



RESMA



ITALIAN AIR FORCE – METEOROLOGICAL SERVICE



W.M.O.

Field Rainfall Intensity Intercomparison

ET/IOC at work, 27 Feb 2007



ET/IOC EXTRAORDINARY INSPECTION MEETING

*“I wanted, always I wanted, very strongly I wanted”
(Vittorio Alfieri, 1775)*

Vigna di Valle, 17-21 September 2007

Vuerich Emanuele, SM-FI

SUBJECTS

Activities report and site final presentation

- ü **Planning activities before installations**
- ü *Laboratory phase (by SM-LI)*
- ü **Instruments position and installations**
- ü **Reference Pits (EN13798:2002)**
- ü **Data output and data acquisition**
- ü **Supervision and maintenance (QA plan)**



*Final State of the
Intercomparison site by sunset*

PLANNING ACTIVITIES

- ü According to Final Report ET/IOC SIIB-3 (3.5.7) the SM-FI soon arranged a timetable for shipping procedures and custom clearance + 3 different ship-procedure letters (CEE instr. for DICAT-Genoa, CEE instr. for ReSMA-IMS, NON-CEE instr.). CIMO web site: 1) Summary; 2) Letters Nr1, Nr2, Nr3; 3) Pro-Forma Invoice (<http://www.wmo.int/pages/prog/www/IMOP/intercomparisons.html>)
- ü The SM-FI sent to each Participant an official letter by E-mail and facsimile with the corresponding instructions for the shipment
- ü The PL sent to Participants a letter with Further Information and a FAQ document (<http://www.wmo.int/pages/prog/www/IMOP/intercomparisons.html>)
- ü An invitation letter was sent by SM-FI to Participants for assisting to installation procedures in Vigna di Valle

TOT EXPECTED INSTRUMENTS (CEE+NOT CEE)	58	37	9	12
TOT NOT CEE (with compulsory custom clearance assumed by Italian Air Force 4°G.R.S. Fiumicino)	11	0	9	2
TOT CEE	47	37	0	10
SHIPMENT PROCEDURES LETTER by Site Manager Mr Vuerich:		Nr.1	Nr.2	Nr.2 OR Nr.3



PLANNING ACTIVITIES

- ü The Air Force “4th Reception and Despatch Group” (4°G.R.S. - Central Logistic Command) was is change of arranging custom clearance (“special” custom regime 24 months – “Incoterms Delivered Duty Unpaid”) and transportations (Genoa, FCO airport, Vigna di Valle)
- ü Nr. **6** transportations by Italian Air Force (one is missing: all spare instruments); Nr. **2** transportations by DICAT (Instr. Nr3 and Nr4 shipped in Genoa Airport);
- ü SM-FI, SM-LI and Data Analysis Expert met **4** times for operational purposes and data-output interpretation, during the pre-installation period and the preliminary Laboratory phase
- ü Pre-installation activities were managed well except for a few technical difficulties discussed during telephone conferences, such as mistakes in shipping procedures, shipping delays, not fully documented instrumentations, hardware upgrades not documented in manuals, instrument data-output difficulties, data-output not complying with WMO/ET recommendations. So Laboratory tests and instruments integration into data acquisition system took more time then planned (**New ET/IOC General agreement of the 5° June 2007 – telephone conference protocol**)



*Official Opening Event
27 February 2007
The Italian PR, PL and
CIMO Senior Scientific Officer*

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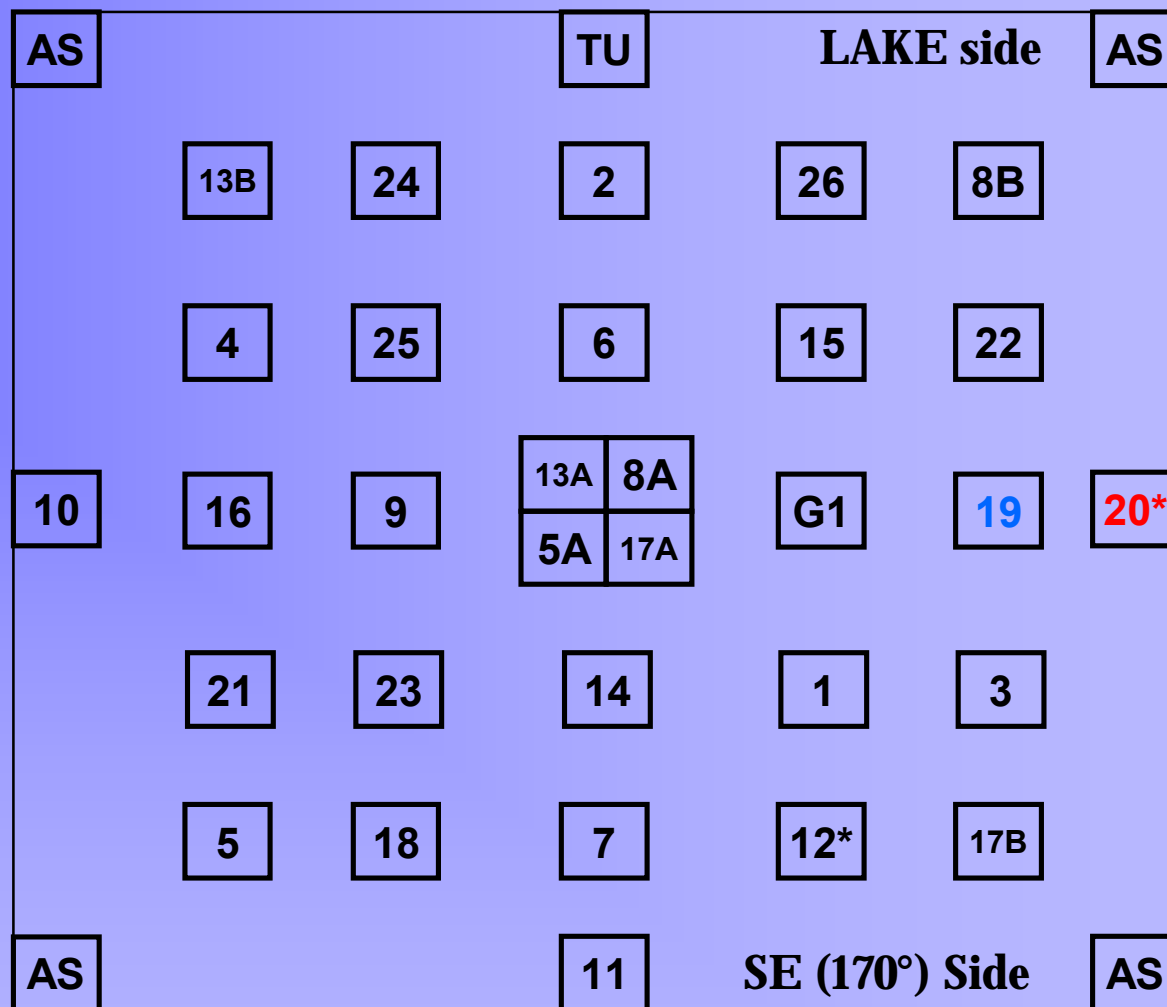
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Final State of the Intercomparison site

INSTRUMENTS POSITIONS

- 1 RIMCO 7499 (TB)
- 2 Paar AP23 (TB)
- 3 Précis-Mecanique (TB)
- 4 Thies PT (TB)
- 5 **ETG R102 A, B (TB)**
- 6 LSI DQO31 (TB)
- 7 SIAP UM7525/I (TB)
- 8 **CAE PMB2 A, B (TB)**
- 9 Davis Rain collector II (TB)
- 10 Lambrecht 15188 (TB)
- 11 PP040 MTX (TB)
- 12 ARG100 Env. Meas. Ltd (TB)
- 13 **MRW500 A, B (WG)**
- 14 Vaisala VRG101 (WG)
- 15 Ott PLUVIO (WG)
- 16 EWS PG200 (WG)
- 17 **GEONOR T-200B3 A, B (WG)**
- 18 MPS TRwS (WG)
- 19 SA „MIRRAD“ MPA-1M (WG)
- 20 Vaisala PWD22 (optical)
- 21 Ott PARSIVEL (OD)
- 22 Thies LPM (OD)
- 23 Vaisala WXT510 (acoustic)
- 24 Eigenbrodt ANS 410 (pressure)
- 25 KNMI electrical raingauge (level)
- 26 PVK ATTEX "DROP" (Radar)



**N. 20 was moved to this position for technical reasons (ET-Chair suggestion – 20th of July 2007)*

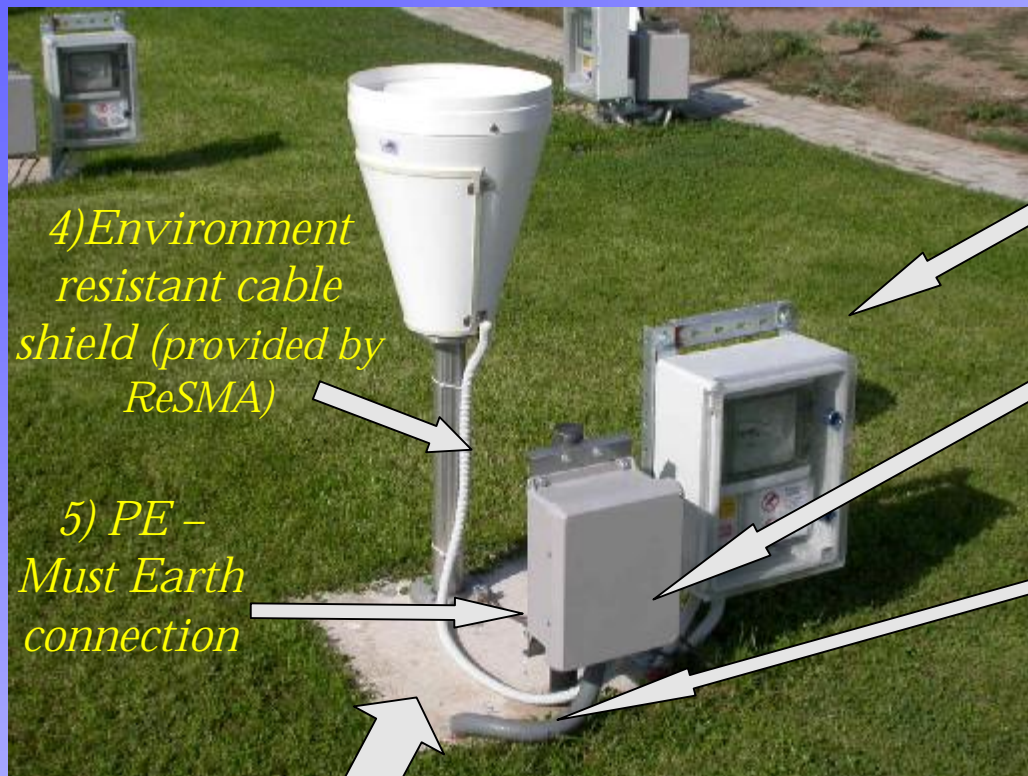
G1 Gill windsonic (IMS-ReSMA)

AS 4 Young 05106 wind sensors + 4 Vaisala DRD11A Rain detectors (USA)

TU Rotronic M101A Temp/RH + Young 61020-L Press + Lycor200X rad. (IMS-ReSMA)

Ancillary sensors

Typical platform installation – Rain gauges



4) Environment resistant cable shield (provided by ReSMA)

5) PE – Must Earth connection

Concrete Platform -
Underground separated cables

Data cables



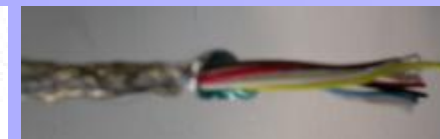
Power cables

1) ISO standard 220VAC power box with surge protection switches

2) ISO standard data box with protected switch-board (12VDC, Converters, protection electronics)

3) High quality data cables, inside metal protected shield:

Belden 9933 Overall Foil / Braid Shield - Datalene insulation - UNPAIRED (8)



Belden 9901 Single Pairs Shield and Overall Foil / Braid Shield - Datalene insulation PAIRED (4)



Typical platform installation – Ancillary sensors



Young 05106 wind sensors + Vaisala DRD11A Rain detectors (USA)



**Gill
Windsonic**



**Young 61020-L (Pr)
Lycor200X (Rad.)
Rotronic M101A (T/RH)**

Participants installation assistance

*CAE (Italy)
and
GEONOR (Norway)
10-12 July 2007*



Participants installation assistance

SIAP-MICROS (Italy)
13 July 2007



Participants installation assistance

*LSI-LASTEM (Italy)
16 July 2007*



Missing photo: Lambrecht (Germany), 18 July 2007

Participants installation assistance

*VAISALA (Finland)
19-20 July 2007*



Participants installation assistance

*MTX (Italy)
23 July 2007*



Participants installation assistance

*Eigenbrodt (Germany)
24 July 2007*



Missing photo: MPS (Slovak Rep. Met Service), 25 July 2007

Participants installation assistance

*KNMI (The Netherlands)
8-9 August 2007*



Missing photo: PVK-ATTEX (Russian fed.), 7-10 August 2007

Participants installation assistance

*ETG (Italy)
9 August 2007*



Participants installation assistance

*METEOSERVICES
(Czech Rep.)
1 August 2007*



...and to conclude

*IMS-ReSMA staff at work
Dec 2006 – Sept 2007*



Mr Cucchiarelli



Mr Oliva



*Mr Rossetti
and
Mr Oliva*



*Mr Adamo
and
Mr Oliva*

SUBJECTS

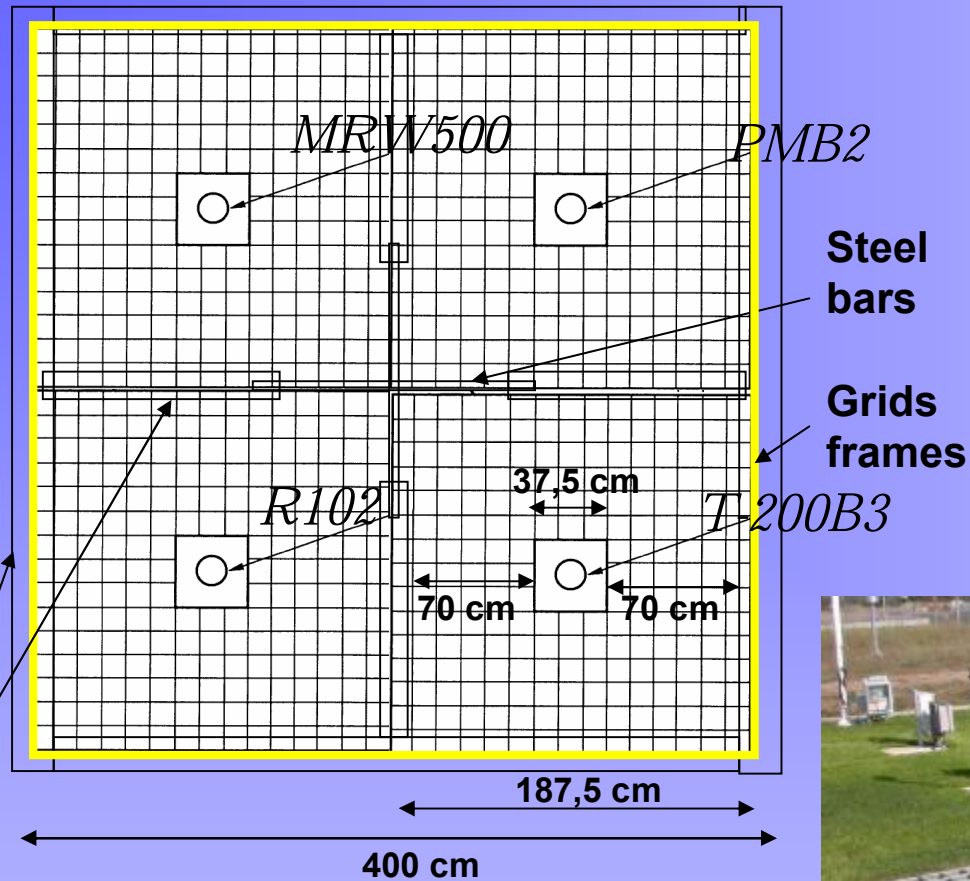
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*Official Opening Group photo
27 February 2007*

ReSMA REFERENCE RAIN GAUGE PITS EN13798:2002



- ü A big Pit 1,7 meters deep was built and divided in 4 parts (4 pits) for hosting the working reference (4 different instruments).
- ü 4 standard galvanized steel gratings 187,5 x 187,5 x 12,0 cm (LxWxH) will be positioned on pit walls. Spaces: 12,5 x 12,5 cm. Accuracy: ±5mm; Strips:3mm

Robust brick walls



ReSMA REFERENCE RAIN GAUGE PITS EN13798:2002

Pit Gauges

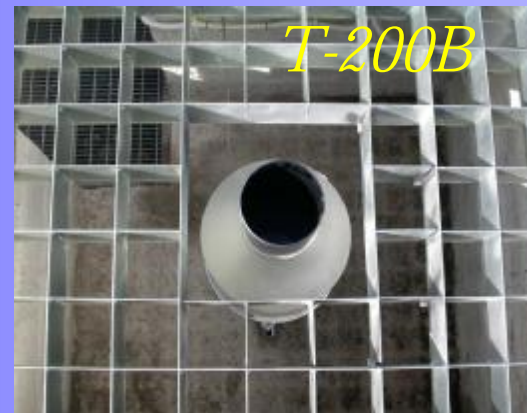
Square dim.

ü **T-200B**

Ø16cm:

Δ=10,5cm

37,5x37,5cm

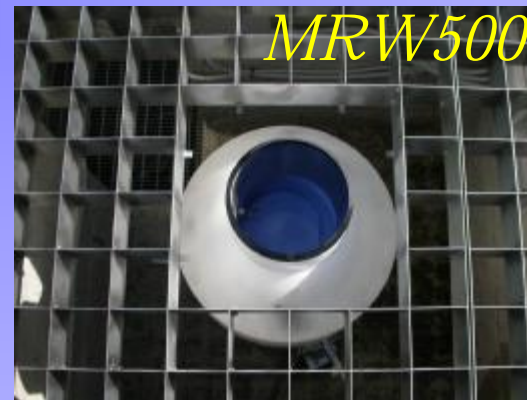


ü **MRW500**

Ø25,2cm:

Δ=12,4cm

50.0x50.0cm



ü **R102 and PMB2**

Ø35,7cm:

Δ=13,4cm

62,5x62,5cm



**Dimensions of
centre square hall
according to:
EN13798 + Final
Report ET/IOC
SBII-3 par. 3.2.3
(Vigna di Valle,
26 Feb-2Mar
2007)**

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ReSMA celebration stone

D.A. STRATEGY & INSTRUMENTS DATA OUTPUT

Following Final Report ET/IOC SBII-3 par. 3.6:

DATA ACQUISITION STRATEGY:

- ü Data storage: DB of 10-second data with an external back-up data storage and Relational Database (RDB) of 1-minute data.
- ü The **raw data** is taken every **10 seconds** and contains all data delivered by the instruments (included “internal errors or status data”) – **Direct measurements and serial output filters**
- ü The RDB will at least contain **1-minute data** of the following parameters: 1-minute RI of all gauges, 1-minute averages of wind speed and wind direction, max. wind speed, temperature + standard deviation (STD), relative humidity + STD, output of wetness sensors and drop counters, and **QC information** (to be discussed with Data Analysis expert and ET) and **metadata (Final Report Annex-VII)**



*DA system –
Campbell Scientific CR1000*

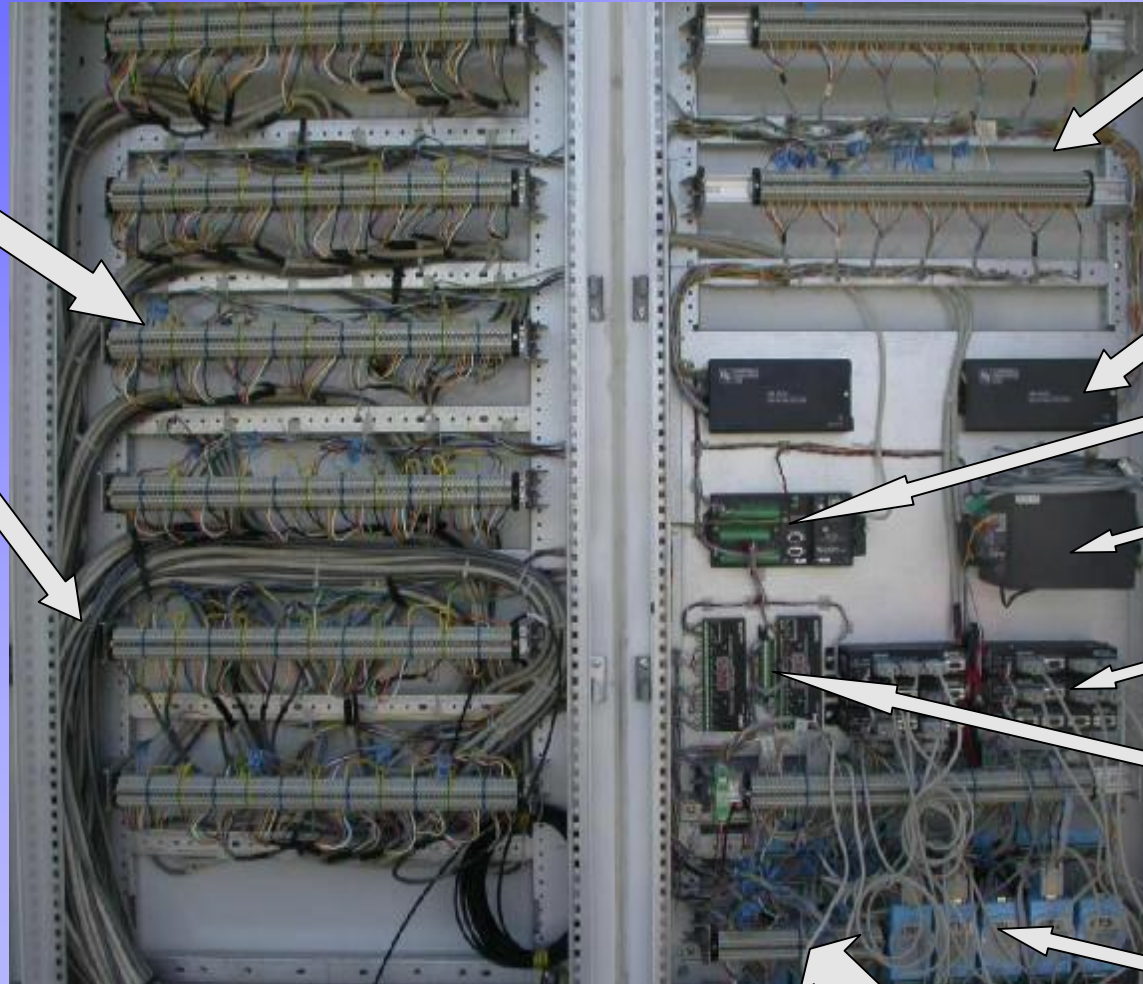
INSTRUMENTS DATA OUTPUT INTERPRETATION:

- ü Extremely time consuming activity due to the non-homogeneity of the instruments outputs; only 9 instruments with direct RI[mm/h]
- ü SM-FI, Data Analysis expert and SM-LI realized a “ad hoc” file for better data output interpretation, evaluation and integration into DA system ([WMO-TRANSFER-FUNCTIONS\(2\).xls](#) ver.13/9/2007)
- ü This file, all available manuals and instr. data telegrams templates are collected in a **ET/IOC web access ftp server** (by **Dr Molini A.**)

DA SYSTEM (protected by copyright)

1) Main Switch boards

Data Cables from platforms



2) Switch boards to Multiplexers

5) Multiplexers

4) The Core: CR1000

8) Datalogger and peripherals UPS

7) SDM-SIO4 peripherals

6) SDM-SW8A peripherals

9) ADAM 4520 RS232-RS485 converters

3) Switch boards to SDM-SIO4

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The Lake, seen from its Castle

SUPERVISION – MAINTENANCE (QA)

- ü (WMO n.8, PIII, cap.5, Annex 5.B) – ReSMA responsible for OPERATOR SERVICING:
 - (a) Provide normal operator servicing for each instrument, such as cleaning, chart changing, and routine adjustments as specified in the participant's operating instructions;
 - (b) Check each instrument every day of the intercomparison and inform the nominated contact person representing the participant immediately of any fault that cannot be corrected by routine maintenance;
 - (c) Use its best efforts to do routine calibration checks according to the participant's specific instructions.
- ü A dedicated Intercomparison **LOG-BOOK** will be adopted by SM-FI as to permit the PL exercises his general control on the Intercomparison.



Intercomparison site and Bracciano Castle by sunset

SUPERVISION – MAINTENANCE (QA)

- ü In addition, ReSMA staff will perform a periodic calibration check (catching gauges) by the **Field Calibrator** projected and provided by DICAT – Univ. Genoa
- ü Considering:
 - the long-term characteristic of this Intercomparison;
 - non-catching rain sensors have not been checked by any laboratory (only factory calibration),
 - the responsibility of ReSMA staff in managing participant prescribed routine calibration checks

a second **Participants-ReSMA meeting** is strongly suggested by SM-FI in Vigna di Valle. This “checking” meeting has the purpose to verify the general status of instruments and to give more assurance to data analysis results.



Intercomparison site and Bracciano Castle by sunset

SUPERVISION – MAINTENANCE (QA)



SM-LI into ReSMA Intercomparison control room with the Field Calibrator

... and before each scientific experiment



Prof. Antonino Zichichi

**“Scientists are morally bound to extol high scientific values. The military are morally bound to defend these values and constantly promote civil and social progress”
(Italian Army, 2007)**

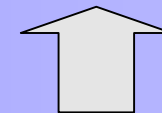
*The Site Manager,
Captain Emanuele VUERICH*

ADDITIONAL OBS/MEASUREMENTS

- ü RESMA operates a H24 WMO-CGOS station: present weather, visibility and precipitation typology could be provided
- ü RESMA operates a H24 WMO-GAW station: ozone (total and profile), global irradiance and UV and chemic precipitation content could be provided
- ü On request, it is possible to receive radar maps and lightning detection maps



**RESMA = "OPEN SKY"
LABORATORY**

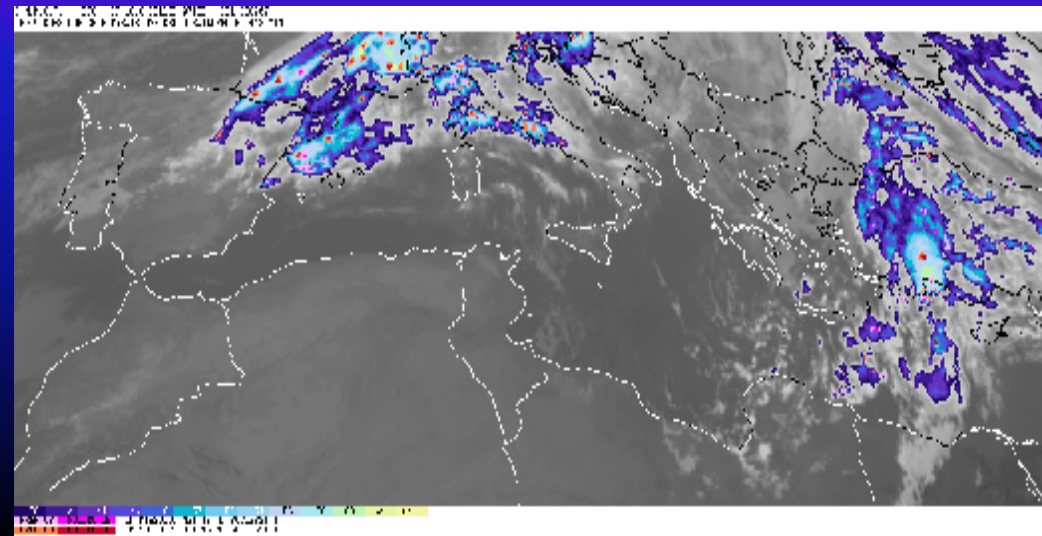
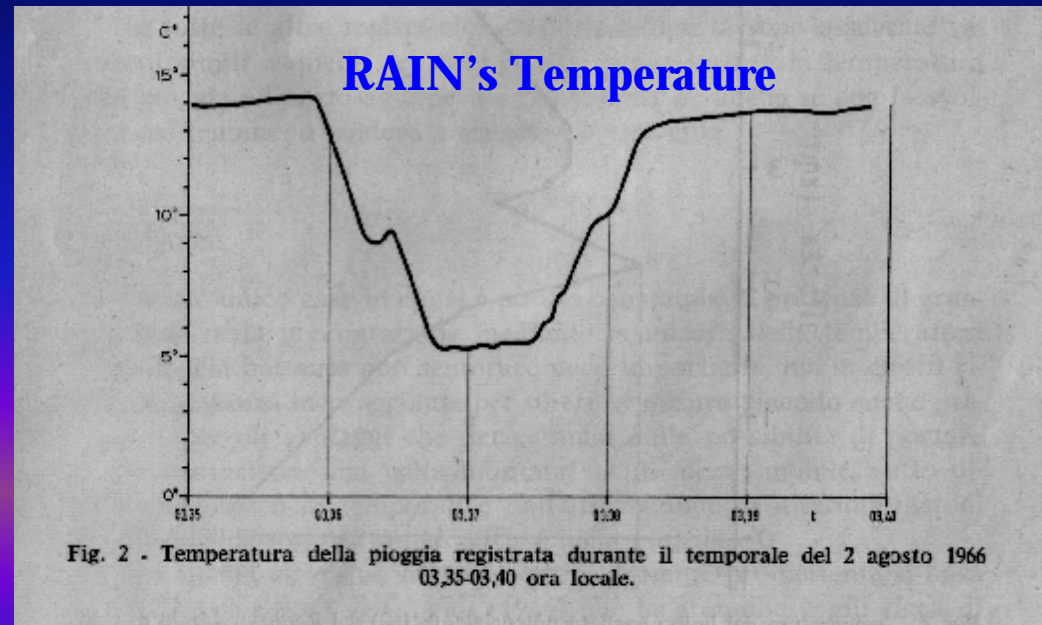
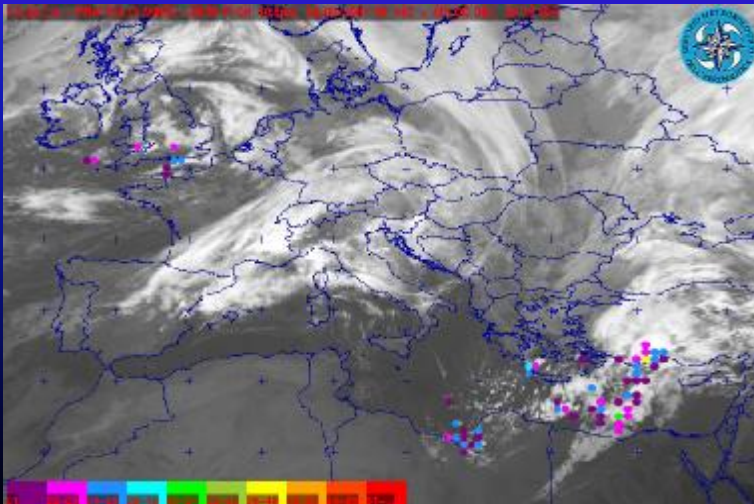


**A CIMO XIV concept:
"Data integration"**

Signal: convective or "warm fronts" precipitation

POSSIBLE MET PRODUCTS AND METADATA (IMS-Resma)

- **Observer reports** (GCOS+GAW 24H Vigna di Valle Met Station)
- **Temperature of rain**
- **Sfuk (lightning)**
- **Nefodine (sat+clouds+water)**
- **Precipitation typology (hail/snow..)**



For every significant precipitation event, personnel will contribute to carry out a metadata record

It is important that should be kept not only the meteorological measurement values, but also the circumstances in which the measurements are made. Such information is known as **metadata** - data about data.

Metadata record for each precipitation event

Field	Content
00	Site number
01	Place
02	Geogr. coordinates (GPS)
03	Precipitation start
04	Precipitation end
05	Precipitation accumulated
06	Wind direction
07	Wind speed
08	Special phenomena
11	Clouds amount
12	Cloud coverage
13	Soil coverage
14	Vegetation phase
15	Notes
16	PL and SM proposal

INSTRUMENT STATISTICAL FORM

Issued, date

Kind of instrument on file:

File No.: Store location:

Make, model, year of release:

Date of despatch to the station: Station:

Name/grade of station personnel responsible for the instrument:

(1) (2)

(3) (4)

Major adverse environmental characteristics of the duty station (frost, strong winds, corrosive pollution, etc.):

Instrument failure: nature/date/remedial action taken/observer on shift:

(1)

(2)

(3)

(4)

Instrument's periodic performance test date: results/staff member:

.....

.....

.....

Re-calibration corrections date: scale range/correction/staff member:

.....

.....

.....

Date of despatch: Date of receipt:

Transit time: Maintenance/repair/calibration time:

.....

Number and kind of spares used:

Maintenance personnel:

Calibration graph attached: YES/NO

REMARKS: ✓

.....

.....

Number of statistical form sheets preceeding the last one dated:

Filing clerk:

According to WMO n.622 – 1986, for every instrument, a book will be realized to archive every operation/problems on the instrument Possible annex to LOG-BOOK