

Metrology and Meteorology at CNR-IMAA Atmospheric Observatory: plans and perspectives

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Outline

- Cooperation CNR-INRiM
- SHC for manual launches
- MoM between CNR and the IT Met Service
- Autosonde data quality
- MWR and GPS
- Plans (2015-2016) and outlook

CNR-INRiM cooperation: objectives

- To implement a calibration laboratory for the CNR-IMAA atmospheric observatory (CIAO), in Potenza, Southern Italy - on the Apennine mountains (40.60N, 15.72E, 760 m altitude) due to a joint project to transfer technology and expertise from INRiM to the CNR-IMAA.
- To establish a calibration centre for the needs of in-situ and ground based remote sensing measurements.
- To establish traceability and calibration procedures for in-situ surface based sensors in a first phase, and for upper air instruments in a second phase.
- To improve sensors and calibration methods of existing and new technologies of in-situ surface and profiling measurements of temperature and humidity.
- Status: not yet started (hopefully in 2015).

Project phases

- **Phase A: implementation of a calibration laboratory for ground-based instruments, involving measurement traceability** for air temperature, humidity, pressure and other to be defined.

Duration: 1 year

- **Phase B: extension of the capabilities of the calibration laboratory to upper air measurements, including the implementation of a facility for dynamics studies of radiosonde sensors**

Duration: After the first steps of phase A will be completed, a phase B will be started, aiming at extending the calibration capabilities to upper air sensors. **This phase B will be defined at a time when it will get advantage on the experience and results achieved by MeteoMet and MeteoMet2 on radiosondes sensors related activities.**

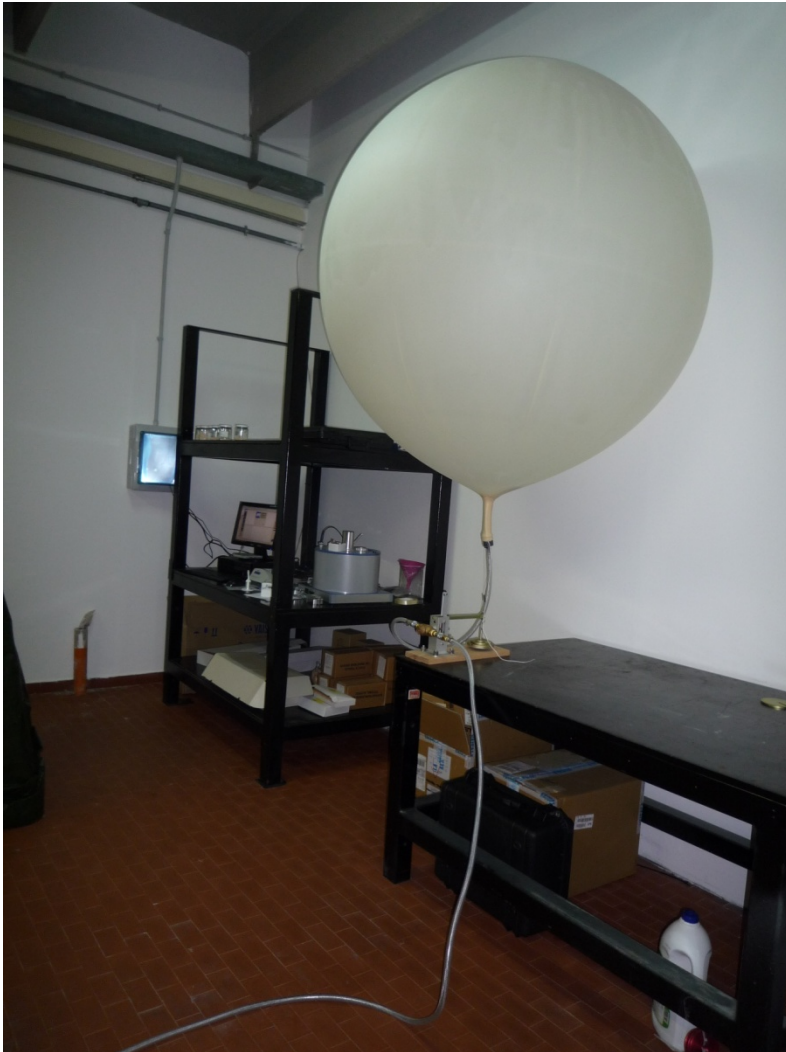
TRACEABILITY AND TESTING OF UPPER-AIR HUMIDITY SENSORS

- A step-by-step approach will be followed in a collaborative effort between INRIM and IMAA CNR to jointly develop and run a calibration facility for reference radiosondes.

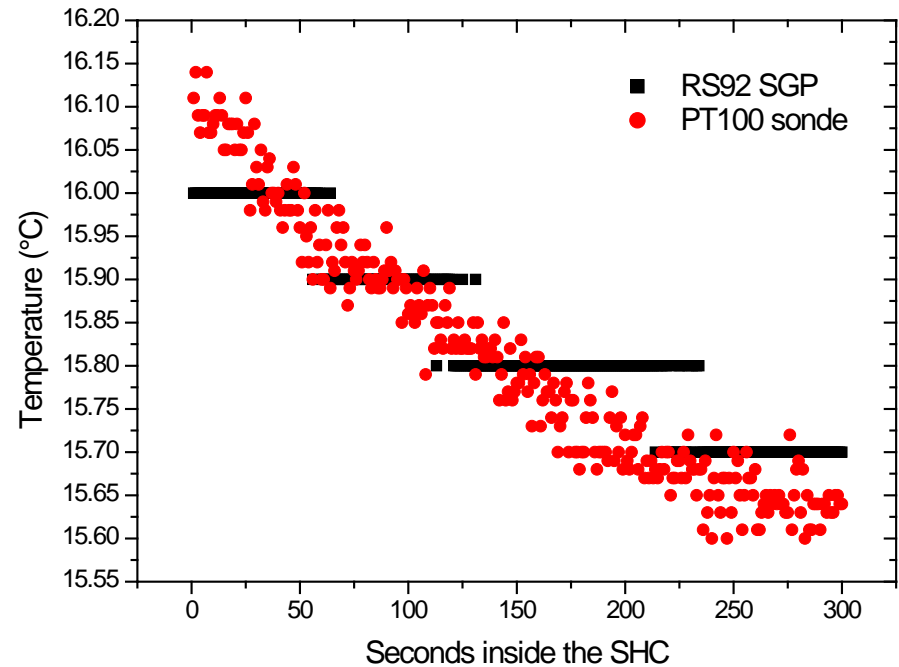
Short term (hopefully)

- An existing climatic chamber at INRiM will be modified to incorporate a sub-chamber and peripheral tools for an early ground check of relative humidity sensors before launch at constant air temperature.

Standard Humidity Chamber (SHC)



- Since January 2015, manual launches have started again, and the procedure include the use of the SPRH100 and of a PT100 sonde for measuring the temperature.



Cooperation with the Met Service

- Formal agreement on the data, expertise exchange and coordination of participation to National and International projects
- Discussion running until end of 2015: to transfer RAOB Brindisi Casale station to Potenza, or to perform additional soundings in Potenza, adopting a transition period (3-4 launches per week, to be performed manually. Use of the autosonde under discussion)
- GCOS support letter still pending though CNR did a few steps forward in the dialogue with the Met Service, the letter is still needed!

Outcome of Met Service discussion

CONCLUSIONI Lista delle decisioni (D) e azioni (A)	
Azione/Decisione	Descrizione
ReSMA 01/A/20140917 entro il 15/10/2014	Esprimere valutazioni sul testo base e a proporre modifiche all'annesso tecnico
ReSMA 02/A/20140917 entro il 15/10/2014	Designare il coordinatore scientifico del WP 3 EUNADICS, previa approvazione superiori autorità
CNR-IMAA 03/A/20140917 entro il 30/10/2014	Impegnarsi a sostenere, in caso di avvio del progetto EUNADICS, il coordinatore scientifico dell'AM agendo a suo supporto secondo le esigenze da lui rappresentate
USAM 04/A/20140917 entro il 30/10/2014	Approfondire, per le implicazioni in EUNADICS, l'opportunità di un'adesione dell'AM, quale Servizio Meteo nazionale, al programma E-PROFILE di EUMETNET EIG.
CNMCA 05/A/20140917 entro il 30/10/2014	Valutare: <ul style="list-style-type: none"> – in caso dalla realizzazione di radiosondaggi aggiuntivi sul sito di Tito Scalo (PZ), l'eventuale impatto (miglioramento) sulle previsioni numeriche che deriverebbe – in caso di trasferimento della radiosonda di Brindisi sull'aeroporto di Galatina o sulla sede del CNR- IMAA a Tito Scalo, le implicazioni sul mantenimento delle serie storica climatologica per le osservazioni al suolo.
CNR- IMAA e USAM D 01/D/20140917 entro il 30/10/2014	Impegno di far conoscere le valutazione delle Parti sulla bozza di Convenzione come emendata in sede di riunione

Sorry in Italian only, but to give you a “body of evidence”!

Evaluate:

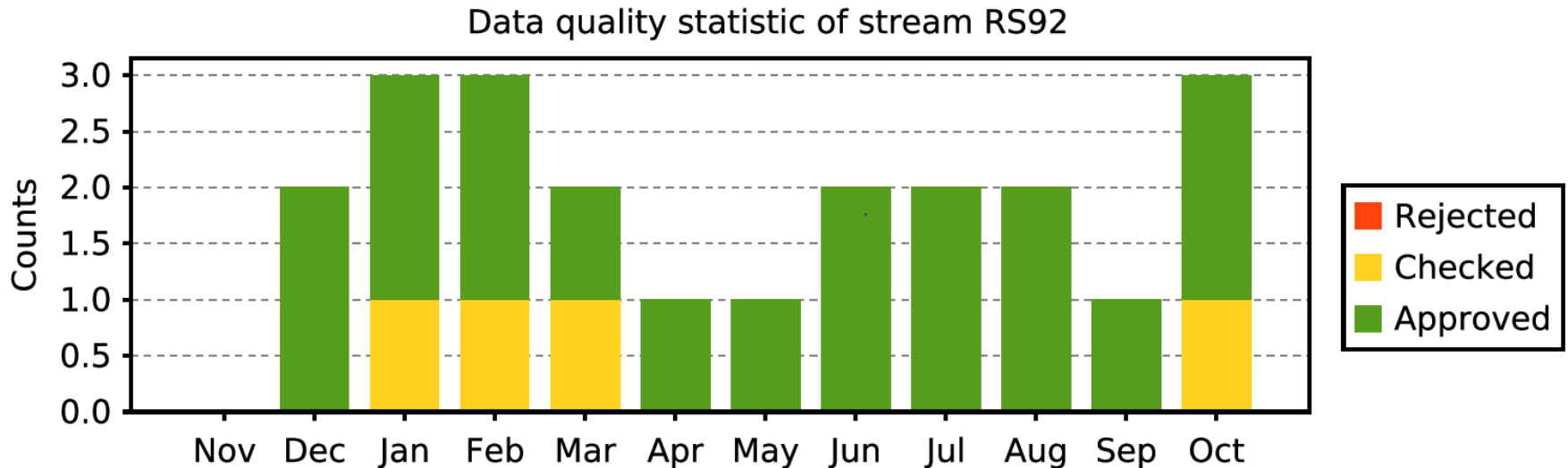
- in the case of additional soundings on the site of Tito Scalo (PZ), the possible impact (improvement) on the numerical predictions that would result;
- in case of transfer of the radiosonde on the airport of Brindisi Galatina or on the site of the CNR-IMAA Tito Scalo, the implications for the maintenance of climatological time series for the observations on the ground.

Translation



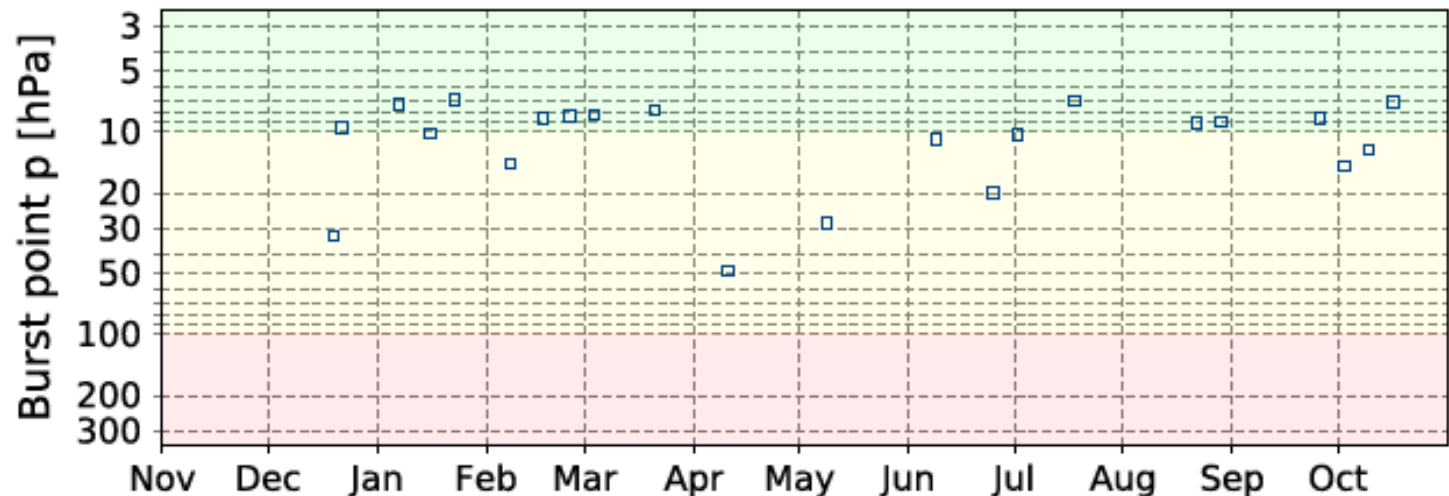
Autosonde: data quality

- Autosonde validity for GRUAN purposes is still under evaluation.
- For Potenza site, autosonde data quality looks good according to the GRUAN quality check, though the SHC cannot be still used in the auto launcher.
- 35% of the soundings do not reach 10hPa (>20 hPa), due to age of the ballon (but also time inside the launch chamber).



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Autosonde within GRUAN

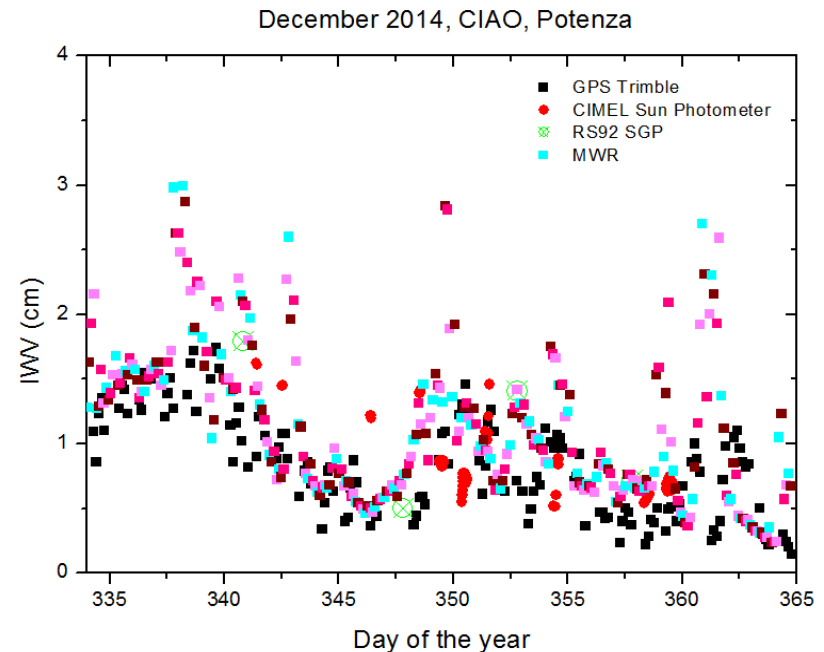
- Mitigation of adverse effects in the use of an autosonde launcher: due only to the lacking of an independent GC. Burst point of manual and automatic launches will be compared to check this issue.
- Reliability of the autosonde for all the other possible factors affecting the measurements, according to our experience but also according to the percentage of launches processed using the GRUAN calculus chain and labelled as "good", is quite high.
- Potenza plans is to continue the GRUAN launches on the basis of a combination of manual and autosonde launches (2 launches per week since early 2016).
- Contribution to the completion of the radiosondes task team activity related to the characterization of the autosonde launchers has been already offered our help to the leader of this work (via email to R. Kivi).

Development of a MWR GRUAN product

► Potenza site also confirms his availability in establishing a MWR GRUAN data product (requested by the WG GRUAN).

► According to the GRUAN needs and the state-of-the-art for the ground based microwave radiometry this should include mainly the retrieval of IWV and temperature profile according to the GRUAN requirements

Example of a monthly time series (December 2014) retrieved by the GPS Trimble antenna (processed by NOAA), by the CIMEL sun photometer and by the MWR. Sondes launches performed during the same period are included.

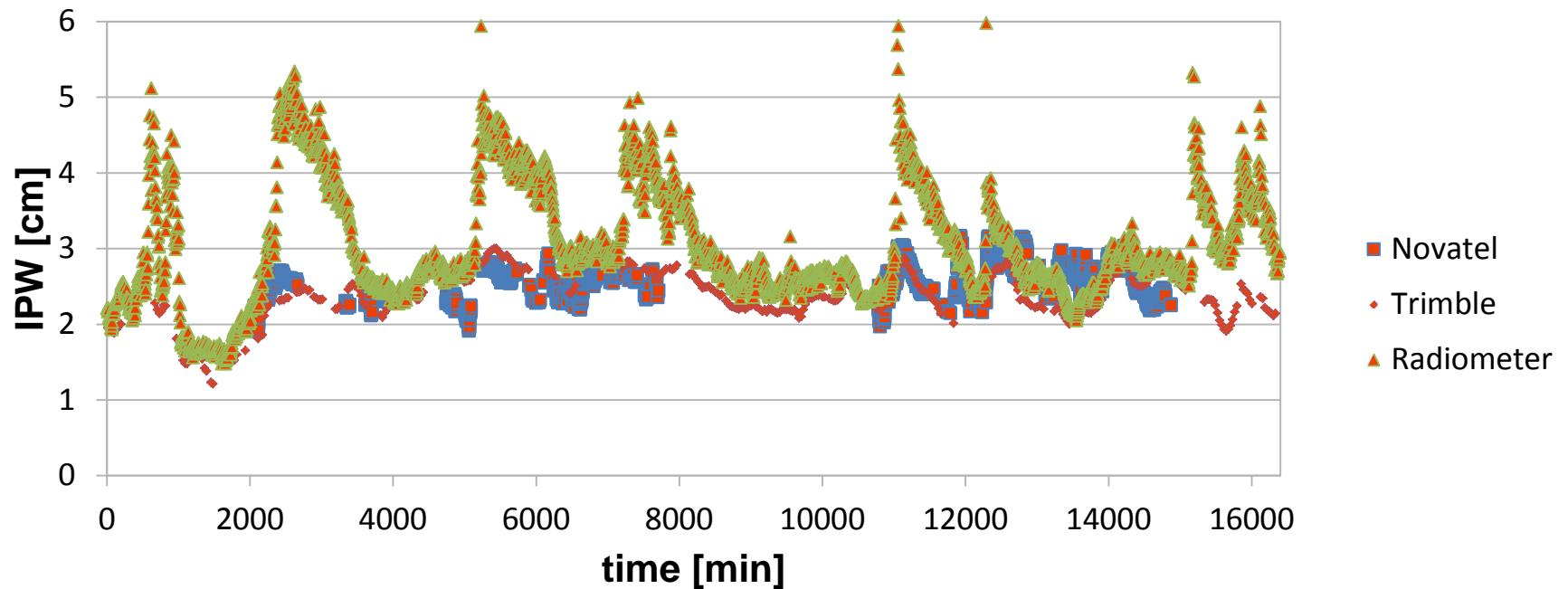


GPS: comparisons

Two GPS antennas are running in parallel in Potenza since July 2014:

1. A **Trimble** GPS antenna/receiver station: it is Trimble L1/L2 Dorne Margolin element with chokerings.
2. A **Novatel** GPS antenna/receiver station: the SMART6-L Novatel

Integrated Precipitable Water Vapour, 1 September - 11 September 2014, CIAO, Potenza, IT



Plans and Outlook

- By early 2016, two RS92 SGP per week (1 using the autosonde and 1 manually) and one ozone sonde per month will be performed.
- The site is ready to submit the GPS raw data to GFZ for the future for centralized processing (now data are also processed at Italian Space Agency by Dr. Rosa Pacione).
- Potenza is offering to develop a GRUAN products for the microwave radiometer.
- The metrologic calibration facility might be also offered as a service activity to GRUAN and ACTRIS networks.
- Preparation for GTS data transfer.
- Funding to support specific experiments might be also available through the Transnational access activities offered by the EU at the CIAO facility via Research Infrastructure projects (ACTRIS-2).

**.... waiting hopefully for the
GRUAN certification**

THANK YOU!



GRUAN ICM-7 , Matera, IT 23-27 February
2015

