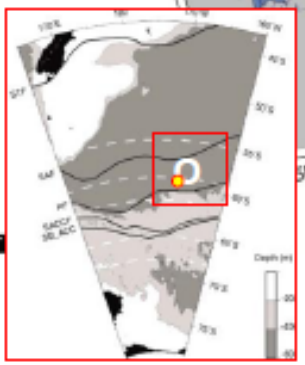
The sun-photometer had communication problems with the computer and we got no data during SOP. The other measurements were (and are) running continuously.



Italian moorings in the Ross Sea

Long time-series of oceanographic parameters (T, S, V, Torbidity, Sediment Traps, ...) collected by several projects from 1994 (mainly: CLIMA I-V, Bioseso e Abioclear) and in **MORSea** after 2009.





A -> 1990-2008
B -> 1995-present
C -> 1995
D -> 1995-present
F -> 1994-98
G -> 2003-present
H1 -> 1995-2008
H2 -> 2002-05
H3 -> 2005-10
K -> 1996-97
L -> 1998-present
O -> 1999
P -> 2006-07

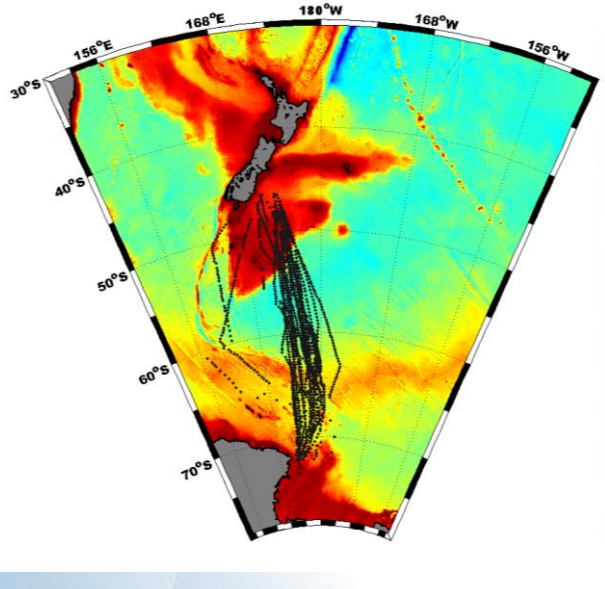
MORSea
Marine Observatory in the Ross Sea

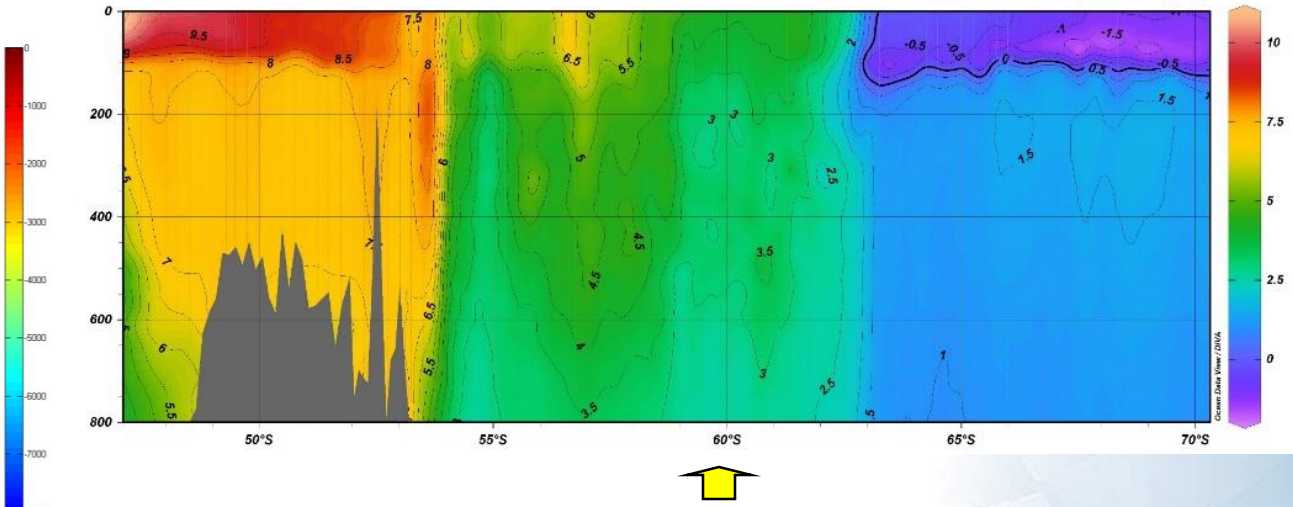
http://morsea.uniparthenope.it/

Consiglio Nazionale delle Ricerche

ISTAV

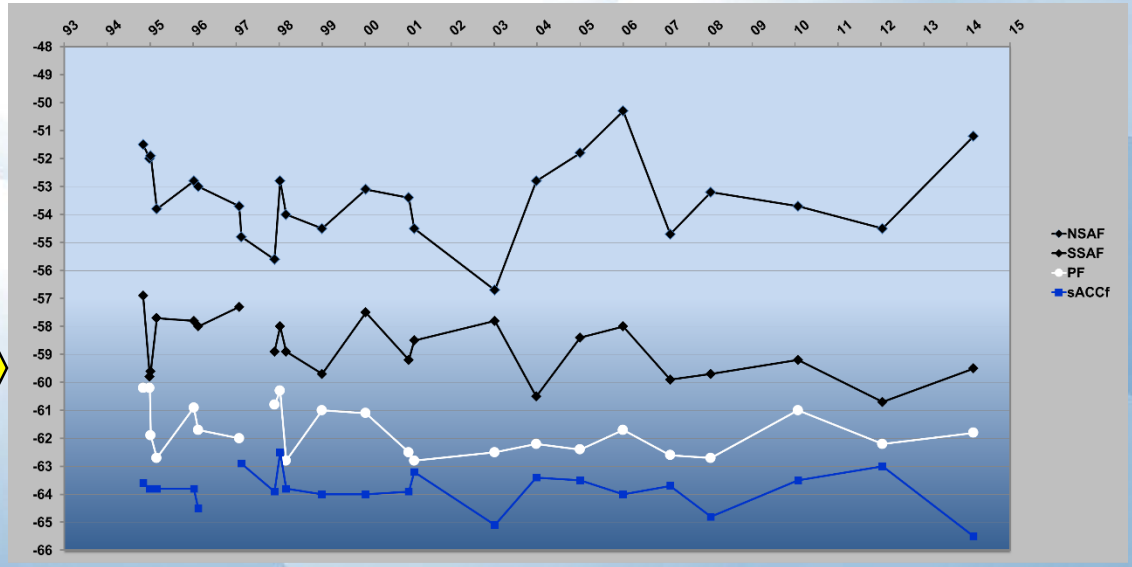
XBT observations in the ACC





Location of the 28 XBT cruises from 1994 to 2016. Color scale indicates the bathymetry.

Positions of main ACC fronts south of New Zealand from XBT data from 1994 to 2015. Black lines indicate the position of the NSAF and the SSAF. White and blue lines show the position of the PF and of the sACCf respectively.



Ground-based Water Vapor retrieval from GNSS stations over Polar regions

GNSS for analysis: a global network of about 200 stations

VLNDEF (ftp://ftp.ira.inaf.it/pub/ogia/)

POLENET (ftp://data-out.unavco.org/pub/rinex/obs/)

IGS (ftp://igs.ensg.ign.fr/pub/igs/data/)

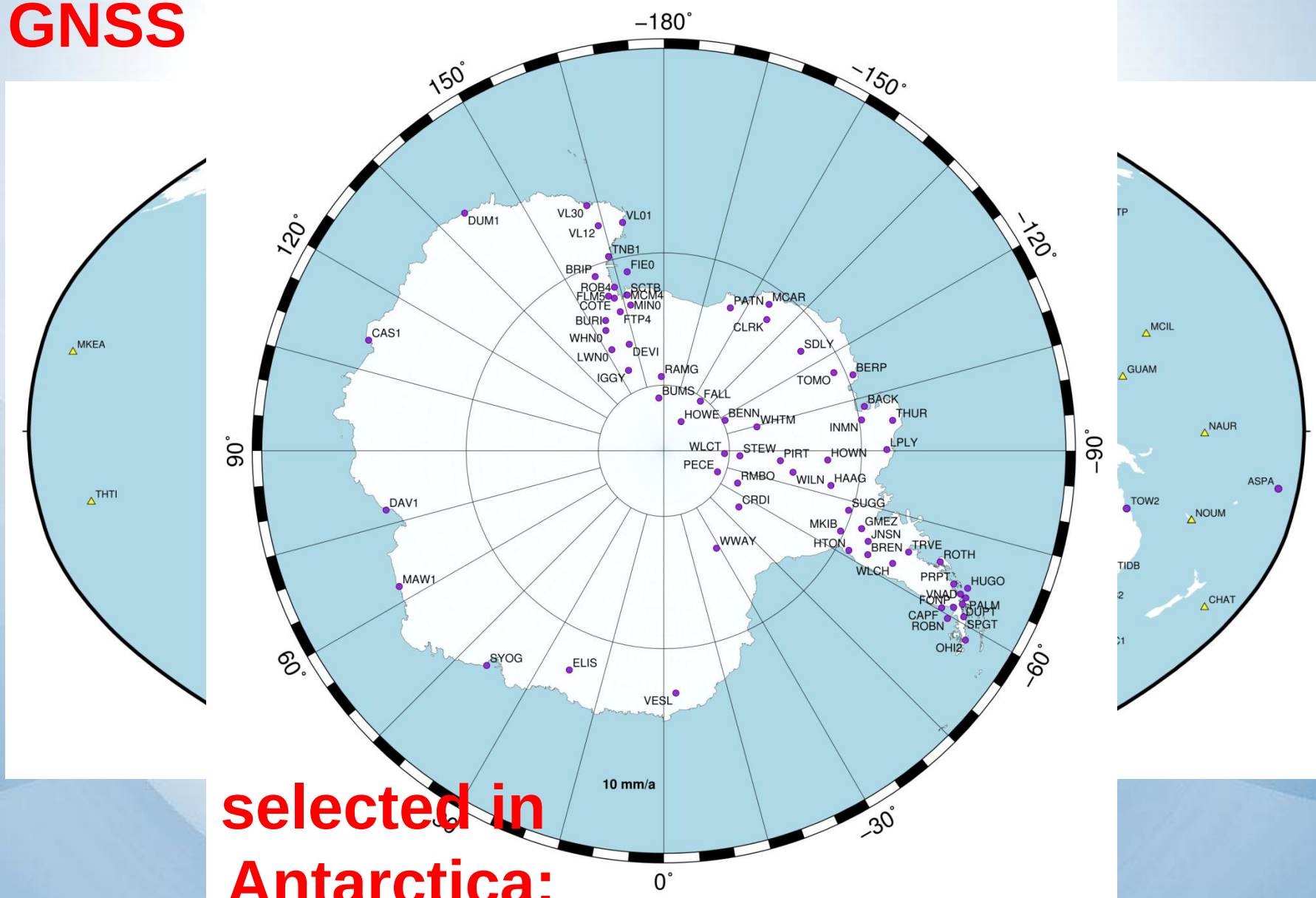
20 years of continuous data (1 epoch/30 s)

100+ global sites + ~ 75 Antarctic GPS

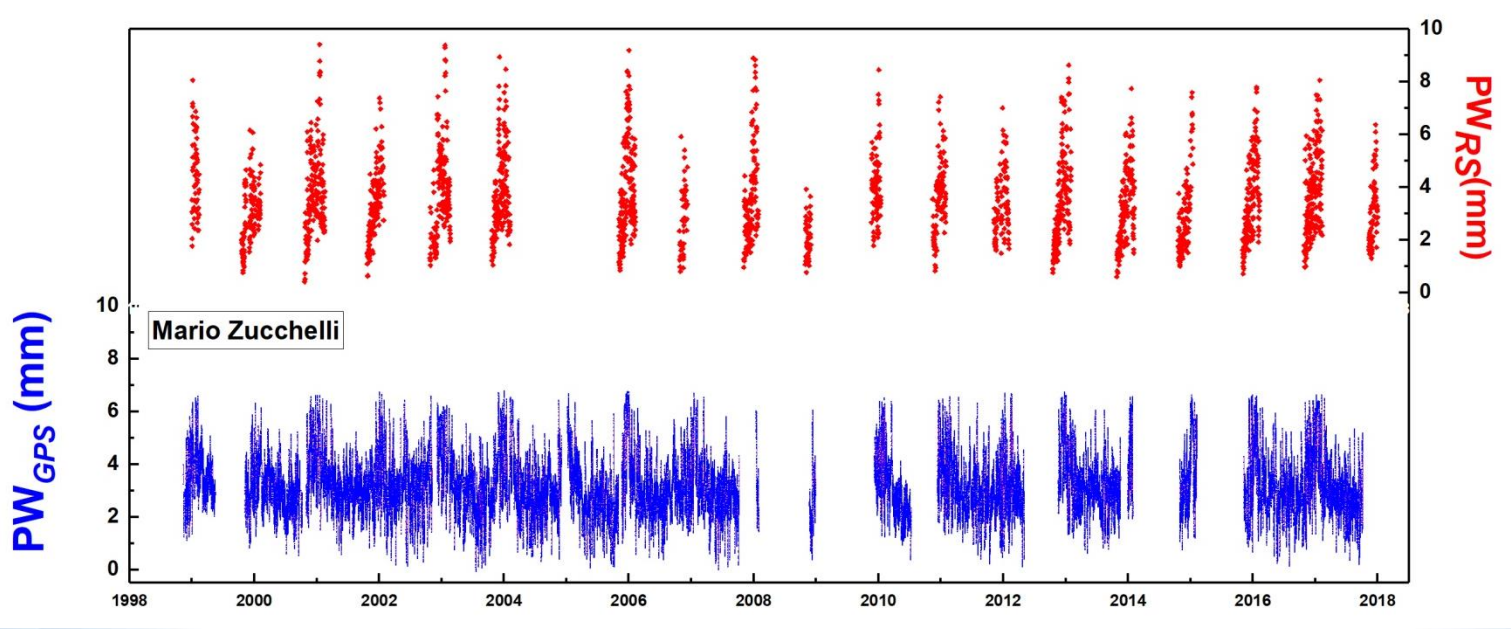
16 GNSS stations co-located with RS (5 in Antarctica)

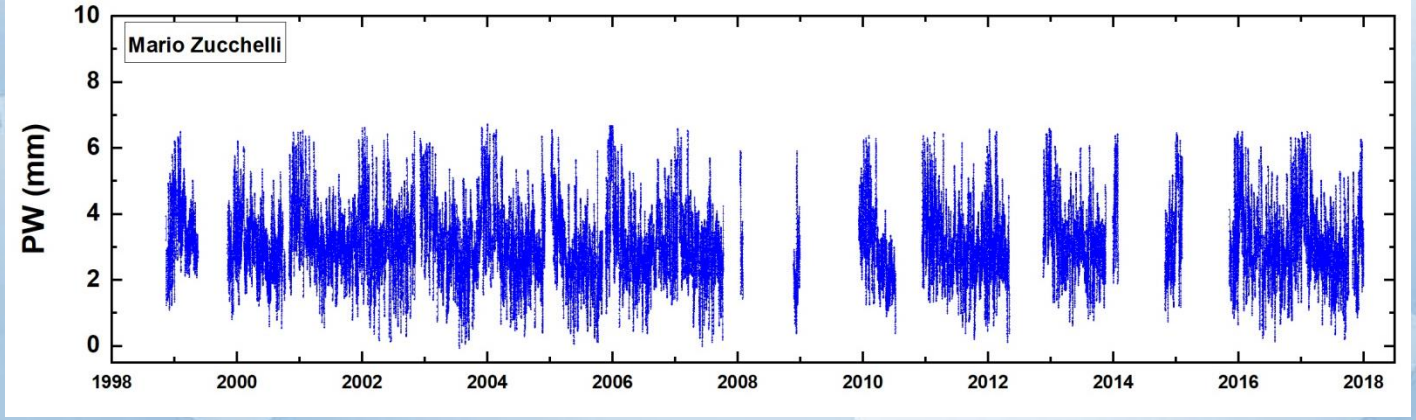
in Antarctica 20 GNSS station with surface meteo information (RINEX file)

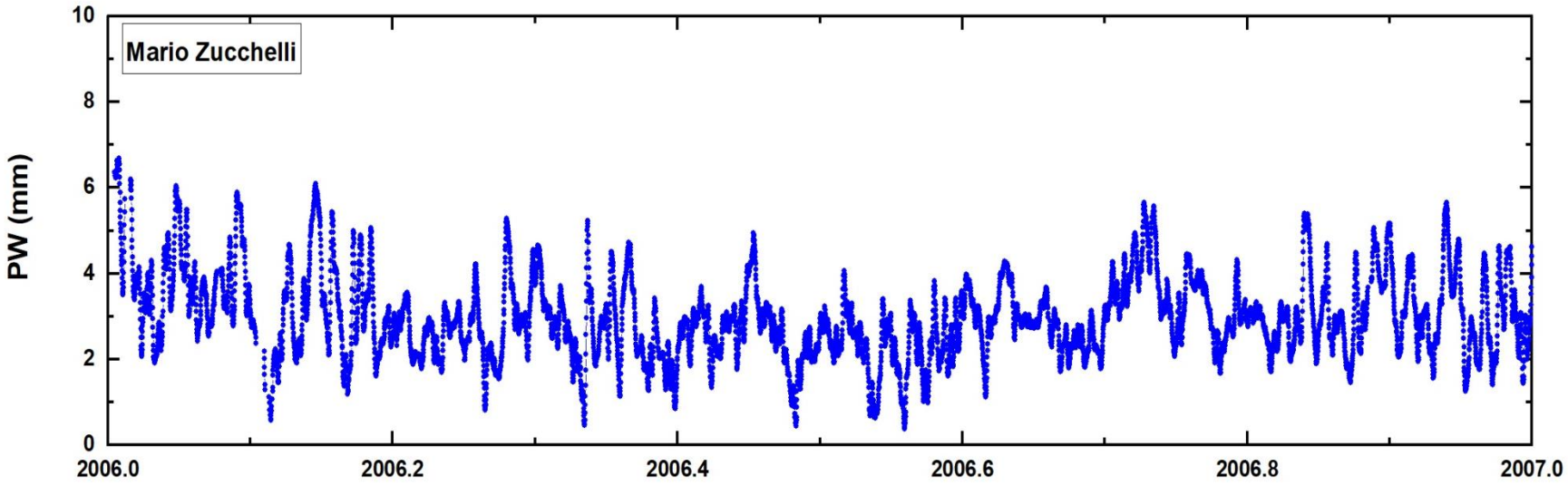
GNSS



selected in Antarctica:


Mario Zucchelli
PW_GPS (mm)
PW_RS(mm)
10
8
6
4
2
0
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018


Mario Zucchelli
PW (mm)
10
8
6
4
2
0
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018

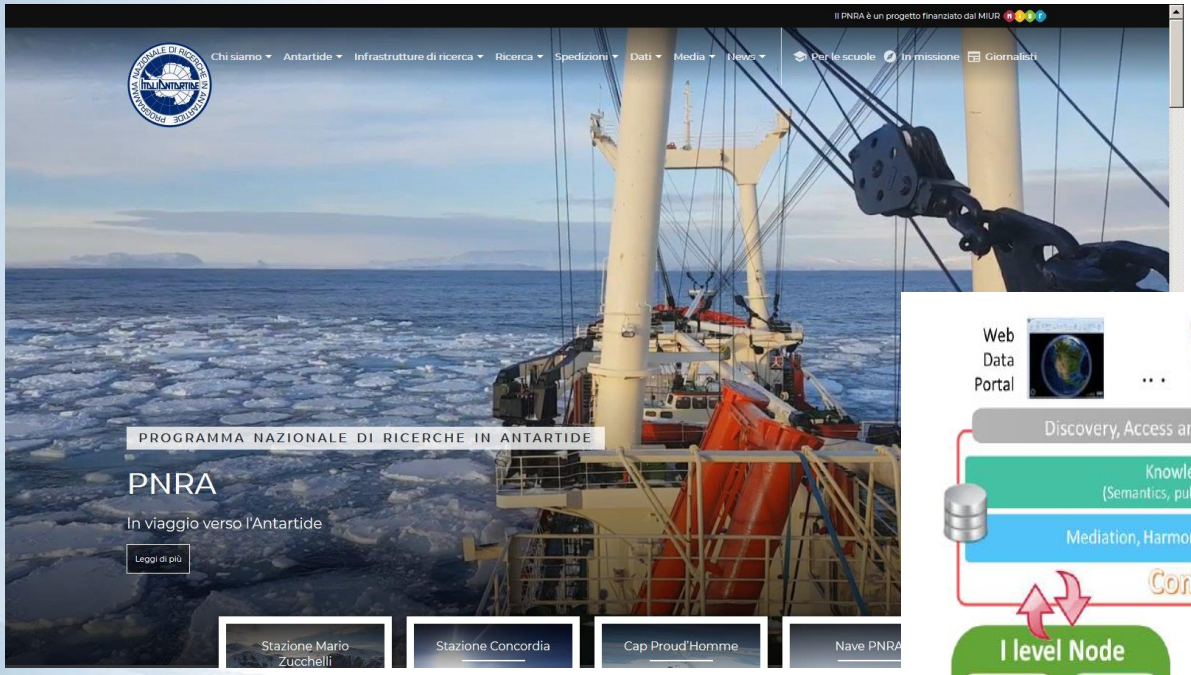


Contribution to YOPP-SH

Data Acquired during SOP by Antarctic and Arctic stations will be analysed to determine PW.

Meteo parameters on Antarctic stations providing them will be also collected.

Potential contribution for a winter SOP.



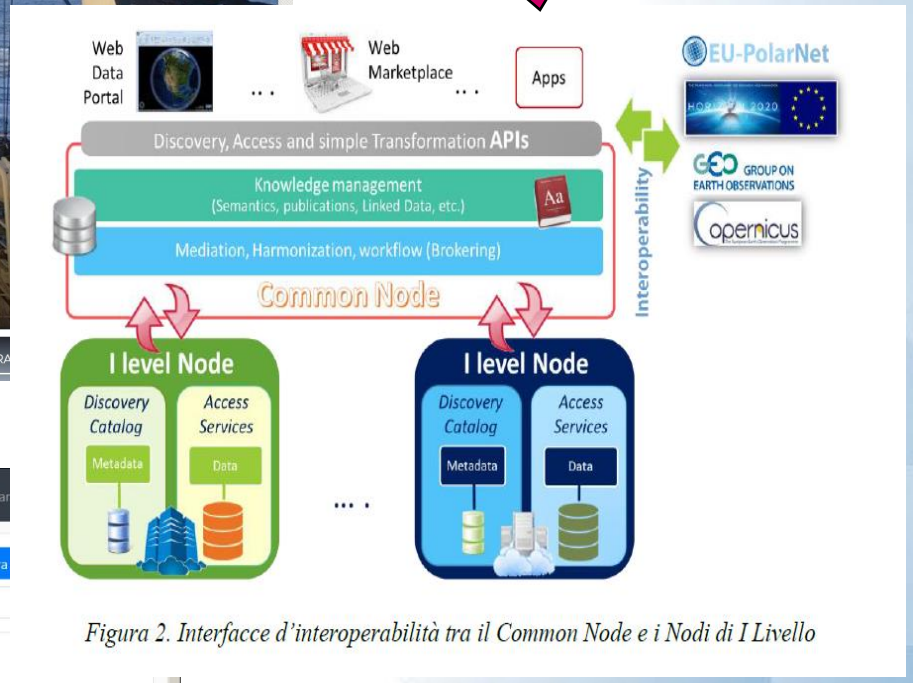
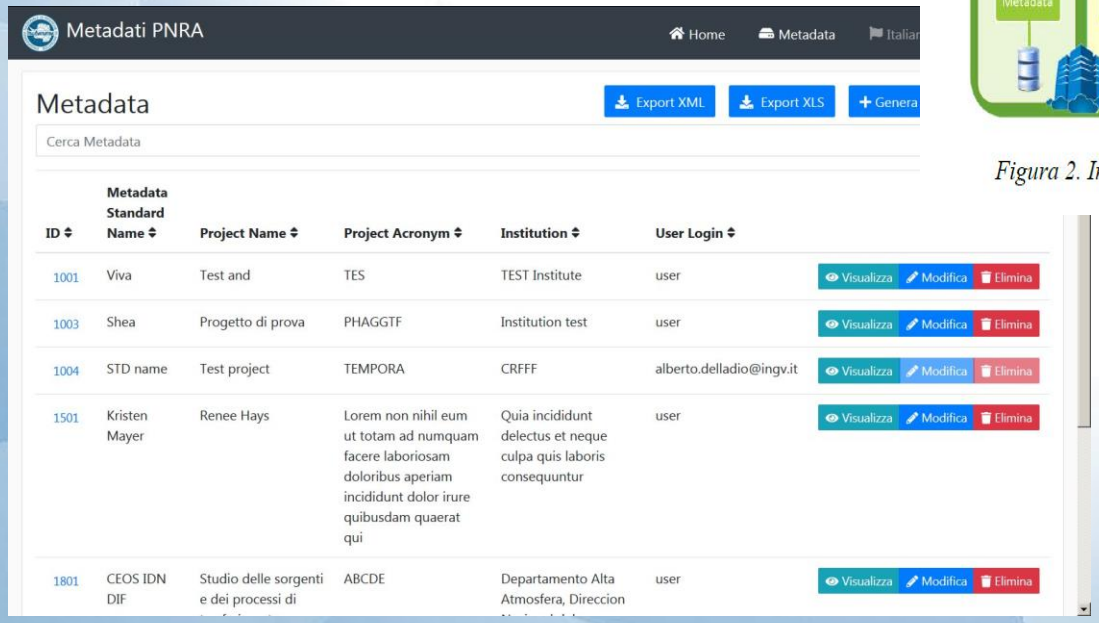


Figura 2. Interfacce d'interoperabilità tra il Common Node e i Nodi di I Livello



ID	Metadata Standard Name	Project Name	Project Acronym	Institution	User Login	
1001	Viva	Test and	TES	TEST Institute	user	Visualizza Modifica Elimina
1003	Shea	Progetto di prova	PHAGGTF	Institution test	user	Visualizza Modifica Elimina
1004	STD name	Test project	TEMPORA	CRFFF	alberto.delladio@ingv.it	Visualizza Modifica Elimina
1501	Kristen Mayer	Renee Hays	Lorem non nihil eum ut totam ad numquam facere laboriosam doloribus aperiam incididunt dolor irure quibusdam quaerat qui	Quia incididunt delectus et neque culpa quis laboris consequuntur	user	Visualizza Modifica Elimina
1801	CEOS IDN DIF	Studio delle sorgenti e dei processi di	ABCDE	Departamento Alta Atmosfera, Direccion	user	Visualizza Modifica Elimina


Thank you for your attention