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# International Collaboration

Danny Scipion

International Liaison - CSSC

CEDAR 2024 - 12 jun, San Diego, CA



# Establishing common goals and objectives

- Ensuring that all parties involved have a shared understanding of the **project's goals, objectives, and timelines** is essential. This alignment helps in maintaining focus and motivation throughout the collaboration. Regularly revisiting and reaffirming these goals can prevent divergence and keep the collaboration on track.



# Clear communication

- Effective communication is paramount in international collaboration. This includes **not only language proficiency but also cultural sensitivity**. Misunderstandings can arise due to differences in communication styles and cultural norms. Utilizing tools like video conferencing, emails, and collaborative platforms can bridge these gaps.



# Respect cultural differences

- Cultural sensitivity plays a significant role in international collaboration. Being mindful of **cultural differences in work styles, decision-making processes, and even perceptions of time** can foster a more harmonious working relationship. Taking the time to learn about each other's cultures and adapting communication and work practices accordingly can enhance collaboration



# Establishing trust and building relationships

- Trust is the foundation of successful collaboration. **Investing time and effort into building strong interpersonal relationships** among team members fosters trust and cohesion. This can involve initiatives such as face-to-face meetings, team-building activities, and regular check-ins to nurture rapport and camaraderie



# Flexibility and adaptability

- Flexibility is key when working across borders and time zones. Unexpected challenges, such as differences in regulations or unforeseen circumstances, may arise. Being **adaptable and open to finding alternative solutions** is crucial for overcoming such obstacles. Flexibility also extends to accommodating diverse perspectives and approaches, leveraging the strengths of each team member to achieve collective success.



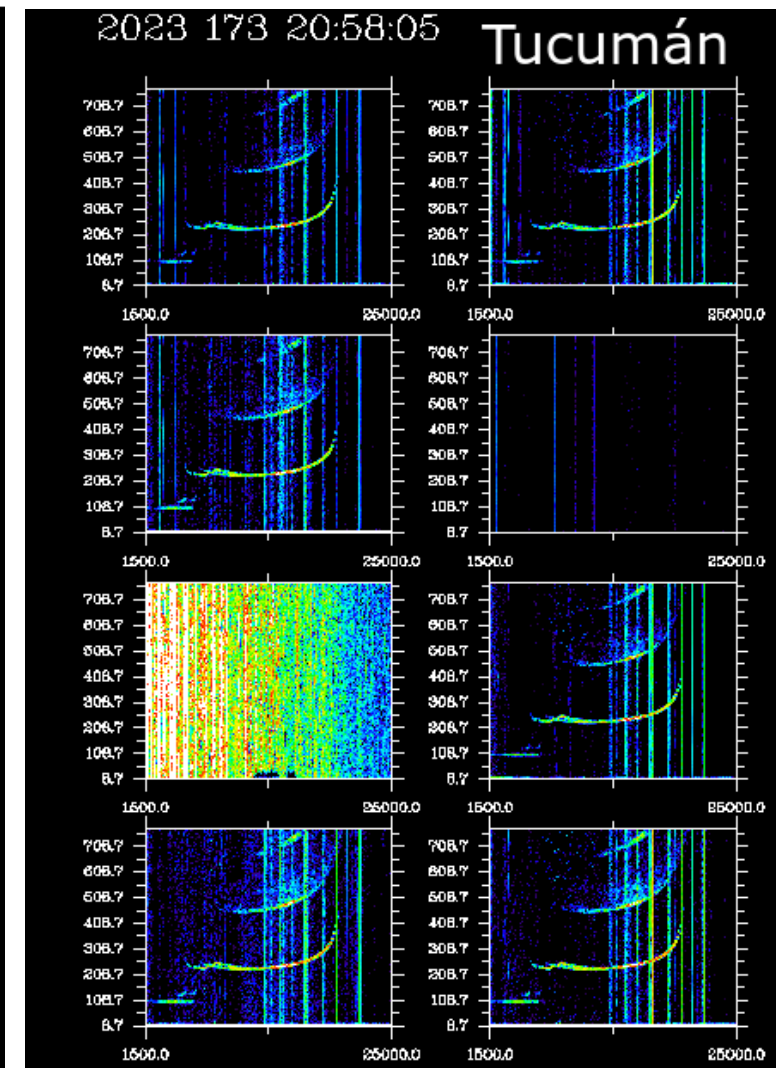
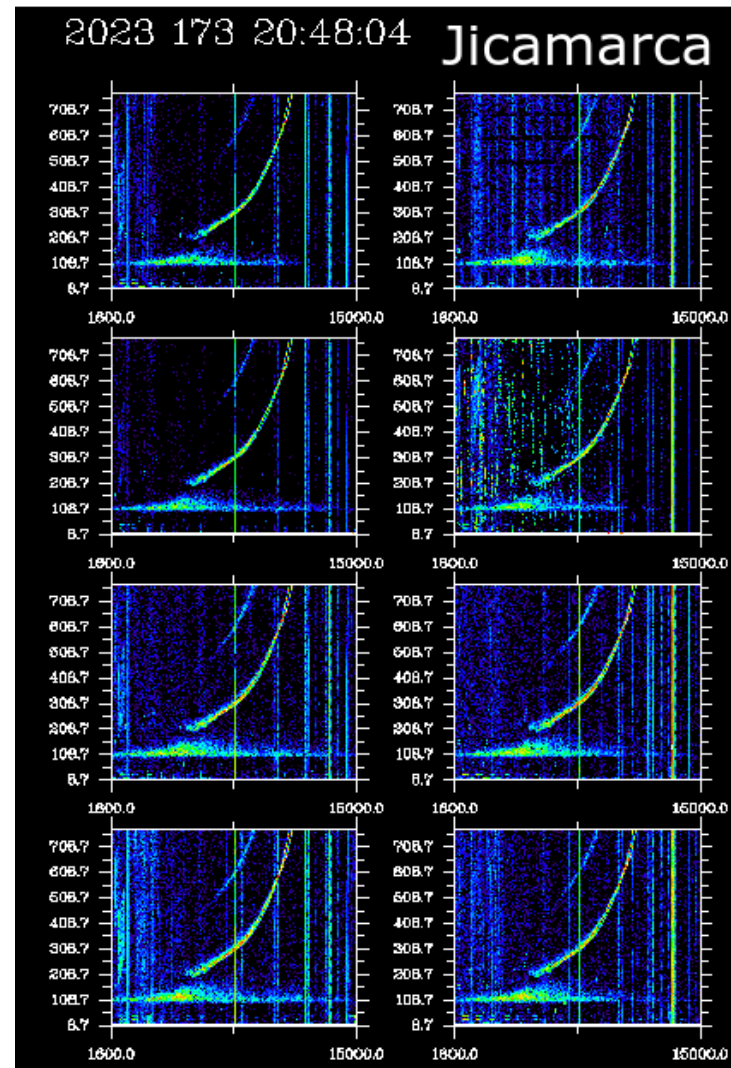
# Peru: Network of instruments

- LISN (C. Valladares, UT Dallas) GNSS receivers, magnetometers, and ionosondes
- Magnetometers (O.Veliz, IGP)
- Ionosondes:
  - Digisonde (B. Reinish, U. Mass. Lowell)
  - VIPIR (E. Kudeki, J. Makela, Illinois)
- Beacon RXs (P. Bernhardt, NRL, Tsunoda, SRI)
- GNSS RXs (J. Morton, U Colorado Boulder)
- CIRI Huancayo (J. Urbina, PSU)
- AMISR-14 (F. Rodrigues, UT Dallas)
- FPI + SOFDI (J. Meriwether & A. Gerrard, NJIT, L. Navarro, U. Colorado at Boulder)
- Airglow Cameras (C. Martinis, Boston U, G. Swenson, Illinois)
- HF multistatic radar (D. Hysell, U. Cornell)
- TIDDBIT (G. Crowley, ORION Enterprises)
- SIMONE (J. Chau, IAP, Germany)





# Peru: Ionosonde network





# Peru: Magnetometers network





# Peru: Magnetometers network

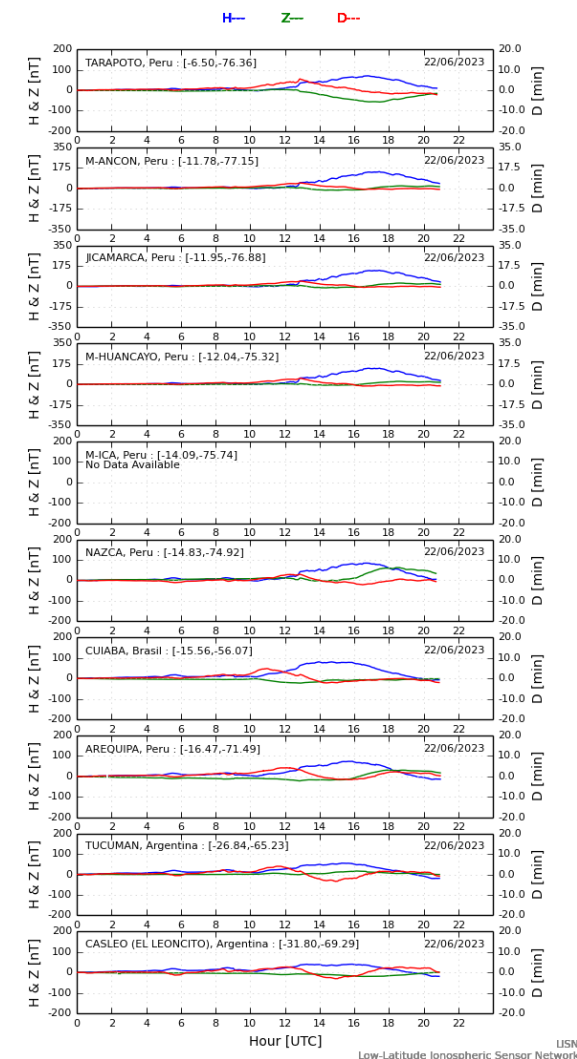
- Peru:
  - Piura, Tarapoto, Ancón, Jicamarca (Lima), Huancayo, Ica, Nazca, Arequipa
- Argentina:
  - Tucuman
- Brasil:
  - Cuiabá

<http://lisn.igp.gob.pe/>

<https://www.igp.gob.pe/observatorios/radio-observatorio-jicamarca/database-cielo/>



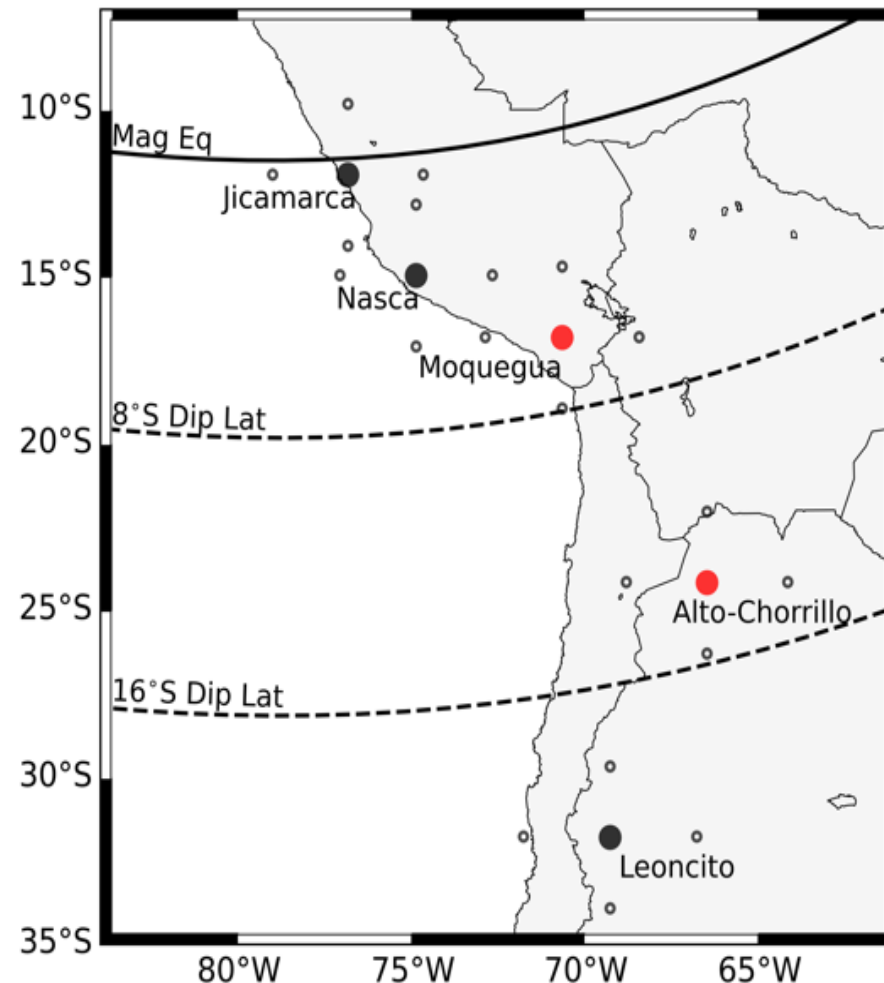
IGP's magnetometers





# Multi-site Fabry-Perot Interferometer (FPI) Measurements of Thermospheric Neutral Winds and Temperatures in Western South America

- Outstanding questions on ion-neutral coupling effects and its effects in thermosphere dynamics
- The influence of lower atmosphere forcing exhibits a midnight temperature maximum (MTM), a phenomenon that clearly affects the ionospheric plasma dynamics.
- The influence of EIA exhibits a reduction of winds to an increase of ion-drag at the site near the EIA southern crest



Location of current FPIs (black circles) and FPIs to be deployed (red circles).





# Latinamerican Association of Space Geophysics (ALAGE) - [www.alage.org](http://www.alage.org)

- Created in 1993 by unanimous resolution of participants of the Latinamerican Conference of Space Geophysics (COLAGE III)
- Scientific civil and autonomous entity responsible for promoting the development of research on specific issues of space geophysics.
- Members from +15 countries (from Latinoamerica and others)
- One of the main activities of ALAGE: Conferencia Latinamericana de Geofísica Espacial (COLAGE), a periodical meeting between students and researchers working in the ALAGE areas of interest: the middle and high atmosphere, the ionosphere, the magnetosphere, the interplanetary medium, the cosmic rays, the planets, satellites, minor planets and small bodies, the Sun and the Solar-terrestrial relations.
- Next COLAGE: Peru 2026

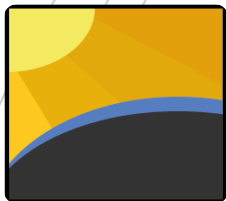


## ALAGE current Directive Board

President: Dr. María Graciela Molina – FACET-UNT – Argentina  
Vice-president: Dr. Danny Scipion – IGP-ROJ – Perú  
International Secretary: Dr. Bea Gallardo-Lacour – NASA – Chile  
Information Secretary: Dr. Esmeralda Romero – Facultad de Ciencias Físico Matemáticas, Universidad Autónoma de Nuevo León– México  
Treasurer: Dr. Alisson Dal Lago – INPE – Brazil



# Argentina: Tucuman Space Weather Center



<https://spaceweather.facet.unt.edu.ar/>



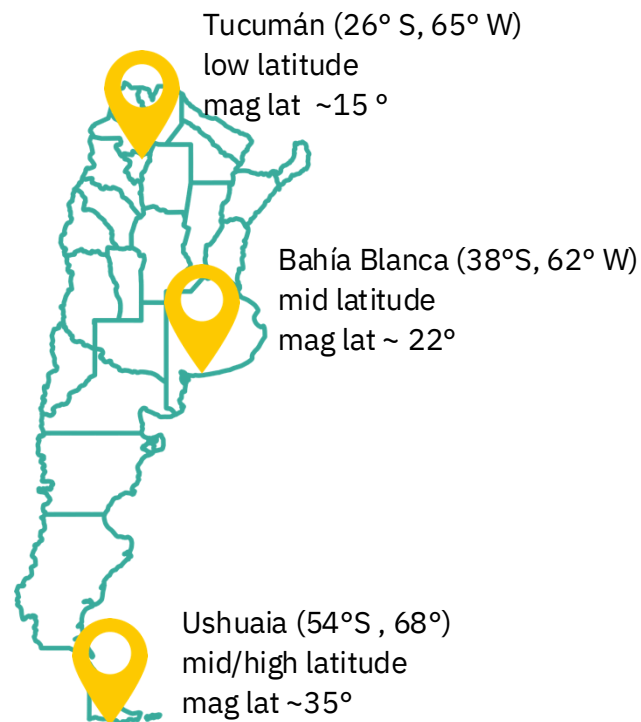
[/spaceweatherargentina/](https://www.instagram.com/spaceweatherargentina/)



- FACET- UNT (Universidad Nacional de Tucuman)
- UTN ( Tuc & Bahia Blanca)
- UNS - Bahia Blanca



- SWx/Ionosphere continuous monitoring.
- Ionospheric validated DB [Arg-Chile]
- TEC calibration service [on request & on the web]
- Automatic AGWs detection
- ML-based ionospheric forecasting (global & regional).
- Tailored Software Development & Data infrastructure for SWx. UNT-ICTP-INGV-Univ. Newcastle



- **Current deployed instrumentation**
- 2 Ionospheric sounders - (low and mid lat). UNT-INGV-UTN.
- 2 GNSS receivers Tuc and Usuahia (multi- freq & multi-constellation). UNT-INGV-SMN.
- 1 Magnetometer (SA Net). UNT-INPE
- 1 Continuous 3D Doppler System (TIDs/AGWs). UNT-CAS. [upgraded in 2022]
- 1 Riometer
- to be deployed: 1 GNSS receiver, 1 magnetometer, 1WCD



# Argentina: Additional groups

<http://lagoproject.net/>



- SWx program
- ML program
- Cosmic Rays
- Latinoamerica

<https://www.argentina.gob.ar/ciencia/conae>



- Argentina Space Program: SWx panel
- Working in collaboration with other groups
- Instrumentation in space (SABIAMAR-SAOCOM-etc)

<https://www.smn.gob.ar/>



- Instrumentation deployment (e.g. magnetometers, meteorological stations, lidar, etc)
- Instrument Networks
- Service oriented and 7/24 operations

<https://www.ign.gob.ar>



- Argentinean network of GNSS receivers, covering all the Argentina surface



- Operative products
- Sun, solar wind, radiation belts,
- Antarctic Swx lab
- Capacity building
- ISES (reg center)



- vTEC modeling using GNSS
- operative vTEC maps
- Capacity building

CONICET



+ Universities

- Many research groups working in the full Sun-Earth system (UNT, UNLP, IAFE, UBA, GEHMe-UM, UTN, US, UNC, etc)
- Human Resources (PhD programs, Courses, etc)
- Infrastructure

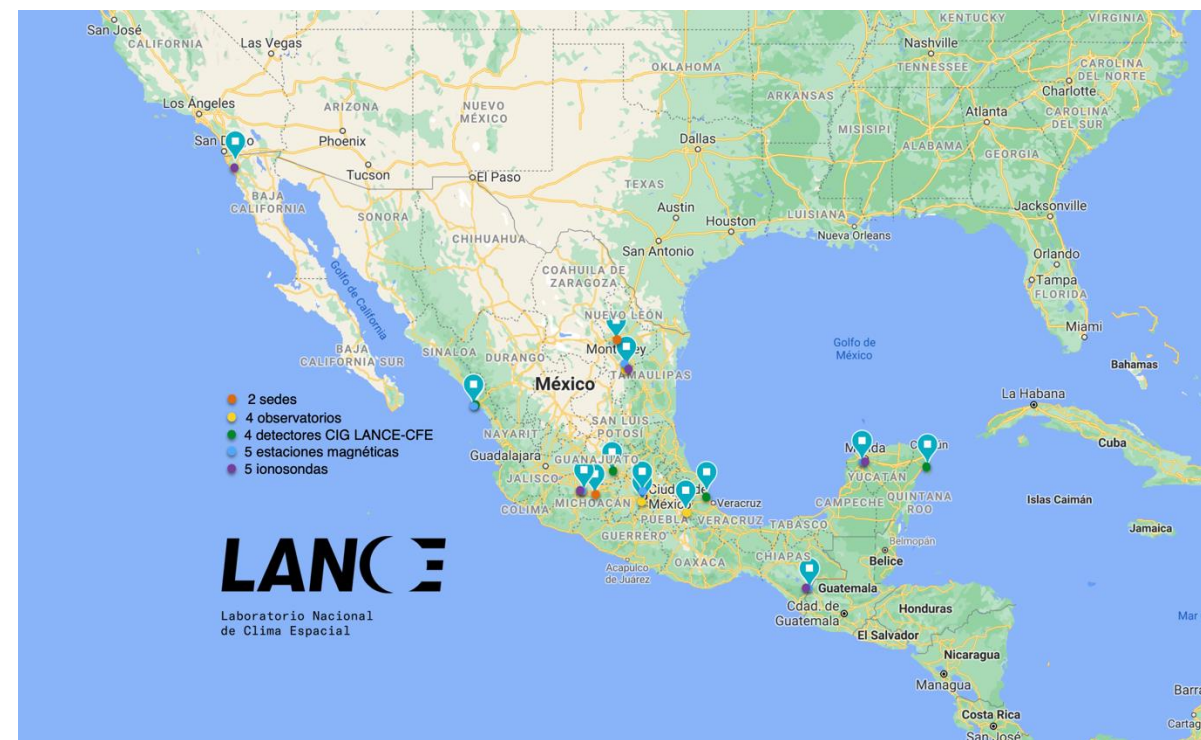


# Mexico: LANCE

- MEXART IPS radiotelescope (Michoacan)
- TEC analysis / GNSS receivers network (SSN-TLALOCNet)
- Magnetometer network (3 in operation)
- Ionosonde network (5 in operation)
- Cosmic rays observatories (2 in operation)
- CALLISTO systems (4 in operation)
- All-sky viewer (2 in operation)
- Schumann resonance station
- GIC detectors network (4 in operation)

# LANCE

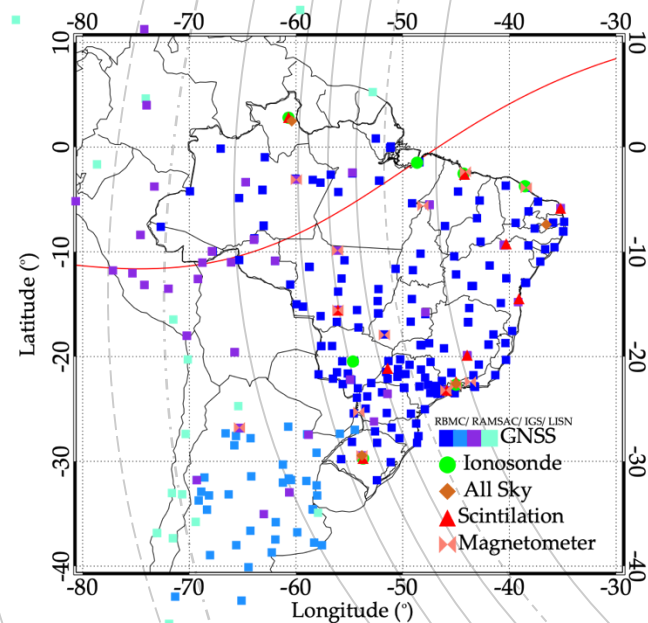
Laboratorio Nacional  
de Clima Espacial



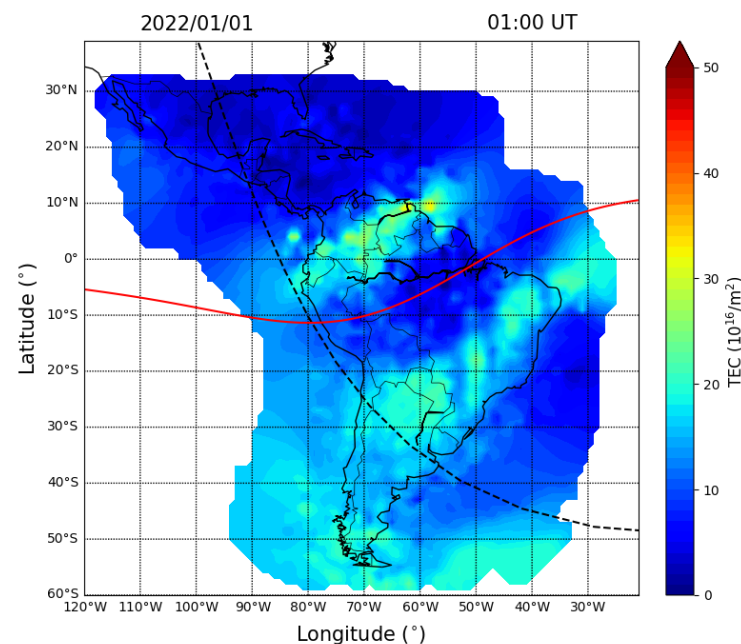


# Brasil: EMBRACE

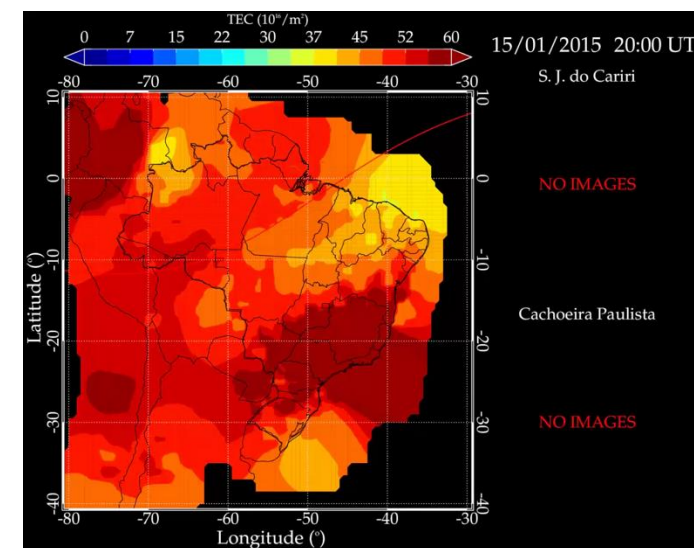
- Sun & Interplanetary medium
- Inner Magnetosphere
- Radiation Belts
- Ionosphere
- Neutral & Ionized boundary
- Geomagnetic induced currents



GNSS TEC Map over South America  
(dynamic map – every 10 min)



Plasma bubbles dynamics  
(realtime)



<http://www.inpe.br/climaespacial>



# EISCAT - 3D



Talk on Thu 8:10am - EISCAT - Devin Huyghebaert

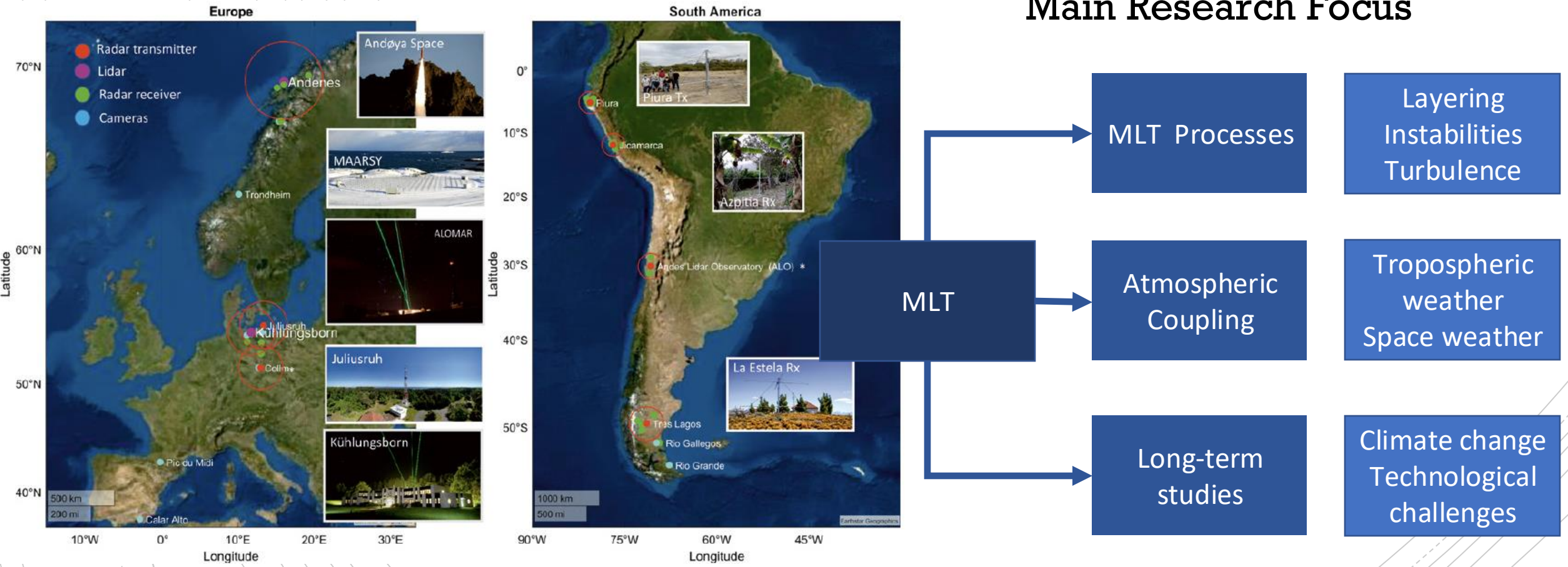
Credit: Johan Svensson, EISCAT



# Germany: The MLT at the Leibniz Institute of Atmospheric Physics

## Instrumentation + Modelling

## Main Research Focus





# Germany: Activities at German Centre for Geomagnetism (GFZ)

- Space weather at GFZ (<https://spaceweather.gfz-potsdam.de/>)
  - Section 2.3 Geomagnetism and Niemeck Observatory
  - Section 2.7: Space Physics and Space Weather
- DFG Research Unit “Magnetosphere, Ionosphere, Plasmasphere, Thermosphere as a Coupled System (MIPT)”, involves
  - German Research Centre for Geosciences (GFZ),
  - University of Bonn (Uni Bonn)
  - Technische Universität München (TUM),
  - Ludwig Maximilian University (LMU) and
  - German Aerospace Center (DLR).



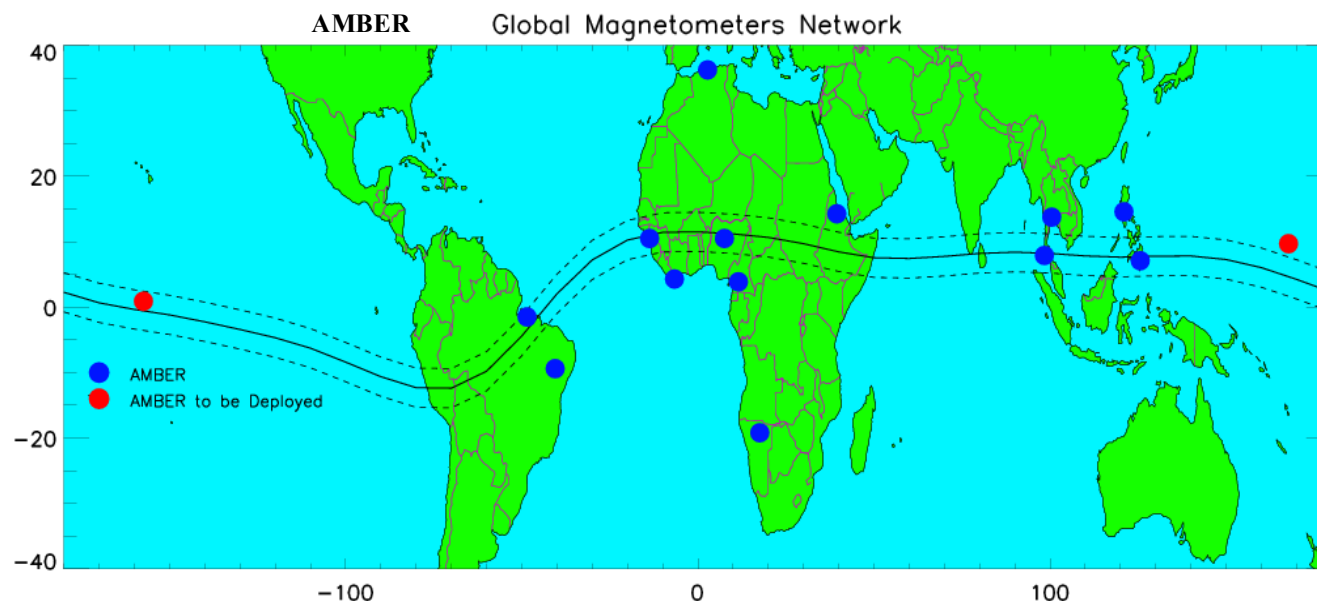
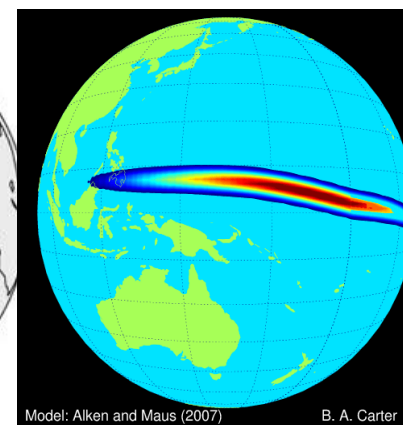
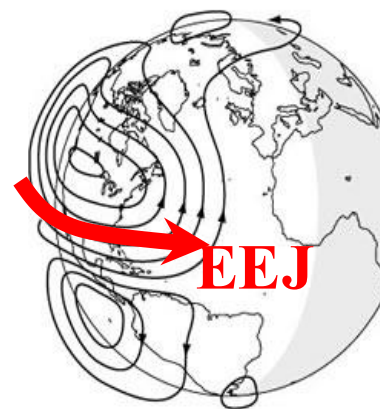
# Germany: Activities at German Space Center (DLR) – Institute for Solar Terrestrial Physics

- Three departments (<https://www.dlr.de/en/so>)
  - Space Weather Impact
  - Space Weather Observations
  - Solar-Terrestrial Coupling
- Ionosphere Monitoring and Prediction Center (IMPC)
  - <https://www.dlr.de/en/so/research-transfer/projects/ionosphere-monitoring-and-prediction-center-impc>



# Africa: AMBER Magnetometer Network

- Objectives:
  - To understand equatorial electrodynamics as a function of local time, longitude, magnetic activity, and season
  - To understand the SMI coupling impact on the equatorial density distributions





# Conclusions

- International Collaboration is based on:
  - Establishing common goals and objectives
  - Clear communication
  - Respect cultural differences
  - Establishing trust and building relationship
  - Flexibility and adaptability
- There are many possible opportunities for collaboration all over the world, I mentioned a few in South America, Europe, and Africa, but there are many more.