

20 & 21 October 2014
Athens, Greece

**2nd South-Eastern Europe GEO Workshop
on Integrating Earth Observation Data
and Services for monitoring the
Environment, protecting the citizens and
stimulating the regional economic growth**

Survey of Observational Infrastructure in Cyprus

Dr. Silas Michaelides
Director of the Cyprus
Department of Meteorology



BEOND



GEO GROUP ON
EARTH OBSERVATIONS

Table of Contents:

- Introduction to Cyprus' Department of Meteorology
- Cyprus' participation to GEO/GEOSS - GEO Delegates, expressions of interest
- Department of Meteorology's Existing EO capacity related to GEOSS Strategic Areas (Agriculture, Biodiversity, Climate, Disasters, Ecosystems, Energy, Health, Water, Weather)
- National Infrastructure – Data and Services
- National Strategies related to EO activities
- Lessons Learned – Concluding Remarks

A Government Department under the Ministry of Agriculture, Natural Resources and Environment (MANRE)

Cyprus Department of Meteorology: Staff

Members of the Staff: 61

17 Scientific (including 12 weather forecasters)

35 Technical – Observers

3 Engineers

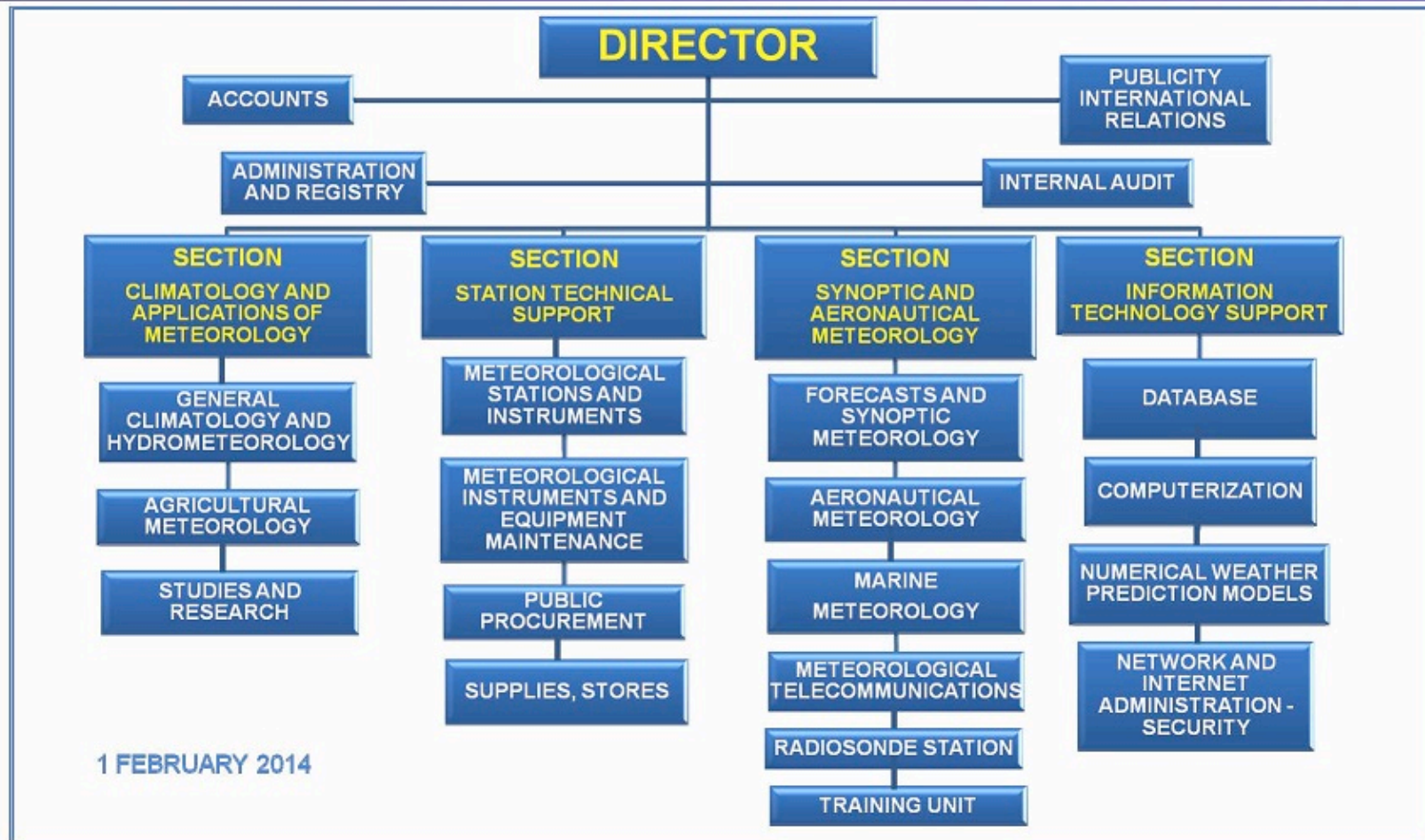
6 Clerical – general staff

Cyprus Department of Meteorology: Certifications

Three Sections are already ISO 9001 certified, the fourth will be certified by the end of the month. All services provided will be ISO certified by the end of this Month.

The services to Civil Aviation are additionally certified in full compliance with ICAO and European Procedures.

DEPARTMENT OF METEOROLOGY ORGANIZATION CHART





World Meteorological Organization
Weather • Climate • Water

The Republic of Cyprus is a Member of the World Meteorological Organization (WMO). The Director is the Permanent Representative of the country with WMO.



The Department of Meteorology is a Member of the European Network of Meteorological Services (EUMETNET)



The Department of Meteorology is a Member of the Economic Interest Grouping ECOMET

The Government of Cyprus has officially appointed the Director of the Department of Meteorology, Dr. Silas Michaelides, as the Principal Delegate to GEO. Dr. Filippos Tymvios, Meteorological Officer A', has also been appointed as Alternate Delegate.

At this stage, the involvement of the Delegation to GEO is to follow developments. Limitations in funding do not permit active participation in other activities.

There are no other partner organizations, and no involvement in GEO Tasks and Working Groups.

There is an expression of interest to participate in GEO from the Cyprus University of Technology (CUT); in particular Prof. Diofantos Hadjimitsis who is Chair of the Department of Civil Engineering & Geomatics.

Also, the Remote Sensing Society of Cyprus expressed its interest in GEO.

• Department of Meteorology's Existing EO capacity related to GEOSS Strategic Areas (Agriculture, Biodiversity, Climate, Disasters, Ecosystems, Energy, Health, Water, Weather)

- The Department of Meteorology is under the Ministry of Agriculture, Natural Resources and Environment and as such it supports all the relevant departments of the Ministry involved in Agriculture. Such support is in the form of weather forecasts, seasonal projections, warnings and statistical information (climatological data).
- The energy sector is supported with radiation and wind data from the Department's archive based on locally operated stations. Also, forecasts for the wind field are provided to the wind turbine generators' companies. Temperature forecast fields are provided to the Energy Regulatory Authority. These are automatically provided on a daily basis from the twice daily run Weather Research and Forecasting Model operationally which is operated by the Department of Meteorology using supercomputer facilities of the Cyprus Institute.
- Sea State and Wave forecasting support is provided to all the marine sector activities and oil drilling platforms offshore Cyprus, whenever needed.
- Health Authorities are provided with daily bulletins on heat waves and discomfort indices.

•National Existing EO capacity related to GEOSS Strategic Areas (Agriculture, Biodiversity, Climate, Disasters, Ecosystems, Energy, Health, Water, Weather)

- There exists a close collaboration with the Department of Water Development (both functioning under the same Ministry). The Department of Meteorology's historical archive is frequently used by the Department of Water Development, both in the infra-structure planning phase (e.g. dams, distribution networks etc) and the operational water resources management.
- The Department of Meteorology provides the Civil Defense Department of Cyprus with warnings on hazardous weather conditions. Also, the Department of Meteorology has a role in several emergency plans drafted by the Civil Defense.
- Warnings are also uploaded and displayed on the European server of Meteoalarm.
- In general, all Government Departments, Universities and Public entities apply to the Cyprus Department of Meteorology for Climatological and weather forecasting information.

- Synoptic Surface Observations: Three manned synoptic stations at Athalassa station and at Larnaca and Paphos Airports. At the two airports these are equipped with fully automatic aeronautical weather observing systems
- Thirty-six automatic climatological stations.
- 140 raingauges, measuring daily rainfall amounts.
- One radiosounding station at Athalassa
- Actinometric Station at Athalassa
 - Kipp & Zonen, Cambell Scientific, every minute)
 - Total, direct and diffuse components of global and par radiation
 - IR(upwards/downwards)
 - UVA, UVB, (full spectrum UVA, UVB and 5 specific UV wavelengths for research purposes)
- Three Lightning detector systems. Two of which form part of European/Global networks

Station Network

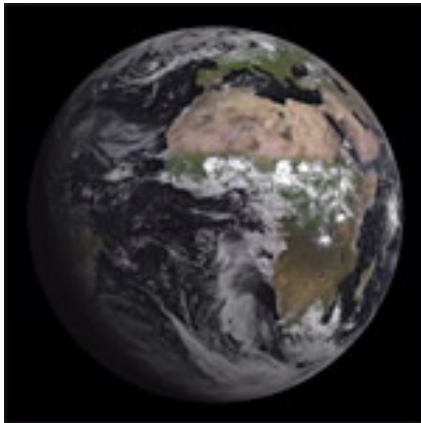


Athalassa actinometric station



The Department of Meteorology is not a member of EUMETSAT.

Nevertheless, the Department of Meteorology has signed a bilateral agreement with EUMETSAT (**European Organisation for the Exploitation of Meteorological Satellites**) for the free provision of satellite data every one hour. These are operationally used by the Weather Forecasters in the Department's Weather Forecasting Office; however, the frequency of data acquisition is not sufficient, bearing in mind the advantages of the 15 minute data set.



New Weather Radar Network



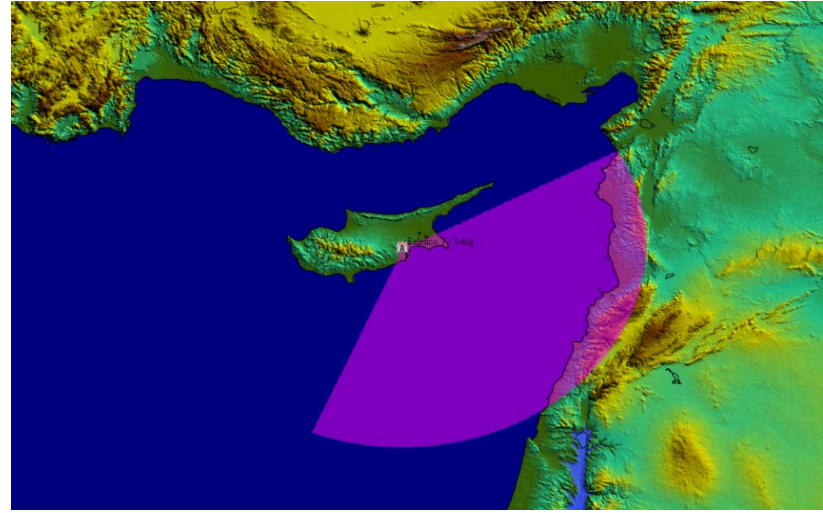
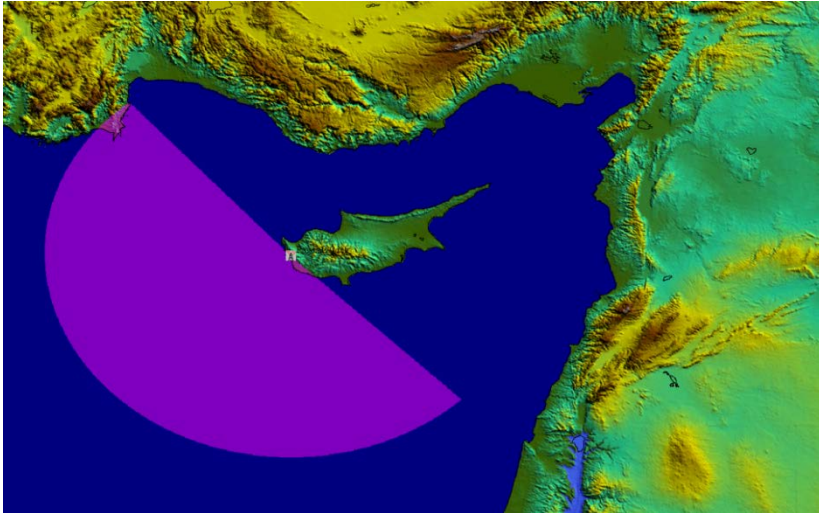
The operation of the C-Band EEC Weather Radar on mount Kykkos was discontinued four years ago and the equipment has been dismantled.

A new contract has been signed in 2013 for the installation of two brand new X-Band Weather radars. Installation is expected to start soon and be completed in the first quarter of 2015.

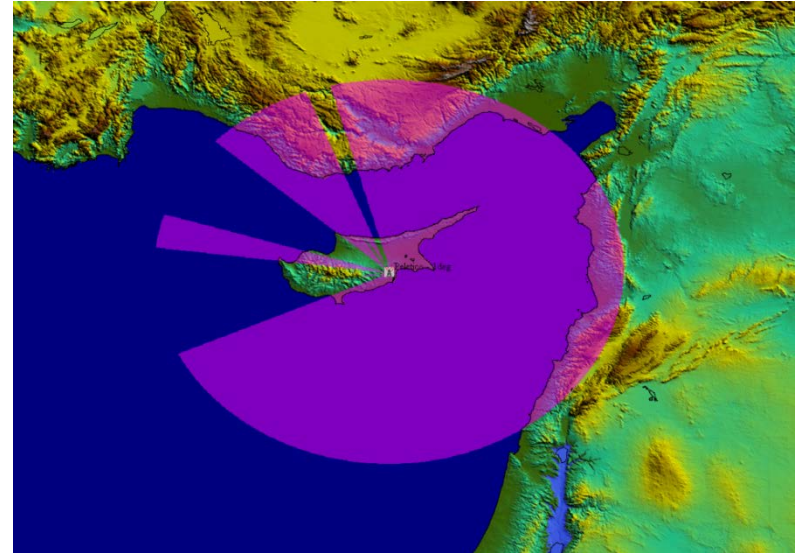
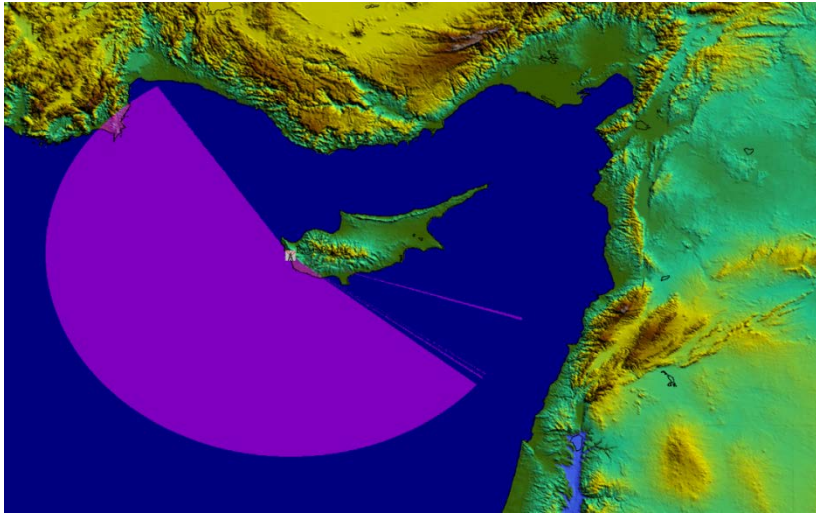
The network of radars will comprise two dual polarization, doppler X-Band radar providing volume data which will cover almost of the island and the surrounding marine area. Data will be processed and merged into a single archive available in several data formats for visualization and further processing.

One of the two radars will be installed near Larnaca, covering the east of the country; the other will be installed near the west coast covering the west part of the island.

Elevation 0°



Elevation 1,0°



Soon after their installation the two Weather Radars will be serving the needs of Short Range Weather Forecasting (Nowcasting), but mainly those of the Civil Aviation at each of the two International Airports (Larnaca and Paphos).

The Radar Network will be proper for several applications, including hydrological, input to NWP models etc.

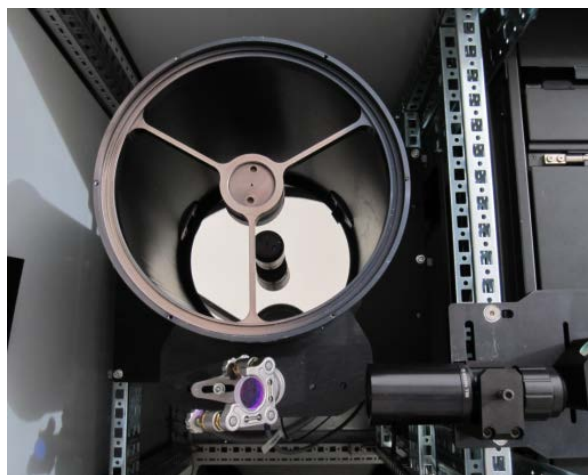
Data from the Radar Network will be ingested to the OPERA data server operated by EUMETNET and from thereon will be made available to a wide range of users.

Remote Sensing Laboratory

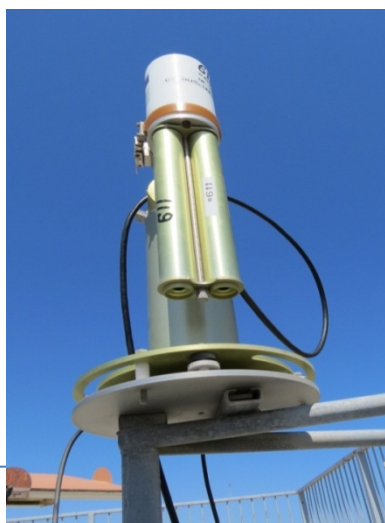
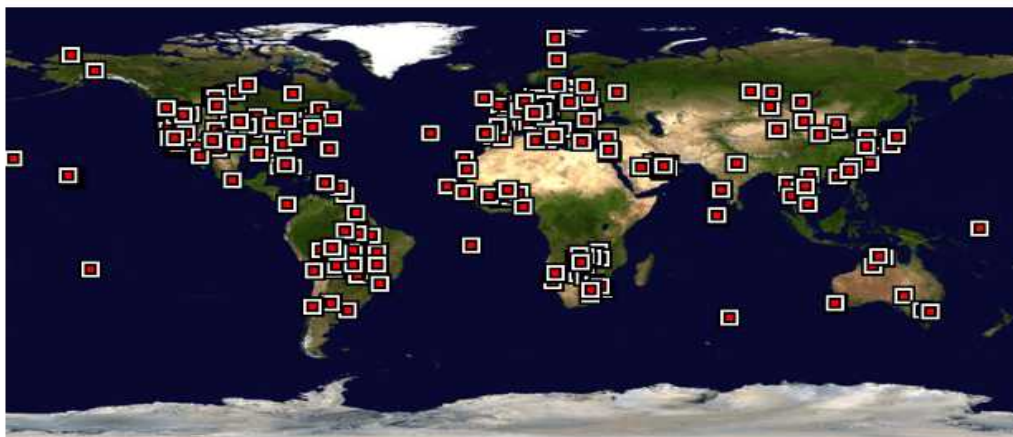


- Field Spectroradiometers: 2 GER 1500, 1 SVC 1024, 1 GER1500i, 1 ASD
- Underwater enclosure
- Sun-photometers: 2 Microtops
- Software: ERDAS Imagine, ER Mapper, Apollo, ENVI, Mapinfo, ArcGIS etc.
- Calibration Device
- 1 Automatic CIMEL Sun Photometer (AERONET/NASA)
- 1GPR MALA
- GPS
- NDVI Camera
- PM10 / Met Stations
- Lidar

Lidar Station

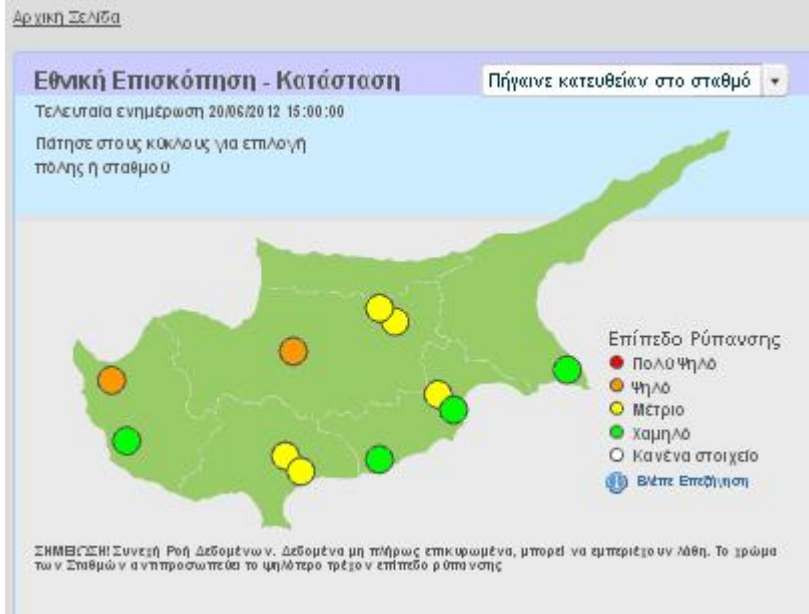


AERONET – Global network (NASA)



unmanned aerial vehicles (UAV)





Air Quality Network



- The Republic of Cyprus has signed a Cooperation Agreement with ESA (European Space Agency) in August 2009.
- The Republic of Cyprus participates in the European Union Copernicus Project. Activities related to Copernicus are coordinated by the Cyprus' Department of Electronic Communications.
- The Department of Meteorology is connected to the WMO Information System (WIS) via Offenbach (Germany) whereby all synoptic data are exchanged.
- The Department of Meteorology will implement WMO's GFCS (Global Framework of Climate Services), whenever this will be put in operation.
- There are plans to participate in the Ground Validation of GPM (Global Precipitation Measurement) Mission.

There is a potential for enhancing Cyprus' participation to GEO and GEOSS activities. There exists a sufficient infrastructure but it seems that there is a need for co-ordination (e.g., creation National Inventory of Earth Observing Infrastructure).

The interest expressed in involvement of GEO and GEOSS activities must be substantiated. Local institutions (e.g. CUT and other Universities) should be encouraged to get involved. Also, other Government Departments that could contribute should become aware of GEO.

Thank you!