Site environment characterization for Southern Wide-field Gamma-ray Observatory

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Outline

SWGO

AEROSITE

All Sky Camera

Site Characterization

Deployment

Outlook

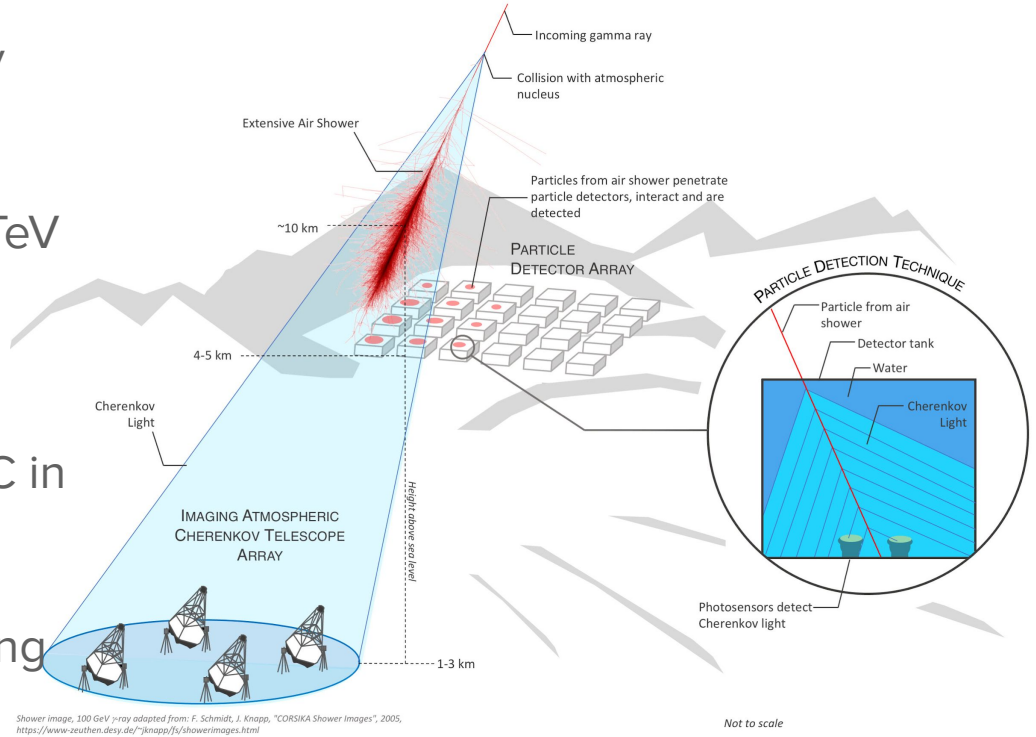
SWGO

The Southern Wide-field Gamma-ray Observatory

> 4.4 km a.s.l. => ~100s GeV – 100s TeV utilizing up to 1 km^2 array of water-Cherenkov detectors

Complementing LHAASO and HAWC in the South

Energy calibration enhancement using IACT under investigation

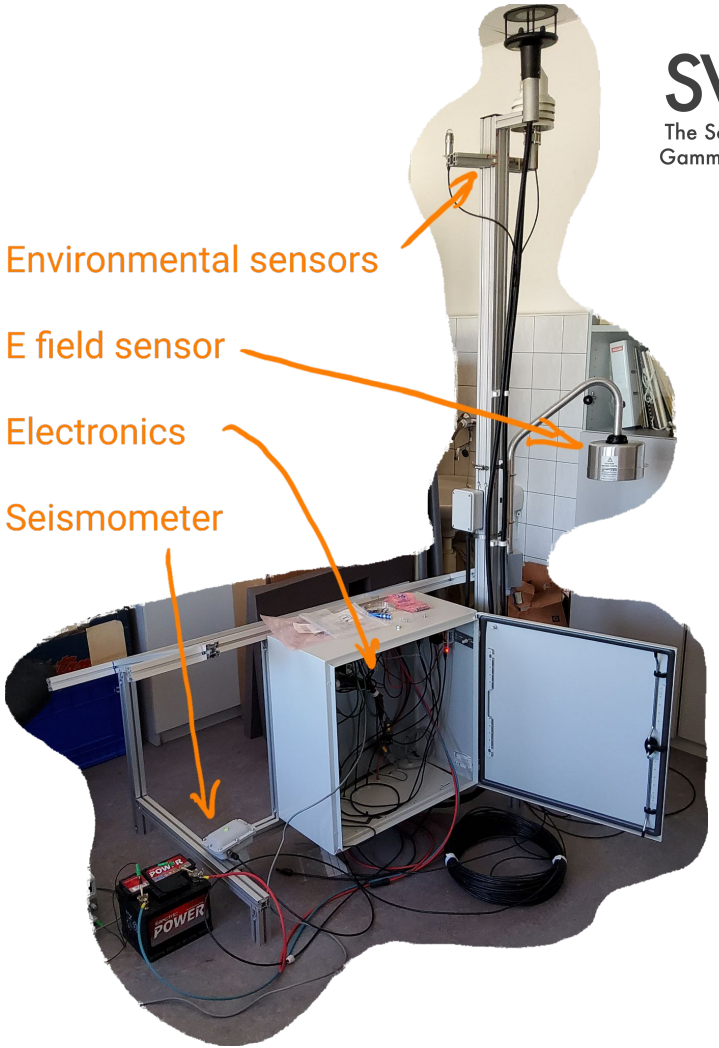


AEROSITE

Autonomous EnviROnmental and Scientific SWGO site characterization InsTrumEnt

Off-grid environmental monitoring on four SWGO candidate sites

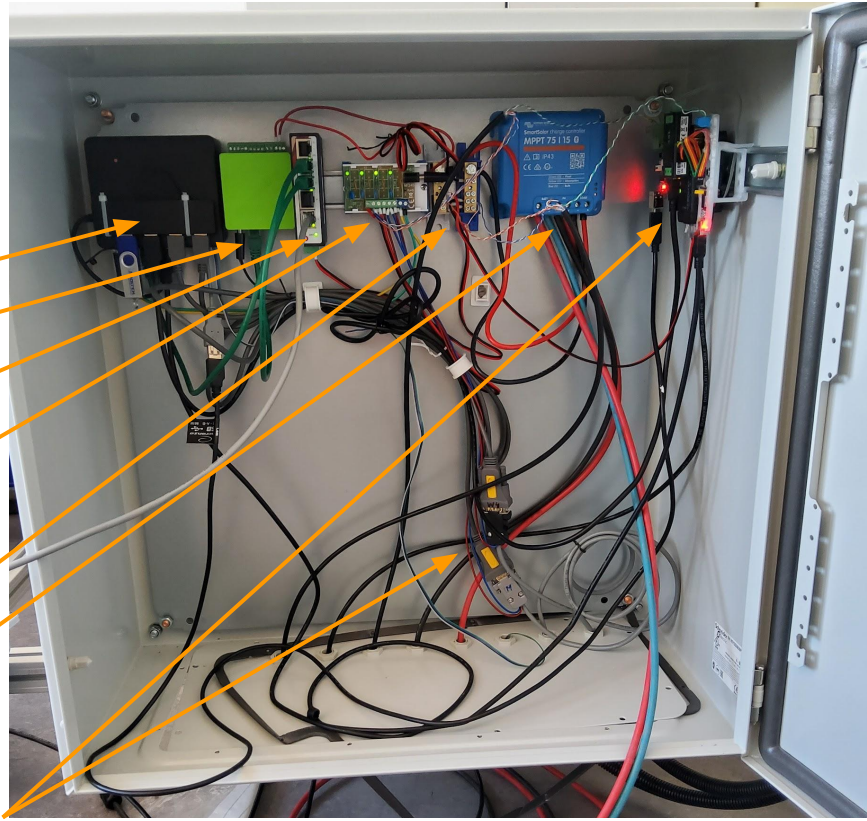
Temperature, humidity, atmospheric pressure, solar irradiation, wind speed and direction, E field, seismic activity



Electronics box

Designed for autonomous operation – solar powered on most sites

Free space for battery (~150Ah)



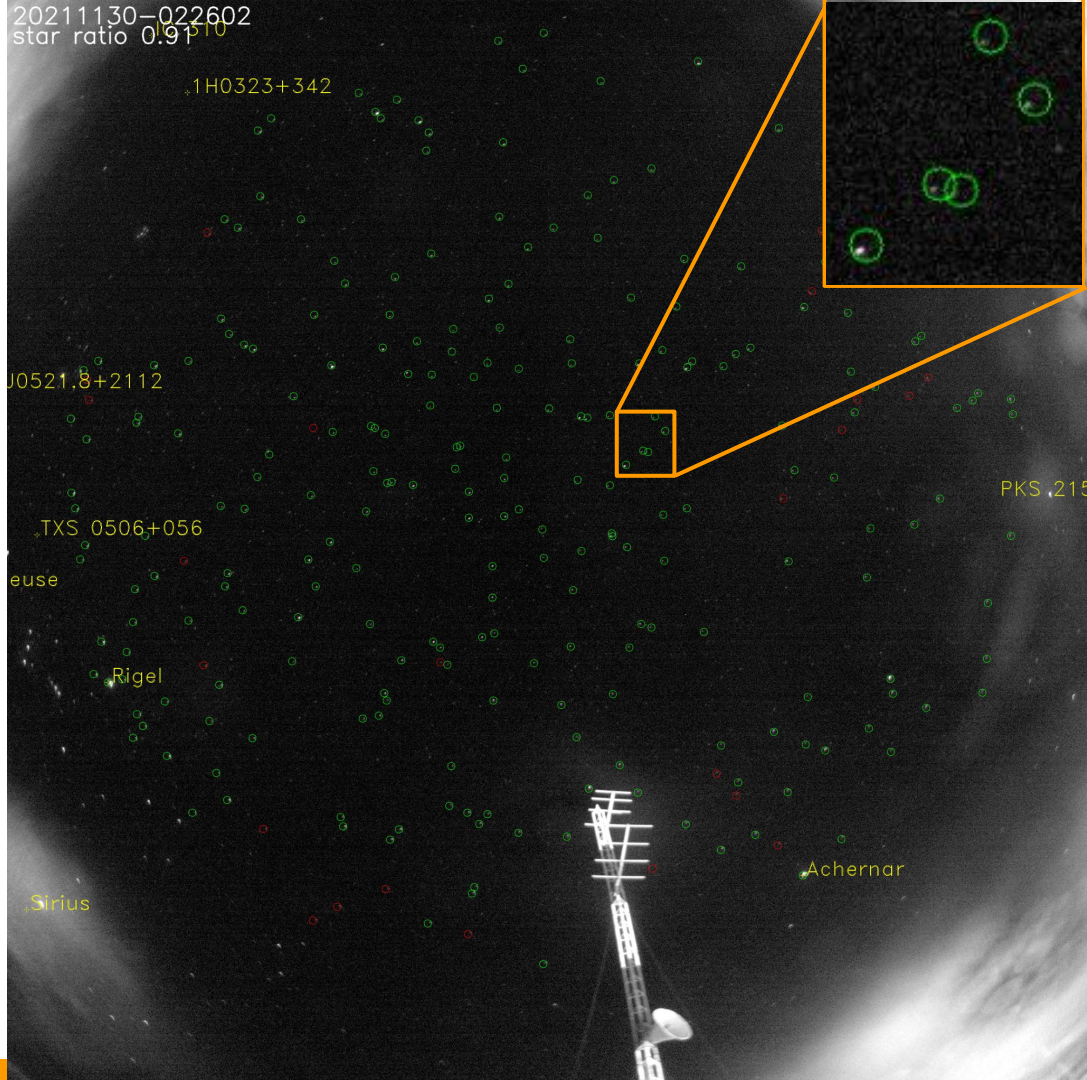
All Sky Camera

Fish eye lens

CMOS camera MII C2-7000

Johnson filters (BVR+UV)

Provides information about night sky brightness, cloudiness and atmospheric extinction



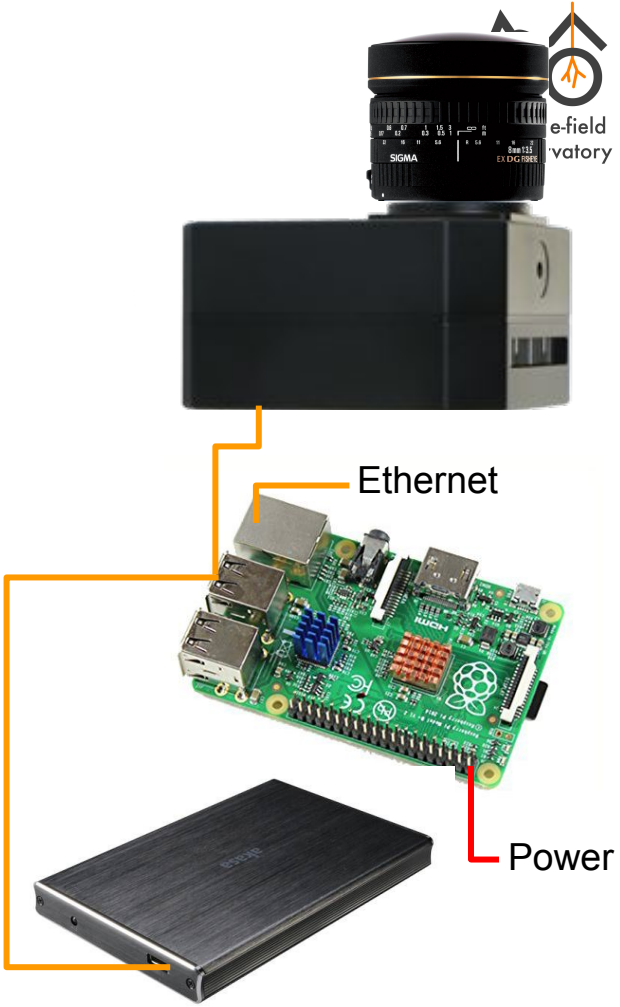
All Sky Camera

Raspberry Pi 3 - image acquisition and analysis

Software in Python 3 using Pylab, Astropy and OpenCV

Industrial SD card and 5V supply

Independent system with web server for monitoring

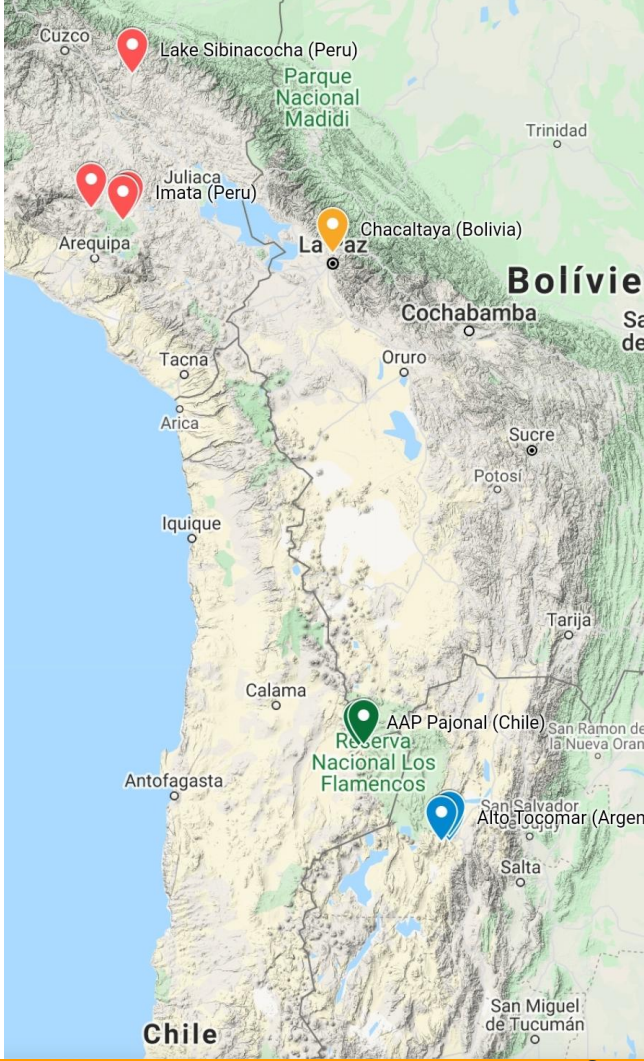


Site characterization

Candidate sites in Argentina, Bolivia, Chile and Peru →

Candidate sites environment will be evaluated based on:

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



Deployment

Aerosites without solar panels and battery were shipped from Olomouc

Power (solar panel + battery or mains) provided by local institutes

Stations assembled by local personnel and deployed on selected sites

Deployment

Peru

at Imata since Oct2021

Aerosite

All Sky Camera

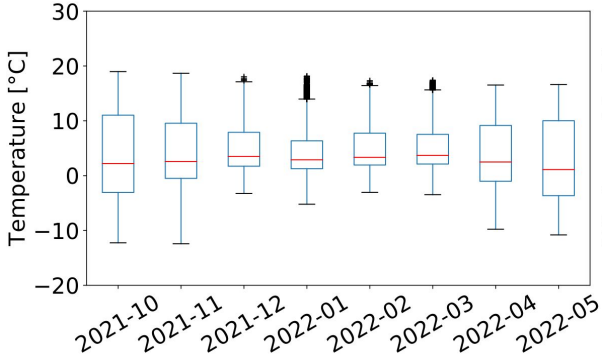
Argentina

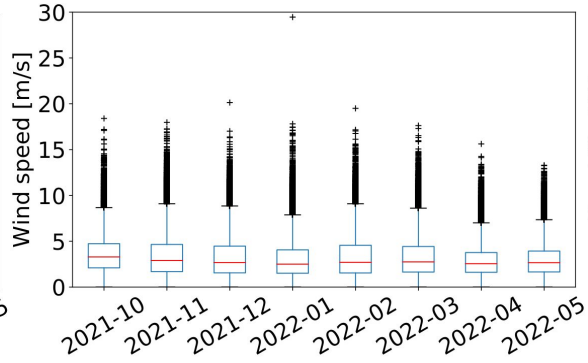
at LLAMA site near Cerro Vecar since Dec 2021

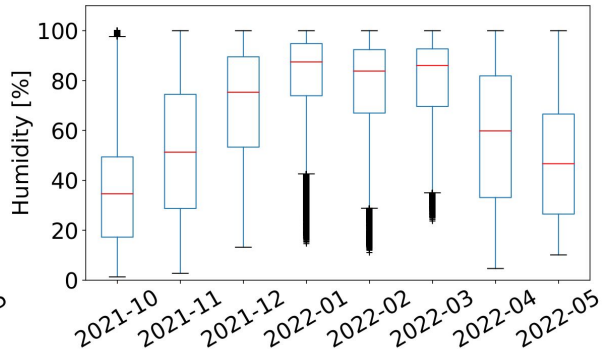
Chile

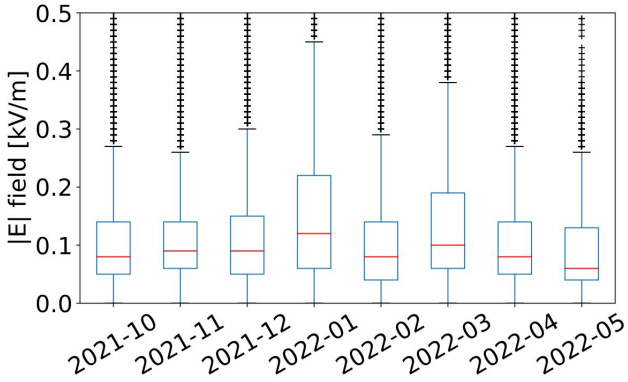
at Chajnantor Plateau since Jan2022

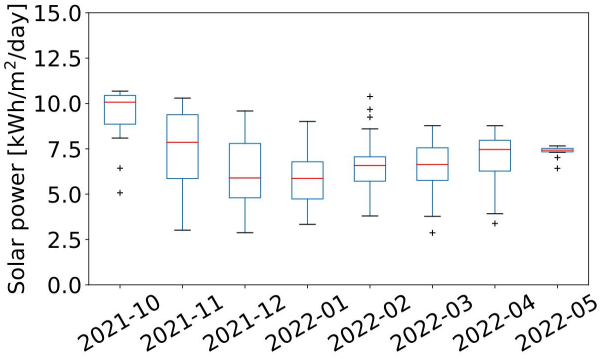
Data are coming











Outlook

AEROSITEs deployed at 3 sites (in Argentina, Chile and Peru), 4th pending

Data taking at least until Q3 2023 (periodical retrieval about every 2 months)

Thank you for your attention

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