The GRUAN Observing Station Payerne - Switzerland

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MeteoSwiss

Radiosonde System

Analog Radiosonde daily 00/12 LST
Operational 1990-2010

Swiss radiosonde SRS-400 developed end of the 1980s by Meteolabor AG with MeteoSwiss and Swiss Army

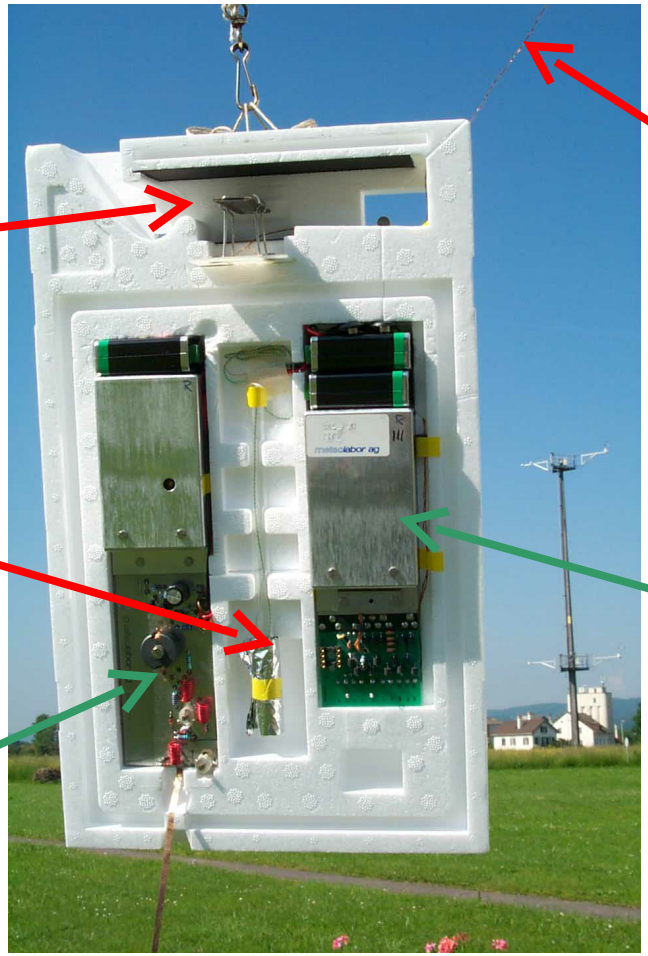
Temperature:	Thermocouple
Humidity:	VIZ/SIPPICAN hygristor
Pressure:	Hypsometer
Wind:	Secondary tracking radar

Swiss analog Radiosonde SRS 400

VIZ/Sippican B2
resistive carbon
hygristor

Water
Hypsometer

Transmitter
400 Mhz



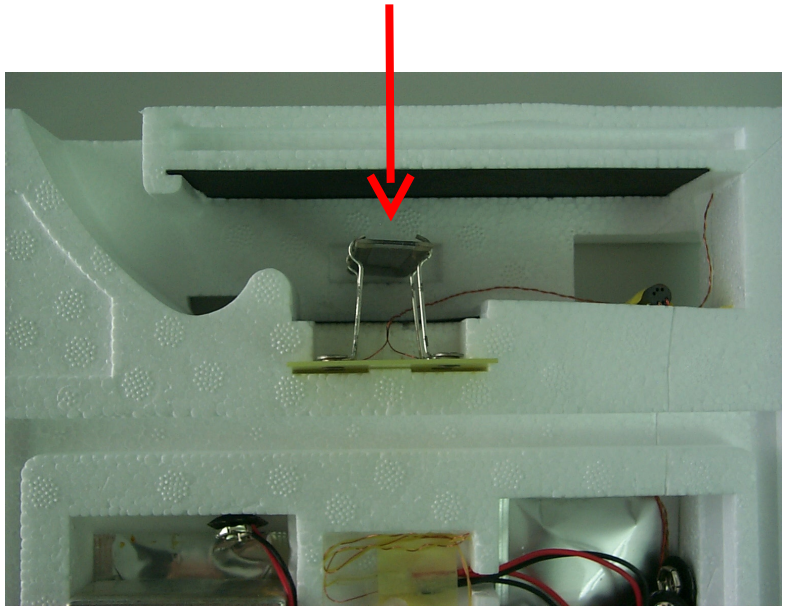
Thermocouple
(Copper - Constantan)
(junction 70 - 100 µm)

Electronique
Interface
with HF filtre

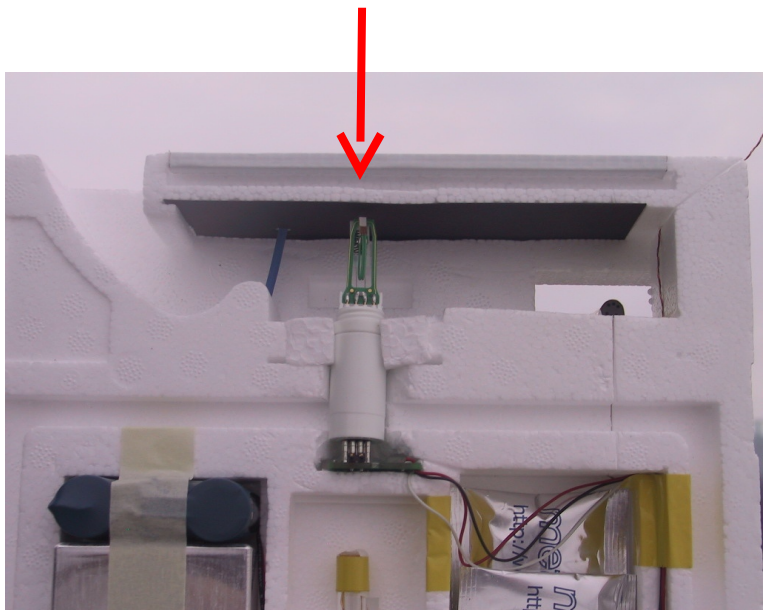
Swiss Radiosonde SRS 400

Replacement of VIZ/SIPPICAN hygristor by ROTRONIC HC2 capacitive humidity sensor in Mai 2009

Resistive VIZ/SIPPICAN hygristor in ventilation channel



Capacitive ROTRONIC HC2 sensor in ventilation channel

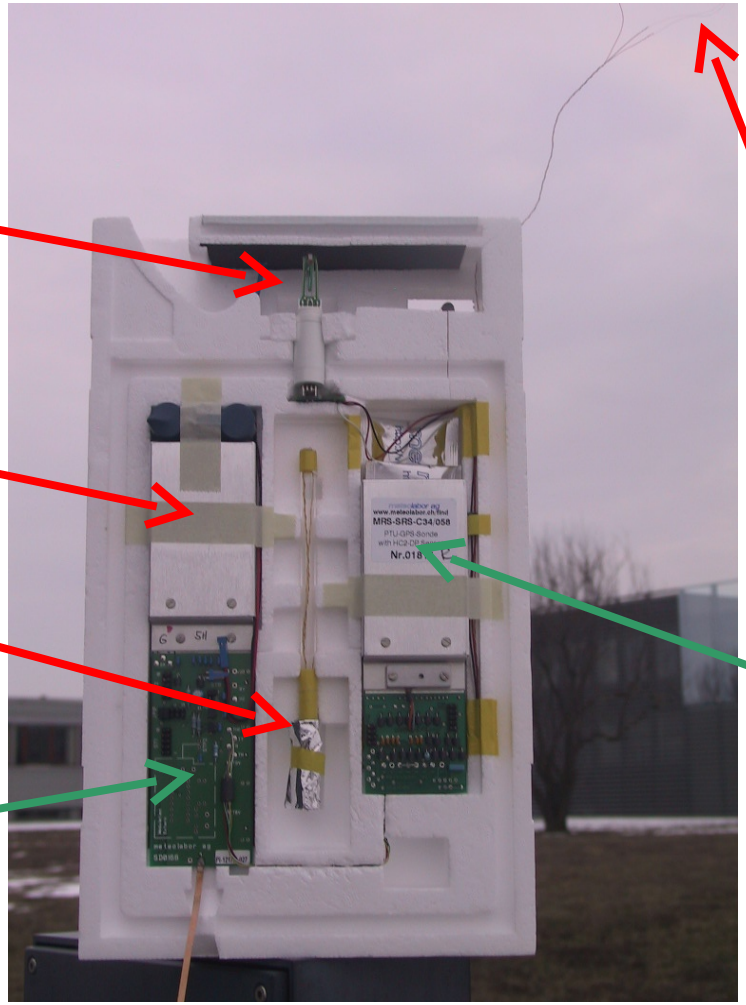


Digital Radiosonde daily 00/12 LST
Operational 2011 –

Swiss Radiosonde SRS-C34 developed by Meteolabor using the same sensors as on SRS 400

Temperature:	Thermocouple
Humidity:	ROTRONIC HC2 capacitive sensor
Pressure:	Hypsometer
Pressure/Wind:	GPS

Swiss digital Radiosonde SRS-C34



Monthly stratospheric WV Nighttime 2010 –

(1 x monthly)
SnowWhite dew/frost point hygrometer
Parallel sounding with SRS-C34 and RS92

(6 times per year)
Flash and SnowWhite dew/frost point hygrometer
Parallel sounding with SRS-C34 and RS92
(SHOMING project UNI Bern)

Weekly Intercomparison Nighttime 2011 –

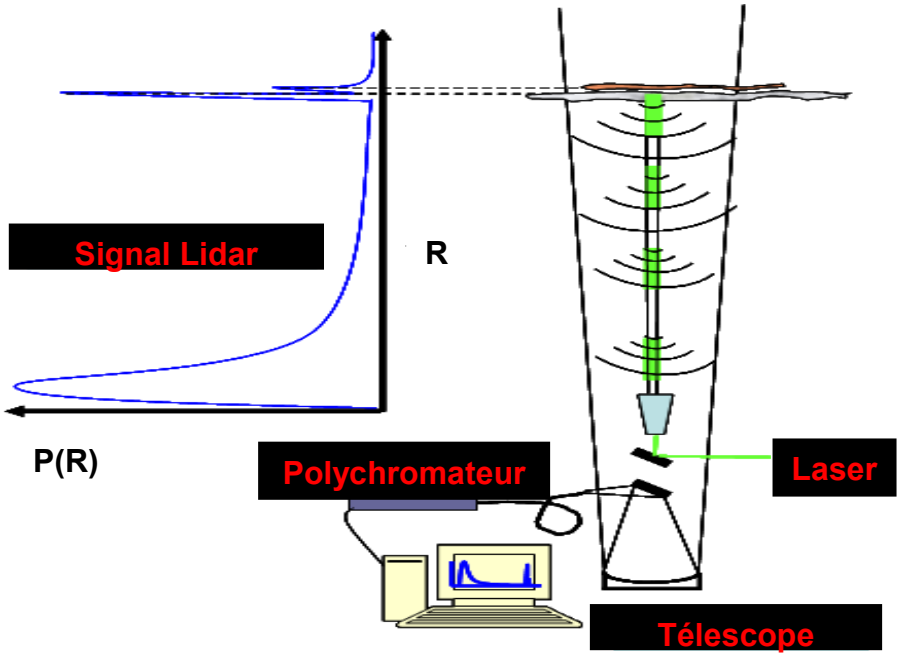
(1 x weekly)

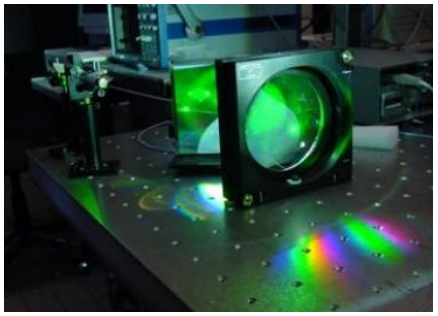
Vaisala RS92 nighttime

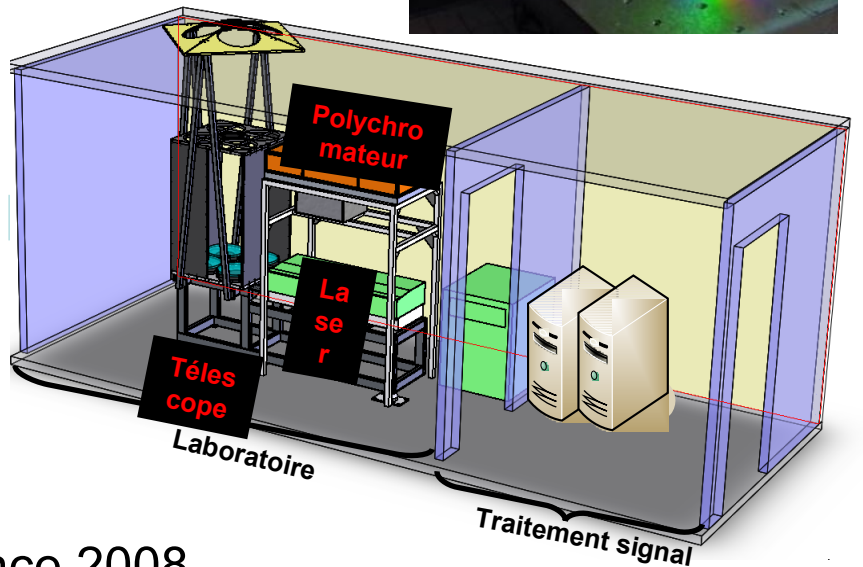
Weekly parallel sounding with operational SRS-C34

Water Vapor Raman Lidar RALMO

Raman Lidar RALMO for water vapor profiling



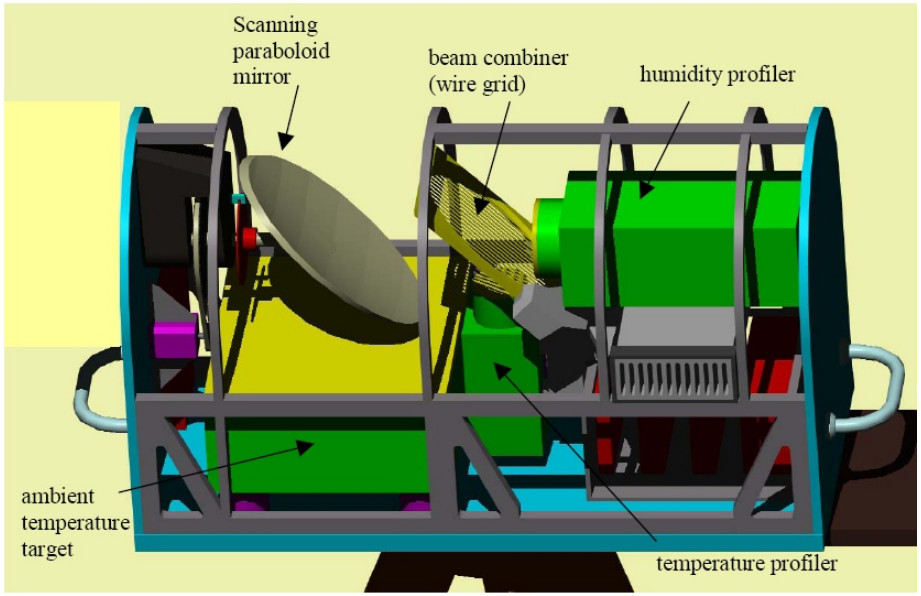




- Fully automatic and in operation since 2008
- Validation in progress

Microwave Radiometer RPG-HATPRO

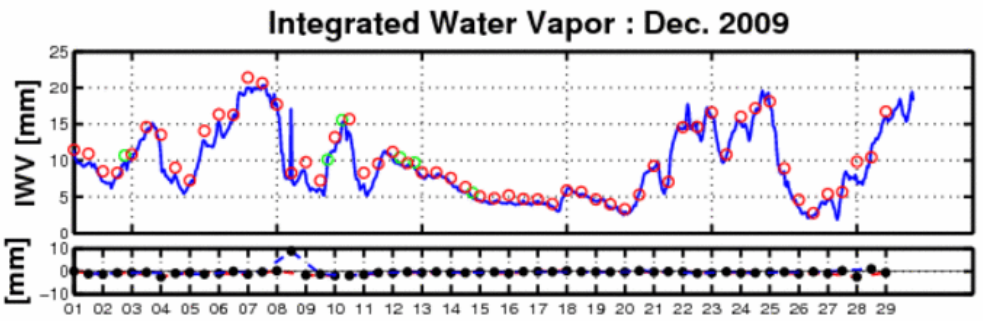
Radiometer for temperature and water vapor profiling



- Fully automatic and in operation since 2007
- Part of CN-MET network for nuclear power plant surveillance in Switzerland

Automated GPS Network Switzerland

AGNES GPS network for integrated water vapor



Compare hourly Integrated Water Vapor/IWV measurements by GPS, microwave radiometer and soundings
Upper graph, the blue curve represents the GPS data, magenta curve: Hatpro IWV, the red dots,
the values estimated from the sounding at 00 & 12 UTC, the green dots, the values estimated
from the other soundings and the cyan dots, the values estimated from the snow white. Lower graph,
the difference between sounding and GPS data recorded at 00 UTC (blue line) and 12 UTC (red line).

	00 UTC	12 UTC	00–12 UTC
bias [mm]	–0.87	–0.19	–0.53
std [mm]	0.69	1.84	1.41
rms [mm]	1.1	1.81	1.49
corr	0.99	0.92	0.95
mean (sond)	10.53	9.46	10
mean (GPS)	9.67	9.59	9.63

Overview of some statistics based on 29 days of Dec. 2009 for the 00 UTC and on 28 days for the 12 UTC.

- GPS data
- Oerational Radiosonde
- Other Radiosondes

Surface Radiation Station

Baseline Surface Radiation Network BSRN

- Direct solar radiation
  broadband and spectral
- Diffuse sky radiation
  broadband and UV
- Global and reflected
  radiation broadband and UV
- Longwave radiation
  downward and upward
- Shortwave and longwave
  upward 10 m and 30 m tower

Surface Meteorological Station

Standard SwissMetNet Station Payerne

Summary

1. Which of your existing radiosonde launches already meet the mandatory requirements (GCOS-121) ?

Twice daily 00/12 LST:	Swiss Radiosonde - analog sonde SRS 400 since 1990 Swiss Radiosonde - digital sonde SRS-C34 starting 2011
Once monthly nighttime:	SnowWhite dew/frost point hygrometer Parallel sounding with SRS-C34 and RS92
6 times annually nighttime:	Flash and SnowWhite dew/frost point hygrometer Parallel sounding with SRS-C34 and RS92 (SHOMING project UNI Bern)
Weekly nighttime:	Parallel sounding with SRS-C34 and RS92 starting 2011 ?

Summary

2. Which ground based measurements can you provide in addition to the mandatory GPS total water vapour column ?

- Raman Lidar RALMO for water vapor profiling (1 profile every 30 minutes)
- Microwave radiometer for temperature and water vapor profiling (1 profile every 30 min)
- GPS receiver for integrated water vapor
- BSRN

3. How can you use these additional observations to make sure that measurement uncertainty estimates will be consistent ?

COST ES0702 “Integration of remote sensing and radiosonde profiling systems”.
PhD student in collaboration between MeteoSwiss and the University of Bern.

Summary

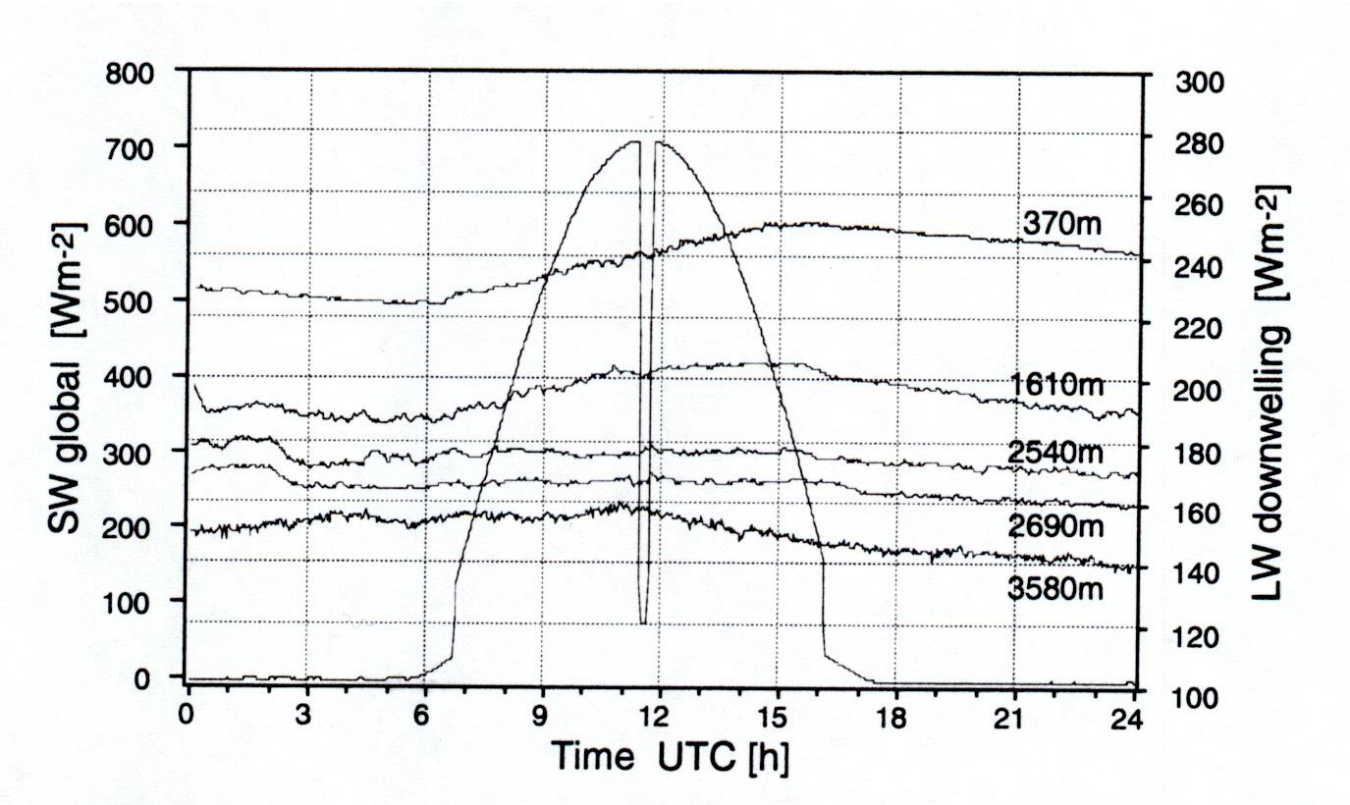
4. What local analysis can you provide to assure that measurements uncertainties will be consistent across the network ?

We think that weekly dual sonde launches (SRS-C34 and RS92) will assure consistent measurements between Payerne and the rest of the GRUAN network.

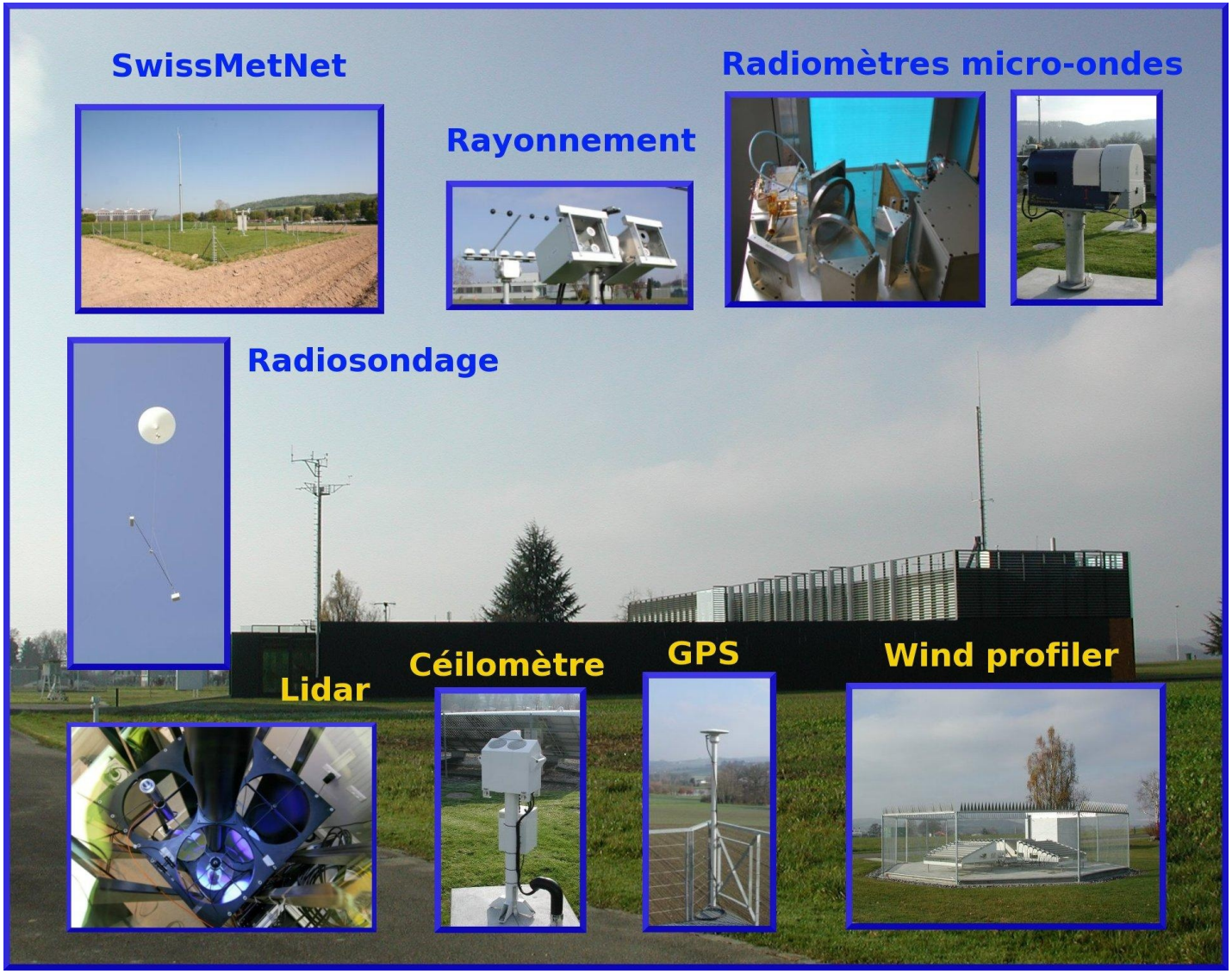
5. What help do you need from the Lead Centre / WGARO / GCOS Secretariat in moving forwards ?

- When do we launch weekly or monthly sondes ?
- Nighttime or daytime ?
- Fixed schedule or fair weather or even clear-sky conditions only ?

Diurnal Shortwave and Longwave downward radiation



Thank you


SwissMetNet
Rayonnement
Radiomètres micro-ondes
Radiosondage
Lidar
Céilomètre
GPS
Wind profiler