

Workshop on harnessing space technological applications in sustainable urban development

Dashboard Case Study in Julia

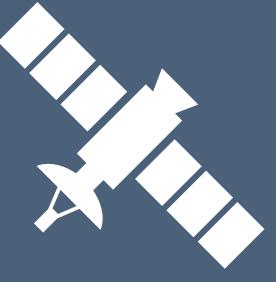
Iga Szczesniak, August 6 2024, Pretoria, South Africa



1. Where did I hear about Julia?
2. When did I start using it?



Why use Julia for Earth sciences?



- Be easy to work with matrices and vectors.
- Have a package ecosystem for common geospatial operations.
- Have a build-in package manager; be a modern programming language.
- Solves a two-language problem.
- User friendly syntax for scientists and engineers without extensive programming background.

Julia is a good choice for:

- Data-driven applications.
- Building real-time data pipelines.
- Time series analysis, e.g. Internet-of-Things.
- Transforming scientific research into web applications and production.

Vineyards of Terceira Project

Objectives

1. Real-time monitoring of vineyards in Terceira.
2. Develop a data visualization and automatic alert system for downey mildew disease prevention.



SOFIS sensors installed in the vineyards in
Biscoitos, Terceira Island.

SOFIS system

Capable to measure

- Temperature,
- Relative humidity,
- Precipitation,
- Wind speed,
- Wind direction,
- Photosynthetically Active Radiation.



4

Vineyards participate in this pilot project

Prototype Vineyard Monitoring Dashboard

Vineyard Monitoring Made Simple

Location of the installed SOFIS sensors



Vineyard monitoring dashboard

A step-by-step process

1. Liaise with stakeholders.
2. Design the dashboard layout.
3. Develop graphs and visualisations.
4. Implement risk calculation model for downey mildew.
5. Add interactive elements.
6. Deploy the dashboard on the web.

Let's open the live dashboard!

<https://services.aircentre.org/agrodigital/terceira/>



Link to the dashboard.

Scientific work



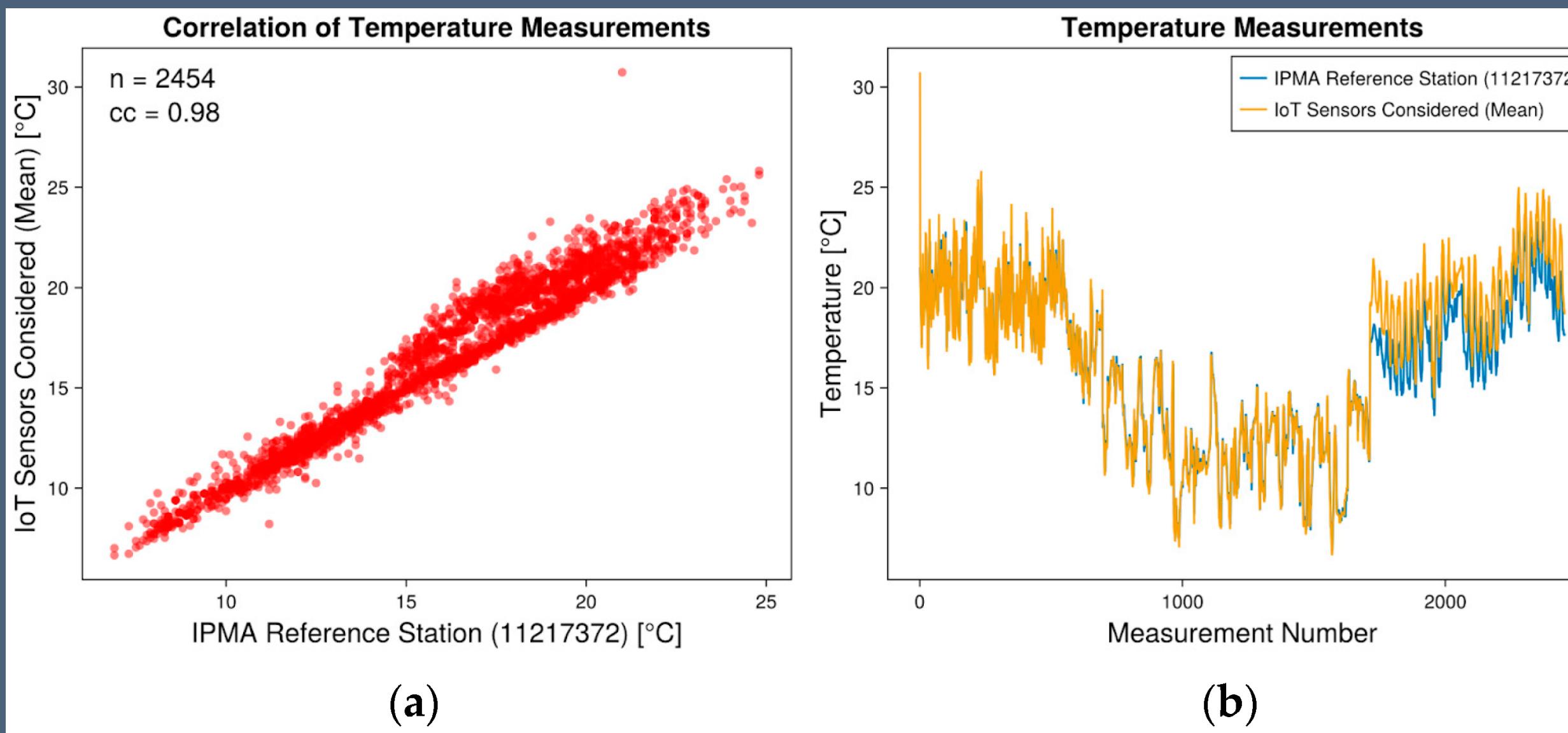
Article

Assessing the Presence of *Pithomyces chartarum* in Pastureland Using IoT Sensors and Remote Sensing: The Case Study of Terceira Island (Azores, Portugal)

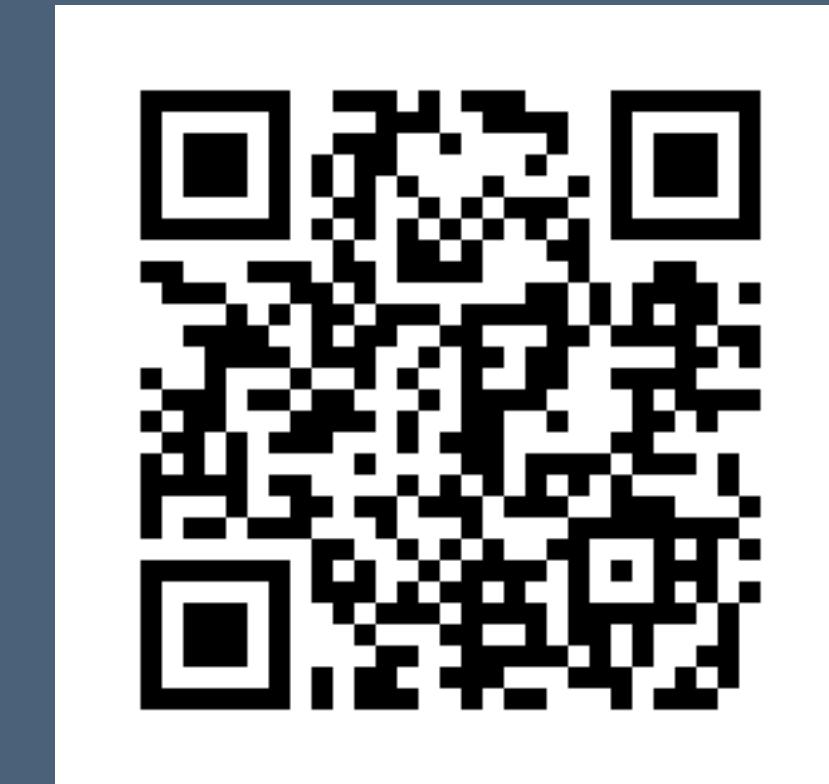
Mariana Ávila ^{1,2} , João Pinelo ¹ , Enrique Casas ² , César Capinha ^{3,4}, Rebecca Pabst ⁵ , Iga Szczesniak ¹, Elizabeth Domingues ⁶, Carlos Pinto ⁷ , Valentina Santos ⁸, Artur Gil ^{9,*} and Manuel Arbelo ²

- Data analysis in scientific work and papers.

A recent paper with data analysis conducted in Julia.



(a) Correlation plot of mean temperature measurements from installed IoT sensors and the reference meteorological station. **(b)** Temperature measurements.



Link to the paper.



Thank you!

Iga Szczesniak, Earth Observation Project Developer @ AIR Centre
linkedin.com/in/iga-szczesniak/
igaszczesniak.github.io/