

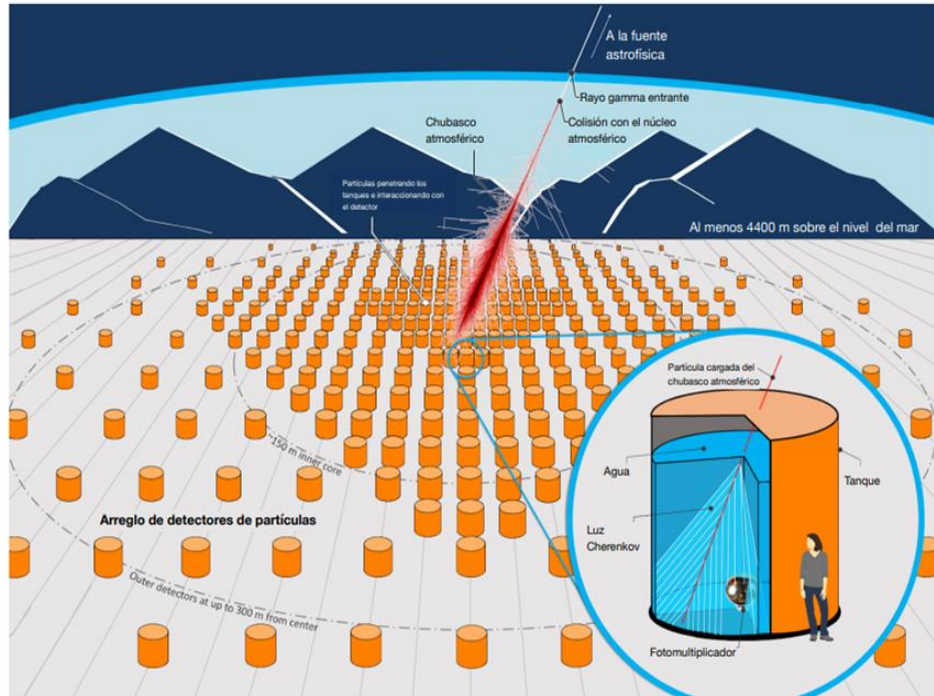


CARACTERIZACIÓN AMBIENTAL PARA LA IMPLEMENTACIÓN DE UN OBSERVATORIO DE RAYOS CÓSMICOS EN YANQUE

PRESENTADO POR:

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Colaboración Southern Wide-field Gamma-ray Observatory (SWGGO)



- SWGGO es un observatorio astrofísico de rayos gamma que será construido en América del sur.
- SWGGO será diseñada para detectar altas energía conocida como rayos gamma que llega desde el espacio exterior.
- SWGGO será el primer observatorio de rayos gamma de gran altitud que proveerá una cobertura amplia de una gran porción del cielo del sur.

Observatorio de Rayos Gamma HAWC



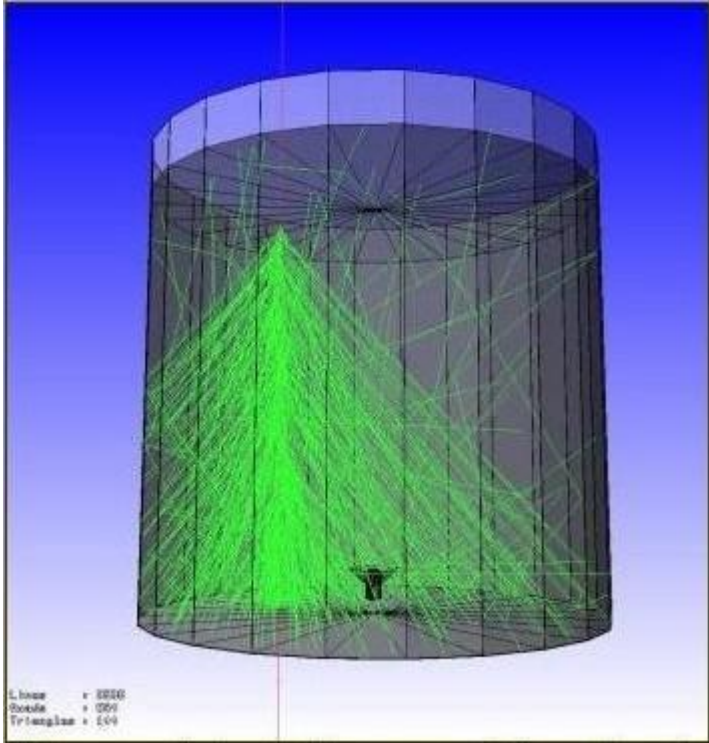
- HAWC es un observatorio de rayos cósmicos y rayos gamma instalados en México.
- HAWC tiene la capacidad de detectar la emisión de rayos gamma con energías de TeV.
- HAWC ha detectado de manera clara unas 40 fuentes en el Plano Galáctico.

Topografía Yanque-AREQUIPA



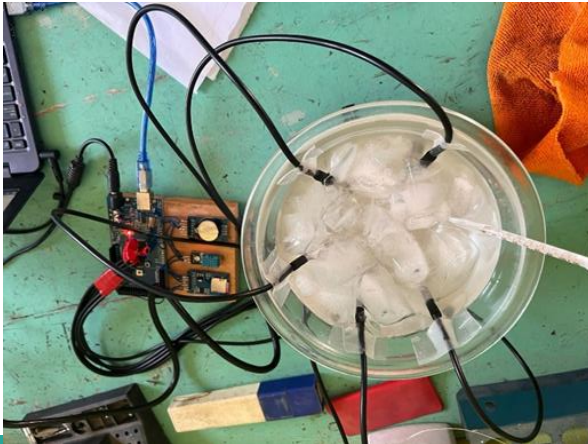
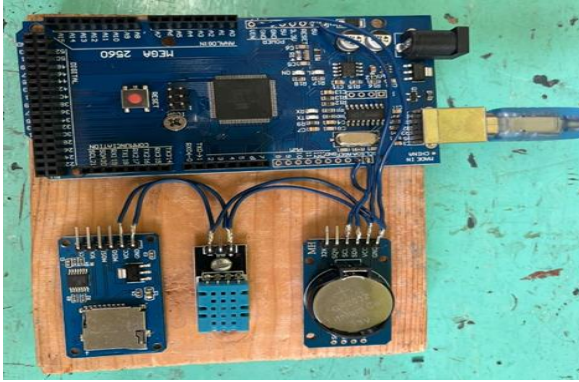
- El distrito de Yanque se encuentra ubicado en la provincia de Caylloma.
- La zona se encuentra localizada geográficamente dentro del valle de colca y la cordillera interandina.
- Posee una altitud de 40808 m.s.n.m.

Tanques de Agua - Cherenkov



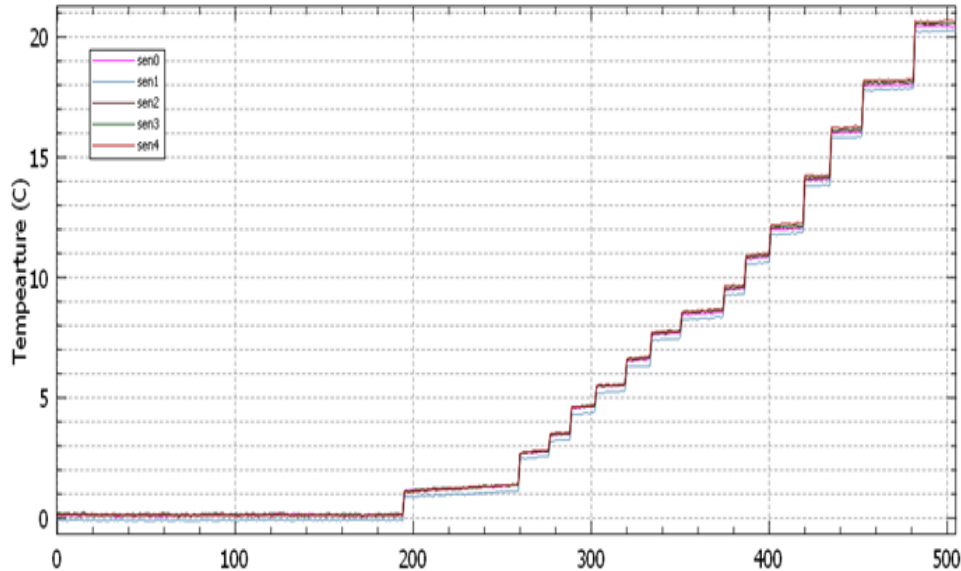
- En el tanque de agua cherenkov se utilizará un tubo fotomultiplicador.
- En un tanque comercial de 4.6 m de largo con un diámetro de 3.5 m.
- Cuando un rayo gamma de alta energía incide en la atmósfera, las partículas pueden ser detectadas por el detector.

Sensor de Temperatura en Líquido

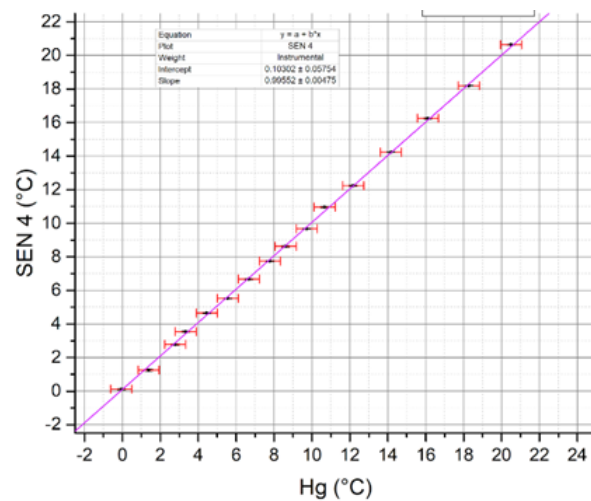
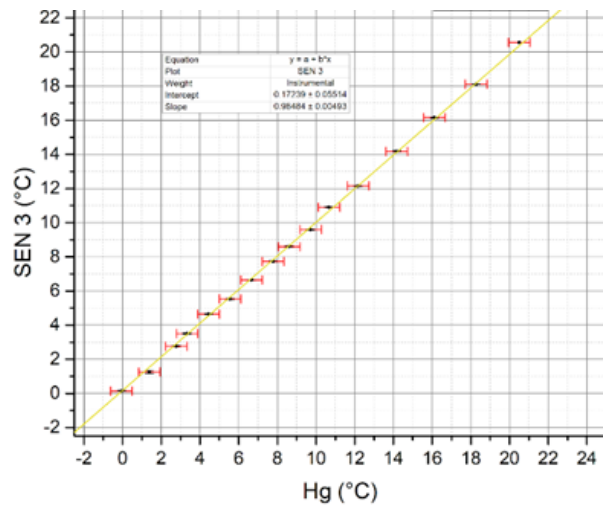
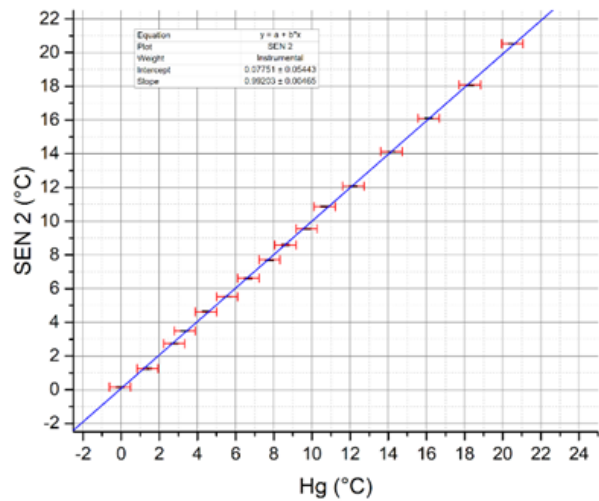
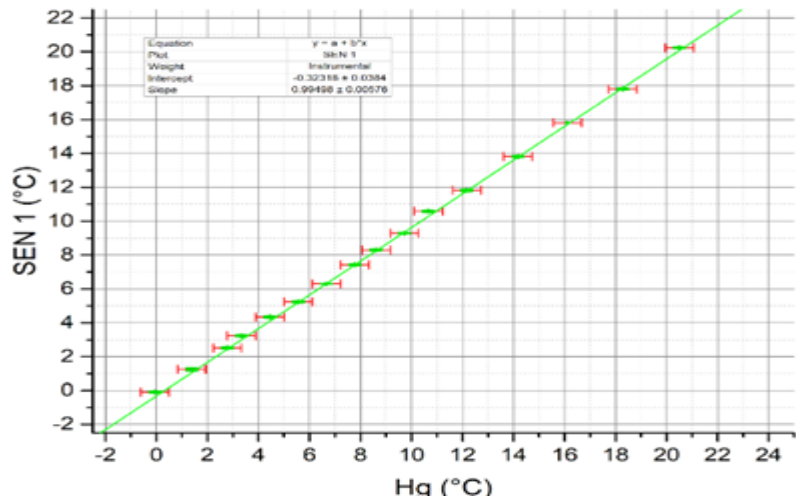
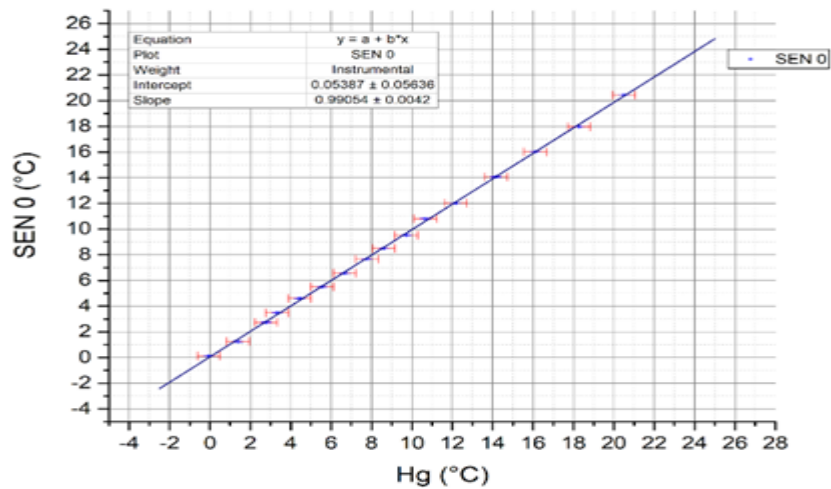


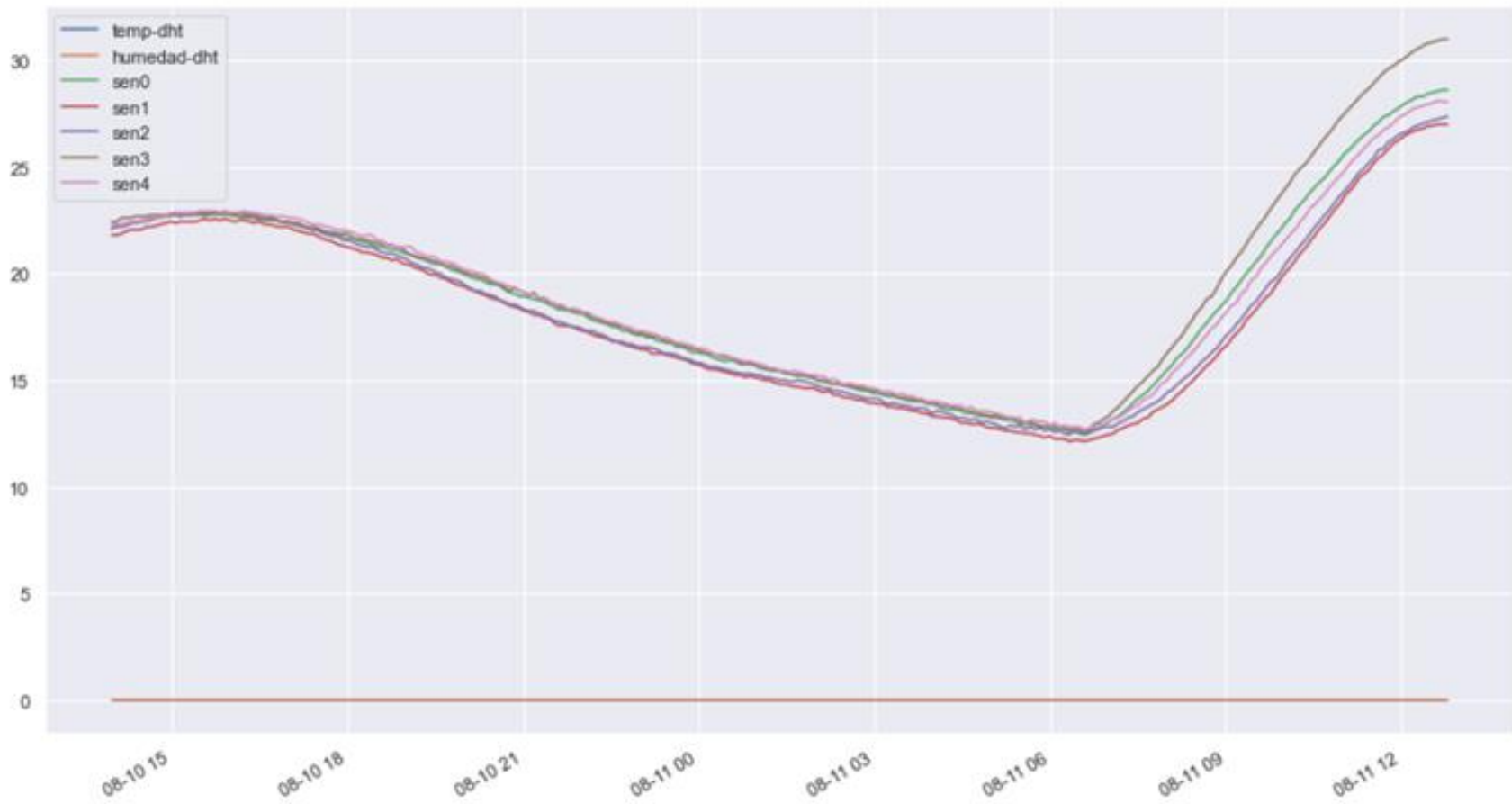
- Sensor de Temperatura en líquido DS18B20 implementado en una placa Arduino
- Cambio de temperatura brusco para la calibración del equipo.
- Análisis de la temperatura del líquido en comparación con un termómetro de mercurio.

Datos de Calibración del Sensor



- Prueba de toma de datos del sensor DS18B20.
- Comportamiento individual de los sensores en varios puntos de temperatura.
- Promedio de evaluación en un periodo de 5 segundos con 20 datos

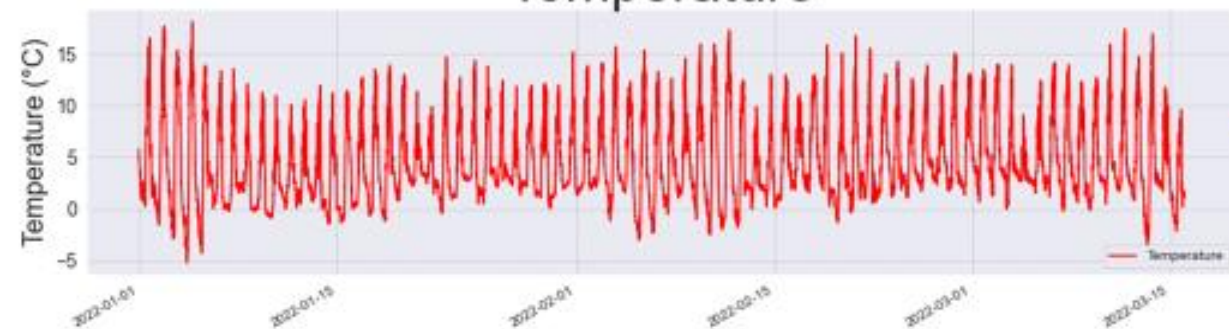




COMPARISON

Aerosite Data - Senamhi Data
Temperature and Wind Speed

Temperature

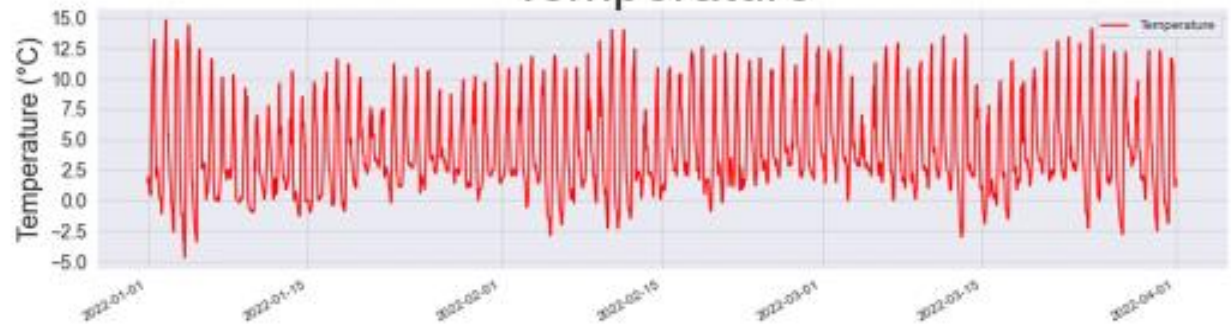


Aerosite

date	Temperature	Min
2022-01-31	-5.21	
2022-02-28	-3.05	
2022-03-31	-3.47	

date	Temperature	Max
2022-01-31	18.17	
2022-02-28	17.32	
2022-03-31	17.42	

Temperature



Senamhi



Date_Time	Temperature	Min
2022-01-31	-4.7	
2022-02-28	-2.9	
2022-03-31	-3.0	

Date_Time	Temperature	Max
2022-01-31	14.8	
2022-02-28	14.0	
2022-03-31	14.1	

WindSpeed



Aerosite

date	WindSpeed	Min
2022-01-31	0.0	
2022-02-28	0.0	
2022-03-31	0.0	

date	WindSpeed	Max
2022-01-31	37.5	
2022-02-28	19.5	
2022-03-31	17.3	

WindSpeed



Senamhi



Date_Time	WindSpeed	Min
2022-01-31	0.2	
2022-02-28	0.1	
2022-03-31	0.3	

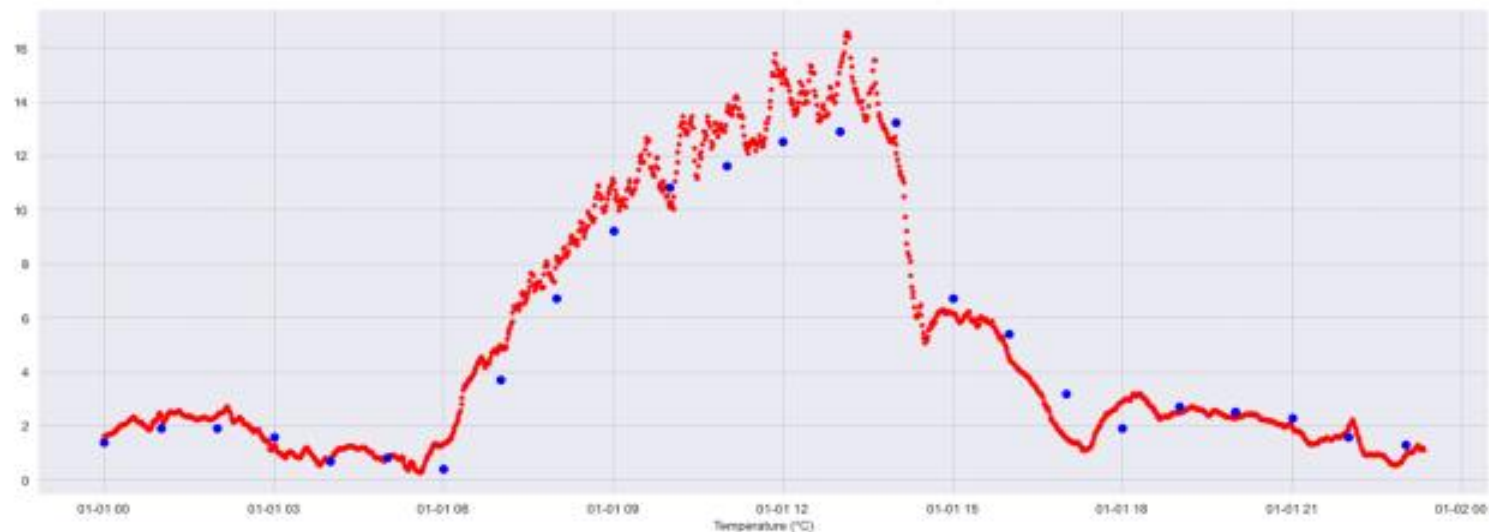
Date_Time	WindSpeed	Max
2022-01-31	13.6	
2022-02-28	15.8	
2022-03-31	13.2	



Aerosite
Weather
Station
Calibration

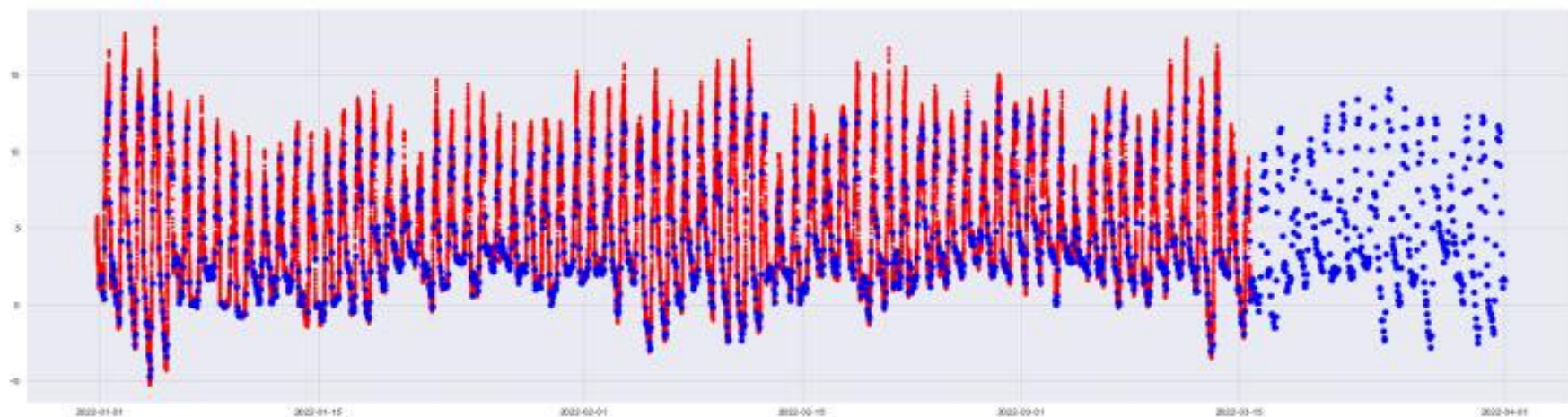
Comparison Aerosite vs Senamhi

- Temperature Senamhi (24 points)
- Temperature Aersite (1400 points)



Comparison Aerosite vs Senamhi

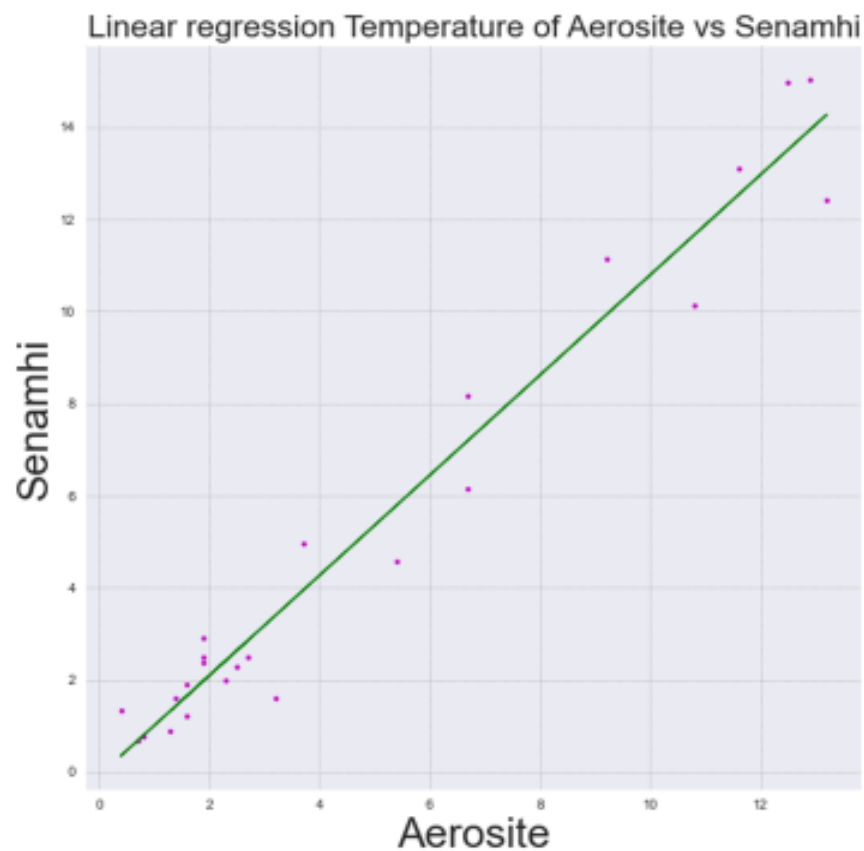
- Temperature Senamhi (1720 points)
- Temperature Aersite (106507 points)



Linear Regression (24 points)

Parameters:

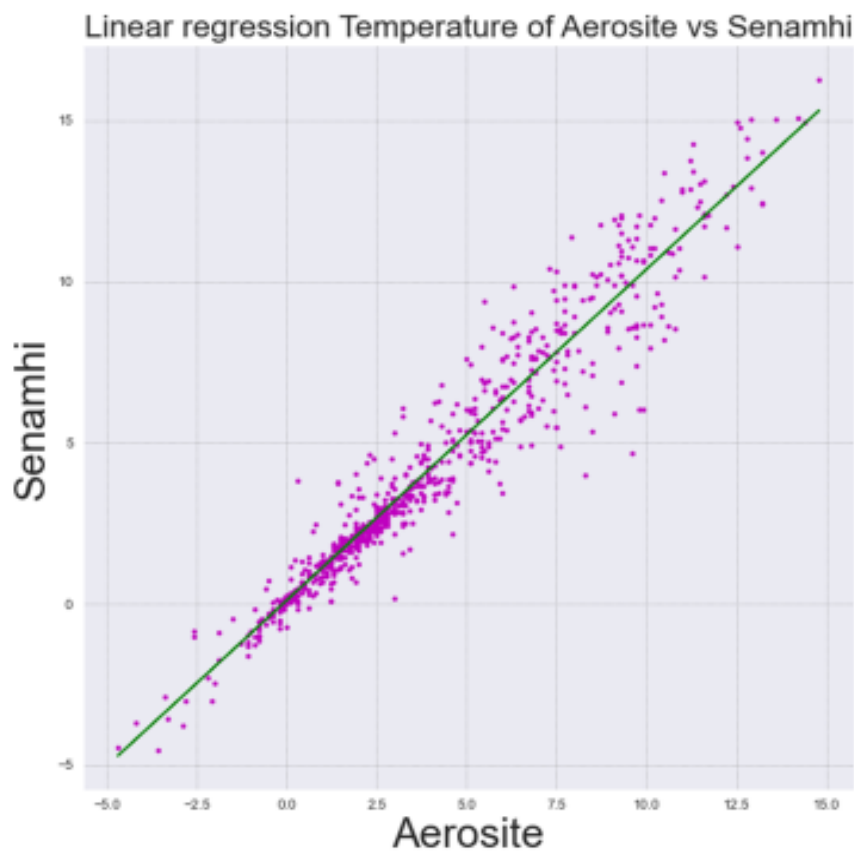
- **Intercept** = -0.08737478
- **Slop** = 1.08808379
- **Correlation Coefficient** = 0.96004355



Linear regression (1720 points)

Parameters:

- **Intercept**= 0.10688908
- **Slop** = 1.02720812
- **Correlation Coefficient** = 0.92919649

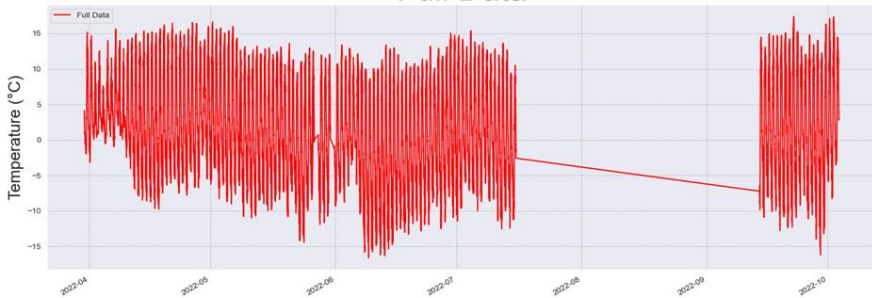


The background is a solid teal color with a dense, repeating pattern of white, hand-drawn geometric shapes. These shapes include various lines, curves, triangles, and irregular polygons, creating a textured, abstract effect.

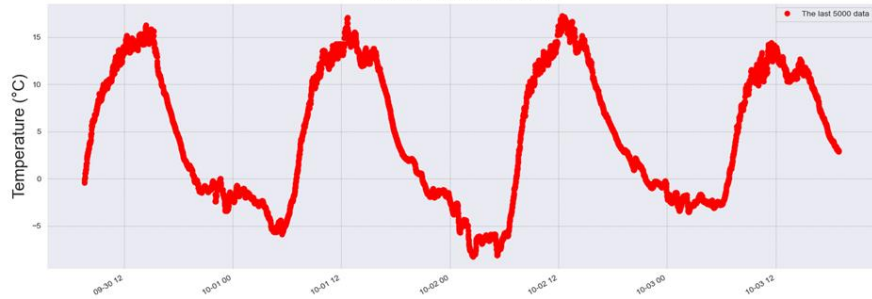
Meteorological Variables

Temperature

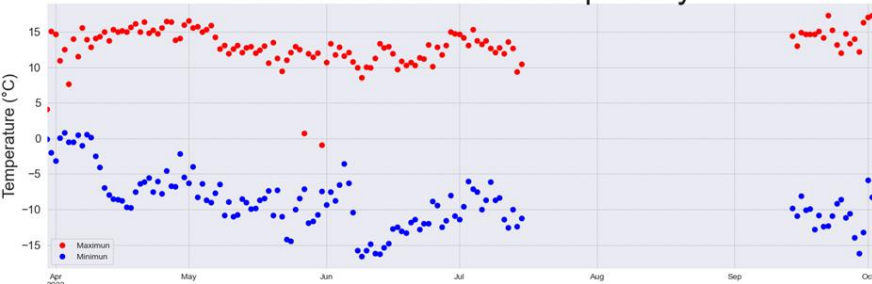
Full Data



The last data

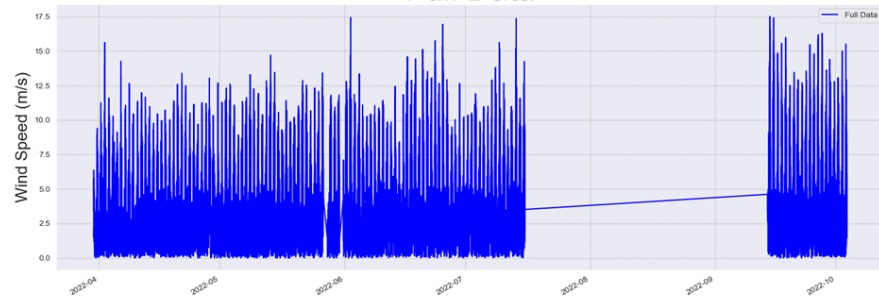


Maximum and minimum per day

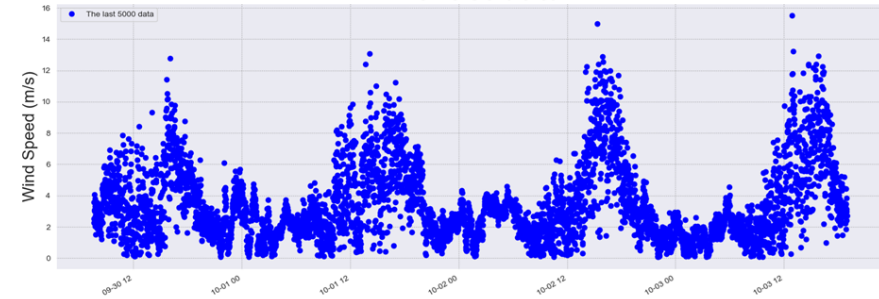


Wind Speed

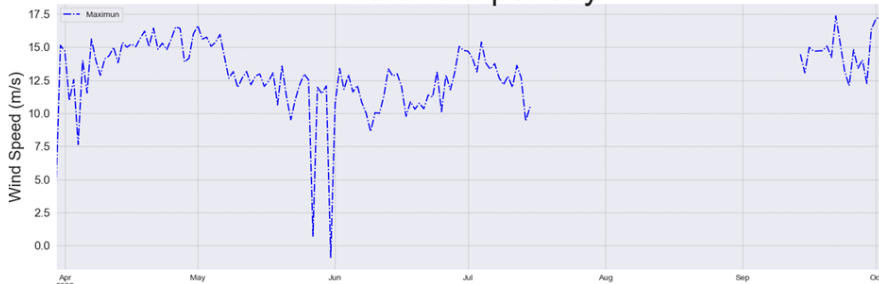
Full Data



The last data

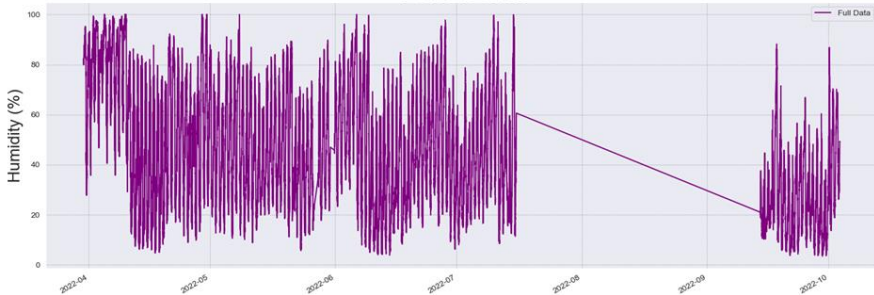


Maximum per day

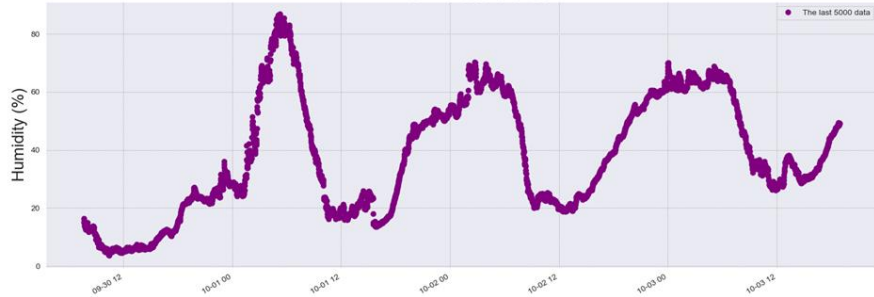


Humidity

Full Data



The last data

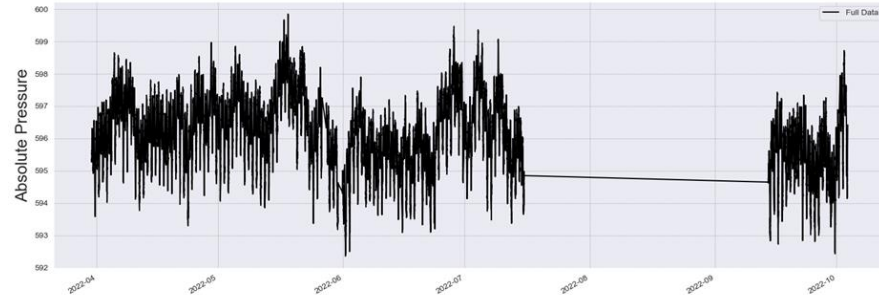


Maximum and minimum per day

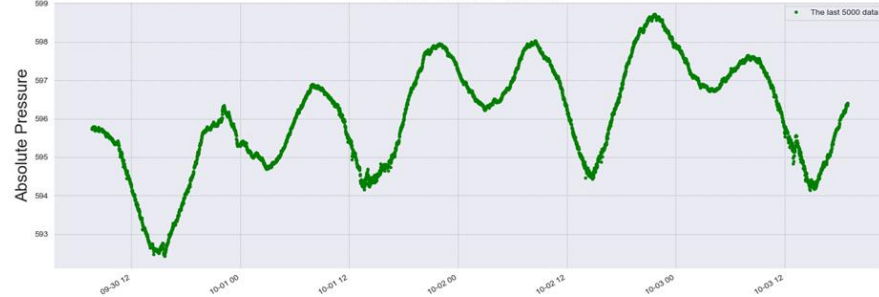


Absolute Pressure

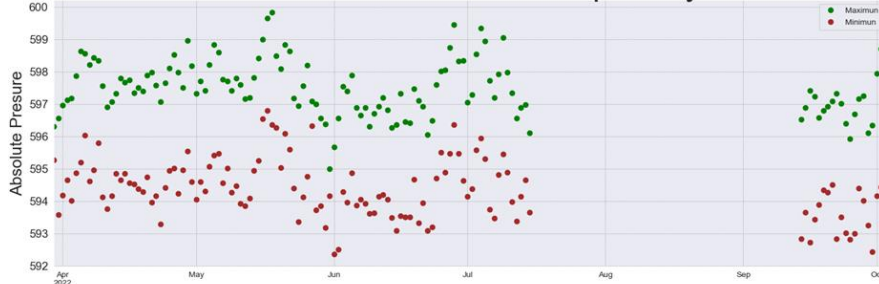
Full Data



The last data

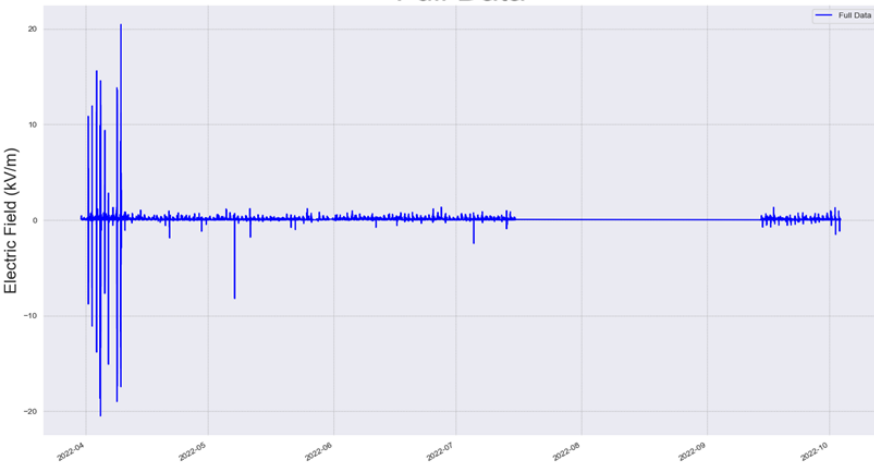


Maximum and minimum per day

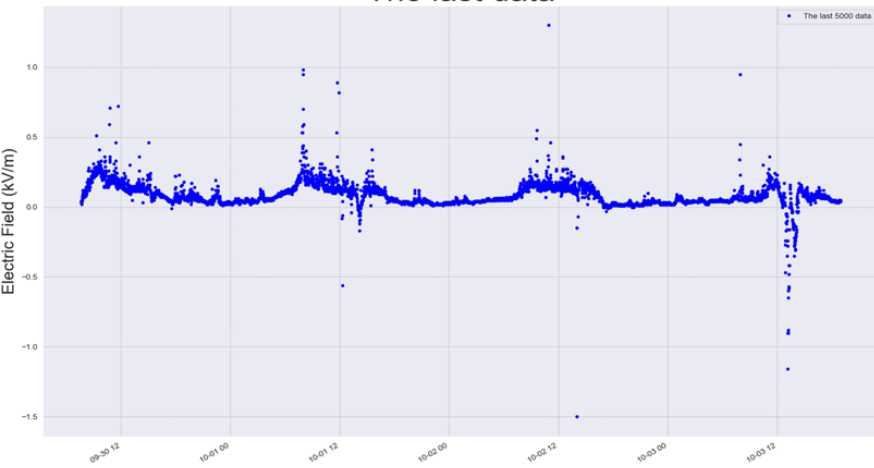


Electric Field

Full Data

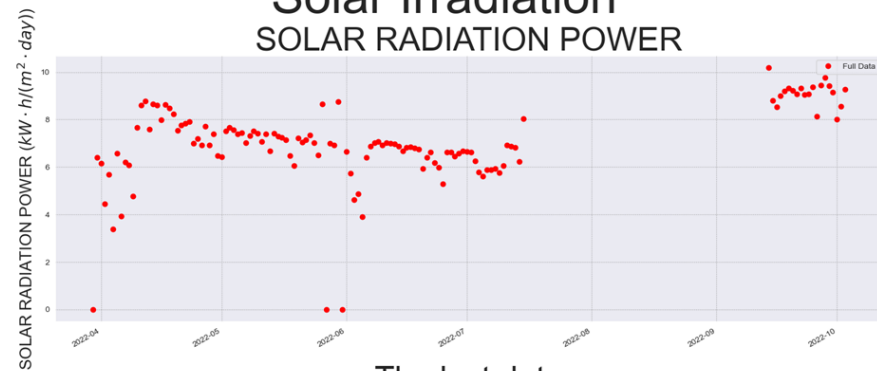


The last data

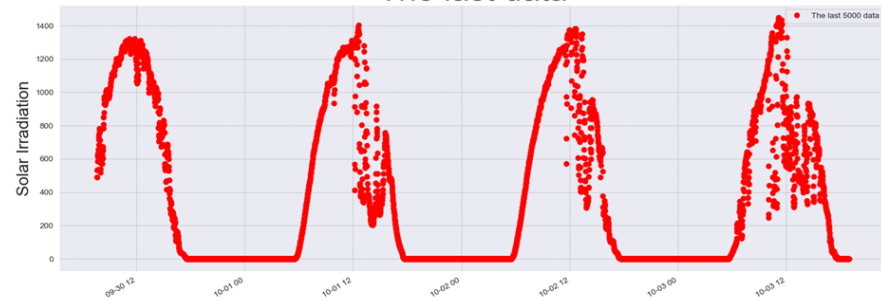


Solar Irradiation

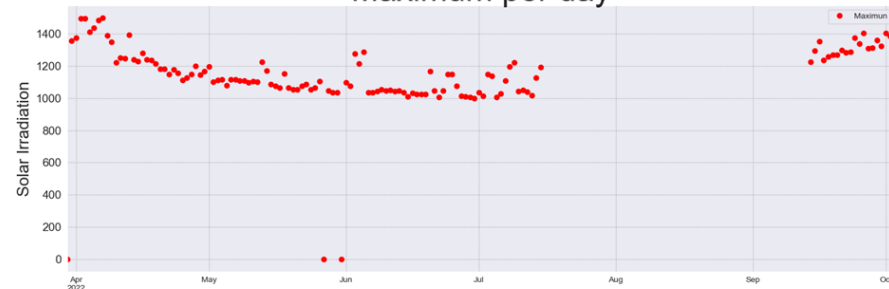
SOLAR RADIATION POWER



The last data



Maximum per day



Agradecemos a:



Msc. Rolando Perca Gonzales



Dr. José Bellido Cáceres

