

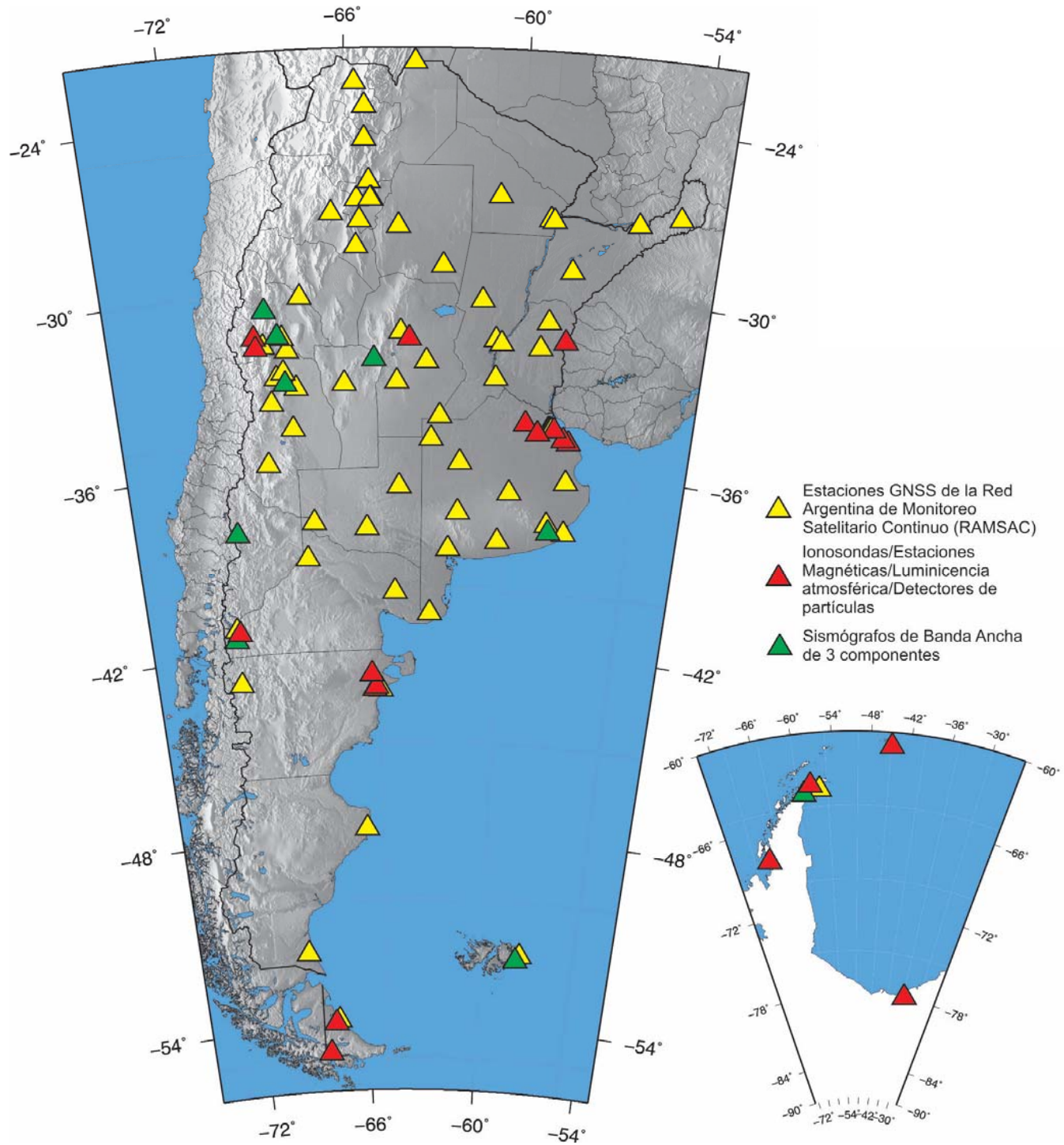
Space Weather Program in Argentina

Active groups on
different Space Weather fields:

- Solar Physics (IAFE, Mendoza)
 - Solar Wind (IAFE, UBA)
- Magnetosphere (UBA, Univ. La Plata)
- Ionosphere (Univ. La Plata, Univ Tuc)
 - Planetary Physics (IAFE)
- Energetic Particles (Balseiro, UBA)
 - Plasma and MHD (UBA)
- High Performance Numerical Simulations (UBA)

Some [incomplete] data associated with Space Weather from Argentina

- Solar Observatory (El Leoncito, 2500 m, asl)
- Net of magnetometers
- Net of ionosonde stations
- Luminescence observatories (e.g., airglow)
- Net of GNSS (RAMSAC)
- Energetic Particle Detectors
[one to install in Antarctic]
- Spacecraft (CONAE) [e.g., SAC-D, orbit ~ 600 km]



The LAGO (Latin American Giant Observatory) Project

A very long baseline “array” of water Cherenkov detectors (WCD)



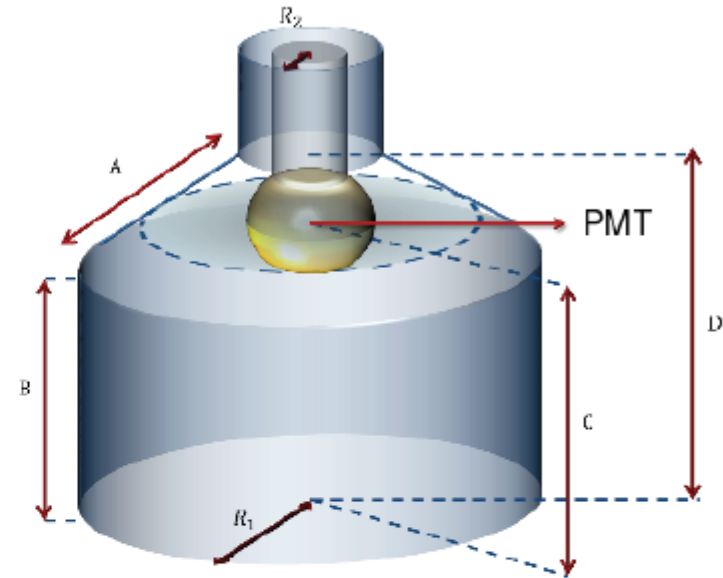
- Sites in eight countries: Argentina, Bolivia, Colombia, Ecuador, Guatemala, México, Perú & Venezuela
- Two new detectors in Brazil will be incorporated by 2015.

The LAGO Collaboration

- 86 members from 28 institutions at 9 LA countries: Argentina, Bolivia, Brasil, Colombia, Ecuador, Guatemala, México, Perú & Venezuela.
- Scientific goals:
 - ▶ Search for HE component of GRBs at ground level
 - ▶ Study transient and long term Space Weather phenomena through Solar modulation (SM) of Cosmic Rays (CR)
- Academic goals:
 - ▶ Train latin-american students in HE, Astroparticle techniques, and Space Weather
 - ▶ Build a Latin-American network of Astroparticle researchers

Our *smart* Water Cherenkov Detector detector (sWCD)

- Autonomous, reliable, simple and cheap detector
- Sensitivity to secondary charged particles and γ (mainly through $\gamma \rightarrow e^+ e^-$)
- Commercial tanks with $1,5 \text{ m}^2 - 10 \text{ m}^2$ of detection area filled with purified water
- Inner coating of Tyvek (UV diffusive and reflective fabric)
- PMT + Digitizer board (own design)
- Integrated GPS & environmental sensors
- FPGA + Raspberry Pi: detector control, telemetry, data acquisition and on board data pre-analysis



- Digitized signals by a 10-14 bits FADC at 40-100 MHz (10-25 ns)
- Temporal synchronization: GPS in PPS mode
- Station consumption: $\lesssim 8 \text{ W}$
- Very low cost detector

