

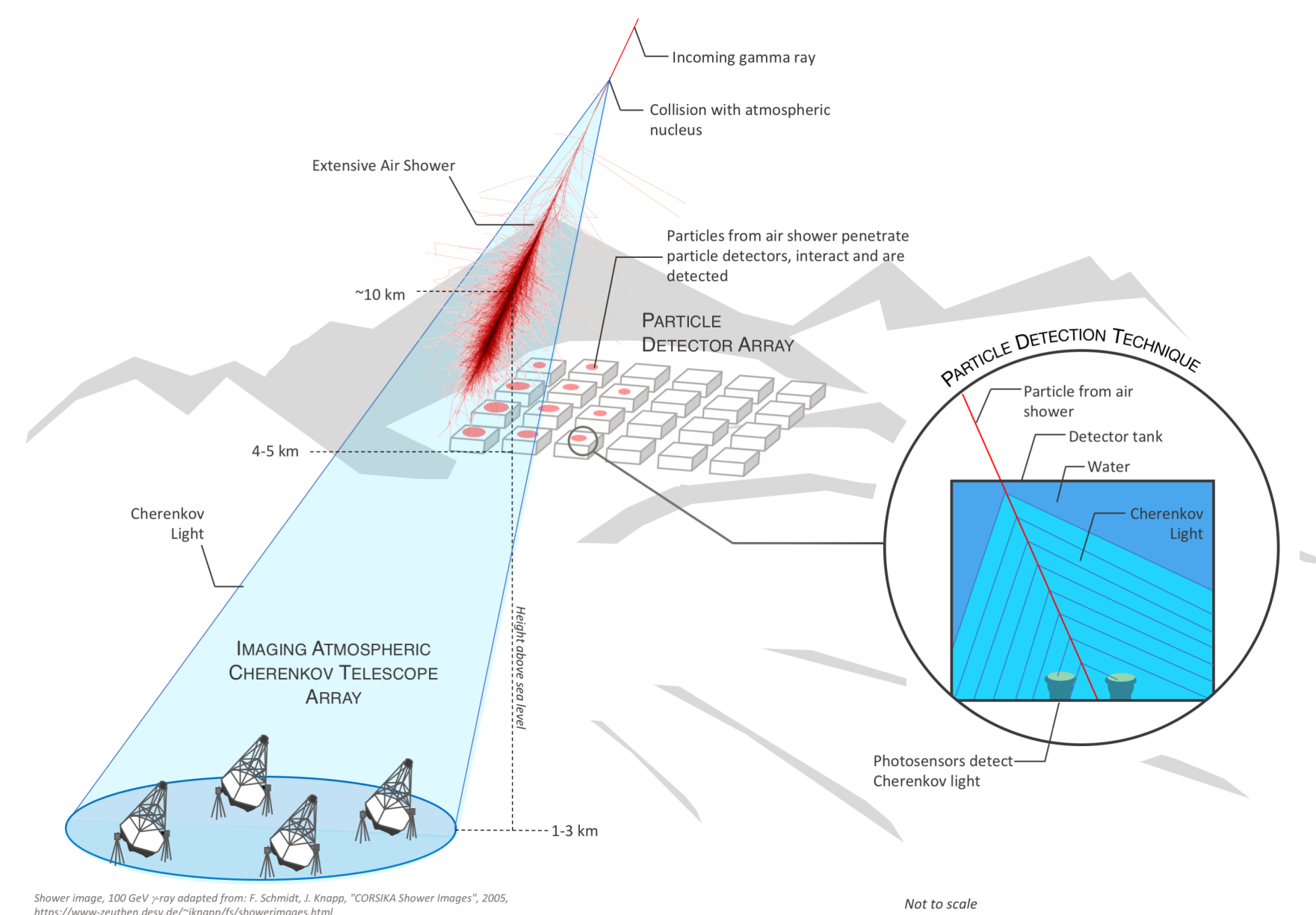
AEROSITE: Autonomous Environmental and Scientific SWGO site Characterization Instrument

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SWGO

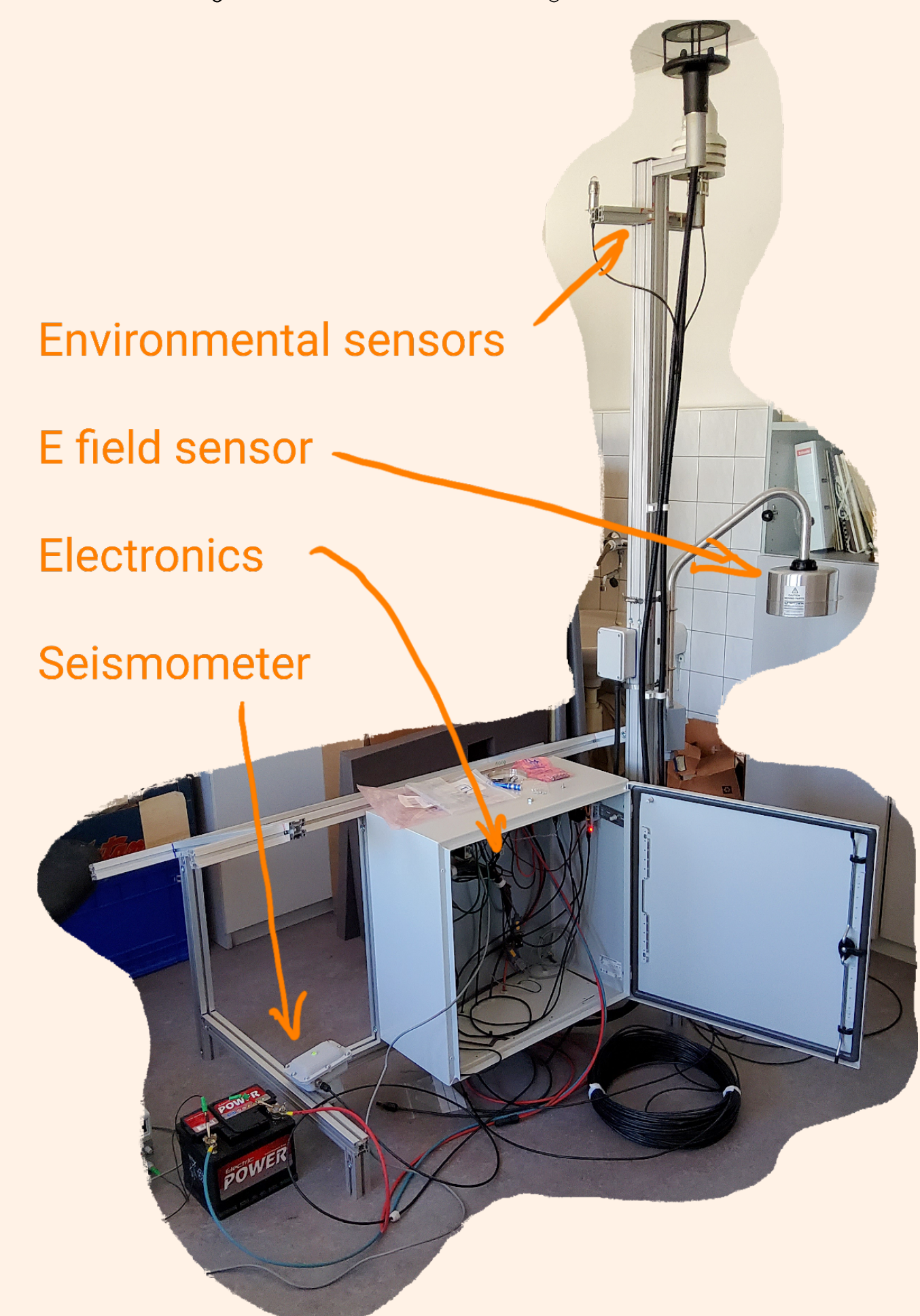
The Southern Wide-field Gamma-ray Observatory [1, 2] aims to build an array of air-shower detectors (primarily water Cherenkov) in the Southern hemisphere at altitude of 4.4 km or higher in order to cover energy range from hundreds of GeV to hundreds of TeV.



AEROSITE

Autonomous EnviROnmental and Scientific SWGO site characterization InsTrumEnt

Off-grid environmental monitoring device to be deployed on four SWGO candidate sites — on-site measurements of temperature, humidity, atmospheric pressure, solar irradiation, wind speed and direction, electric field intensity and seismic activity.



Field cross-calibration

Four sets of environmental sensors installed on roof of Joint Laboratory of Optics in Olomouc, CZ from Oct 2020. Break for climate chamber test, sets being removed between Jan and Apr 2021 for AEROSITEs assembly.

Results from the first period in Fig. 1.

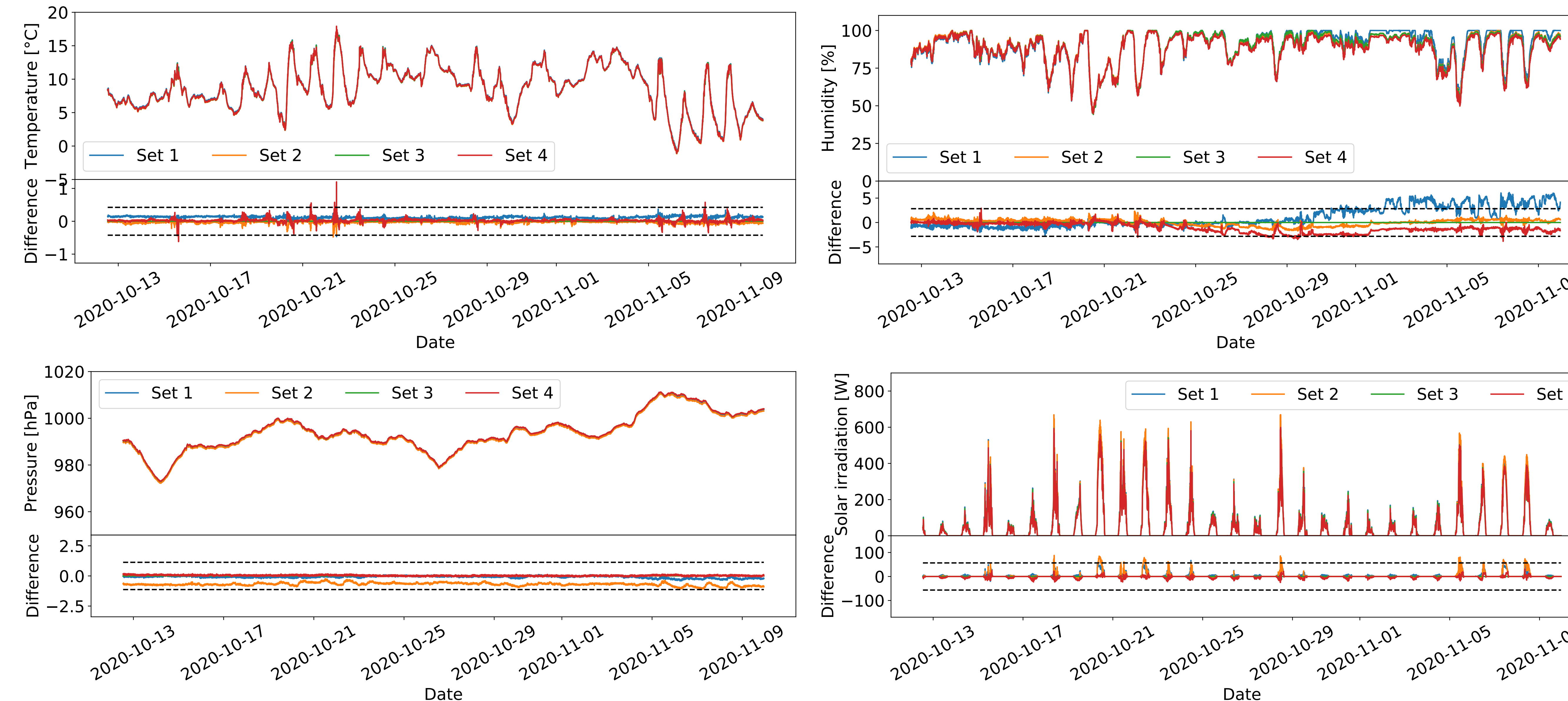


Figure 1: Results of field test campaign. Black dashed lines in difference plots mark declared accuracy.

Climate chamber test

Cycling of sensors (Fig. 2):

- Temperature cycling -20°C to 35°C
- Temperature steps $-20, 0, 20$ and 35°C
- Low humidity test and humidity cycling 5% to 100%

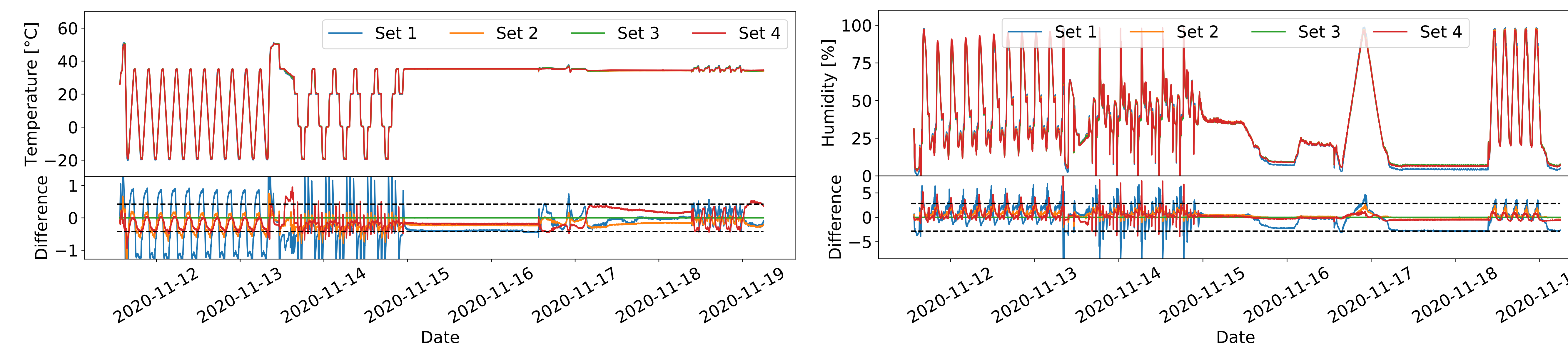


Figure 2: Results of climate chamber test. Black dashed lines in difference plots mark declared accuracy.

SWGO candidate sites

- **Argentina:** Cerro Vecar, Alto Tocomar (closeby)
- **Bolivia:** ALPACA site
- **Chile:** Pampa la Bola, Pajonales (closeby)
- **Peru:** Imata, lake Sibinacocha

Underlined sites are to be equipped by AEROSITE

Site characterization

Candidate sites environment will be evaluated based on:

- Public data – long term historical data obtained from nearby observatories, meteorostations, satellites etc.
- AEROSITE data – data from cross-calibrated instruments provide reliable reference

The public data come from various sources with different uncertainty and possible offsets and are mostly collected by instruments located rather far from the candidate sites. Hence, the AEROSITEs provide a way to calibrate these data and calculate reliable uncertainties.

Deployment

AEROSITEs are being shipped and will be assembled and deployed by local institutions personnel (ca. end of summer 2021).

Data to be collected every 2 months (or continuously where internet is available) over the period of at least 2 years.

Acknowledgements

The work is supported by project LTT20002 of MŠMT, Czech Republic.

References

- [1] URL: <https://www.swgo.org>.
- [2] J. Hinton. "The Southern Wide-field Gamma-ray Observatory: Status and Prospects". In: *ICRC 2021*. Berlin, DE, 2021.