

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 Open-GeoHub 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

- Zambrano, F.**, Anton, V., Meza, F., Duran-Ilacer, 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>
- Zambrano, F.**, Herrera, A., Olgún, 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>
- 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>
- 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>