



Italian Air Force



Centre for Meteorological Experimentations

Met Service



Major Stefania Vergari

stefania.vergari@am.difesa.it

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ITAF Met Service

Organizational structure since 2006:

Central Level

U.S.A.M. (policy and regulations)

C.N.M.C.A. (national weather centre)

24h weather monitoring and forecasts,
charts production and dissemination, climatic
archive, telecommunication hub, training and
personnel employment

Mid Level

Re.S.M.A. (experimentations, obs QC)

1°C.M.R. (air navigation support)

C.A.M.M. (GAW global station)

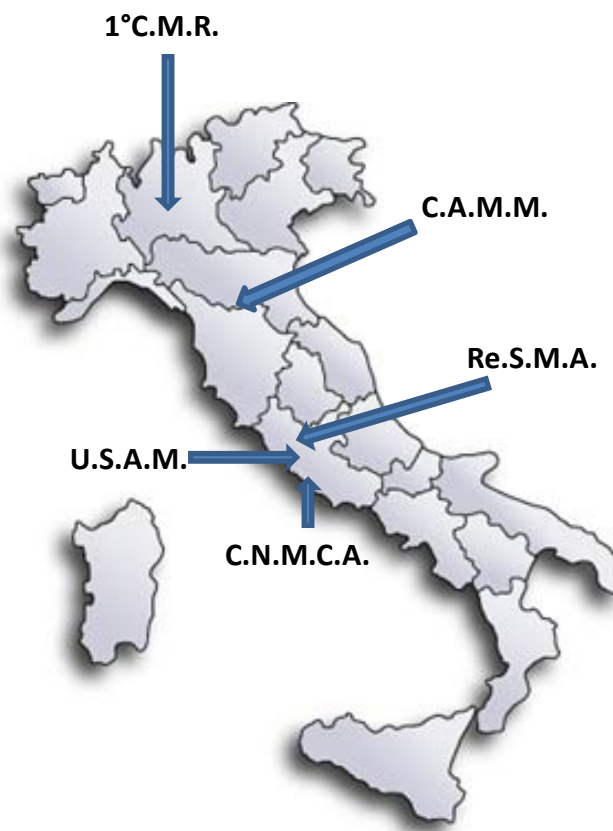
Local level

28 Airport Met Offices

75 Manned Met Stations

60 Automatic Weather Stations

6 Upper Air Met Stations





Upper Air Stations

- ✓ **Udine Campoformido** (EUCOS- GOS)
- ✓ **Milano** (EUCOS - GOS - RBSN-t)
- ✓ **Pratica di mare** (EUCOS - GOS - RBSN-t - GUAN)
- ✓ **Brindisi** (EUCOS- GOS - RBSN-t)
- ✓ **Trapani** (EUCOS - GOS - RBSN-t)
- ✓ **Decimomannu** (EUCOS - GOS)
- +**
- ✓ **Vigna di Valle** (GOS - RBSN-s - RBCN - GAW - GSN)
(soundings for experimental activities)





Upper Air Stations: details

Udine C.

Milano

Brindisi

Trapani

Decimomannu

- 2 launches per day at 00z and 12z (extra launches on request)
- 600 gr. weather balloons filled with helium
- Vaisala Digicora sounding system MW41 (recently updated)
- Vaisala Radiosondes RS92 until stocks run out (RS41 already distributed)

Pratica di Mare

As above except for 1000 gr. weather balloons

Vigna di Valle

2 ozone-soundings per month
(1000 gr. weather balloons, ECC-6A ozone sensor)

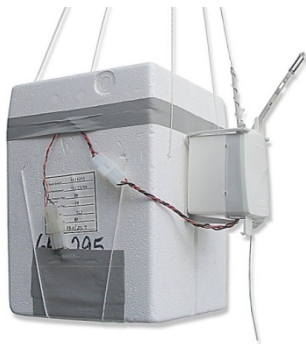




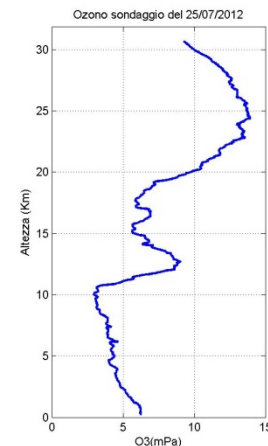
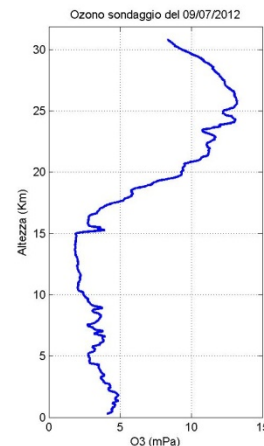
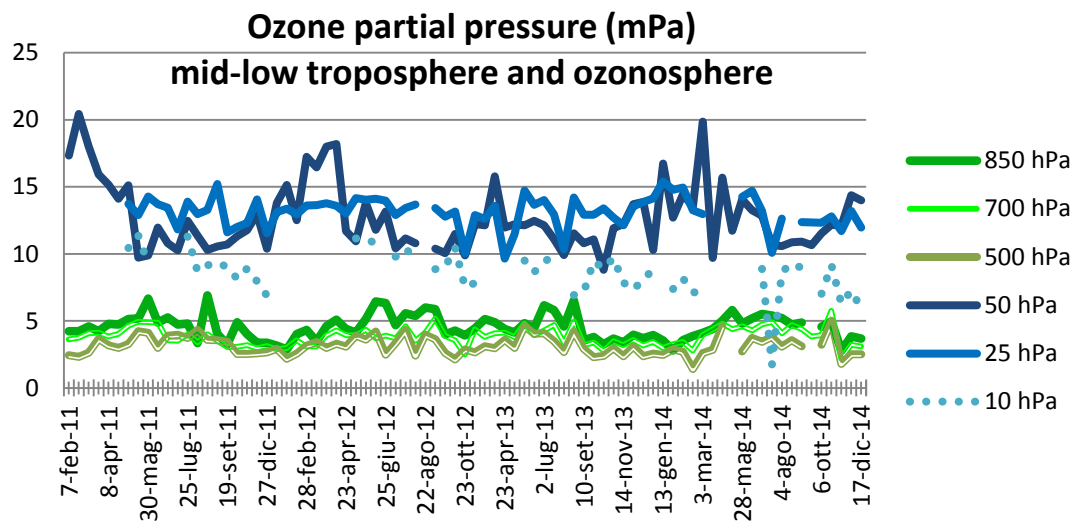
Ozone-soundings in Vigna di Valle

Experimental ozone soundings since 1980.

2003 - Acquisition of Digicora sounding system MW21 equipped by a one-point ozone-calibrator check against reference. Occasional soundings for experimental activity.



2011 - 2 ozone soundings per month, regularly planned. WOUDC archive format.





Radioactivity soundings in Vigna di Valle

1961 - Agreement between ITAF Met Service and National Research Council (CNR) for radioactivity measurement of the atmosphere.

During '60s:

- Experimental soundings with Geiger-Muller counters in conjunction with nuclear test

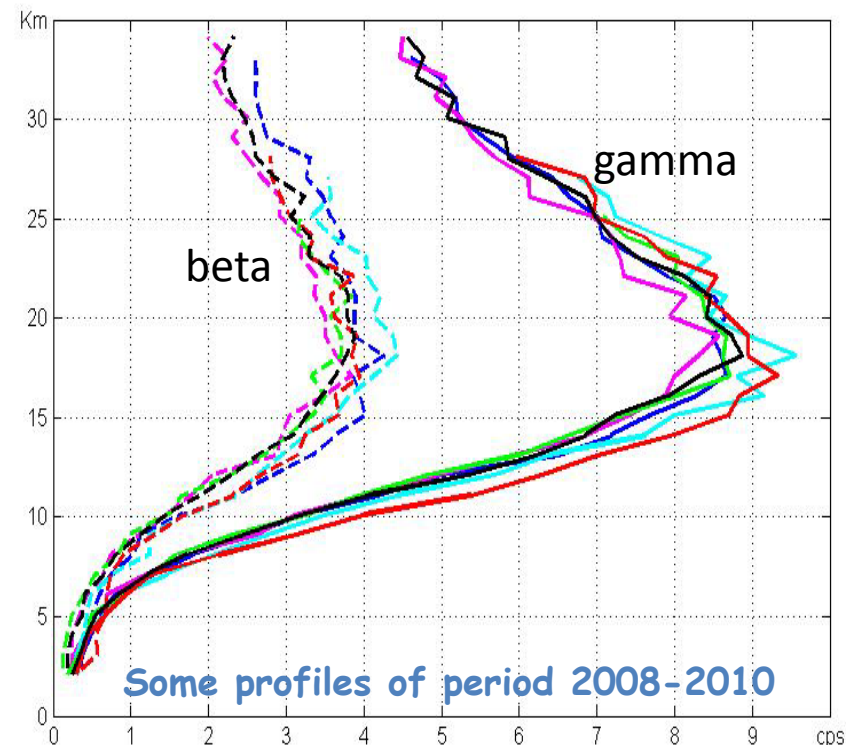
During '70s and '80s:

- Environmental radiation monitoring by atmospheric particles chemical analysis, sampled at the ground

1997 - Two years campaign of radioactivity soundings from 6 upper air stations

2006 → 2010

Radioactivity soundings at Vigna di Valle station till stocks of sensor NSS921 (G-M counter for beta and gamma radiations) ran out.





Re.S.M.A.-

Centre for Meteorological
Experimentations

Planned in 1907 by Capt. Cristofaro Ferrari

Realized in 1909 after a survey to Lindenberg
Observatory to see the state of art.

Fully working since 1910



Headquarters

Meteorological Station

Experimental area

Meteorological support at the first
flying activities through terrestrial
observations and experimental
atmospheric soundings.



Re.S.M.A. - Historical notes and names

1910: weather observatory (at the ground and low levels) of Royal Italian Army

1912: main royal weather sounding station

1923: experimental weather sounding station of the Royal Italian Air Force

1937: scientific and experimental weather observatory

1952: main meteorological and space physics observatory

1972: scientific and experimental weather observatory (again)

Since 1985: Centre for Meteorological Experimentations (Re.S.M.A.)

Picture taken before 1927



Weather balloon designed by Ing. Luigi Avorio. It was similar to the German Draken-balloon, with lobes for stability, tethered to the ground at a revolving tower by a steel cable of length more than 3000 meters.



Re.S.M.A. - activities

In according to international standards, Re.S.M.A. assures the quality of measurements and observations coming from the ITAF Met Service observation network, by:

- reference instrumentation for temperature, pressure, humidity, precipitation, solar radiation;
- calibration devices;
- development of calibration and testing procedures.





Re.S.M.A. – in particular

Testing of accuracy for new purchased instrumentation: thermometers and barometers for standard weather stations.

Preliminary accuracy checks for instrumentations designed for Automatic Weather Stations and controls on demand for temperature, humidity and pressure digital devices and solar radiation too.



In progress:

Development of a calibration biennial plan for meteorological digital devices in airports.





Re.S.M.A. is the field infrastructure for:



The Lead Centre is a joint initiative of ITAF Met Service and University of Genoa (Precipitation Intensity Laboratory). Main activities:



- Working Reference Group to provide the best possible estimation of reference RI measurement
- WMO intercomparisons
- Support to WMO Members, Commissions and Expert Teams
- Support to standardization bodies



Re.S.M.A. - for example....

Support to WMO Agricultural Meteorology Division

Goal: increased self-reliance of rural farmers by raising awareness of effective weather & climate risk management, sustainable use of weather information, services for agricultural production.

Many weather info (even if poor accuracy) **+** Simple Crop Model **=** Important crop advice for rural farmers

5000 plastic rain gauges distributed to 2,800 villages

Perform in Italy comparison tests for the plastic raingauges provided by WMO in order to define their accuracy







Develop rainfall observation procedures and guides for instrument installation for non-professional observers, such as farmers

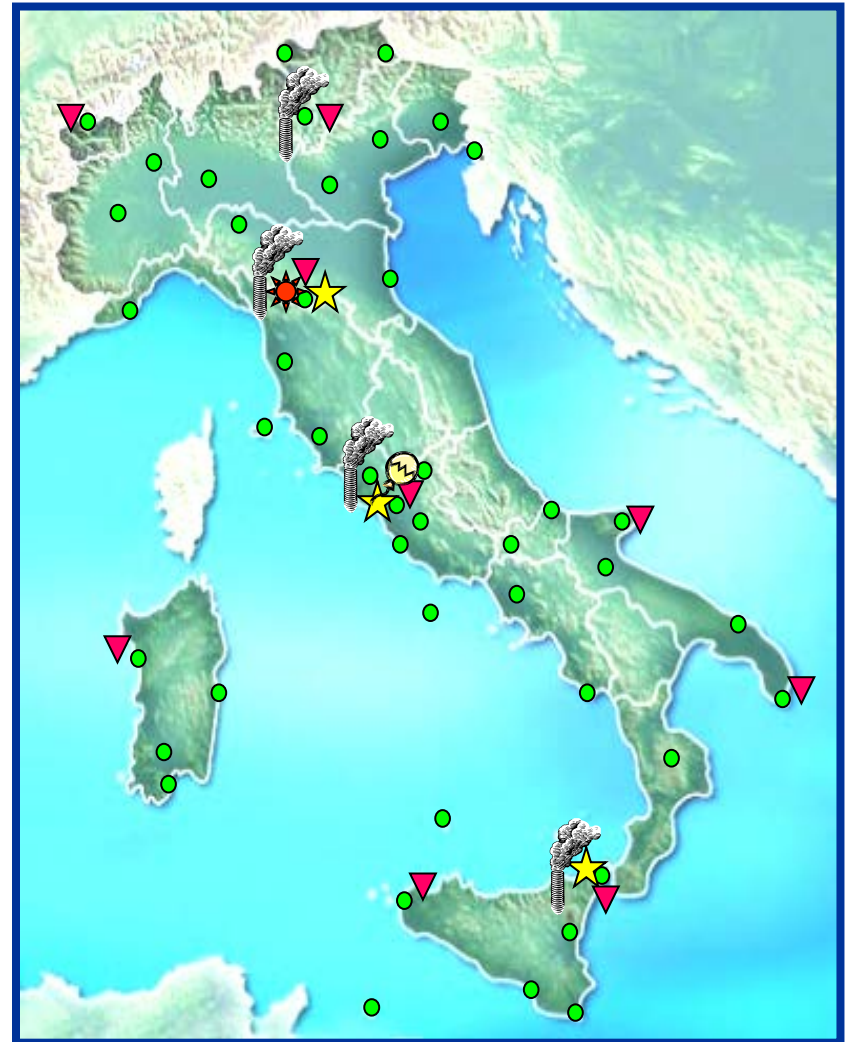
Identify the "best procedure and practice" for the use of simple plastic raingauges to improve agriculture services



Environmental Obs:

In according to WMO world collecting centers procedures, Re.S.M.A. collects and manages "environmental observations" from the ITAF Met Service network. Such activity is related to WMO GAW program.

-  Solar radiation and sunshine duration
-  Total Ozone and UV
-  Carbon Dioxide
-  Acid rains
-  Atmospheric turbidity
-  Ozone profile

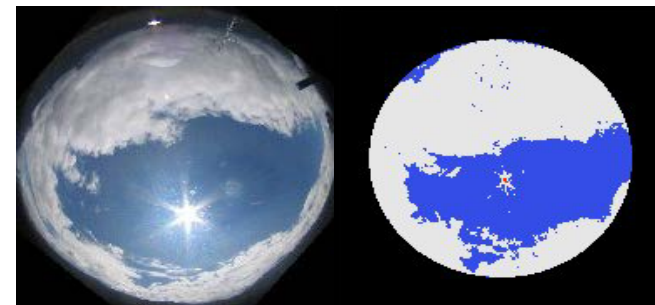


Experimentations:

Re.S.M.A. carries out experimental measurements tests in order to evaluate the performance of various and innovative measurement systems

It develops the fit methodologies for the control, sampling and verification of new instrumentations introduced in national area.

Visibility detection by digital imaging



Cloud cover automatic estimation

Automatic weather station software testings





Re.S.M.A. - and more

Investigation about an operative "near real time" product for volcanic ash detection



Identification of volcanic ash cloud

10 minutes of time resolution for a volcanic ash warning



5 minutes measurements collection and elaboration



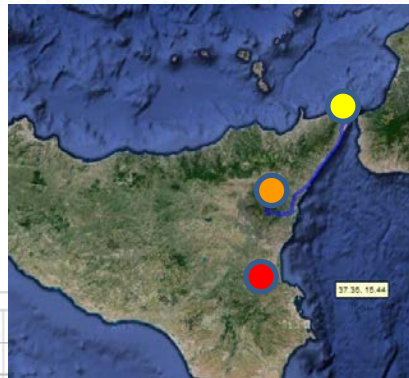
Calculation of the clouds height, backscatter analysis for vertical profiles



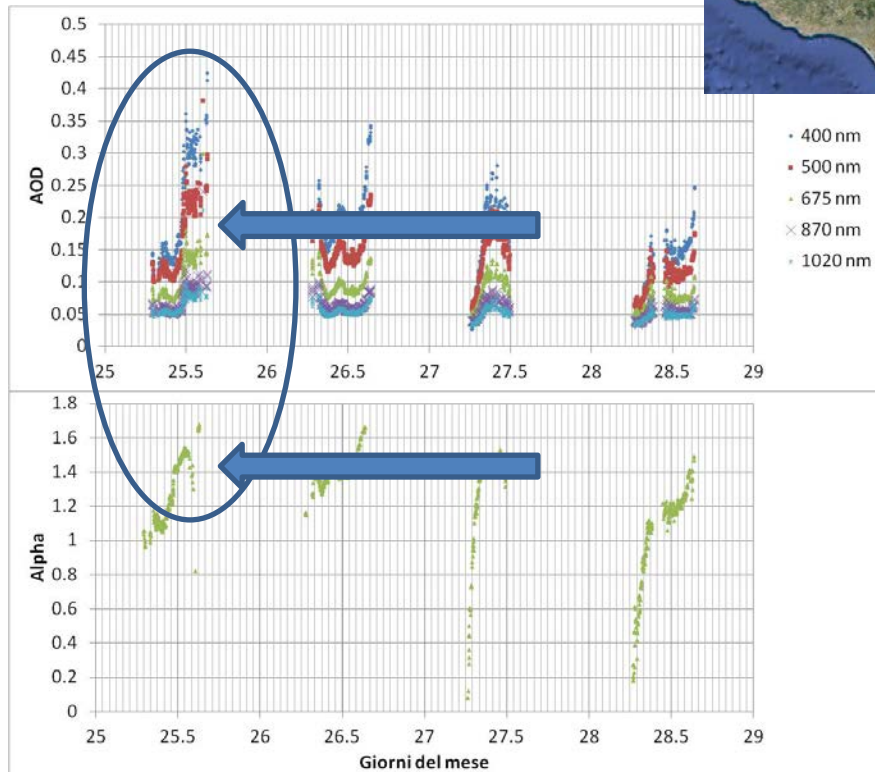
Re.S.M.A. - in fact ...



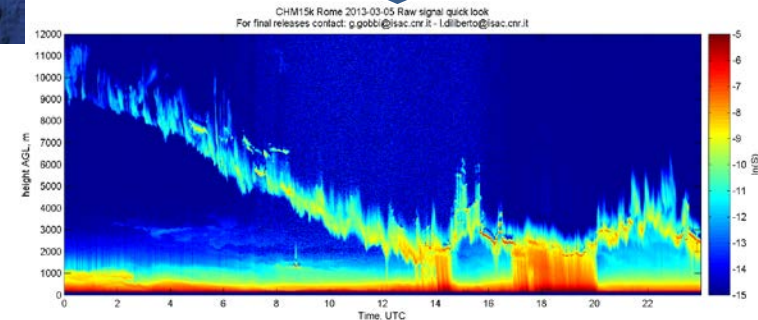
POM 01 sun-sky radiometer in
● Messina saw ● Etna eruption
on 25/10/2013



No backscatter profiles from
ceilometers were available to
detect the ash altitude



Rapid increase of: AOD, Angstrom
coefficient and fine particles volume



Next actions:

- Movement of POM 01 from Messina to ● Catania-Sigonella Airport;
- Collection of backscattering outputs of the local CL31 - joining E-profile program
- Analyze events of interest to derive a near real time warning product for volcanic ash





ITAF Met Service

... waiting for you in Vigna di Valle,

many thanks

for the attention

