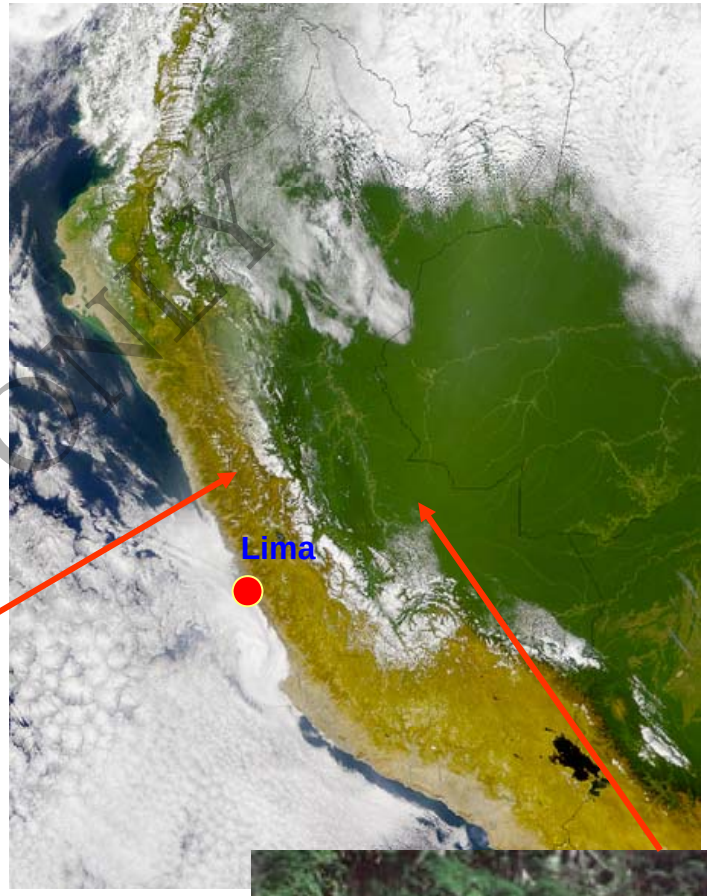
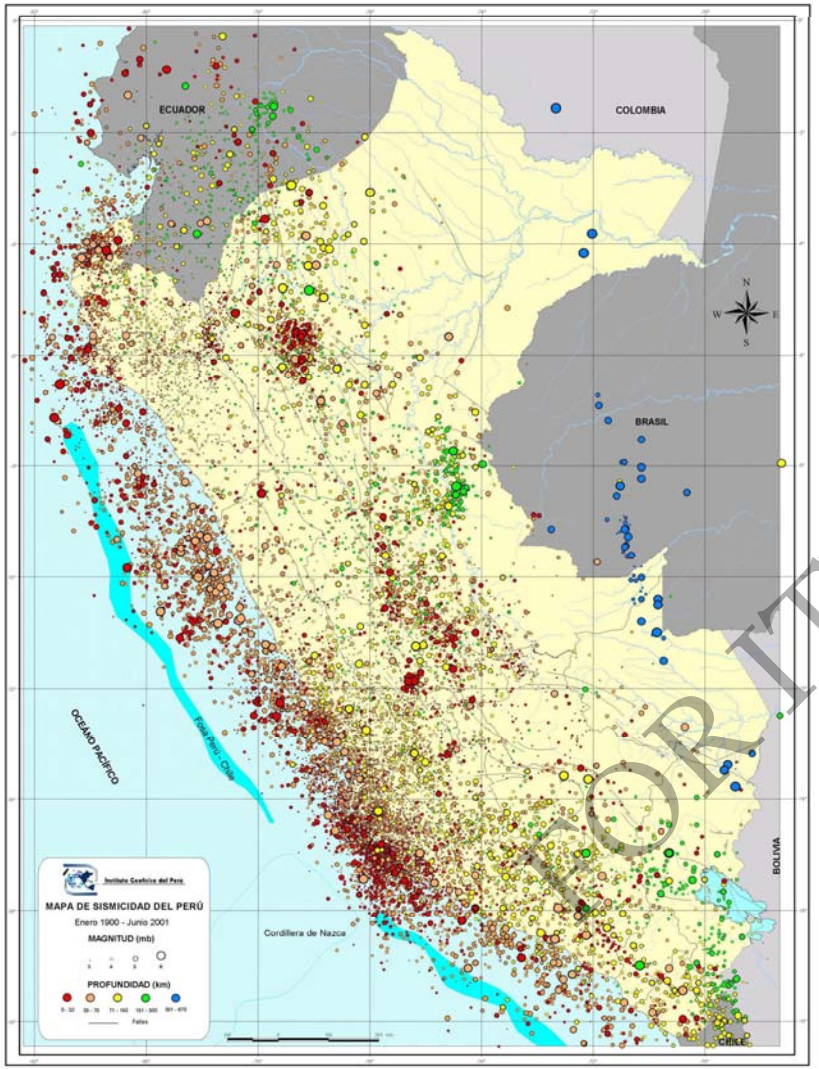
Instituto Geofísico del Perú

The 6th International Training Workshop, May 10 to 14 Taipei

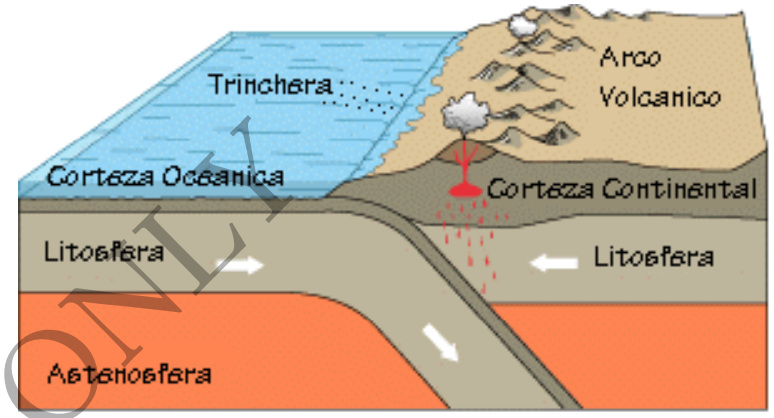
Perú is located in the central and western part of South America. Its geography is one of the most complex due to the presence of Peruvian Andes mountain chain which divides the territory into three regions (Coast, highlands and jungle) whose weather, vegetation and culture are distinctive.



Instituto Geofísico del Perú



PERU SEISMIC MAP: 1900 - 2001



Oceanic-continental convergence

In the geodynamic context, Perú is located throughout the active margin generated by the convergence of the Nazca and South America Plates. This process is realised at an approximated speed of 68 mm/year and is the direct cause of the natural (surface geologic events) or induced hazard as well collapses of tailing dam.

Instituto Geofísico del Perú

FACILITIES IGP IN LIMA CITY

1. Headquarters IGP in Lima

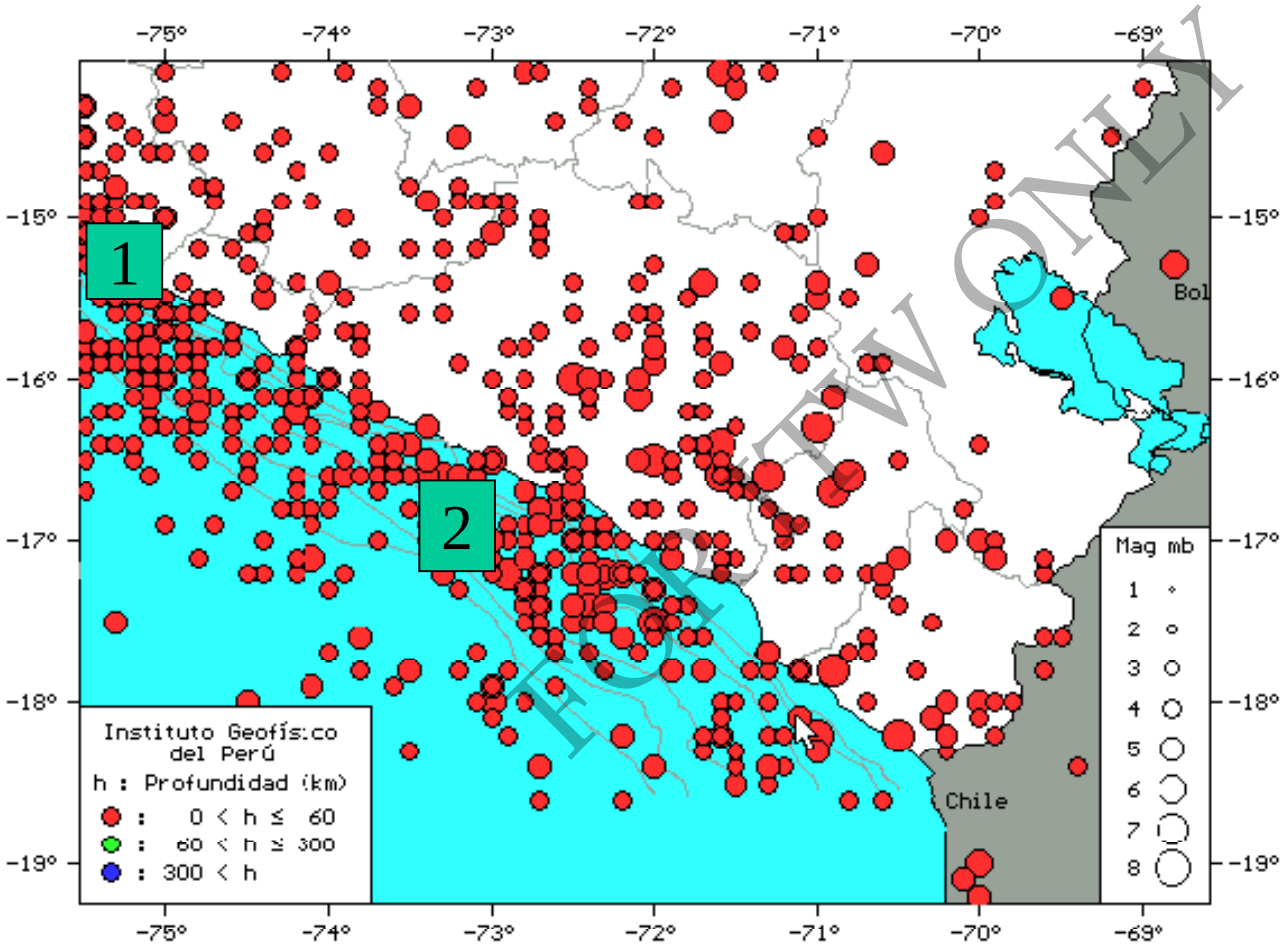
2. Camacho Site, Geophysical Net Laboratory

3. Jicamarca Radio Observatory, East Lima

4. Ancón Magnetic Observatory, North Lima

Instituto Geofísico del Perú

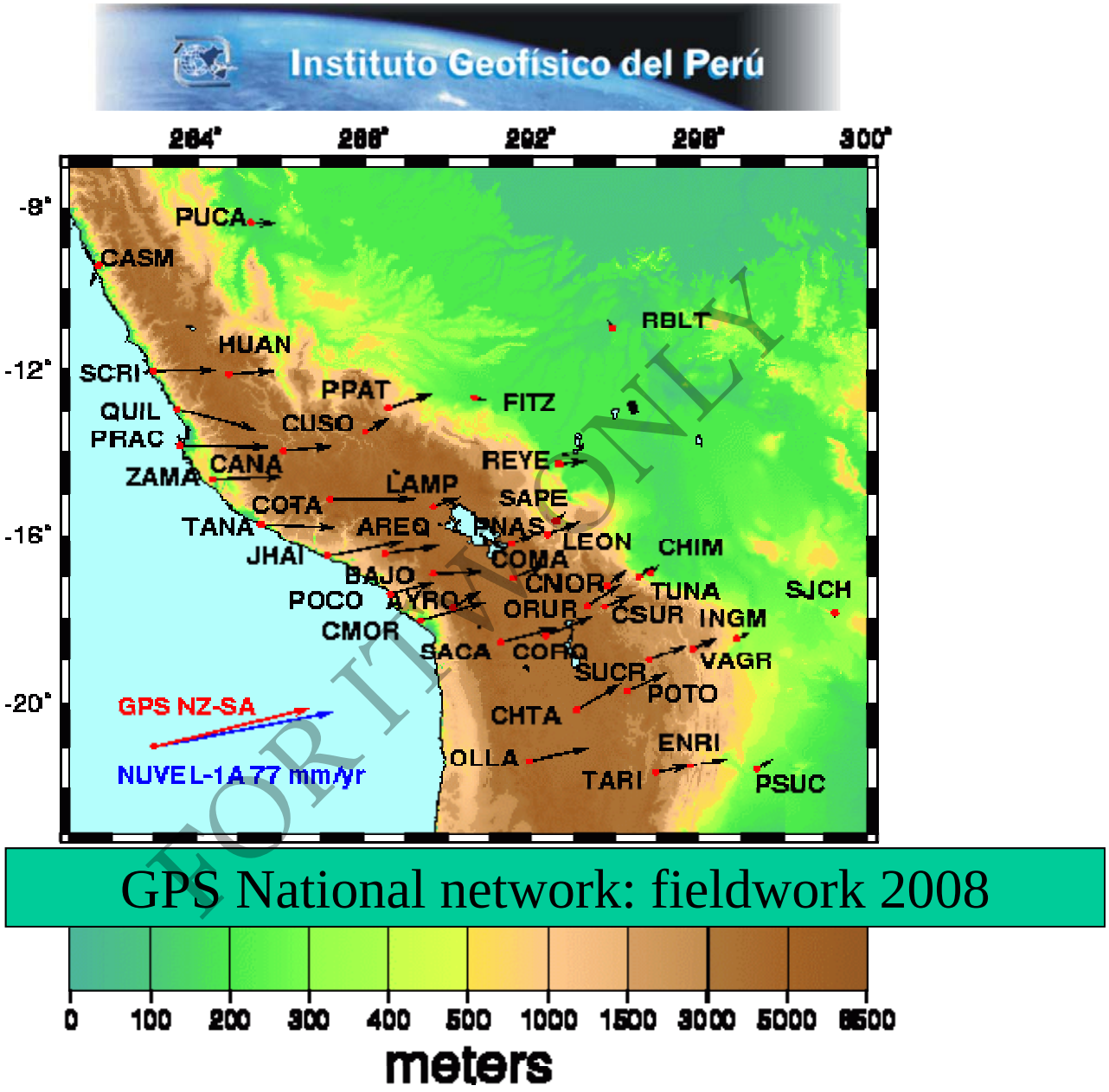
SURFACE SEISMICITY IN SOUTH PERU



The last big Earthkuakes:

1. 2007, Pisco 8.0 Mw

2. 2001, Arequipa 8.4 Mw



GPS National network: fieldwork 2008

The 6th International Training Workshop, May 10 to 14 Taipei

Instituto Geofísico del Perú

RESEARCH IN EQUATORIAL IONOSPHERE

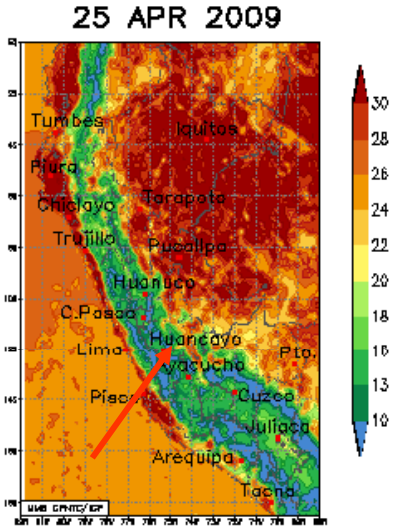
The Jicamarca Radio Observatory (JRO) is the equatorial anchor of the Western Hemisphere chain of incoherent scatter radar (ISR) observatories The JRO is the premier scientific facility in the world for studying the equatorial ionosphere. It consists of three 1.5 MW transmitters and an antenna array of 18,432 dipole elements, covering an area of approximately 85,000 m^2.. The Observatory is about half an hour drive inland (east) from Lima and 10 kms from the Central Highway (latitude 11.95˚ South, longitude 76.87˚ West)

The 6th International Training
Workshop, May 10 to 14 Taipei

Instituto Geofísico del Perú

RESEARCH IN CLIMATE CHANGE

Niño Phenomena: Floods and droughts

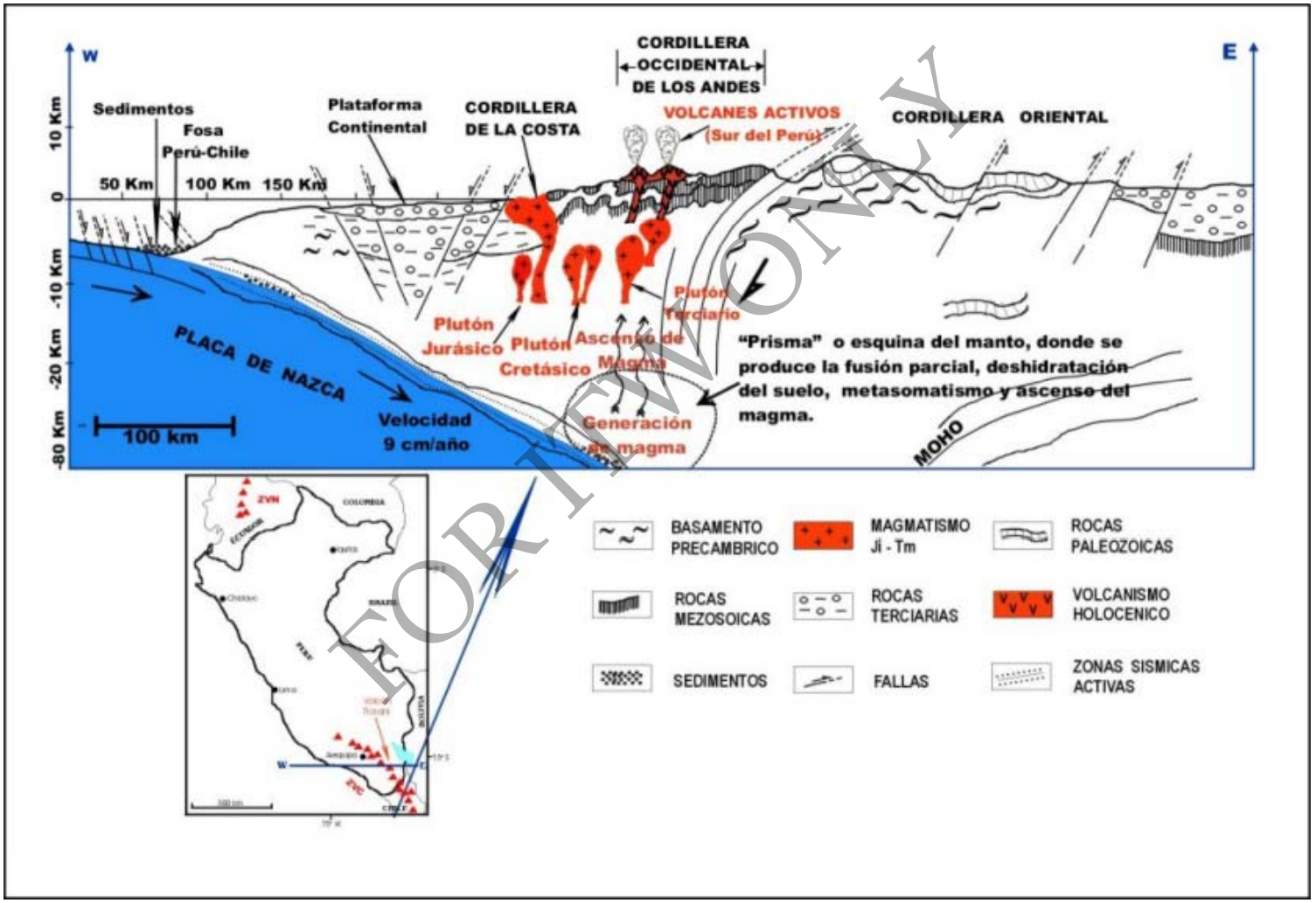


Meteorological station in Huancayo, Central Region Peru

The 6th International Training
Workshop, May 10 to 14 Taipei

Instituto Geofísico del Perú

THE VOLCANISM IN PERU



The 6th International Training Workshop, May 10 to 14 Taipei

Instituto Geofísico del Perú

RESEARCH IN VOLCANIC HAZARD: AREQUIPA REGION SOUTH PERU

El riesgo volcánico en Arequipa

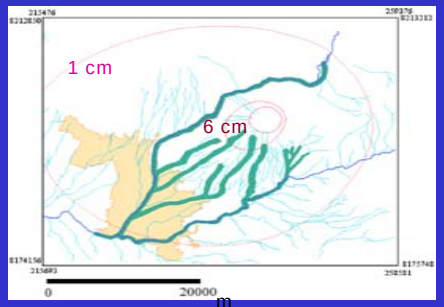
Cráter (5822 m) ⟷ Plaza de Armas (2330 m)

17 km

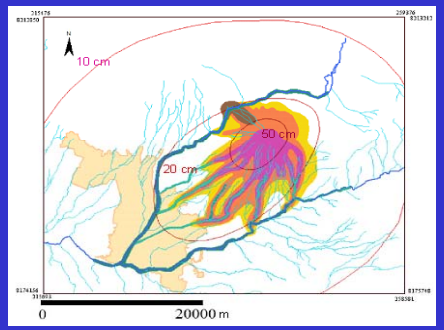
Ultima erupcion moderada ~ 1440 - 1470

Ultima erupcion importante ~ hace 2000 años

Mapas de Peligro volcánico



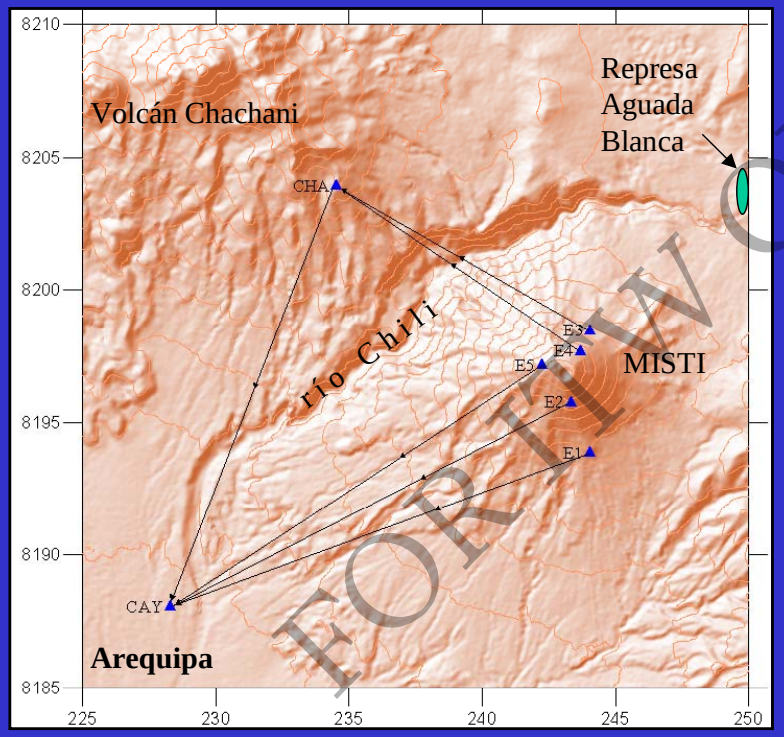
Delaite, Thouret et al., 2004



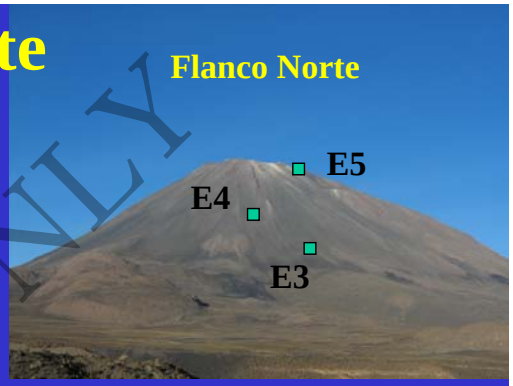
Instituto Geofísico del Perú

SEISMIC NETWORK IN MISTI VOLCANO AREQUIPA

Una RED SISMICA permanente



E1 - E5: Estaciones sísmicas
CHA: Estación repetidora de Chachani
CAY: Estación CENTRAL (IGP-Cayma)

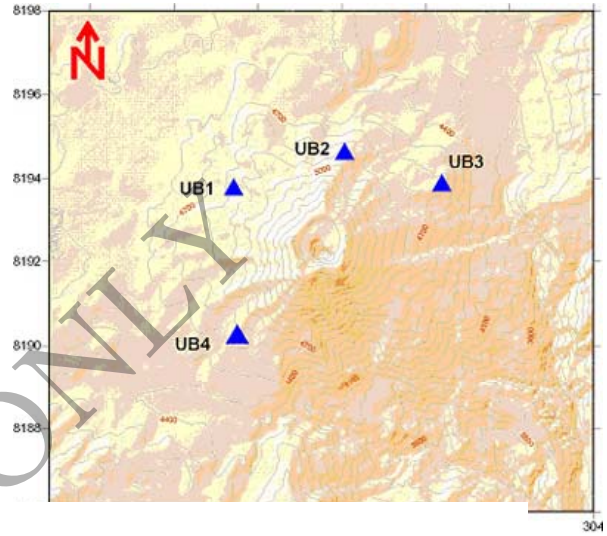


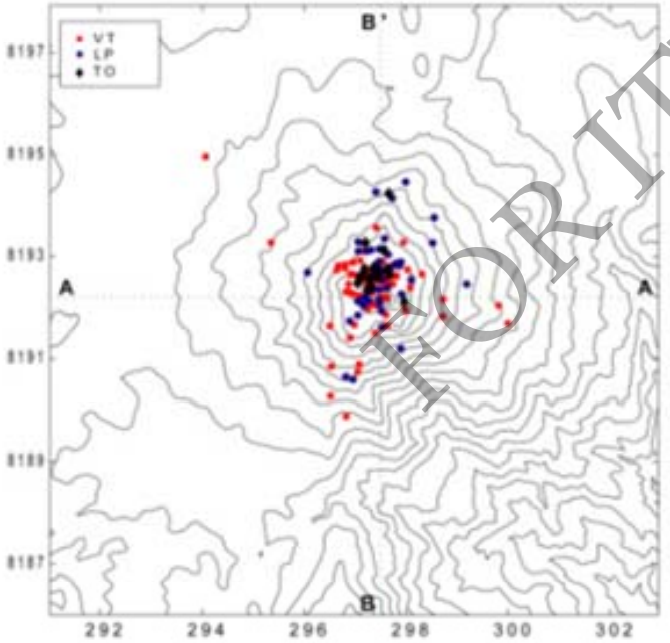
Estación E2 (5200 m) Misti Sur

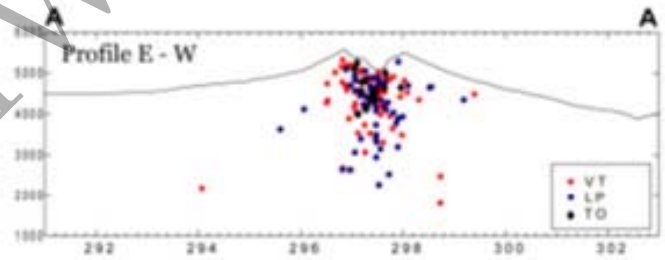
Instituto Geofísico del Perú

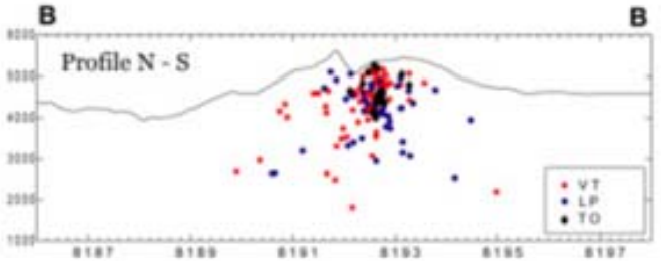
Ubinas volcano begun erupting once more on March 25th 2006, threatening 3500 people living at río Ubinas valley. After a short phreatic eruption phase, on 19th April 2006 magma arrived on surface

Instituto Geofísico del Perú

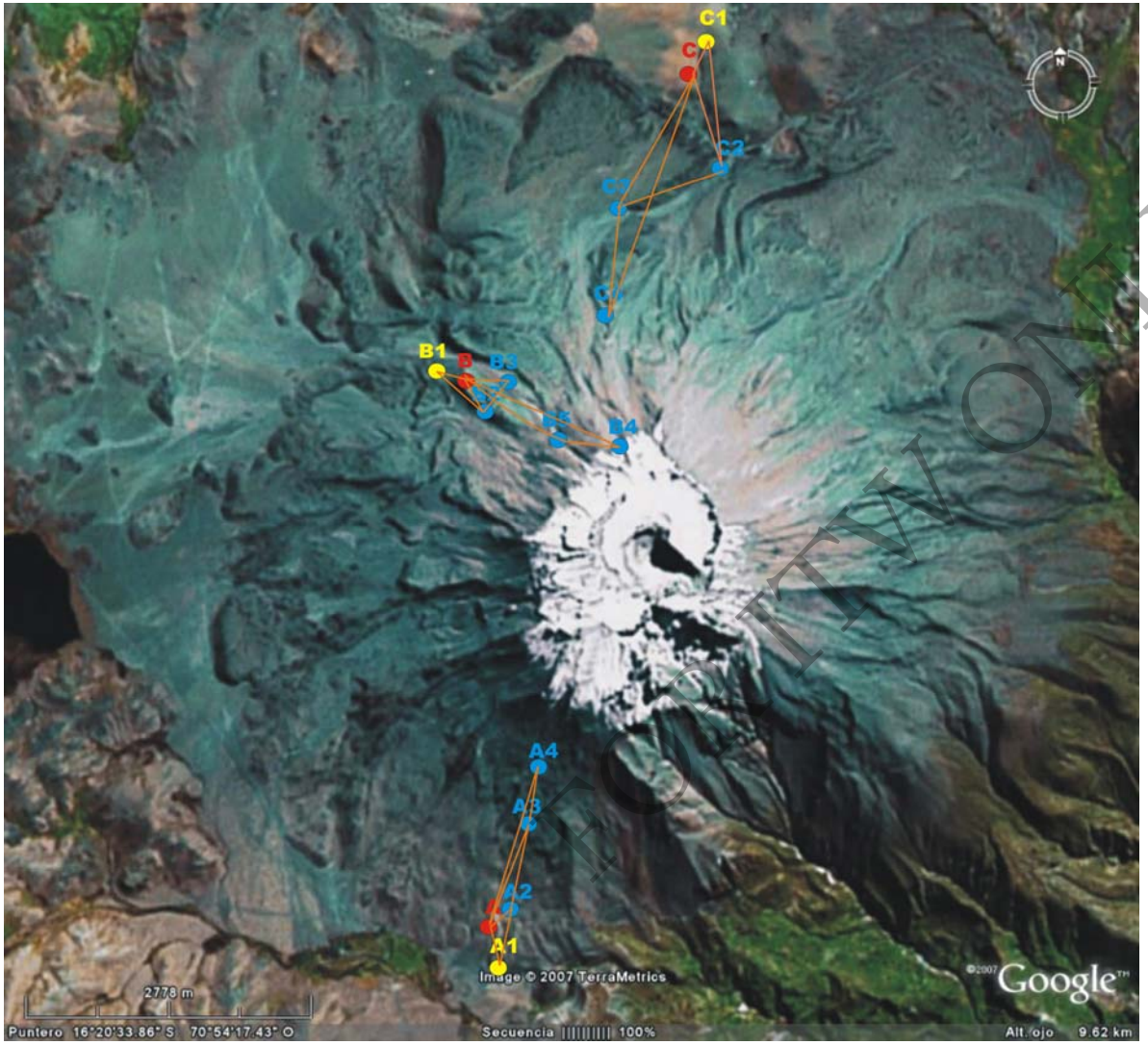






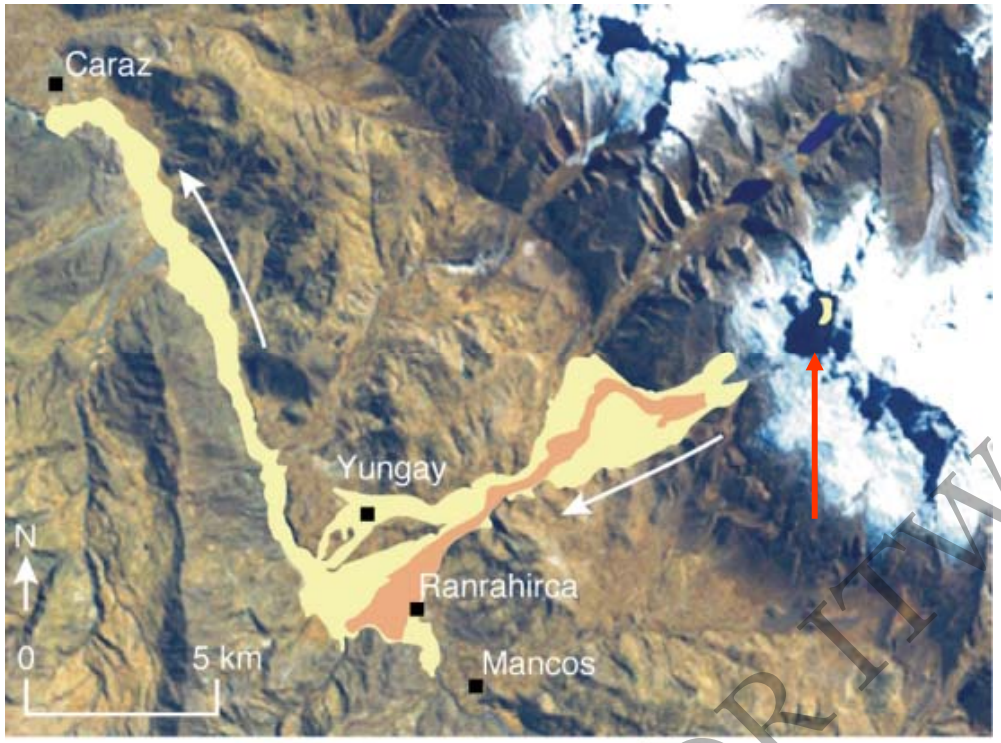


Instituto Geofísico del Perú



EDM NETWORK IN UBINAS VOLCANO, MOQUEGUA REGION

The 6th International Training Workshop, May 10 to 14 Taipei



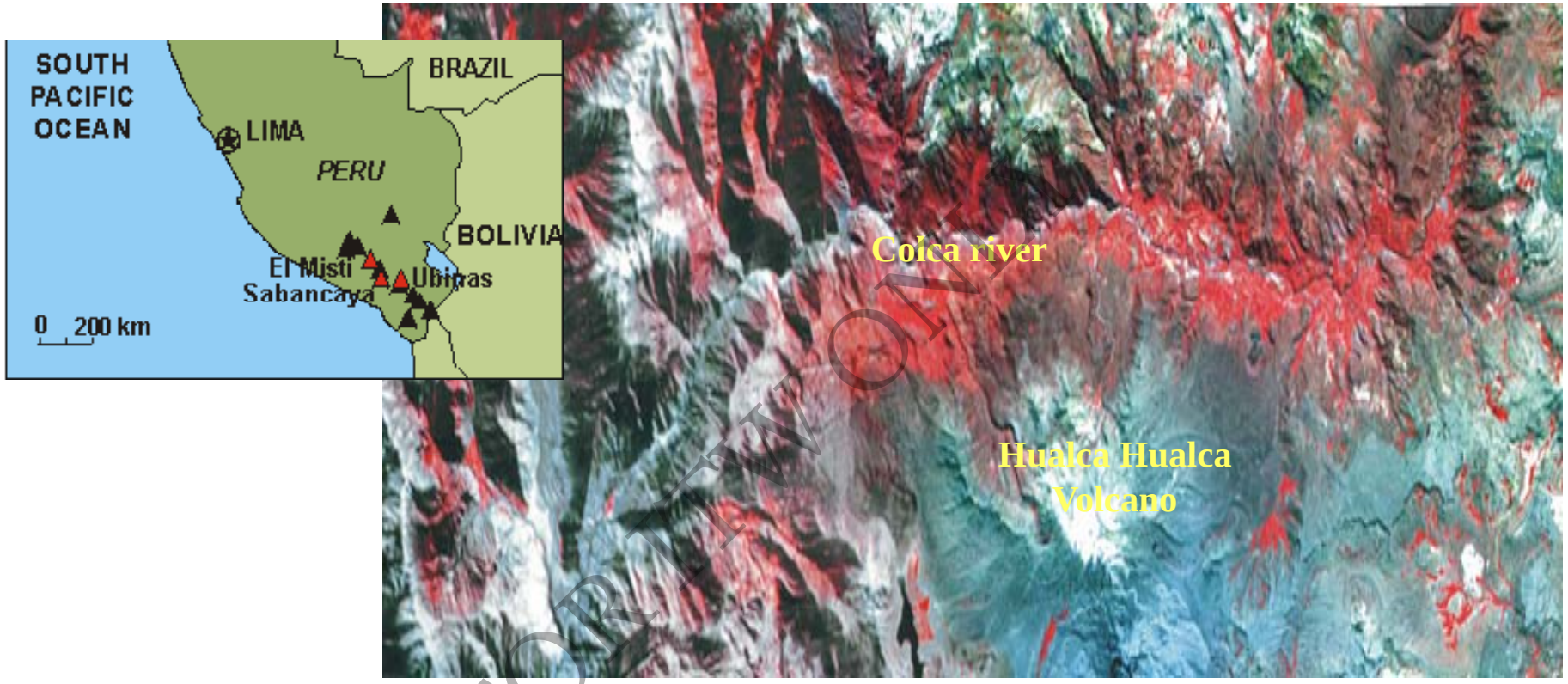
GEOLOGIC HAZARD IN PERU

This type of study aims to improved characterization of indicators of risk of surface geological events more frequent and common in mountain areas.

The results are in a set of thematic maps, assessing the hazard of the different phenomena geological that have affected the study area over time, and to serve as a basis for future studies and enhance implement prevention and risk mitigation and disaster in the future.

The picture show the debris avalanche from Huascarán Mountain in 1970. Earthquake 8.2 Mw (May 31,1970). Around 40,000 people died.

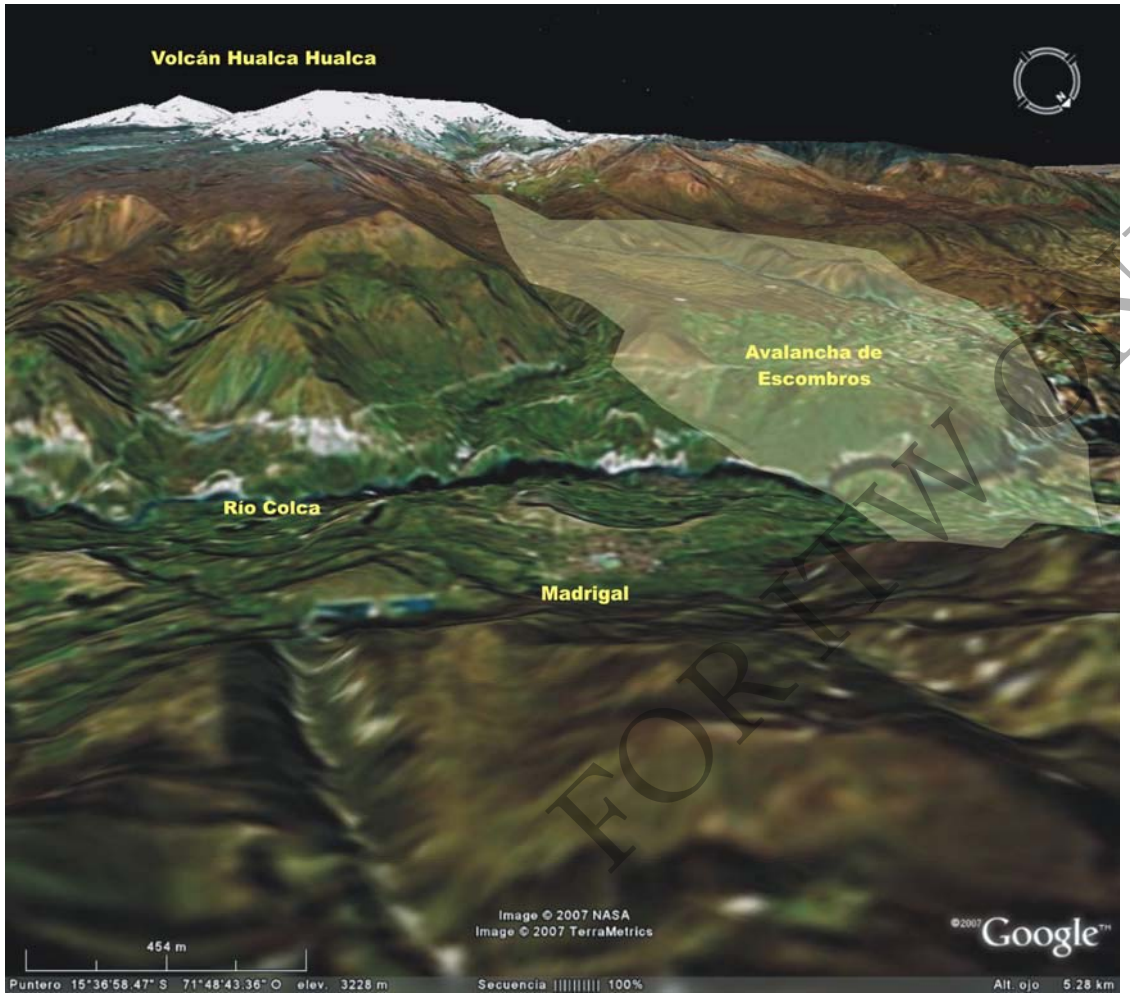
Instituto Geofísico del Perú



PILOT AREA: COLCA RIVER VALLEY, AREQUIPA REGION SOUTH PERU

Colca river valley is located in the southern segment of the Central Andes South America. This segment is characterized by a highly tectonic and geological processes . Its shows a morphology strongly changing with the time, as result of these processes. The area is affected by: active geological faults, high surface seismic activity, volcanic activity episodic and recurrent, and others geological and geodynamic phenomenas: landslides, debris avalanches, mudflows, etc.

Instituto Geofísico del Perú



MAXIMUM GEOLOGICAL EVENT IN COLCA RIVER VALLEY AREQUIPA REGION

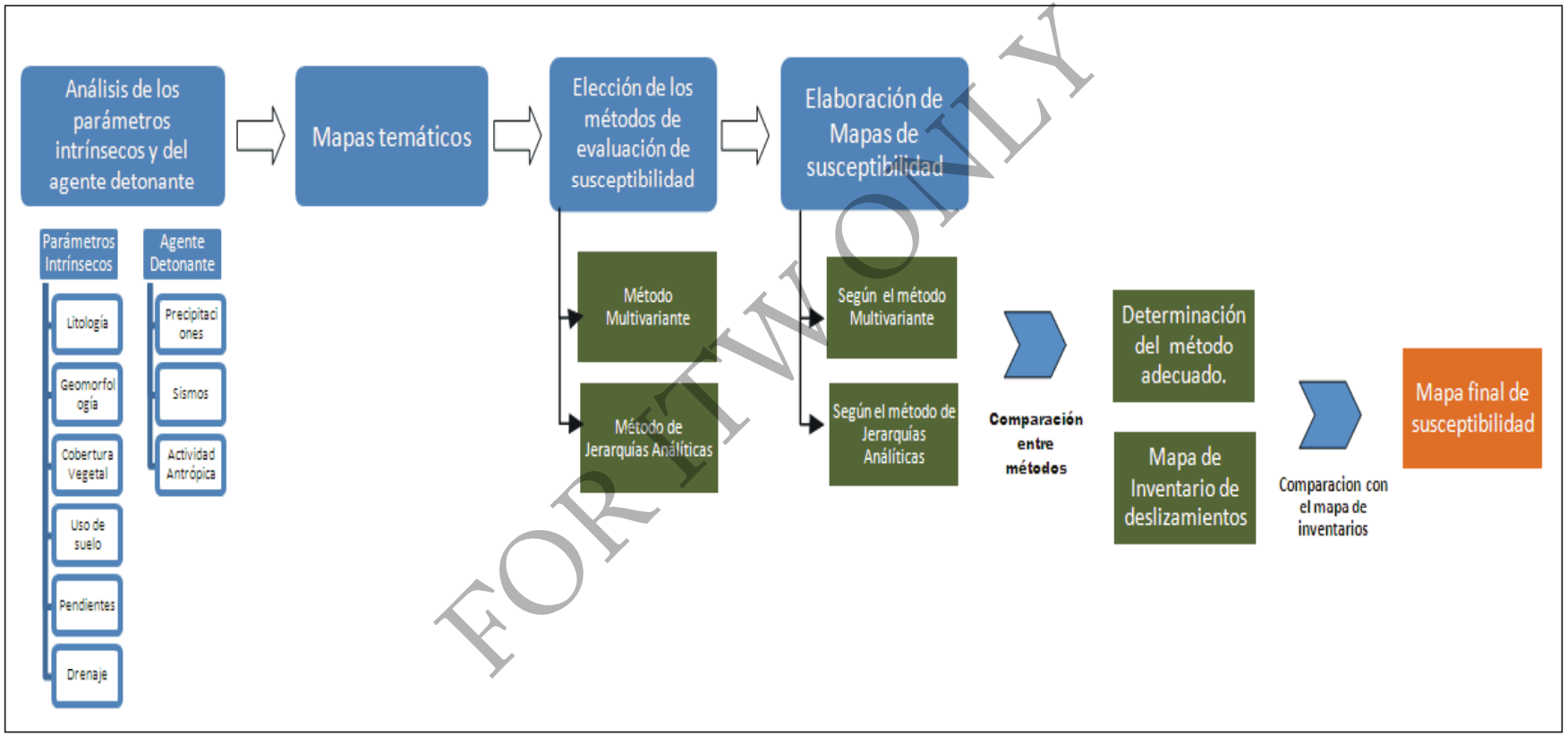
In the Arequipa region, particularly in the Colca river are many evidences of the occurrence of surface geological catastrophic recurrent and intense volcanic and seismic activity.

These natural processes have triggered large-scale events, as the volcano debris avalanche Hualca Hualca, which dammed Colca River and originated to the Colca paleolake.

Colca paleolake dimensions:
Length: 19.5 km,
Wide: 3.8 km
Maximum depth: 400 m.
Run off: 2.5 km

Hualca Hualca Peak: 6025 msl
Colca river: 2100 msl
Level difference: 3925 m

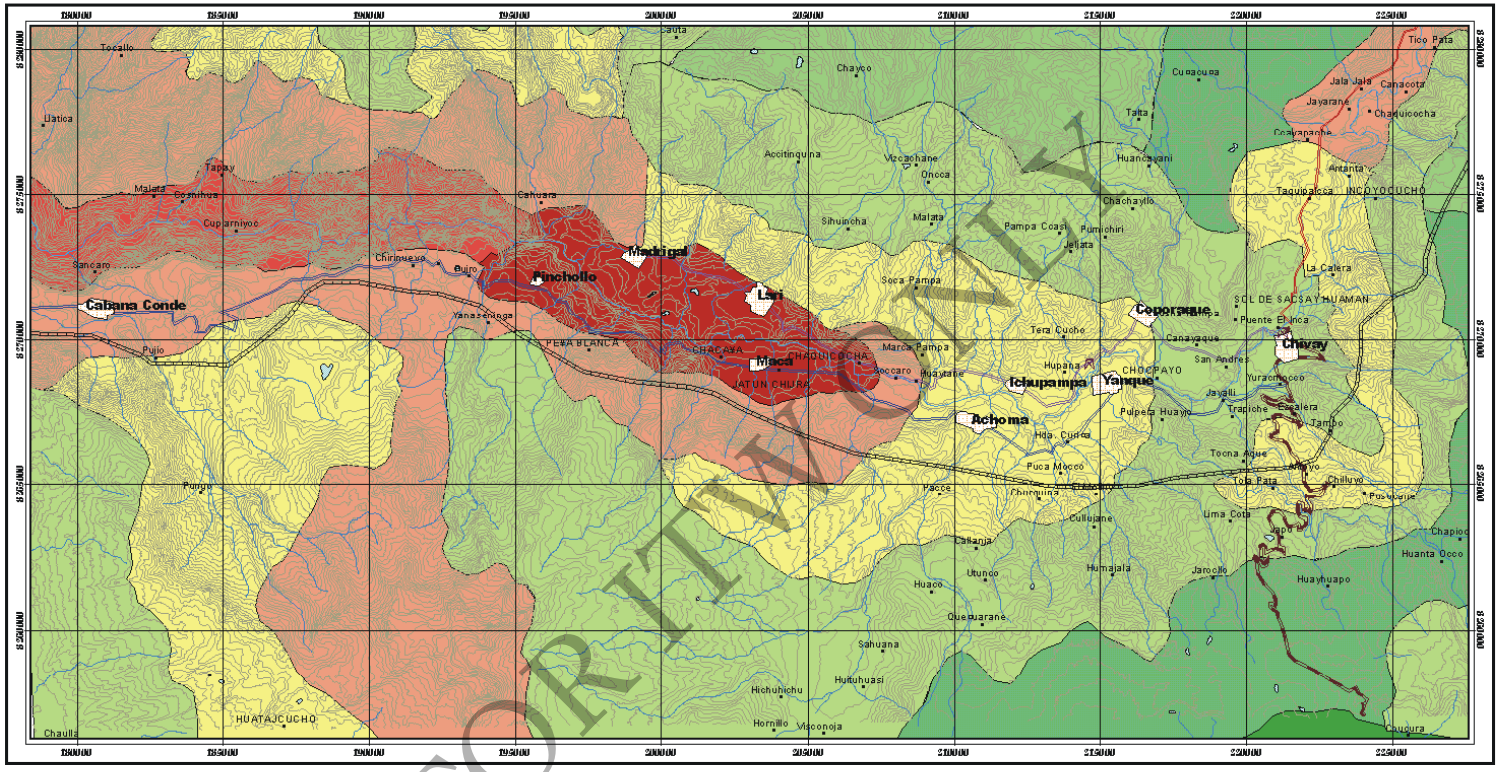
Instituto Geofísico del Perú



METHODOLOGY OF SUSCEPTIBILITY MAP FOR LANDSLIDES

The 6th International Training
Workshop, May 10 to 14 Taipei

Instituto Geofísico del Perú



SUSCEPTIBILITY MAP FOR LANDSLIDES IN COLCA RIVER VALLEY, AREQUIPA REGION

GRADO DE SUSCEPTIBILIDAD

- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

- Caserio
- Puente
- Pueblo
- Hidroelectrica
- Drenaje
- Curvas de nivel
- Laguna
- Canal Majes
- Carretera Chivay - Cabanaconde
- Carretera Chivay - Arequipa
- Carretera Chivay - Callalli
- Carretera Chival - Madrigal

The 6th International Training
Workshop, May 10 to 14 Taipei

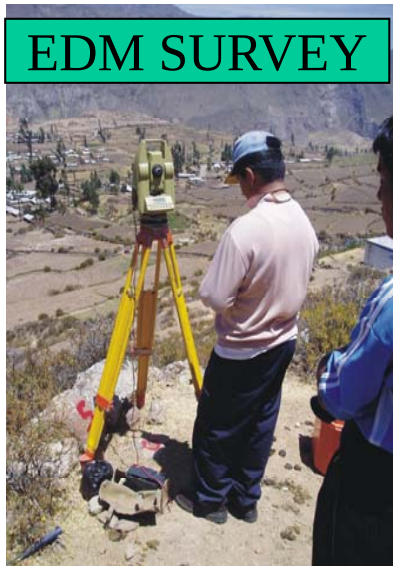
Instituto Geofísico del Perú

MONITORING LANDSLIDES

MACA LANDSLIDE

GPS SURVEY

EDM SURVEY



Instituto Geofísico del Perú

ANCIENT AGRICULTURE TERRACES IN COLCA VALLEY
AREQUIPA REGION, SOUTH OF PERU

The 6th International Training
Workshop, May 10 to 14 Taipei