



**Montevenda Engineering
International Association**



G. Giuliani

Fondazione Onlus

Ricerca Sperimentale Precursori Sismici

1st International Conference on Natural Hazards and Disaster Management

June 1-3, 2017 - Osaka, Japan

Theme: "Significance of Early warning systems and risk management strategies"

**The geophysical precursors of Earthquakes:
Emissions of radon-222 and ionizing radiation in imminent earthquakes.
The proposal of a seismic warning network for Ecuador**

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Earthquake of Ecuador Coast, April 16th, 2016 ex-Shopping Center of Portoviejo



Volcan Cotopaxi crisis, 2015



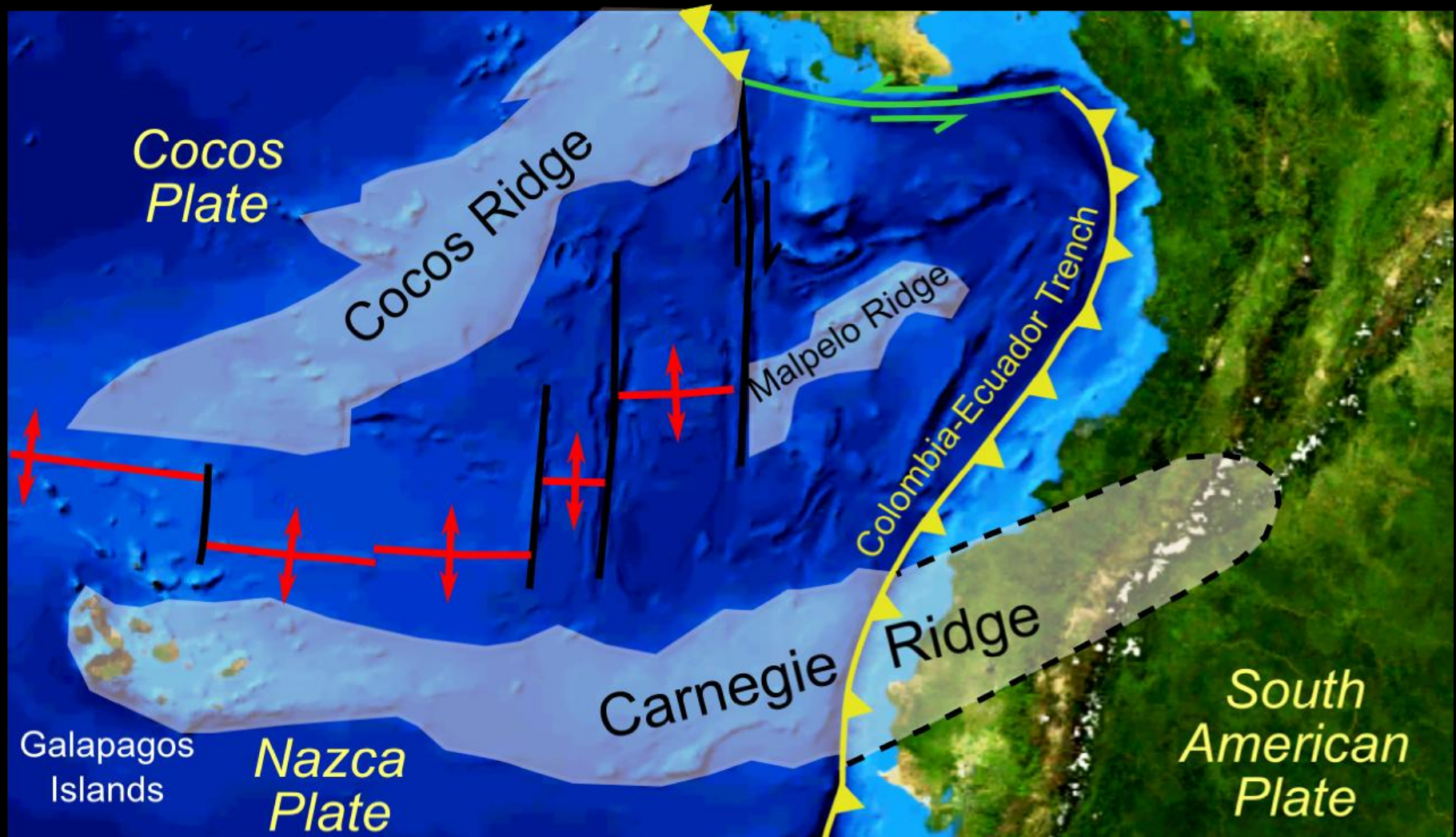
Selva Alegre (Pichincha Province), evacuation test for the Cotopaxi Volcano crisis, 2015



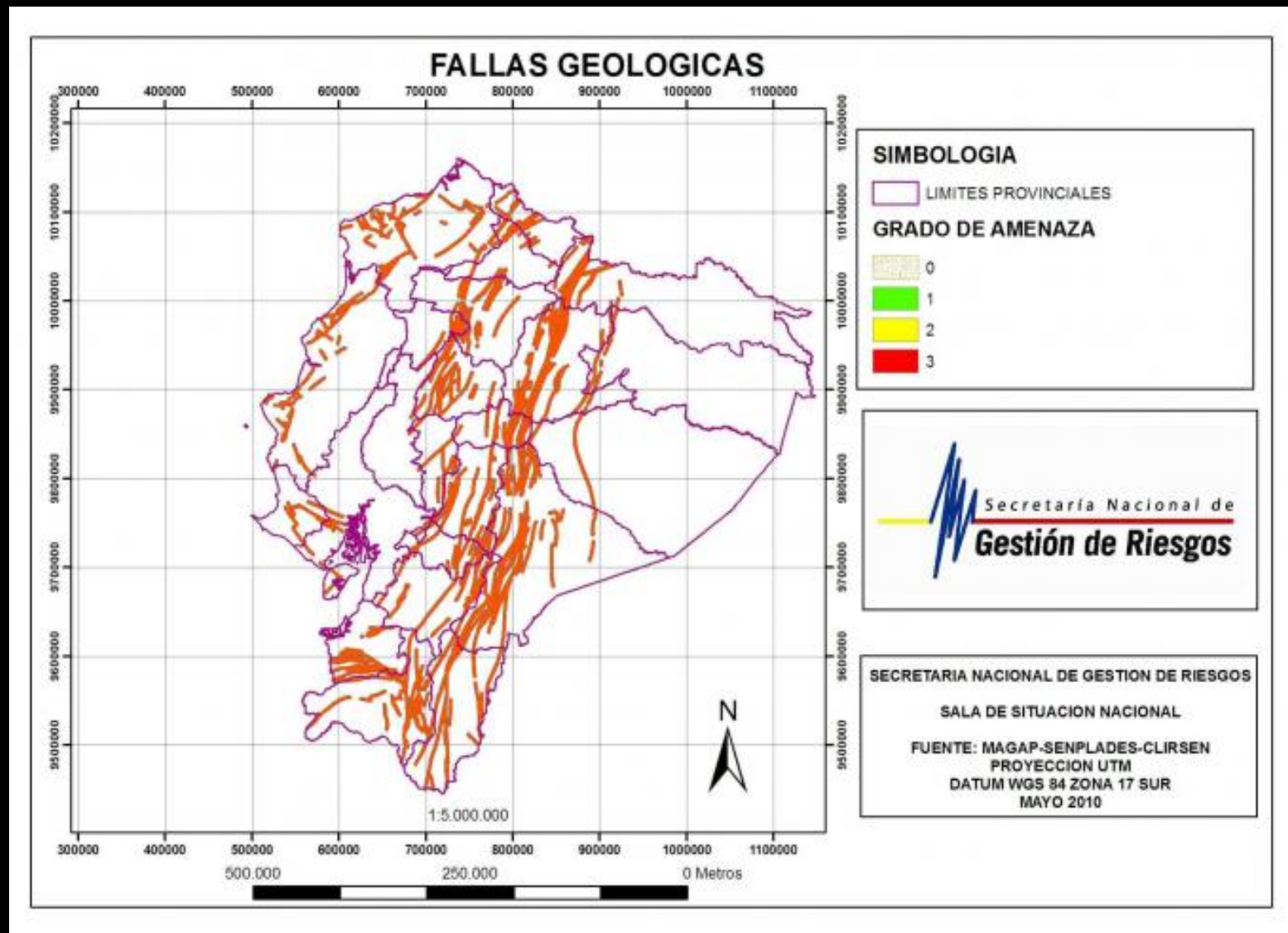
Tectonic plates around Ecuador



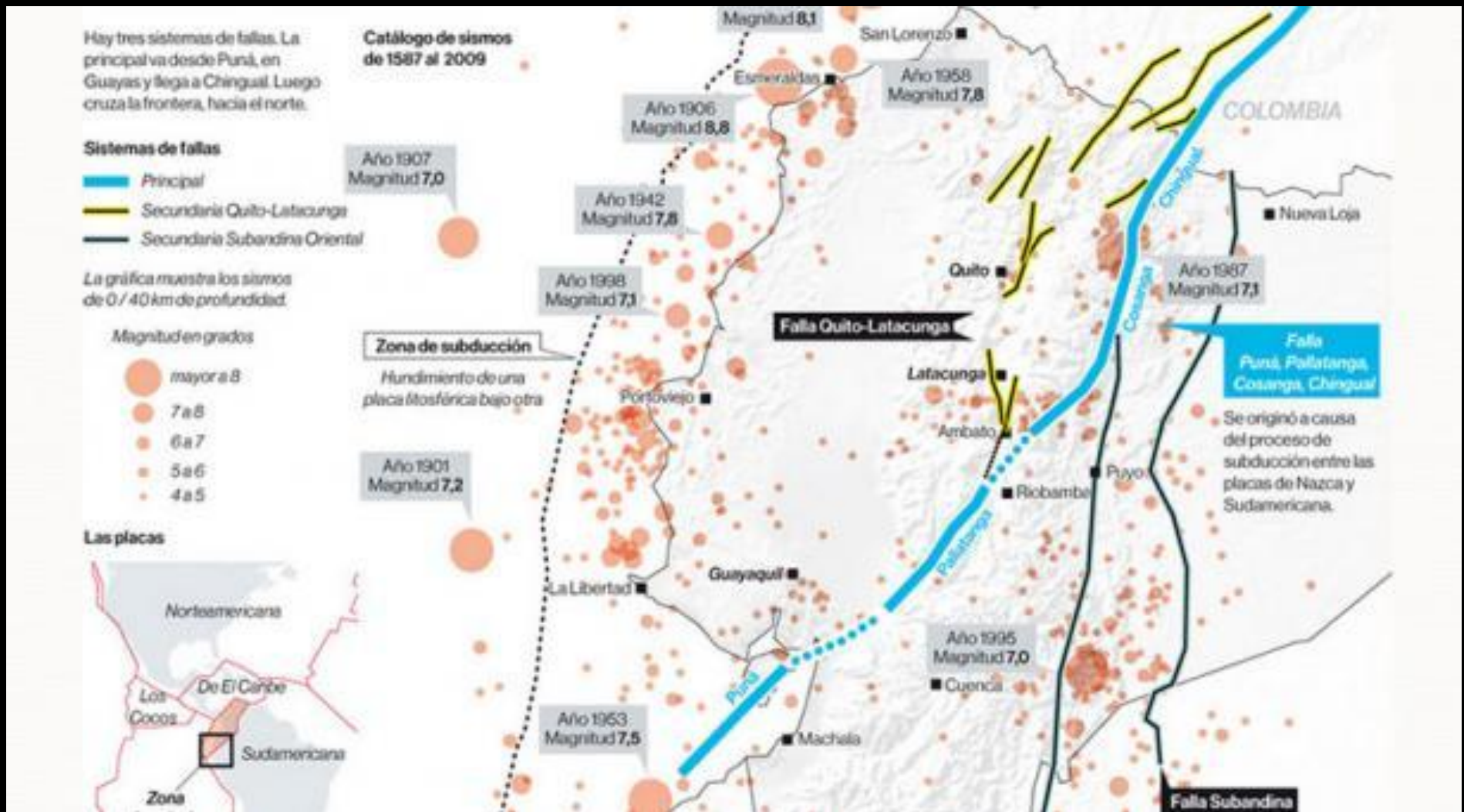
Tectonic situation around Ecuador



Faulting system of continental Ecuador

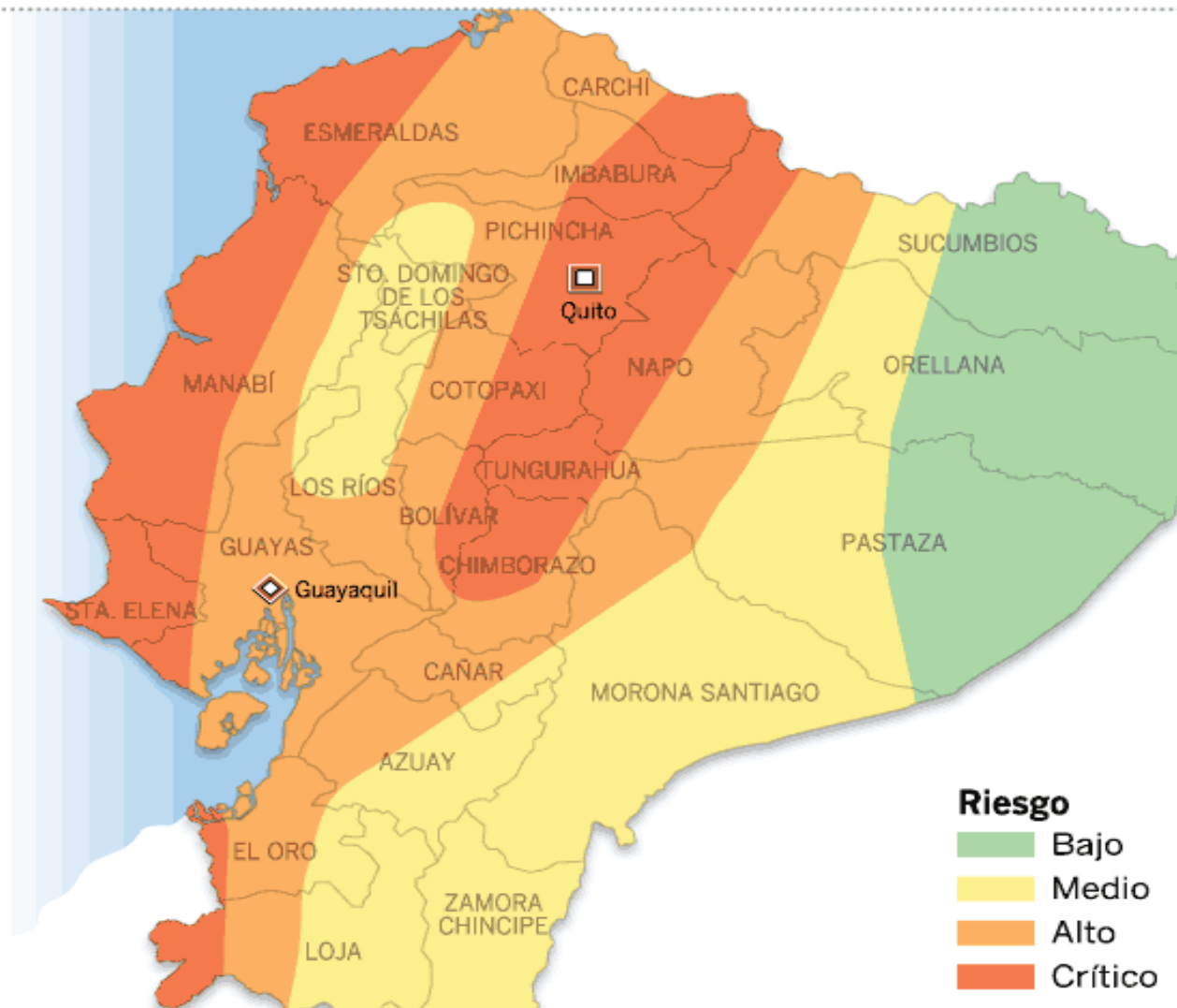


Faulting system and considerable earthquakes



Seismic risk in Ecuador

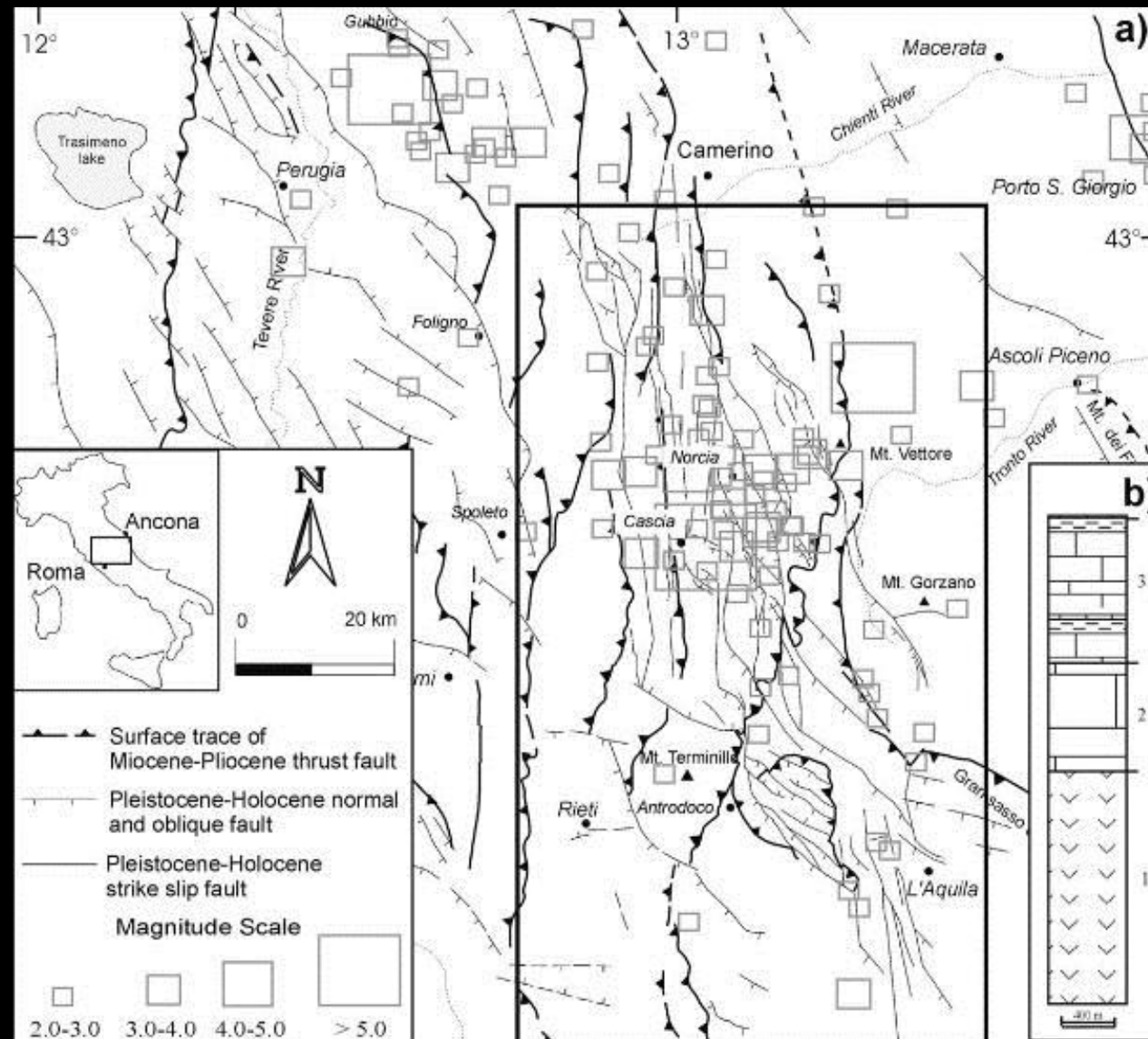
Zonas sísmicas



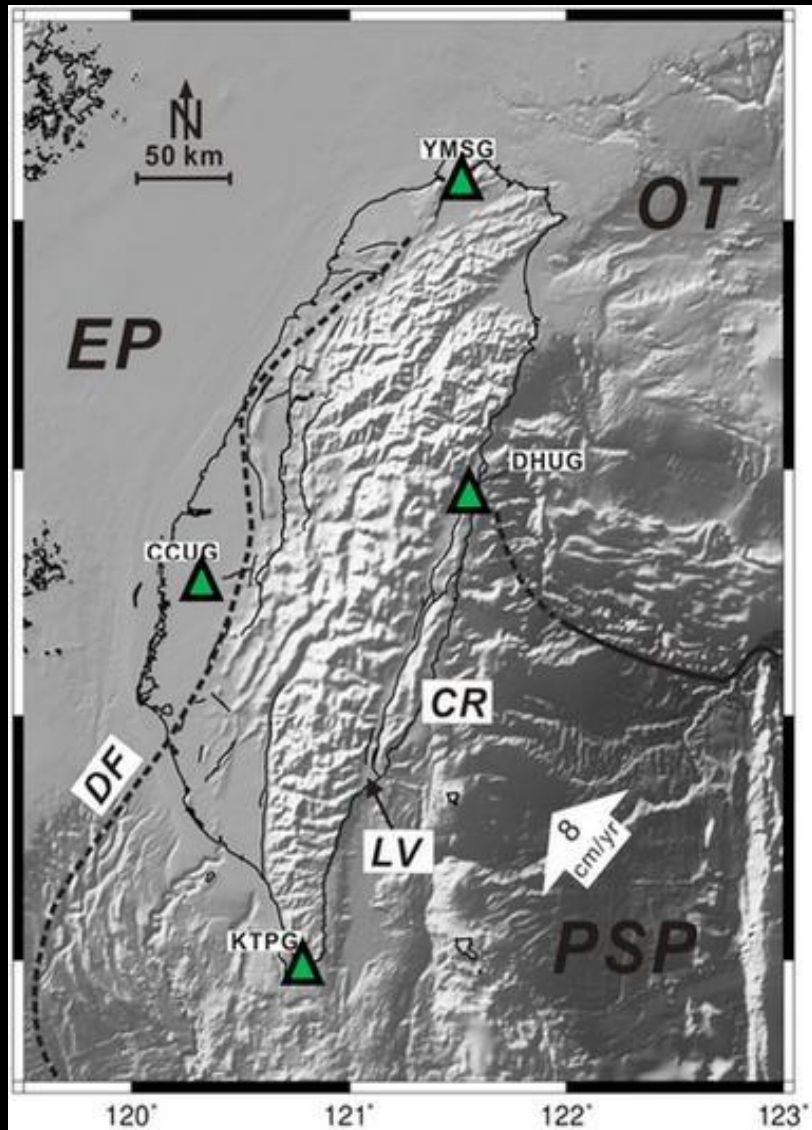
Radon-222 Sensor Network in Central Italy



Faulting system in Central Italy



Radon-222 Sensor Network in Taiwan



Location of gamma-ray station

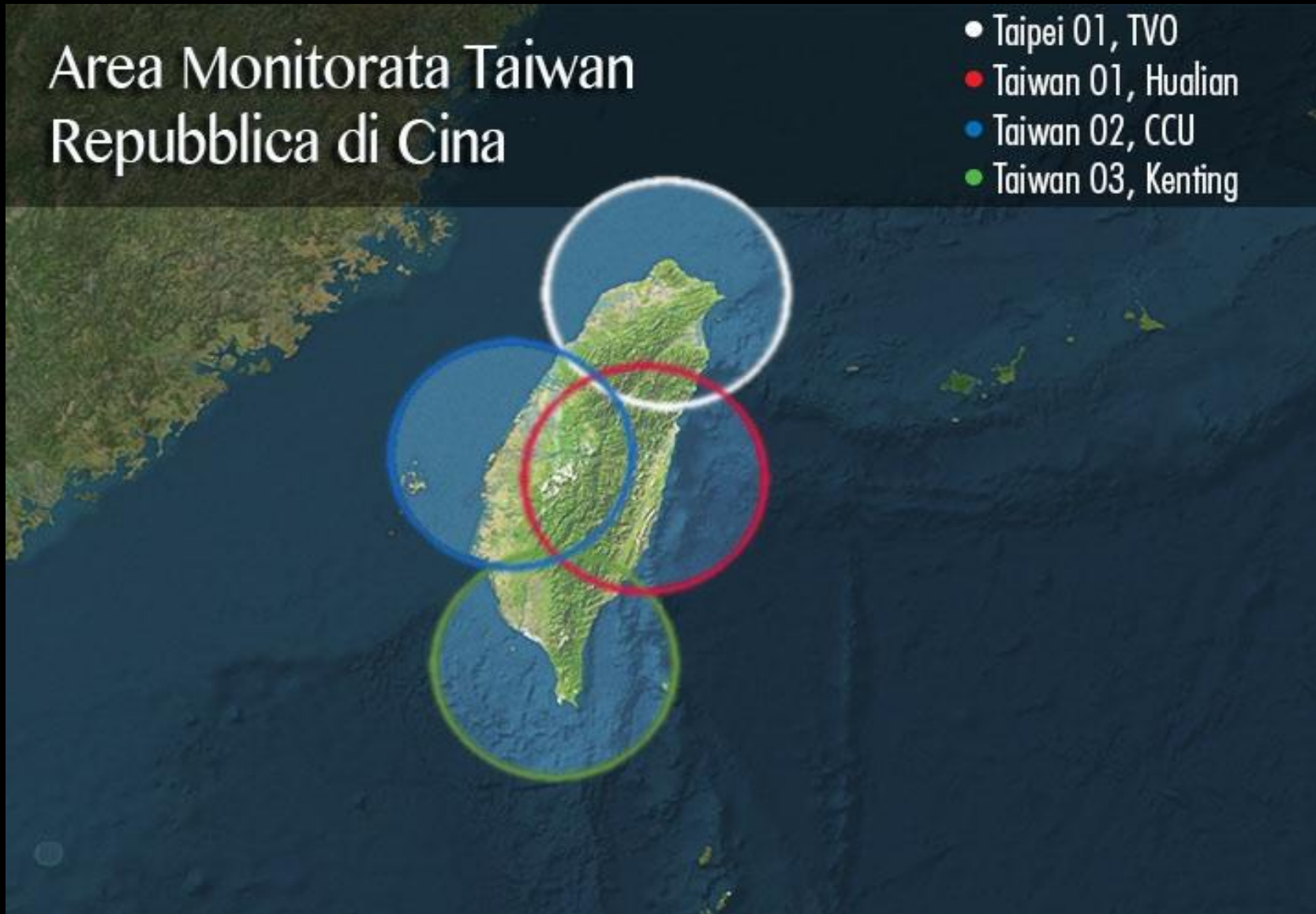
- Taiwan Volcano Observation at Tatun Mountain (YMSG)
- Hualien Dong Hwa University (DHUG)
- Chiayi Chung Cheng University (CCUG)
- Kenting National Park (KTPG)

▲ The green triangle represents the location of the gamma-ray monitoring station

Monitored area by Radon-222 sensors in Taiwan

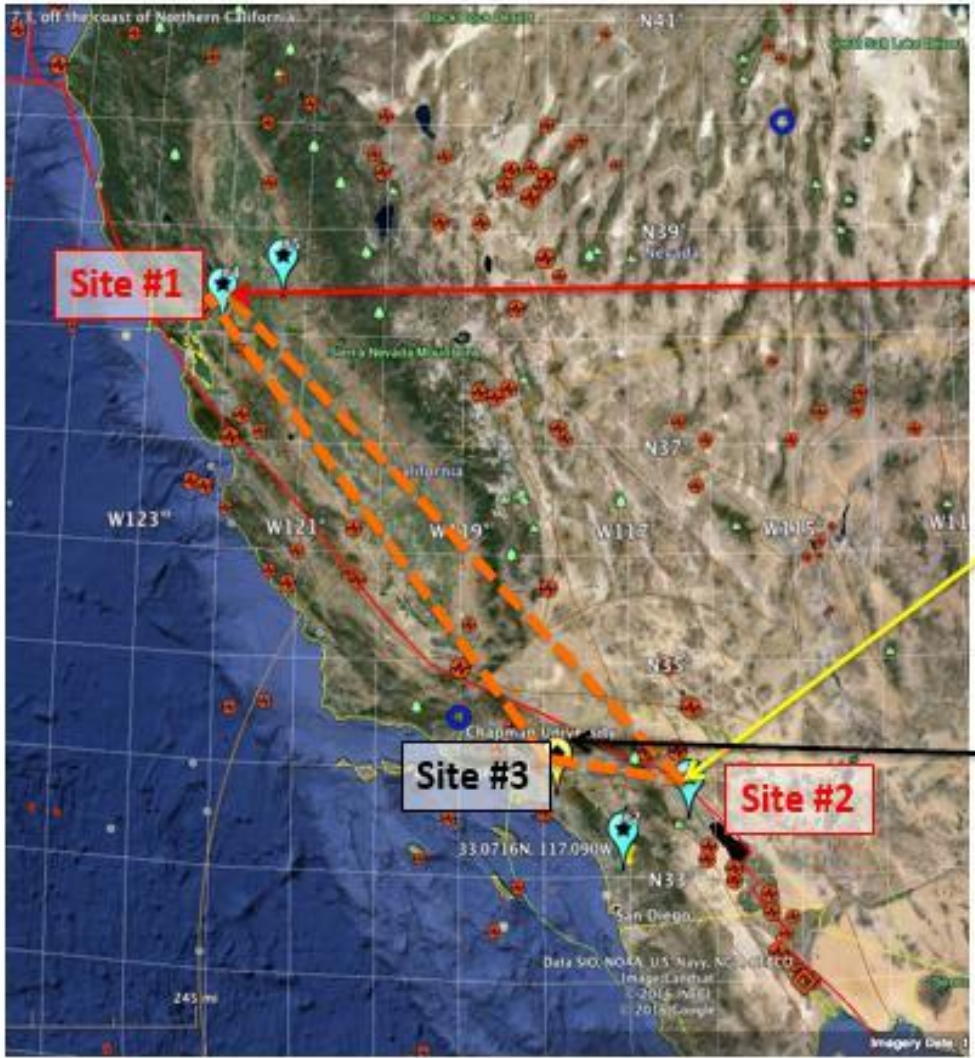
Area Monitorata Taiwan
Repubblica di Cina

- Taipei 01, TVO
- Taiwan 01, Hualian
- Taiwan 02, CCU
- Taiwan 03, Kenting



Radon-222 Sensor Network in California

Potential New sites for radon sensor installation using Power + offices



Benicia Office: 401 W. Channel Benicia, CA 94510

Palm Springs Office: 16839 Little Morongo Rd. Desert Hot Springs, CA 92240

Existing Sensor Orange, Chapman University

Monitored area by Radon-222 sensors in California

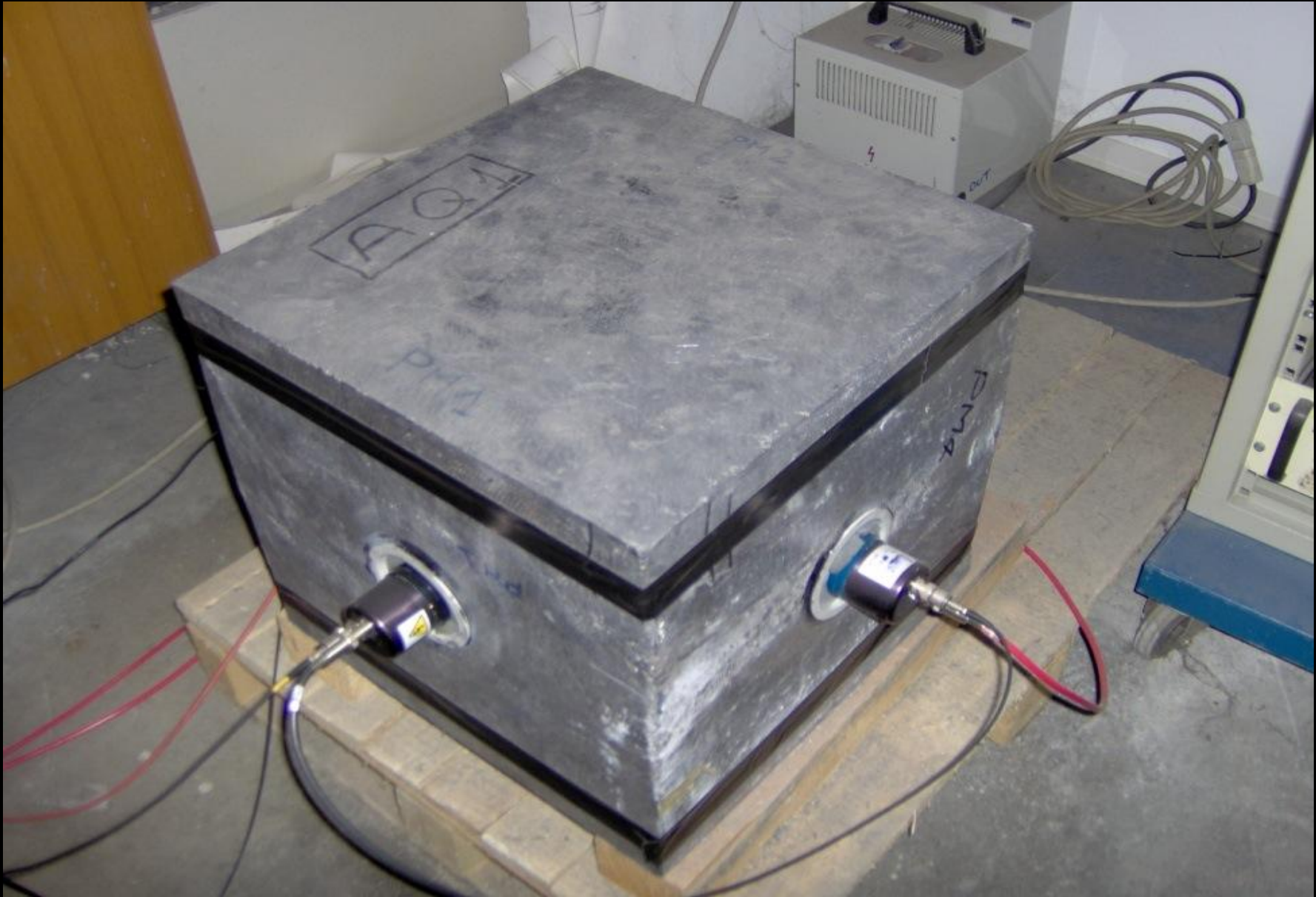
Area Monitorata Sud California - USA
Orange, CA



Scheduled Radon-222 Sensor Network in Ecuador



Sensor of Radon-222



Installation of a Radon-222 sensor

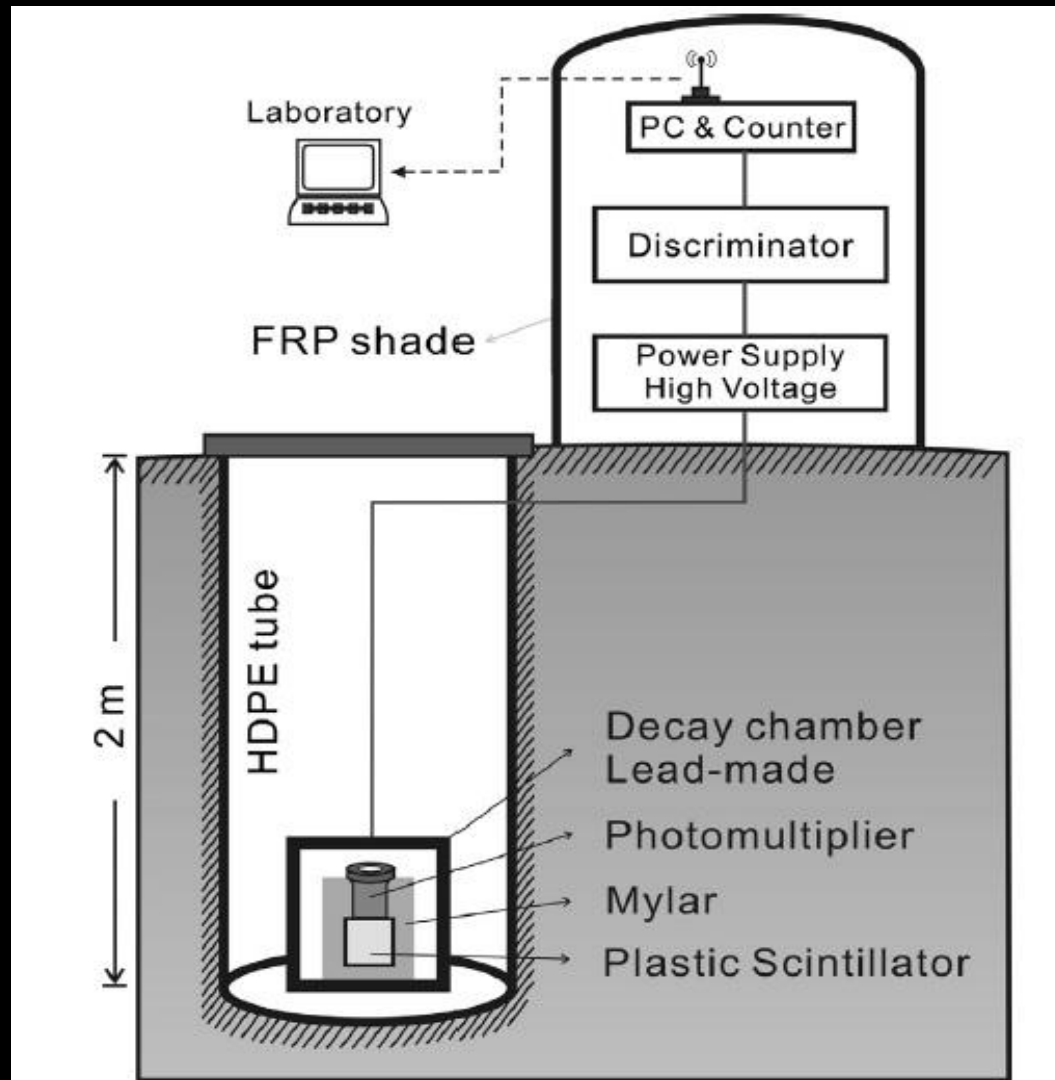
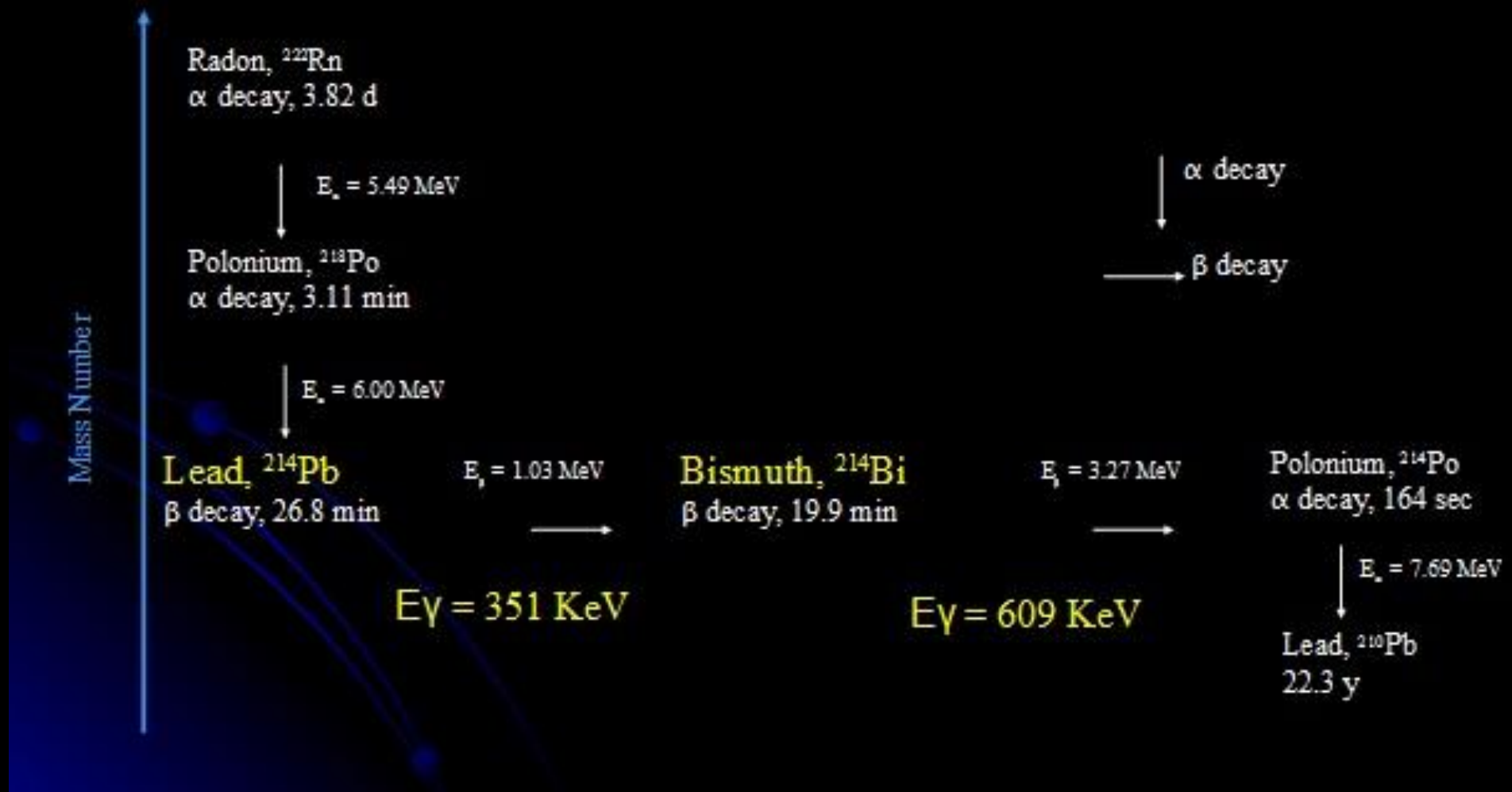


Fig. 2. The scheme of gamma-ray monitoring station.

Radioactive decay scheme Radon-222

Decadimento ^{222}Rn



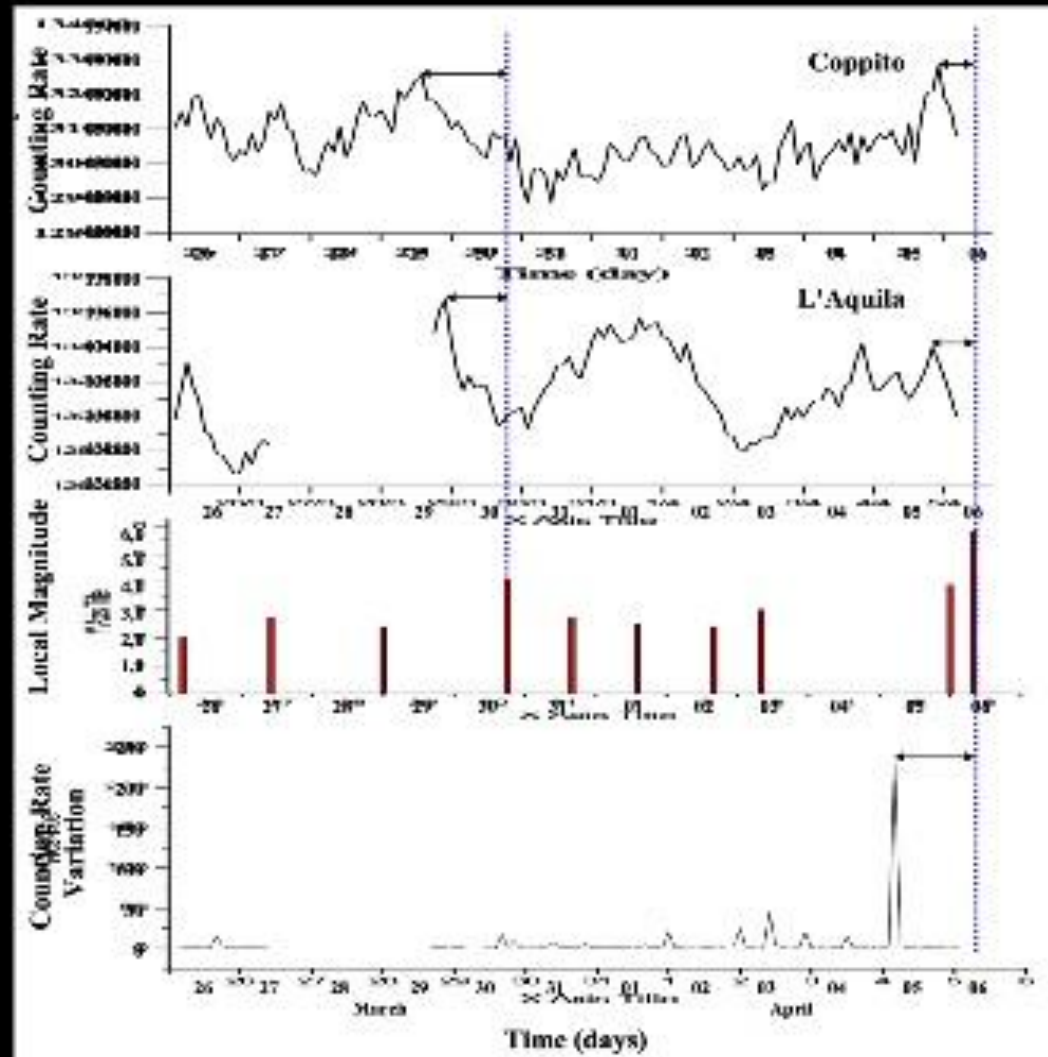
Recordings of Radon-222 concentrations and seismic shocks in Abruzzo, 2009

April 2009

Counting rate

Earthquakes

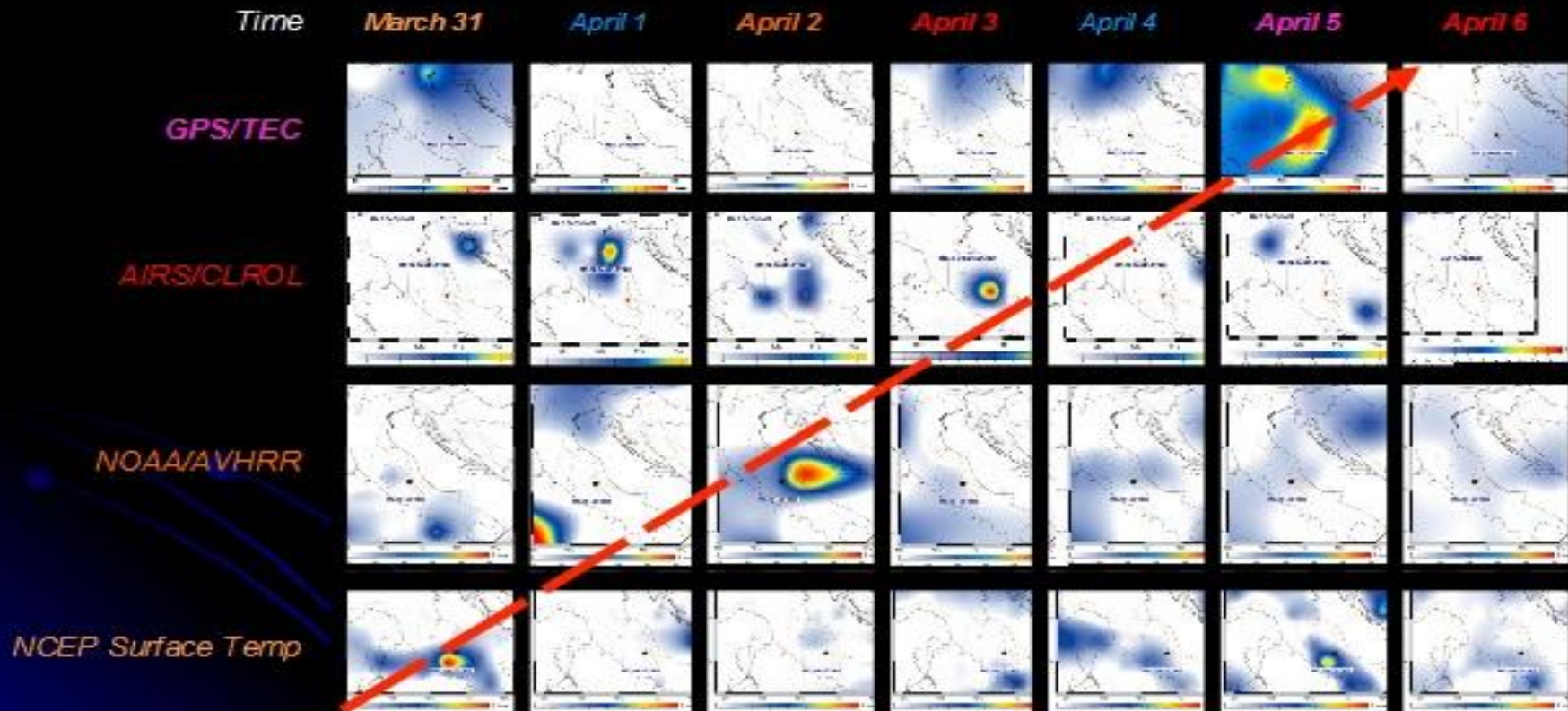
Counting rate variation



Satellite images of Abruzzo, 2009

l'Aquila, Italy, 06.04.2009

Mosaic of atmospheric activities March 31-April 6th,2009



Seismic risk in Latin America



Thank for Your kind attention!

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