Institute for Scientific and Technical Research for Defense -

CITEDEF

To execute research and development plans, programs, and projects framed within the scientific-technological policies for Defense assigned by the competent authorities of the Ministry of Defense.

Laser Department -

Atmosphere Division

The global study of the atmosphere

Instituto de Investigaciones Científicas y Técnicas para la Defensa

Ministerio de Defensa
Argentina

Atmosphere Division

¿Who are we?

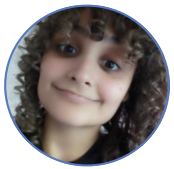
Dra. M. Gabriela Nicora

Dr. Facundo Orte

Dr. Juan Pallotta

Téc. Raúl D'Elia

Dra. Daiana Baissac



Geof. Constanza I. Villagrán Asiares

BSc. Anabela Lusi

Geof. M. Florencia Barle

BSc. Yasmín Velazquez

BSc. Lucía Pini

Téc. Nahuel Diaz

- We are a young group formed by Phd, students and technicians.
- We conducts studies of the atmosphere based on passive remote sensing, solar radiation, clouds and lighting.
- Lidar:
  - Data analysis using LPP.
  - Working to have a lidar again at CITEDEF.

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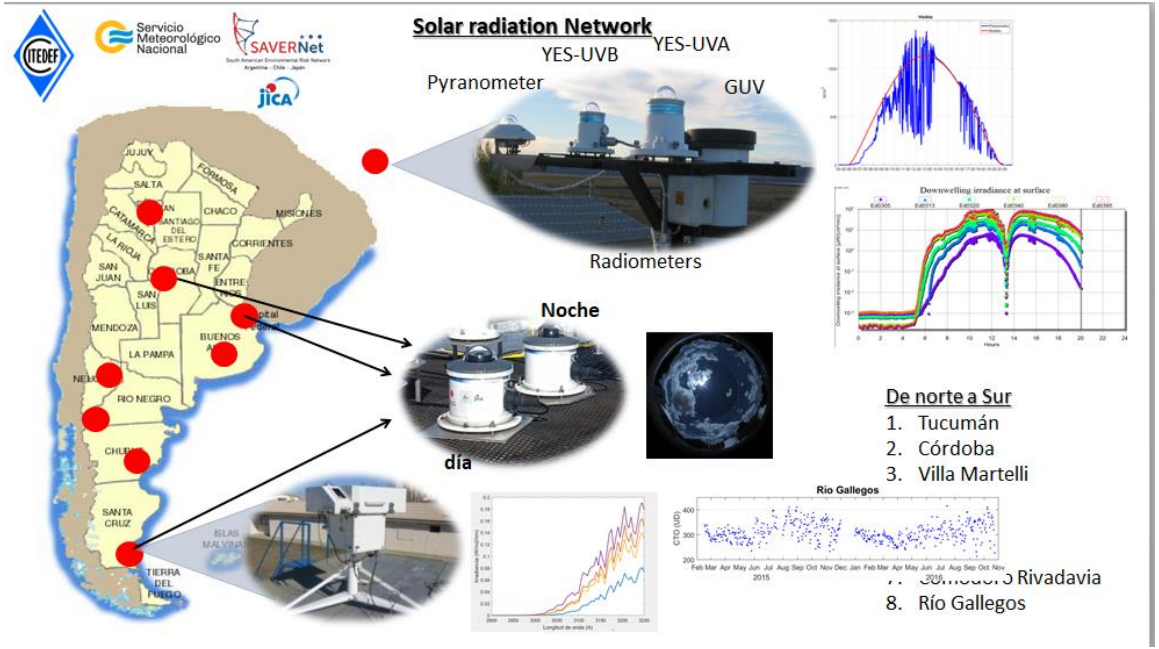
Solar Radiation



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Argentina

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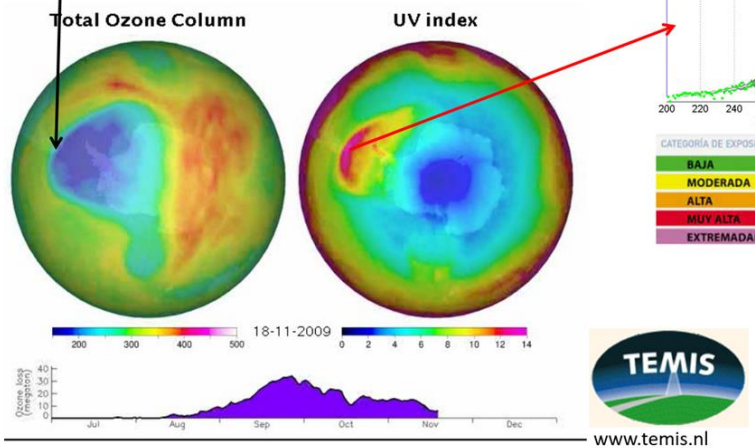
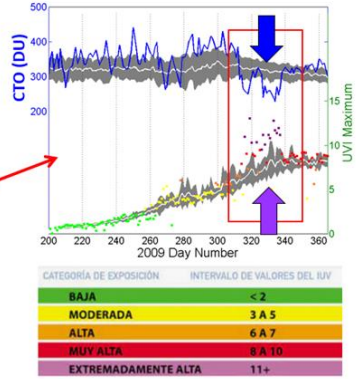
Stratospheric Ozone and UV radiation

Observatorio Atmosférico de la Patagonia Austral





TEMIS

www.temis.nl

Solar UV radiation

- Risks
  - Erithema
- Benefits
  - Vitamin D

Lack of VD

- Rickets in children
- Multiple sclerosis
- high blood pressure
- Infectious diseases
- Risk of contracting different types of cancer (eg breast and colon cancer)

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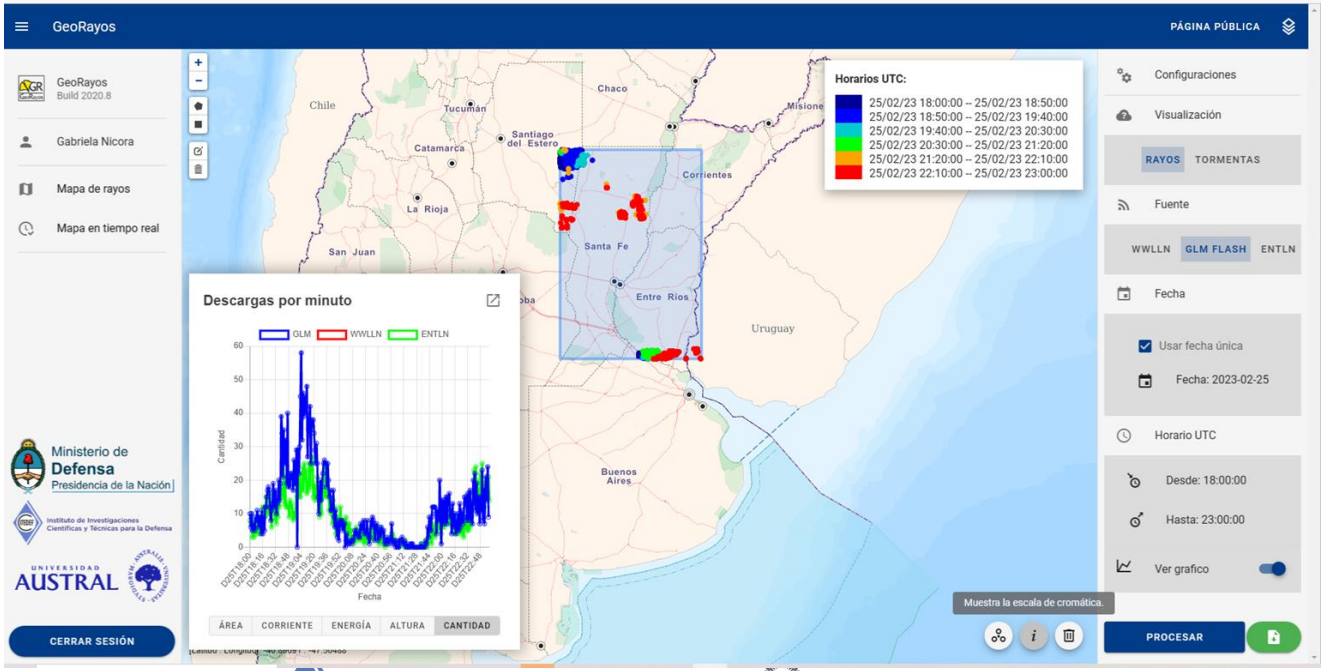
GeoRayos *georayos.citedef.gob.ar*



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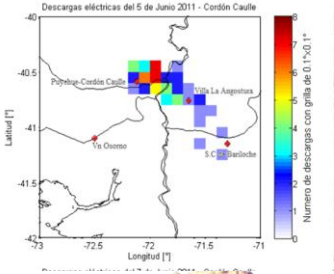
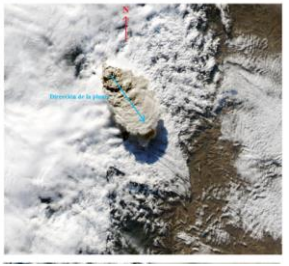
Volcanic Lightning

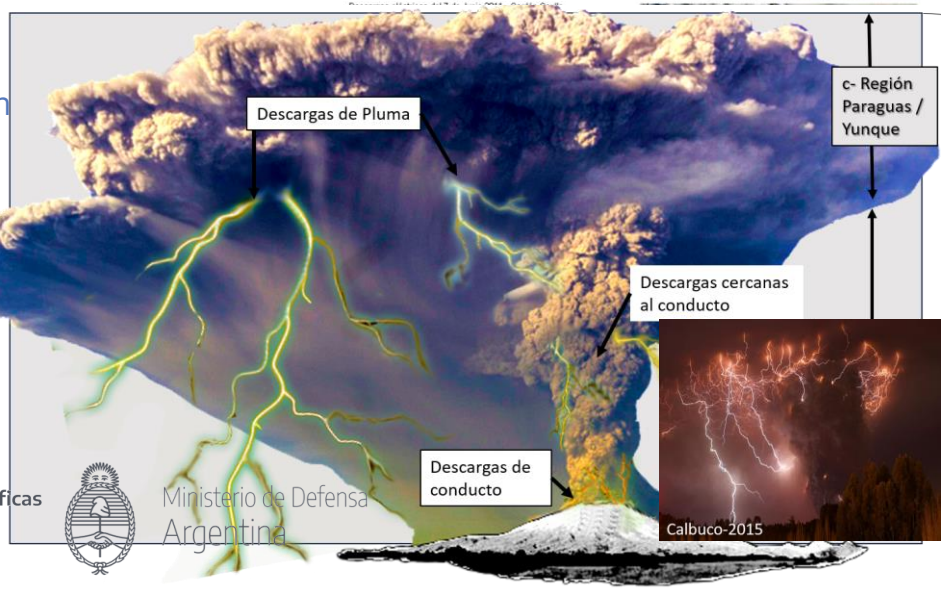




Ph.D. thesis tituled: **Estudio de las Descargas Eléctricas Asociadas a la Actividad Volcánica en Los Andes**.

D. M. Baissac, M. G. Nicora, E. E. Ávila, y G. A. Badi, **Lightning in the eruption of the Volcan de Fuego 2018 - Seeing from earth and space**, en 2021 35th international Conference on Lightning Protection (ICLP) and XVI International Symposium on Lightning Protection (SIPDA), sep. 2021, vol. 1, pp. 01-07. doi: 10.1109/ICLPandSIPDA54065.2021.9627363.

D. M. Baissac, M. G. Nicora, L. J. Bali, G. A. Badi, y E. E. Ávila, **Volcanic alert system by lightning detection using the WWLLN - ash cloud monitor**, Journal of South American Earth Sciences, vol. 108, p. 103234, jun. 2021, doi:10.1016/j.jsames.2021.103234.



D. M. Baissac

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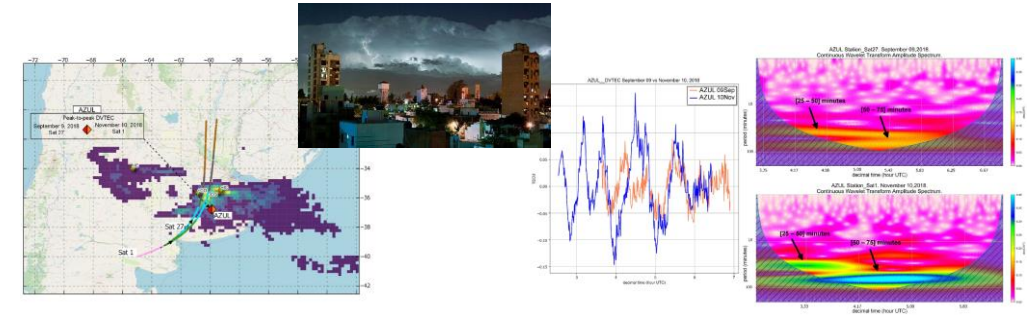
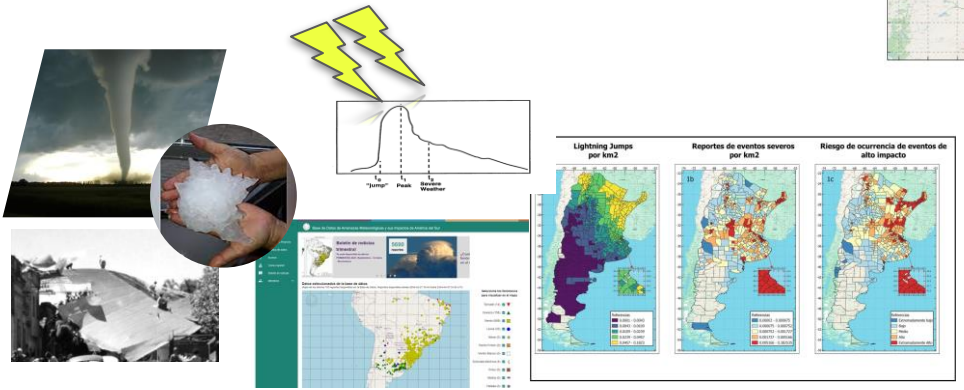
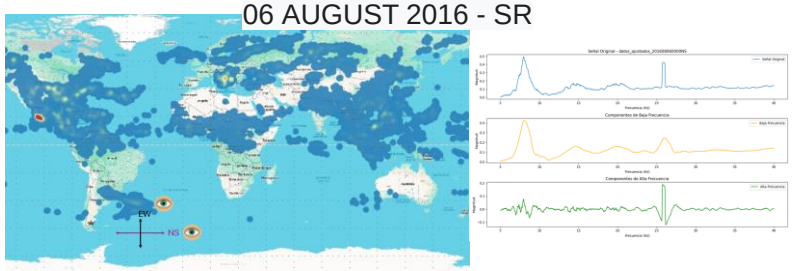
Extreme weather / Interaction in the Upper Atmosphere

Villagrán Asiares, C. I., Nicora, M. G., Meza, A., Natali, M. P., Ávila, E. E., Rubinstein, M., & Rachidi, F. (2023). Ionospheric Variations Induced by Thunderstorms in the Central Region of Argentina during the RELAMPAGO–CACTI Campaign. *Atmosphere*, *14*(9), 1386.







C.I Villagrán Asiares

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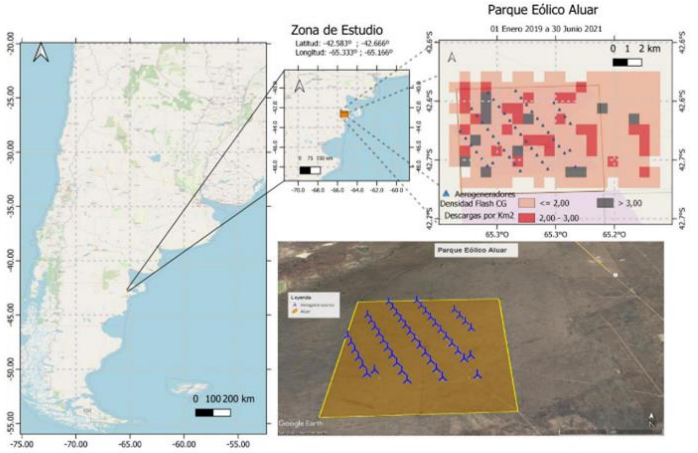
Tall Towers / Renewable energy sources

Villagrán Asiares, Constanza I.; Nicora, M. Gabriela; Baissac, M. Daiana; Pfeiffer Gonzalo; Bertone, Fiorela; Avila, Eldo E; Meza, Amalia. - Análisis de la Actividad Eléctrica Atmosférica en parques eólicos de Argentina en un contexto de cambio climático" - XIV Congreso Argentino de Meteorología. Buenos Aires. Noviembre 2022.



To be presented at ICLP 2024

Application of the Smorgonskiy Method for the Estimation of Upward Lightning Incidence on Tall Towers Using WWLLN Data - Preliminary Results. **L. Pini**, D. M. Baissac, M. G. Nicora, M. F. Barle, E. Mansouri, Toma Oregel-Chaumont, Y. R. Velázquez, C. I. Villagrán Asiares, D. Pastafiglia, A. Stacul, F. Rachidi, M. Rubinstein.

L. Pini

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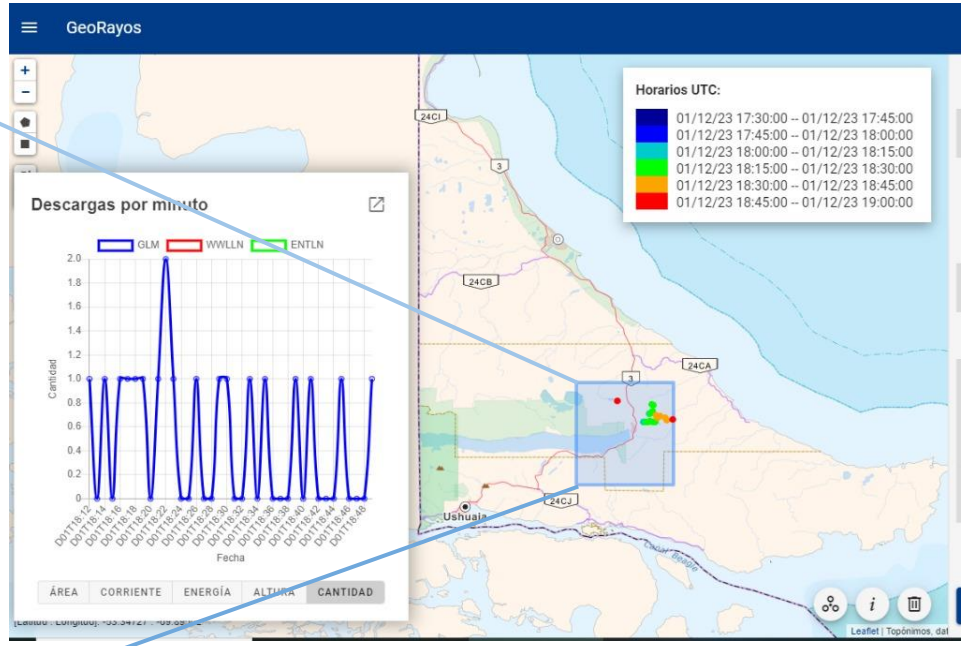
Wildfires

Degree Thesis: “Estudio de Incendios Generados por Rayos en la Zona Central del País”.

L. Pini and D. M. Baissac



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Electric field

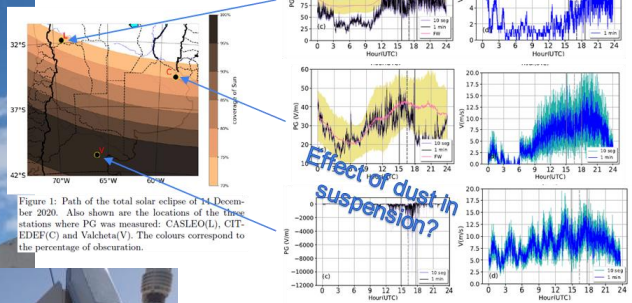
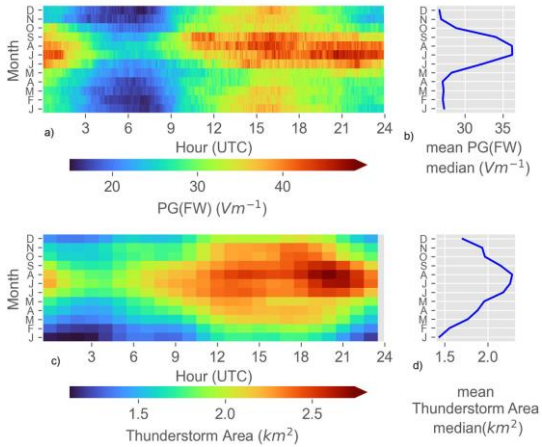


Figure 1: Path of the total solar eclipse of 14 December 2020. Also shown are the locations of the three stations where PG was measured: CASLEO(L), CITEDEF(C) and Valcheta(V). The colours correspond to the percentage of obscuration.

Year 2022

https://doi.org/10.4279/pip.140008

Year 2024



https://doi.org/10.1016/j.atmosres.2023.107182

aerosols

global

PG

fog

regional

Currently

Y. Velázquez

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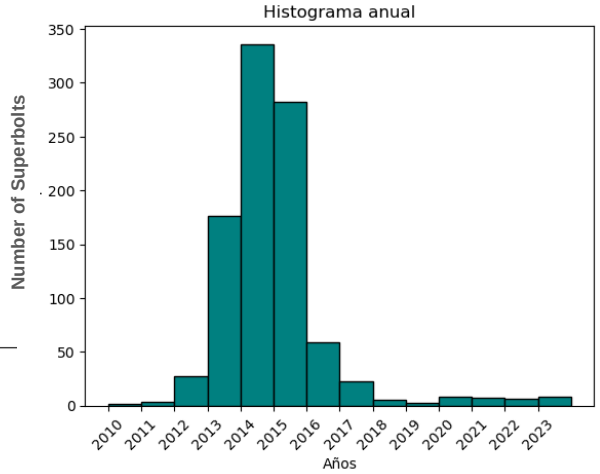
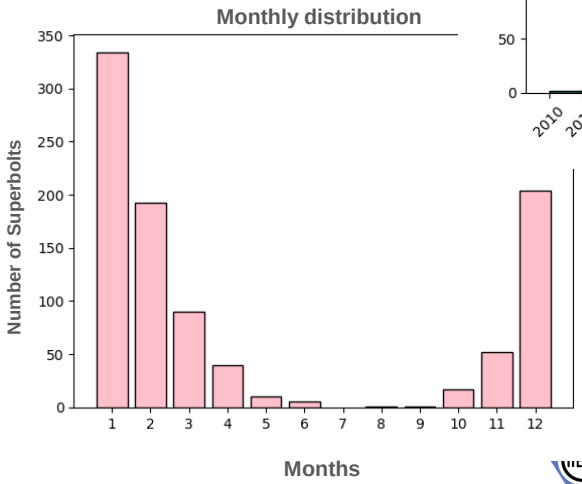
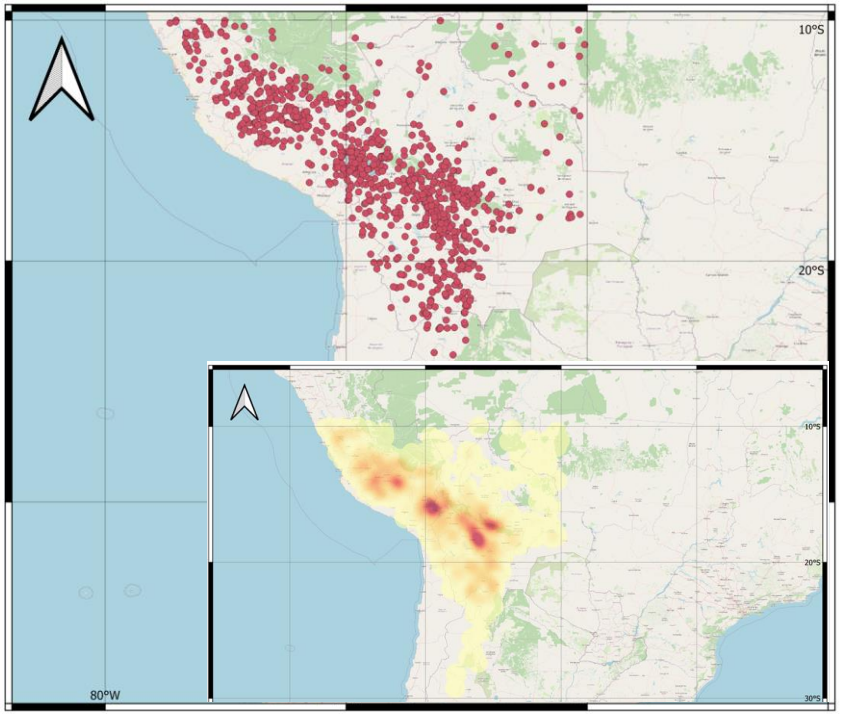
Superbolts and TLES

10^6 J < Energy values < 10^8 J





World Wide Lightning Location Network (WWLLN)



M. F. Barle

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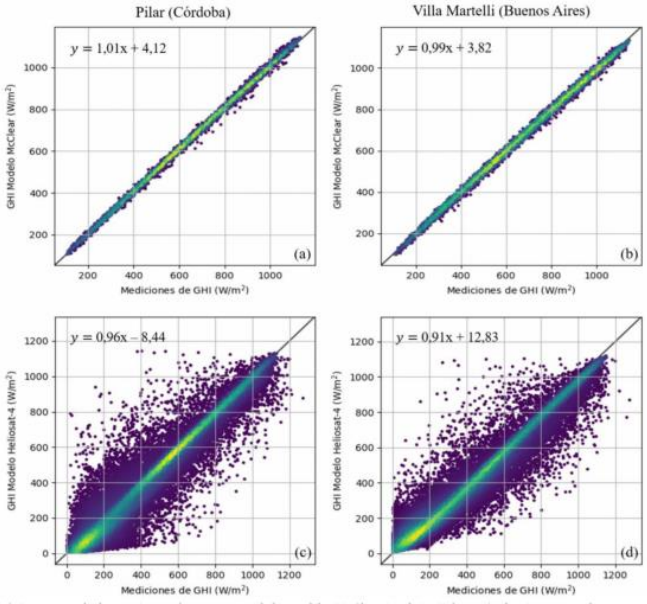
Solar Radiations and Cloud Classification

Lusi, A. R., Orte, P. F., Wolfram, E., & Orlando, J. I. (2024). Cloud classification through machine learning and global horizontal irradiance data analysis. *Quarterly Journal of the Royal Meteorological Society*, *150*(765), 5435-5451.

Lusi, A. R., Orte, F., Suárez, R. A., D'Elía, R., & Wolfram, E. (2023, September). Evaluación de los modelos de radiación solar global Heliosat-4 y McClear en dos sitios de Argentina. In *Anales (Asociación Física Argentina)* (Vol. 34, No. 3, pp. 5-5).



A. Lusi

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OAPA

“Observatorio Atmosférico de la Patagonia Austral”

- Located in Río Gallegos, Santa Cruz, Argentina.
- Atmospheric observation since 2005.

- Parameters:
  - Stratospheric Ozone and UV Radiation
  - Solar radiation
  - Aerosols
  - Atmospheric discharges
  - ELF Data

- It has installed its own instruments (CITEDEF), as well as instrumentation belonging to the SMN (National Weather Service) and international institutions (i.e. France, Japan, Germany, USA and Poland).

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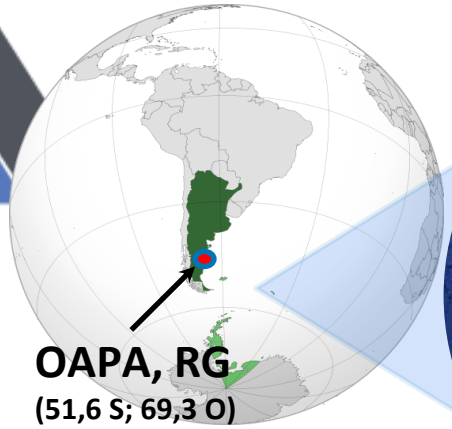
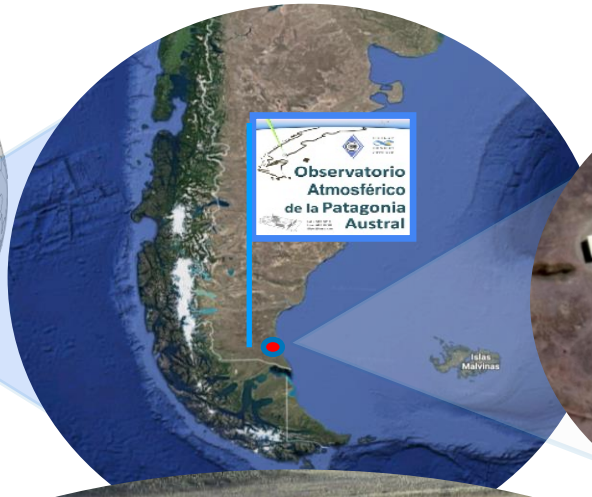
Location

BASE AEREA MILITAR-RG (FFAA)



OAPA, RG
(51,6 S; 69,3 O)



Argentina
unida

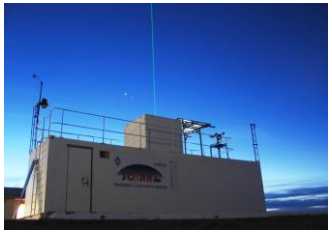
Instrumentation and international collaboration

AERONET (NASA)

Radiómetros Solares (CITEDEF-SMN)

Brewer (CNRS-Francia)

DIAL (CITEDEF)

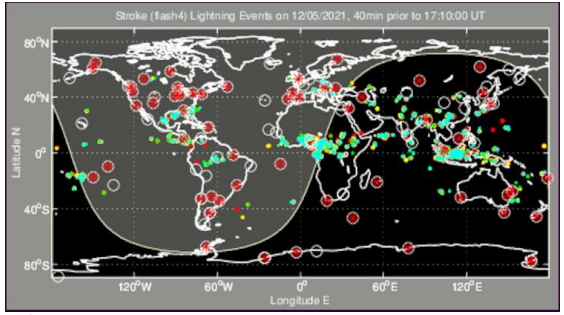


ELF Data (Krakow ELF Group, Polonia)

SAOZ (LATMOS, Francia)

Rad. Ondas Milimetricas (U. Nagoya, Japón)

WWLLN (CITEDEF)



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y Técnico

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Thanks a lot!

Dra. M. Gabriela Nicora

gnicora@citedef.gob.ar

Dr. Facundo Orte

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Dr. Juan Pallotta

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Dra. Daiana M. Baissac

Daiana M. Baissac holds a Ph.D. in Geophysics, with a specialization in Atmospheric Electric Activity, particularly in relation to volcanic eruptions. She is currently undertaking her Postdoctoral research in the Atmosphere division at the Center for Laser Research and Applications of CITEDEF. Her research focuses on the impact of electric discharges in wind farms and their role in the ignition of wildfires in Argentina. Her work significantly contributes to our understanding of atmospheric phenomena and their implications.

dmbaissac@gmail.com

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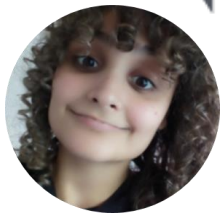

Constanza I. Villagrán Asiares

Constanza Inés Villagrán Asiares is a Geophysicist and is doing her Ph.D. in Geophysics at the National University of La Plata, Faculty of Astronomical and Geophysical Sciences. Her main line of research is the study of extreme weather events through the associated Atmospheric Electric Activity and its interaction in the Upper Atmosphere in the context of climate change. She investigates these interactions using Lightning Jump, Schumann Resonance, ELF data, and Total Electron Content analysis.

villagranasiares.constanza@gmail.com

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BSc. Anabela Lusi

Anabela Lusi has a degree in Environmental Technology. Her research focuses on the impact of cloudiness on solar radiation for the forecast of short-term solar irradiance: application in the generation of renewable energies

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BSc. Yasmin Velazquez

Yasmin Romina Velázquez has a degree in Atmospheric Sciences and is currently pursuing her PhD in Atmospheric Sciences as well. She was a teaching assistant at the University of Buenos Aires, Faculty of Exact and Natural Sciences. Her research topic is the study of the atmospheric electric field in different states of the atmosphere in the territory of Argentina and its implications in the forecast of high impact atmospheric events.

yasminrvelazquez@gmail.com

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M. Florencia Barle

María Florencia Barle has a degree in Geophysics. She is currently pursuing a PhD in Atmospheric Electrical Activity and also, she has an assistantship at the National Technological University of La Plata. Her research topic is the study of atmospheric electrical activity -specifically Superbolts- in the northern part of Argentina and Chile, Bolivia and Perú. This study is within the framework of Climate Change.

mfbarle@gmail.com

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Lucia Pini has a degree in Geophysics and is currently pursuing a Ph.D. in Geophysics. Her research focuses on the impact of lightning activity on renewable energy sources, including wind parks and solar farms, as well as its influence on Atmospheric Electrical Activity.

BSc. Lucía Pini

luciapini98@gmail.com

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