

# JOHNS HOPKINS UNIVERSITY DATA VISUALIZATION PROGRAM

## FIRE RISK DASHBOARD – BOSQUE PEHUÉN

### REVISED PROJECT PROPOSAL

**Student:** Felipe Guarda

**Project Type:** Analytical dashboard integrating interactive data visualizations

**Submission Date:** December 2025

## I. Project Description

This project develops an interactive dashboard that visualizes and analyzes wildfire risk using modelled meteorological data from the Open-Meteo API (CC BY 4.0). The application focuses on Bosque Pehuén, Fundación Mar Adentro's privately protected area located in the Andean foothills of southern Chile, and its surrounding landscape.

The dashboard retrieves hourly temperature, relative humidity, wind speed, and precipitation data for the site's coordinates and computes a composite Wildfire Risk Index. This index integrates the main variables used by Chile's national fire-danger model, with one modification: the "days without rain" variable replaces a proprietary drought factor used by Chile's forestry agency. This variable is adapted from Argentina's Rodríguez-Moretti Index (IRM) (Dentoni, M., & Muñoz, M., 2012), allowing the model to approximate local fuel dryness.

The result is a reproducible and open-source tool that allows users to:

- View current and forecasted risk levels
- Compare contributing variables through interactive polar and time-series plots
- Visualize regional risk gradients on an interactive map
- Access production-ready code through a modular, maintainable architecture

All computations are implemented in Python using open-source libraries and visualized through Streamlit.

## II. Project Status & Accomplishments

### Core Implementation

**Current Progress:** ~85% of deliverables and tasks are complete, this includes data retrieval and preprocessing, risk index computation, visualization layout (polar plot, table, time-series, wind compass, regional map), dashboard integration in Streamlit, and a comprehensive documentation and README

### III. Revised Project Plan

#### Phase 1: Final Report and Presentation (Current – Weeks 11–12)

- Complete final paper sections (Abstract, Introduction, Background, Approach, Results, Conclusion)
- Prepare video demonstration (2–5 minutes)
- Final review and refinement of code documentation

**Deliverables:** Final technical report and video presentation

#### Phase 2: Submission and Deployment (Week 13)

- Submit all course deliverables
- Package application for Streamlit Cloud deployment
- Archive in stable GitHub repository

**Deliverables:** Submitted coursework and open repository

### IV. Revised Timeline

Week	Task	Status	Deliverable
1–2	Data retrieval & preprocessing	✓	API integration with caching
3–4	Risk calculation implementation	✓	Validated scoring model
5	Visualization prototypes	✓	Polar plot, table, time-series
6	Streamlit dashboard integration	✓	Interactive dashboard
7	Regional mapping & wind rose enhancement	✓	Interactive map with overlays
8	Documentation & README	✓	Technical documentation
9 - 10	Final report & video preparation	<b>In Progress</b>	Draft sections + video
11	Final submission	Planned	Complete deliverables

## V. References

1. Dentoni, M. C., & Muñoz, M. M. (2012). Sistemas de evaluación de peligro de incendios. Informe Técnico N° 1. Plan Nacional de Manejo del Fuego – Programa Nacional de Evaluación de Peligro de Incendios y Alerta Temprana. Esquel, Chubut, Argentina. ISSN 2313-9420.
2. Open-Meteo. (2022–2025). Weather Forecast API. Retrieved from <https://open-meteo.com/en/docs>
3. Gil-Romera, G., et al. (2023). Environmental Forest Fire Danger Rating Systems and Indices Around the Globe: A Review. *Land*, 12(1), 194.  
<https://doi.org/10.3390/land12010194>