Updates on the AWS's, Operational Meteorology and Remote Sensing at the Italian Antarctic Programme PNRA

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ABSTRACT

During the Austral Summer 2007-2008, reduced activities were carried on at the Italian Antarctic Station "Mario Zucchelli Station" (MZS), due to budget constraints. On the contrary, Concordia Station – the French-Italian Cooperative Station at Dome C – was fully operational year-round.

MZS was opened in order to service the Station itself and the permanent (automated) instruments; also, MZS served as a 'Hub' point for personnel and cargo transportation to Concordia. Operation Management and the Weather Office were activated to assist flight and terrestrial operations. The weather observing systems – including the weather monitoring software MetData – were serviced, as well as the satellite receiving stations.

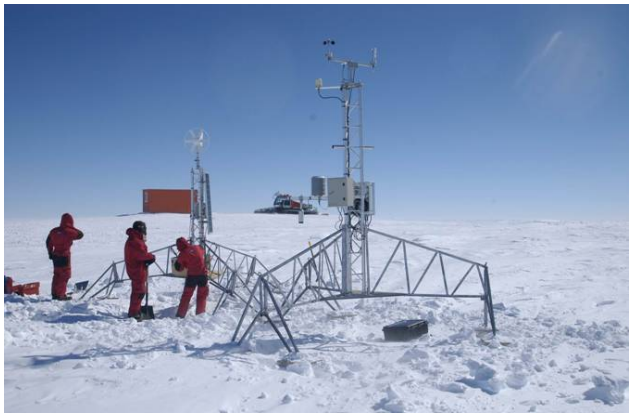

fig. 1 – The new stand for AWS

Concerning the AWS's network, which is operated by the Antarctic Meteo-Climatological Observatory (PNRA Res. Project 2004/2.6), all AWS's were serviced (20 AWS's and remote automated instruments). The innovative AWS stand (fig. 1), that was installed last year for the first time, was tested and it proved to be very efficient in limiting the snow accumulation on the basement and making the servicing easier.

All activities, including air operations and airstrips management, (fig. 2) are constantly supported by the Weather Office at MZS.

The Weather Office is provided with an easy-to-use and complete access to all observations. The data acquisition system, called "*METdata*", has been implemented to version 3.0 at MZS during Summer 2007-2008. Fig. 3 shows some screenshots from the METdata system.

In the present configuration the METdata System acquires and displays data from several devices:

- Automatic Weather Stations in the area of Terra Nova Bay (trhough radiomodem).
- Airstrip anemometers and Present Weather Sensor (trhough radiomodem & repeaters).
- Ceilometer (serial connection).
- Remote Automatic Weather Stations (trhough Iridium Satellite Terminal).

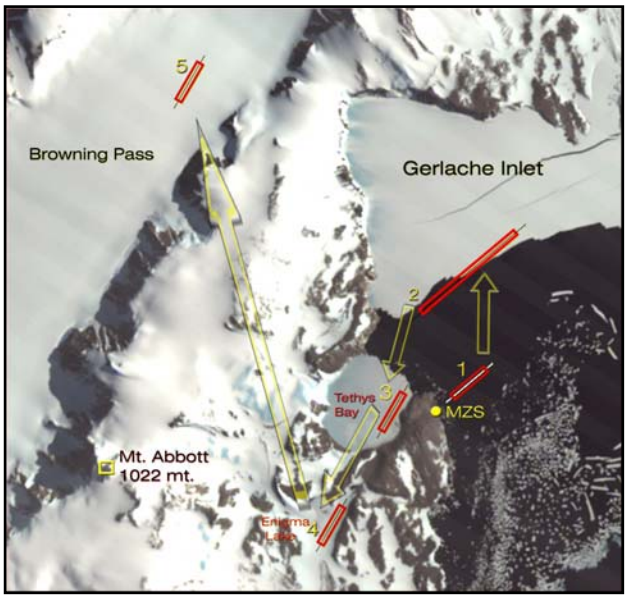

Fig. 2 – The Airstrip System at Terra Nova Bay

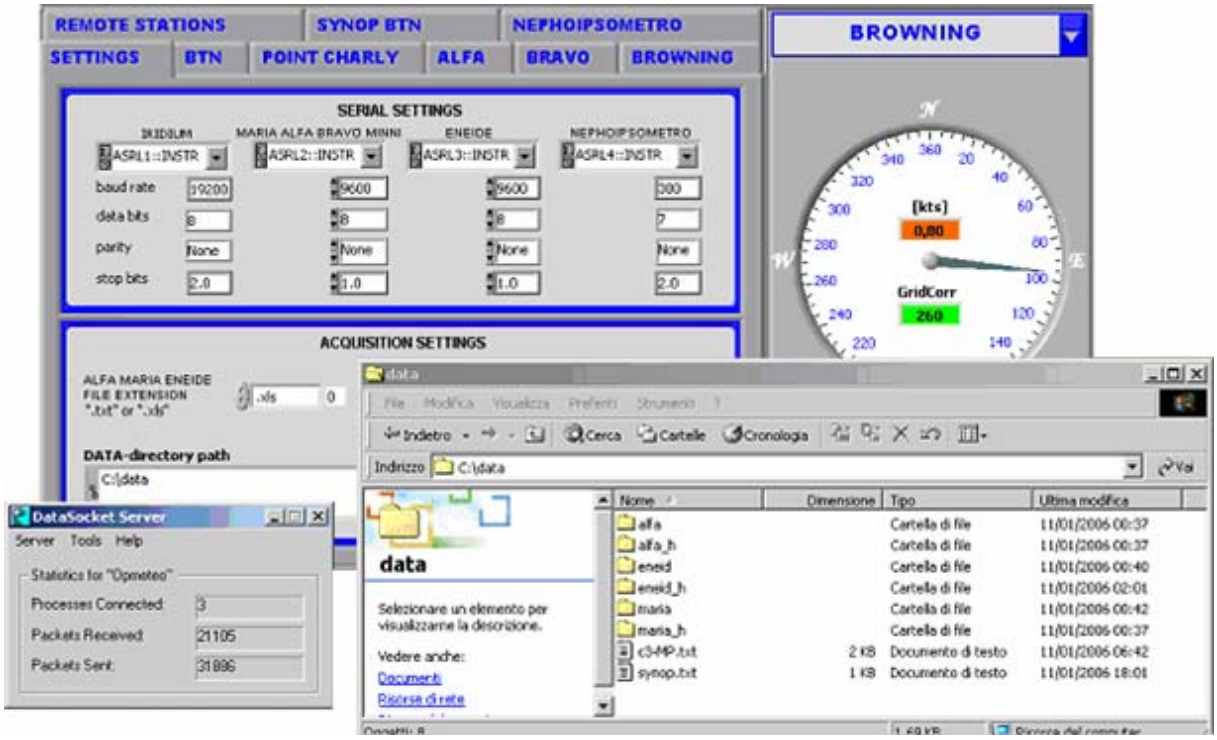

Fig. 3 – The METdata System's modules

Two receiving stations for NOAA and DMSP satellites were operated at MZS. Images and data for assistance to flight and ship operations were produced: figures below show an example of composite image obtained from 5 NOAA passes (fig. 4), and the ice concentration map obtained from SSM/I sensor of DMSP (fig. 5).

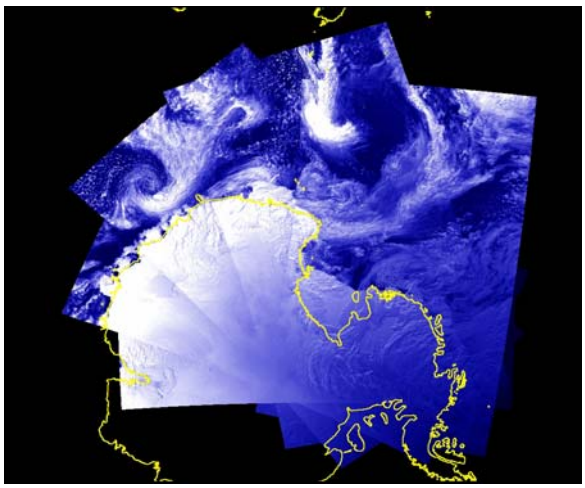

fig. 4 – Composite NOAA image

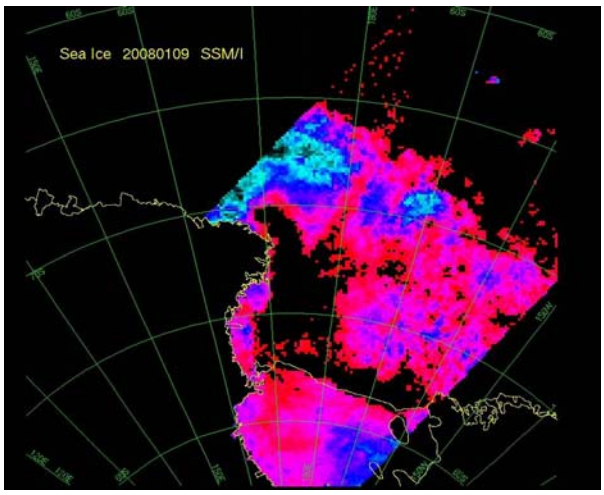

fig. 5 – Sea-ice concentration from SSM/I

To complete the information system dedicated to the Meteorological assistance, an integrated widespread software and hardware system retrieves, collects and processes meteorological data and products.

At several PNRA sites, in Italy, dedicated automated software procedures:

- retrieve GRIB data from the ECMWF (European Centre for Medium range Weather Forecast), throughout the Italian Airforce Weather Service CNMCA (Centro Nazionale di Climatologia e Meteorologia Aeronautica), and organize them by topic in smaller size files;
- retrieve from the WMO/GTS TAF, METAR and SIGMET bulletins concerning regions surrounding MZS and overseas alternate airfields;

- retrieve and process AMSR-E* ice concentration maps and ASAR* high resolution images in order assist the cargo ship, during its route to Antarctica (fig. 6 and fig. 7).

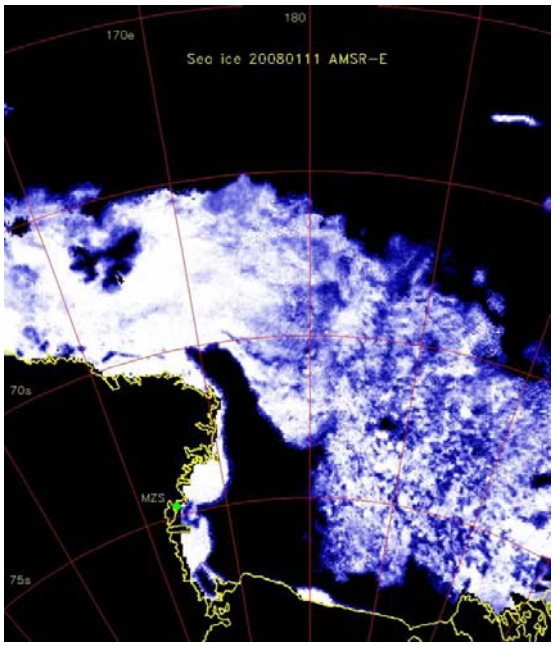

fig. 6 - AMSR-E sea-ice concentration

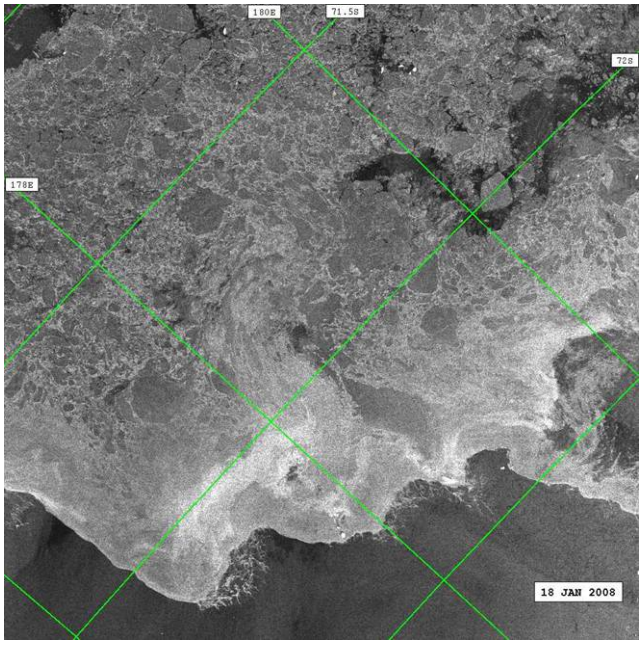

fig. 7 - ASAR high resolution image (pixel value 75 m)

All those data are available via FTP to the Weather Office at MZS or, in some cases, automatically sent to it.

Another important activity carried on outside the Antarctic Continent by the Meteo-Climatological Observatory of PNRA is the maintenance of www.climantartide.it, the web-accessible database of the Observatory's data (fig. 8). The database makes accessible all meteorological data and information retrieved and/or produced by PNRA. At the end of Summer operations, it was updated with the last season's data.

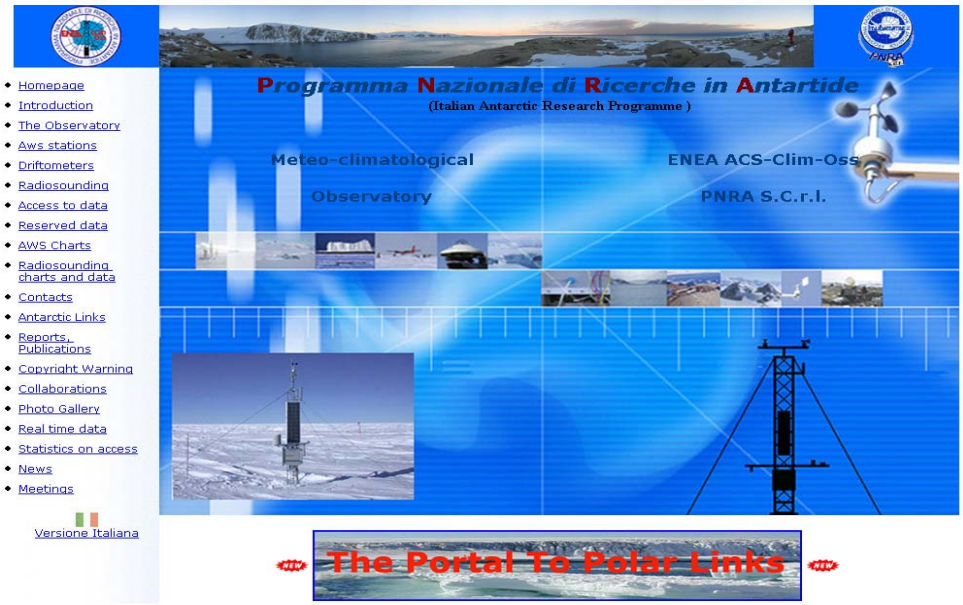

fig. 8 – The Homepage of www.climantartide.it

* *ASAR and AMSR-E data are made available as part of the ESA and E.U. Program "GMES-PolarView"*

At Concordia Station, the PNRA operates a Weather Station (fig. 9) and a Radiosounding System.

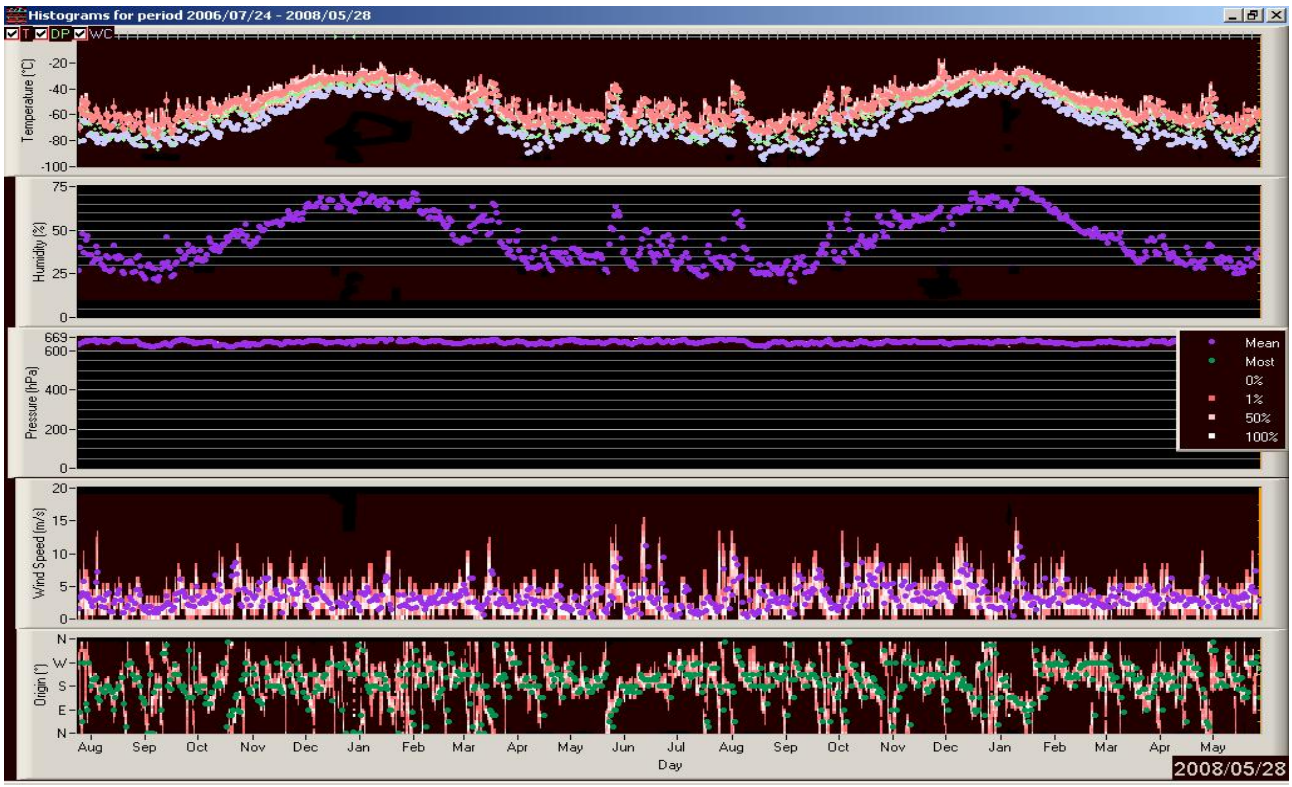

Fig. 9 – AWS Concordia data from Aug. 2007 through May 2008.

As of May 29, 2008, 137 radiosoundings were succesfully made since Jan. 1 (150 days). Launches are made at 12:00 UTC, once a day.

Within a cooperative Programme three ozonesondes were flown on February 2008 (fig. 10) by the French “Service d’Aeronomie”.

Fig. 10 – Ozonesounding at Concordia Station.