Francisco Zambrano PhD

- Providencia, Santiago, Chile
- Chilean-Italian

Skills

Spatial data analysis 10 yrs.

R | {tidy|verse/models} 10+ yrs.

Python 5 yrs.

Google Earth Engine 3 yrs,

Amazon Web Service (AWS|EC2) 3 yrs.

Dockers 3 yrs.

GIS 10 yrs.

Rmarkdown 6 yrs.

Quarto 1 yrs.

R-Shiny 6 yrs.

Software

- Git
- RStudio - Positron
- VS Code
- Terminal
- QGIS
- SAGA

Spatial data

- MODIS
- ERA5/ERA5-Land
- CHIRPS
- Sentinel-1/2

Summary

Senior Geospatial Data Scientist with 15+ years in remote sensing and spatial analysis for climate change, agriculture, and water resources. Led ANID-funded projects totaling >600M CLP, developing national platforms (ODES-Chile, SatOri) for drought monitoring and irrigation optimization. Expertise in Python, R, GIS, and ML to drive data-driven decisions in AgTech and climate risk. Seeking industry roles to apply academic insights to scalable solutions.

Experience

Senior Geospatial Scientist & Project Lead **Feb 2018 - Aug 2025**
Earth Observation Center
Hemera - Universidad Mayor

- Built and launched ODES-Chile (https://odes-chile.org) - national drought observatory & early-warning system processing ERA5-Land, MODIS, CHIRPS at country scale (1,000-10,000 monthly users including Ministry of Agriculture).
- Designed and deployed SatOri (https://s4tori.cl) - operational satellite irrigation optimization platform for cherry orchards using Sentinel-2 + meteorological data + ML to predict stem water potential and deliver irrigation recommendations.
- Developed and released national PM2.5 forecasting dashboard (2025) combining SINCA stations + satellite aerosol data + ML (https://frzambra.shinyapps.io/app_pm25).
- Secured and directed 600M CLP (US$650k) in competitive grants as Principal Investigator.
+ Published lead-author papers in Remote Sensing of Environment, Agricultural Water Management, Earth's Future

Visiting Doctoral Researcher **Sep - Dec 2016**
Faculty of Geo-Information Science and Earth Observation (ITC)
University of Twente, Enschede, The Netherlands

- Built agricultural productivity decline models using MODIS/CHIRPS time-series and spatial analytics; published in Remote Sensing of Environment (impact: policy-relevant for Chilean drought mitigation).

Visiting Doctoral Researcher **Jan-Jun 2016**
CALMIT/NDMC
University of Nebraska, United States

- Evaluated satellite precipitation products for drought monitoring; results in Atmospheric Research, informing national agroclimate reports.

Research Assistant **2012 - 2015**
INIA Quilamapu

Automated monthly drought/agroclimate reporting using climate station and satellite data, integrated into regional decision-making tools.

Water Resources Engineer **2007 - 2012**
Public Sector (DGA, CNR, INDAP)

Advised on water management for agriculture and water user organizations, optimizing resource allocation in arid regions.

- Landsat 7/8/9
- SoilGrid
- CMIP6

Awards

- Hackaton Winner in the OpenGeoHub Summer School, Siegburg, Germany, 2022.
- PhD Scholarship, National Agency for Research and Development, Chile, 2014.

Languages

- English - Advanced (B2-C1)
- Spanish - Native

Education

03/2014 - 09/2017

Ph.D in Agricultural Engineering, Mention in Water Resources

Universidad de Concepción

Thesis: Agricultural Drought in Chile: From Assessment to Prediction Using Satellite Data

03/2000 - 09/2007

Civil Engineering

Universidad de Concepción

Contact

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Selected Publications

1. **Zambrano, F.**, Anton, V., Meza, F., Duran-llacer, I., Fernández, F., Venegas-González, A., Raab, N., Craven, D., 2025. From Drought to Aridification: Land-cover fingerprints of a drying Chile. Earth's Future. https://doi.org/10.1029/2025EF006744
2. **Zambrano, F.**, Herrera, A., Olguín, M., Miranda, M., Garrido, J., & Almeida, A. M. (2025). Prediction of the daily spatial variation of stem water potential in cherry orchards using weather and Sentinel-2 data. *Agricultural Water Management, 318*, 109721. https://doi.org/10.1016/j.agwat.2025.109721
3. **Zambrano, F.**, Vrieling, A., Nelson, A., Meroni, M., Tadesse, T., 2018. Prediction of drought-induced reduction of agricultural productivity in Chile from MODIS, rainfall estimates, and climate oscillation indices. Remote Sensing of Environment 219, 15–30. https://doi.org/10.1016/j.rse.2018.10.006
4. **Zambrano, F.**, Wardlow, B., Tadesse, T., Lillo-Saavedra, M., Lagos, O., 2017. Evaluating satellite-derived long-term historical precipitation datasets for drought monitoring in Chile. Atmospheric Research 186, 26–42. https://doi.org/10.1016/j.atmosres.2016.11.006