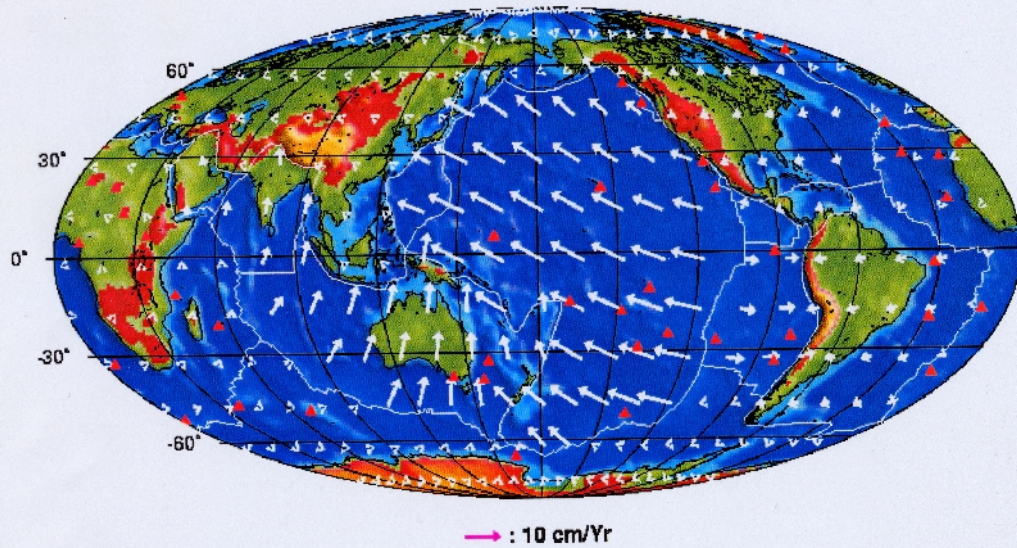
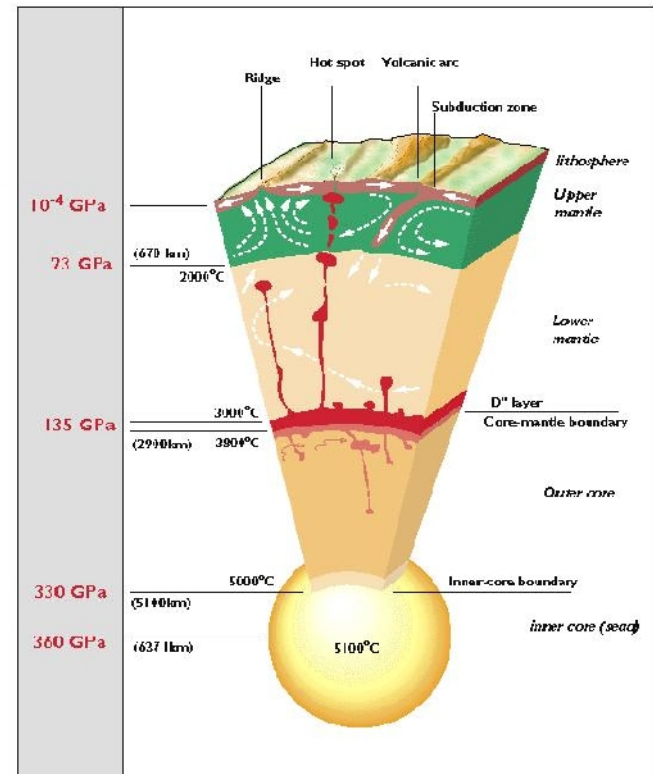


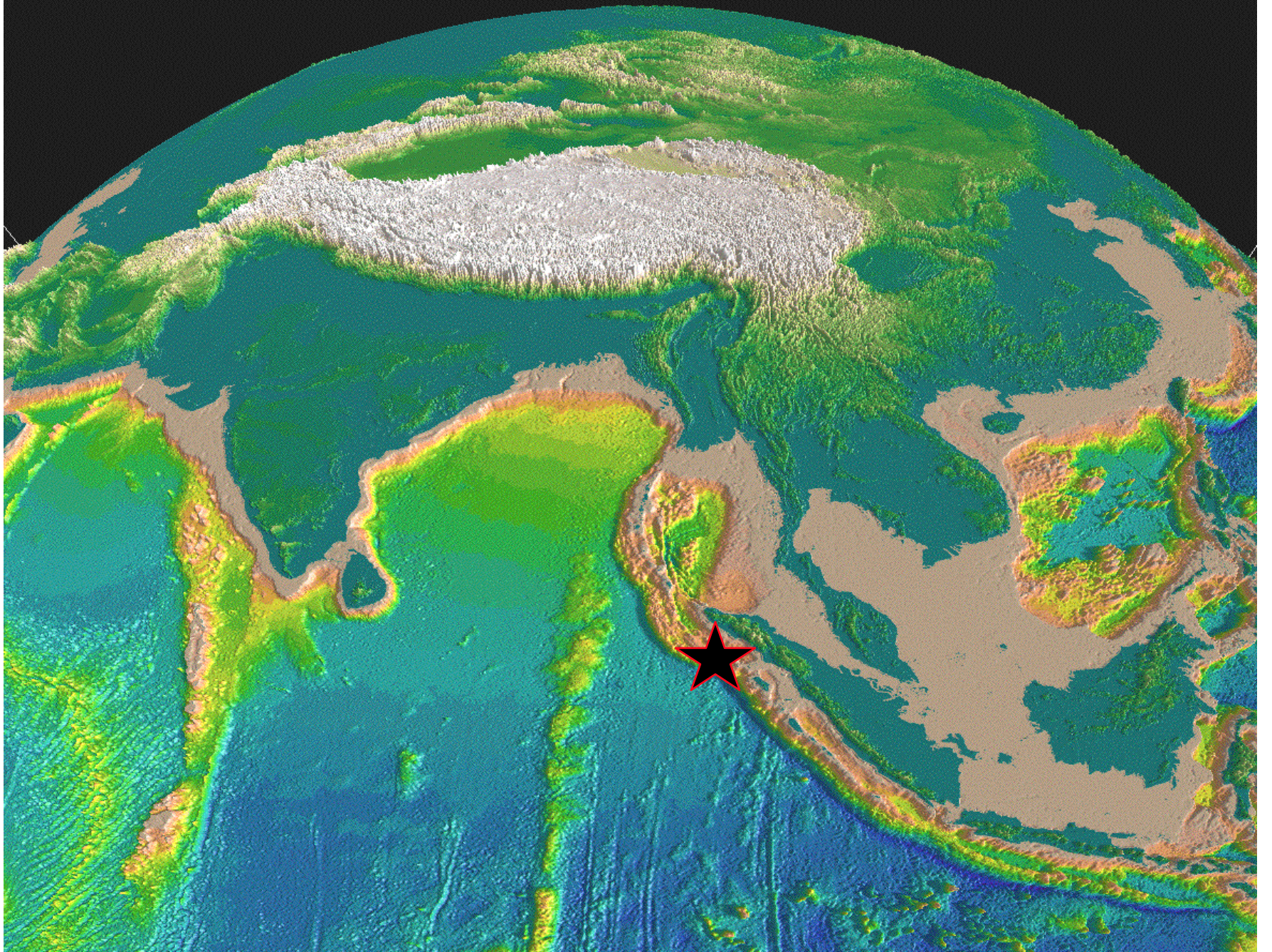
Structure de la Terre

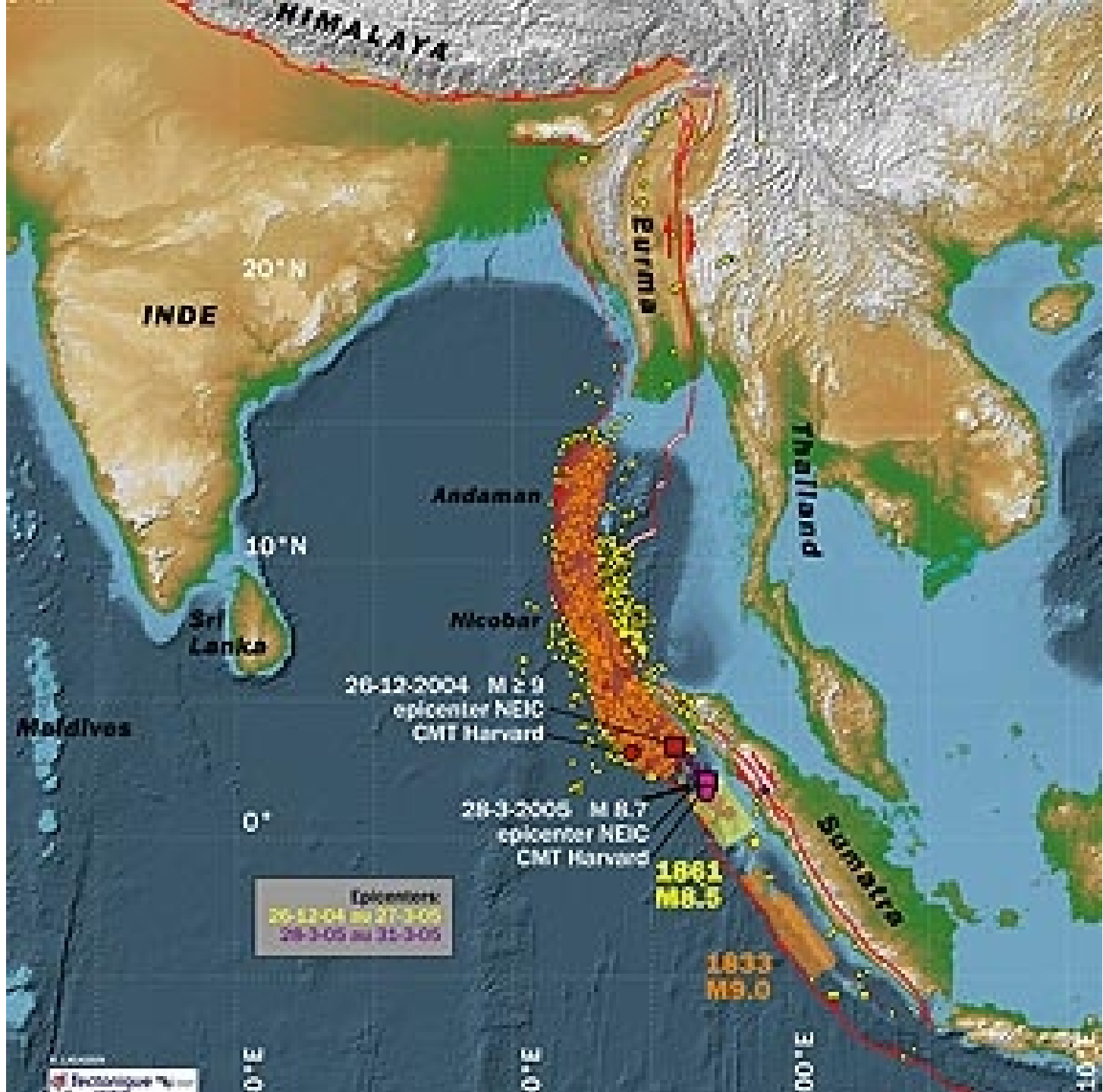
Plate tectonics



Mantle Convection







INDE

20°N

10°N

Sri Lanka

Maldives

0°

0°E

Andaman

Nicobar

26-12-2004 M 9.0
epicenter NEIC
CMT Harvard

28-3-2005 M 8.7
epicenter NEIC
CMT Harvard

Burma

Thailand

Sumatra

1861
M 8.5

1833
M 9.0

Epicenters:
26-12-04 au 27-3-05
28-3-05 au 31-3-05

Banda Aceh

before



after



Overview

Large scale Seismology: an observational field

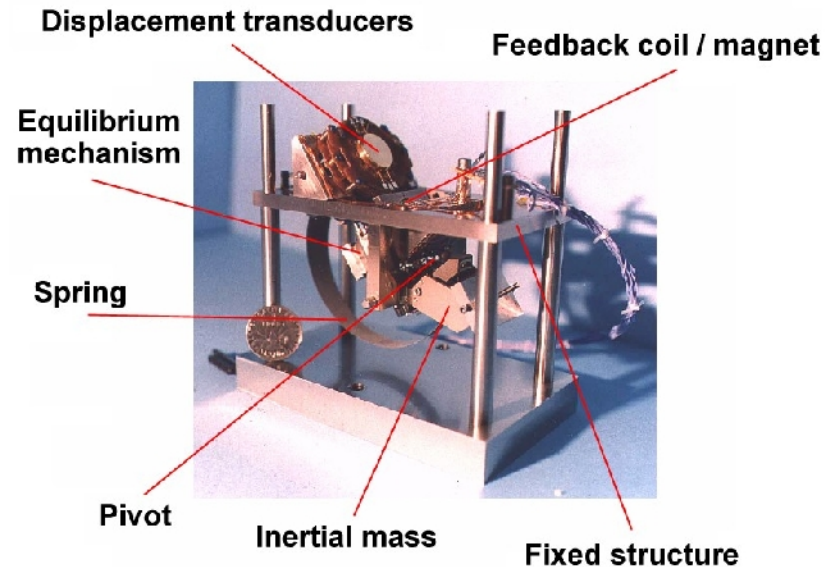
- Data (Seismic source) + Instrument (Seismometer)
->Observations (seismograms)
- Historical evolution: Ray theory, Normal mode theory, Numerical techniques (SEM, NM-SEM)
- Scientific Issues: earthquakes, structure of the Earth and planets
- NM-SEM and time reversal
- Tomographic Technique: seismic imaging
- Seismic Experiment: Plume detection

Seismic Instruments

- Seismoscope
(China - 100BC)



Broadband
Seismometer
(1mHz-20Hz)
(Cacho, 1998)

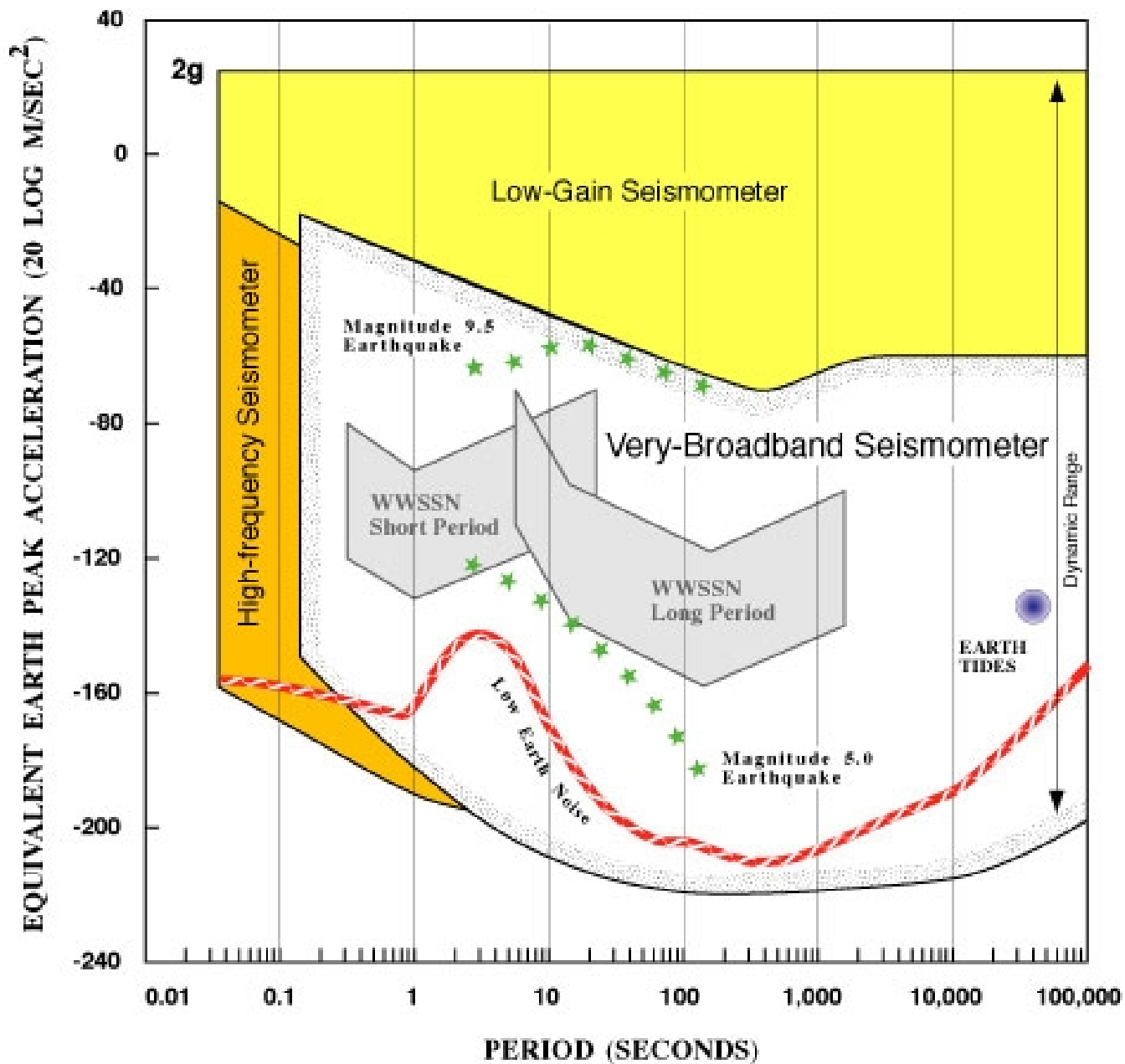


Late 19th century: development of the seismometer



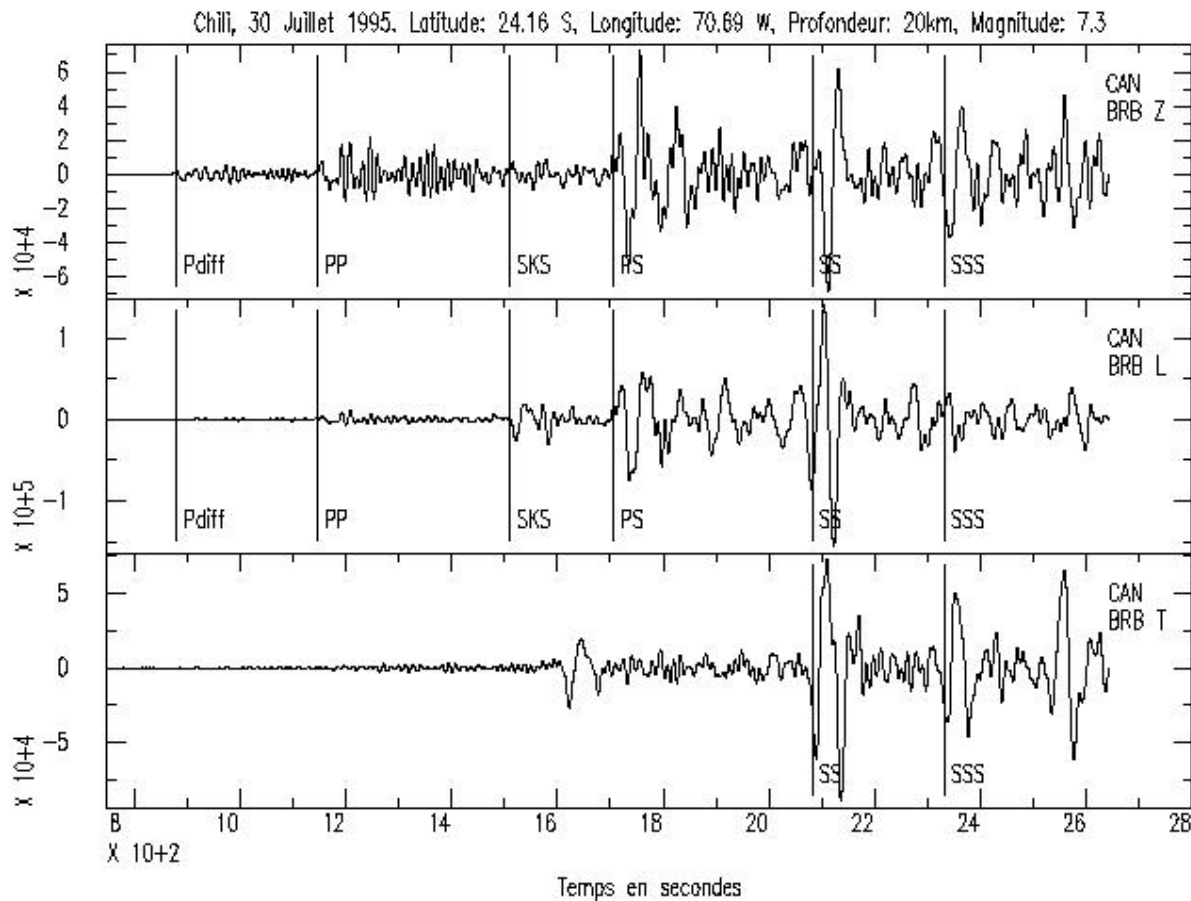
The first signal recognized as coming from a distant earthquake (Japan to Potsdam, Germany) was identified by E. von Rebeur-Paschwitz in 1889. (From Nature, Vol. 40, 1889.)

IRIS GSN SYSTEM



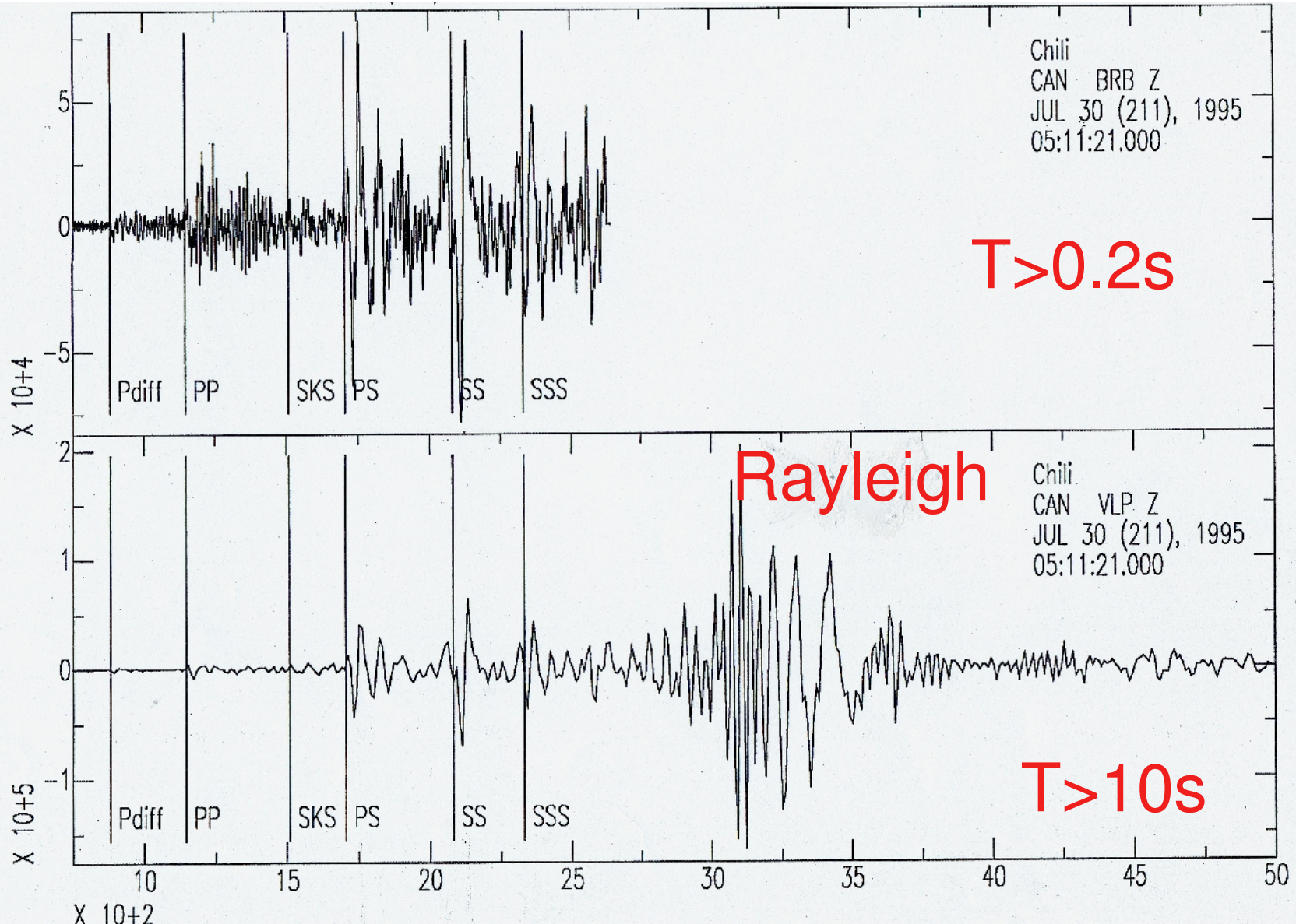
3 components

frequency range: 1mHz-20Hz
Period range: 0.05-1000s

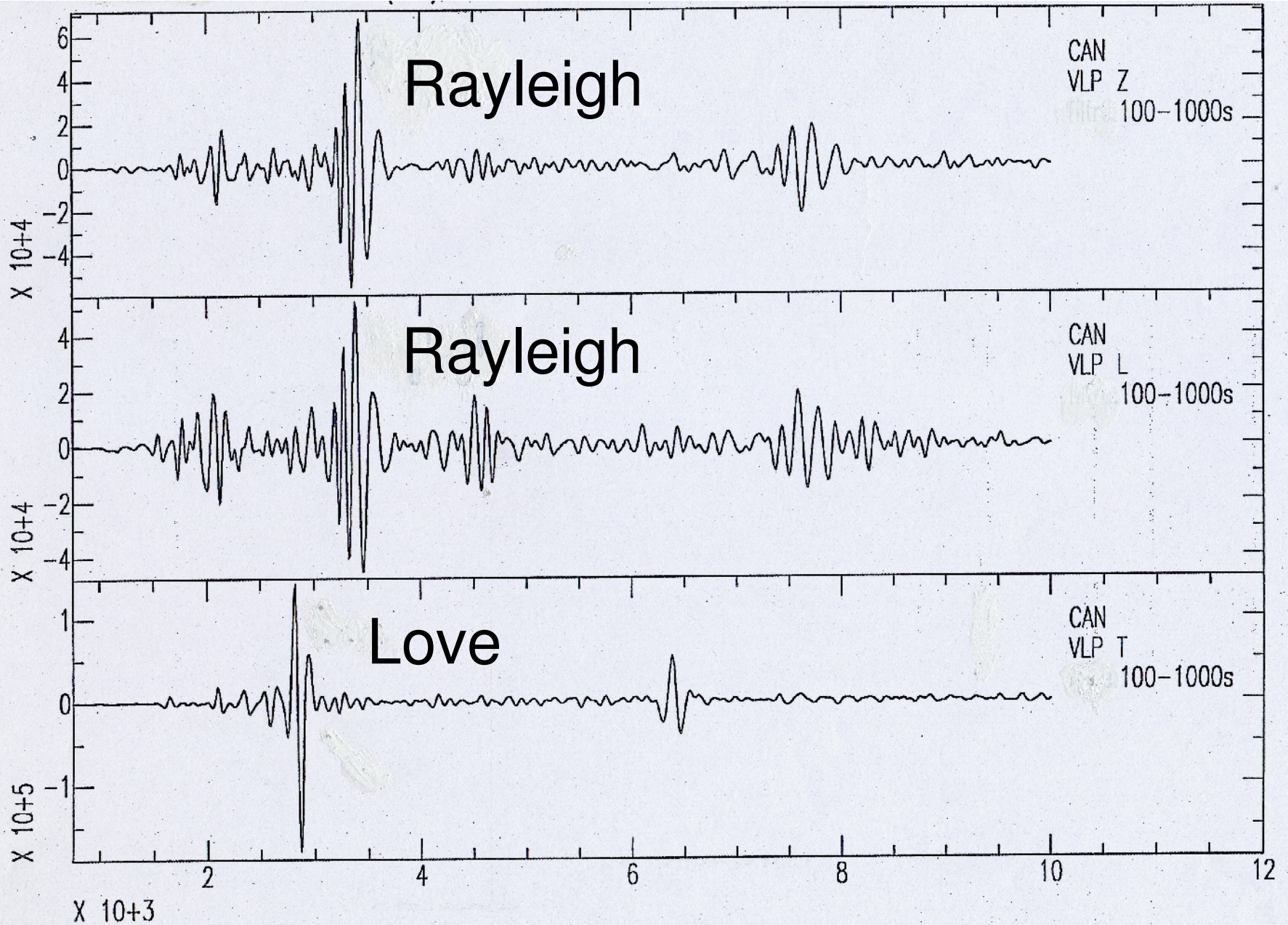


Chile earthquake magnitude= 7.3

Epicentral distance = 12,300km-depth 33km

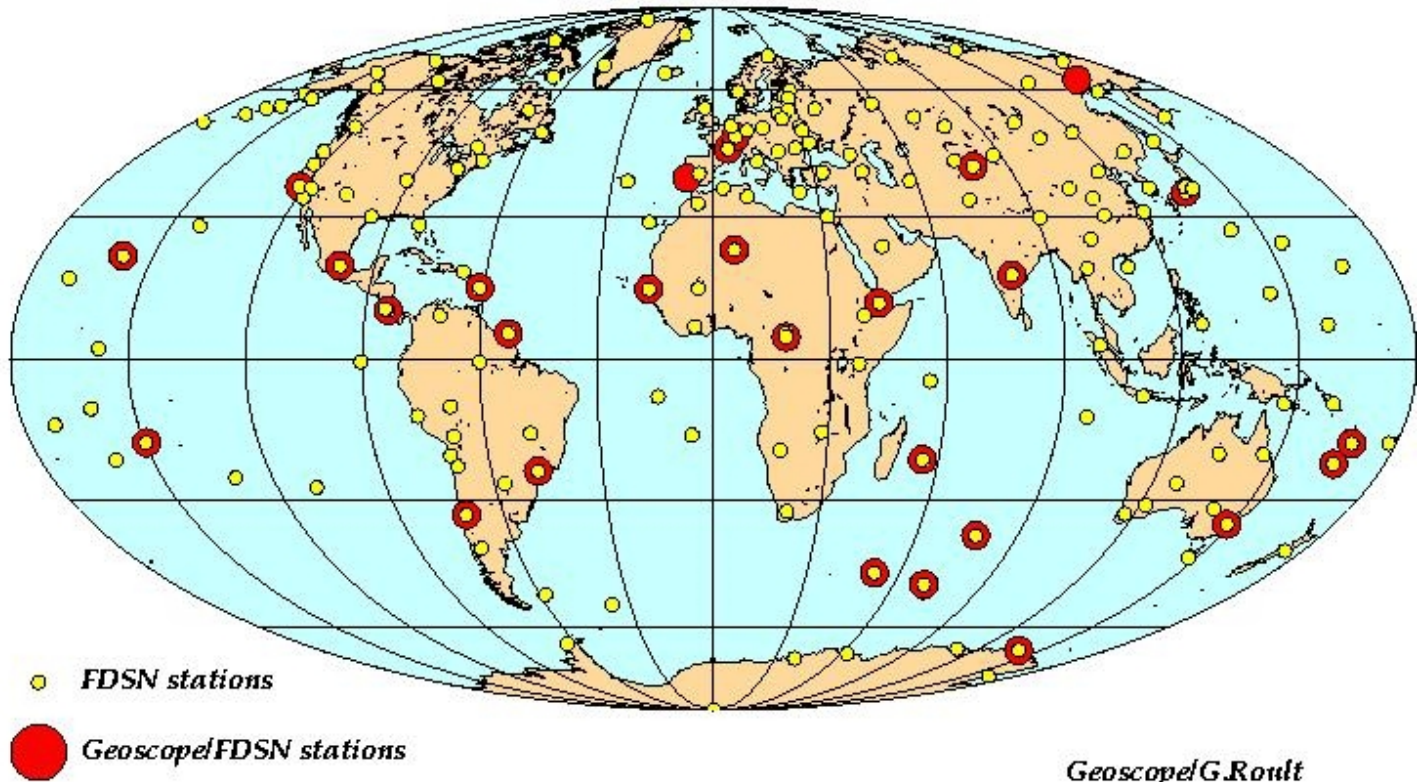


Chile Earthquake Jul. 1995



RESEAUX GLOBAUX

GEOSCOPE stations and FDSN stations

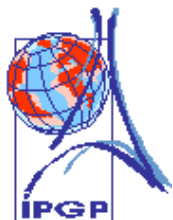


Observatoires Fond de Mer

=> International Ocean network (I.O.N.)

- 2/3 de la terre recouverts par la mer.
- Les sismomètres fond de mer permettent de:
 - Étudier ces régions avec une meilleure resolution
 - Remplir les trous dans le réseau global

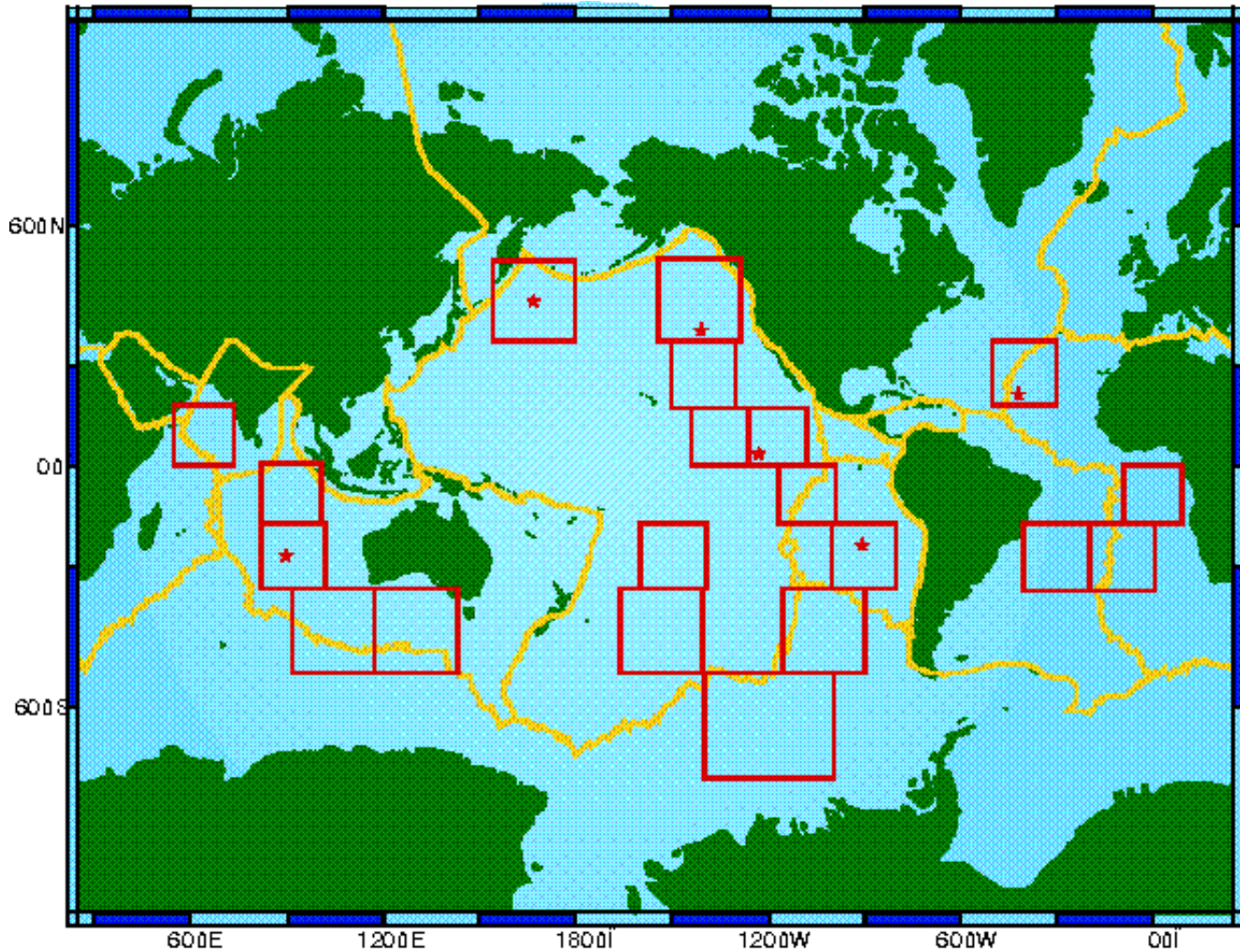
NERO (joint French-Japanese Project)

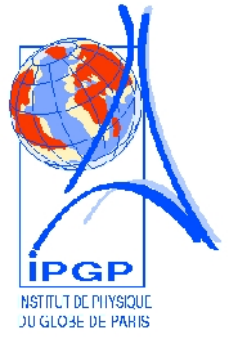


I.O.N.

International Ocean Network

ION (International Ocean network) France, Italy, Japan, UK, U.S.

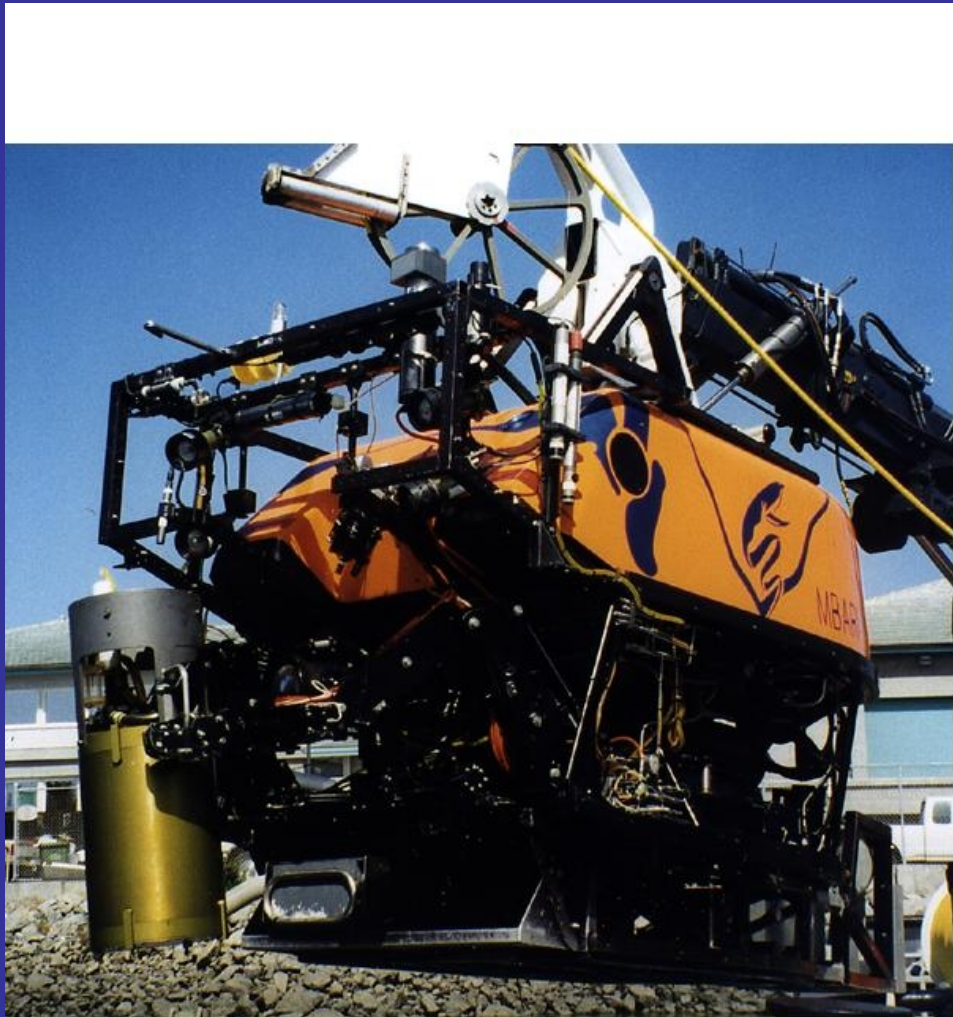


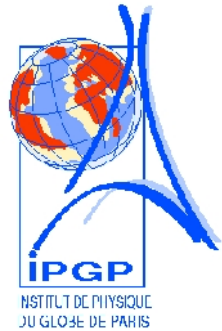


M.O.I.S.E (June-Sept. 1997)

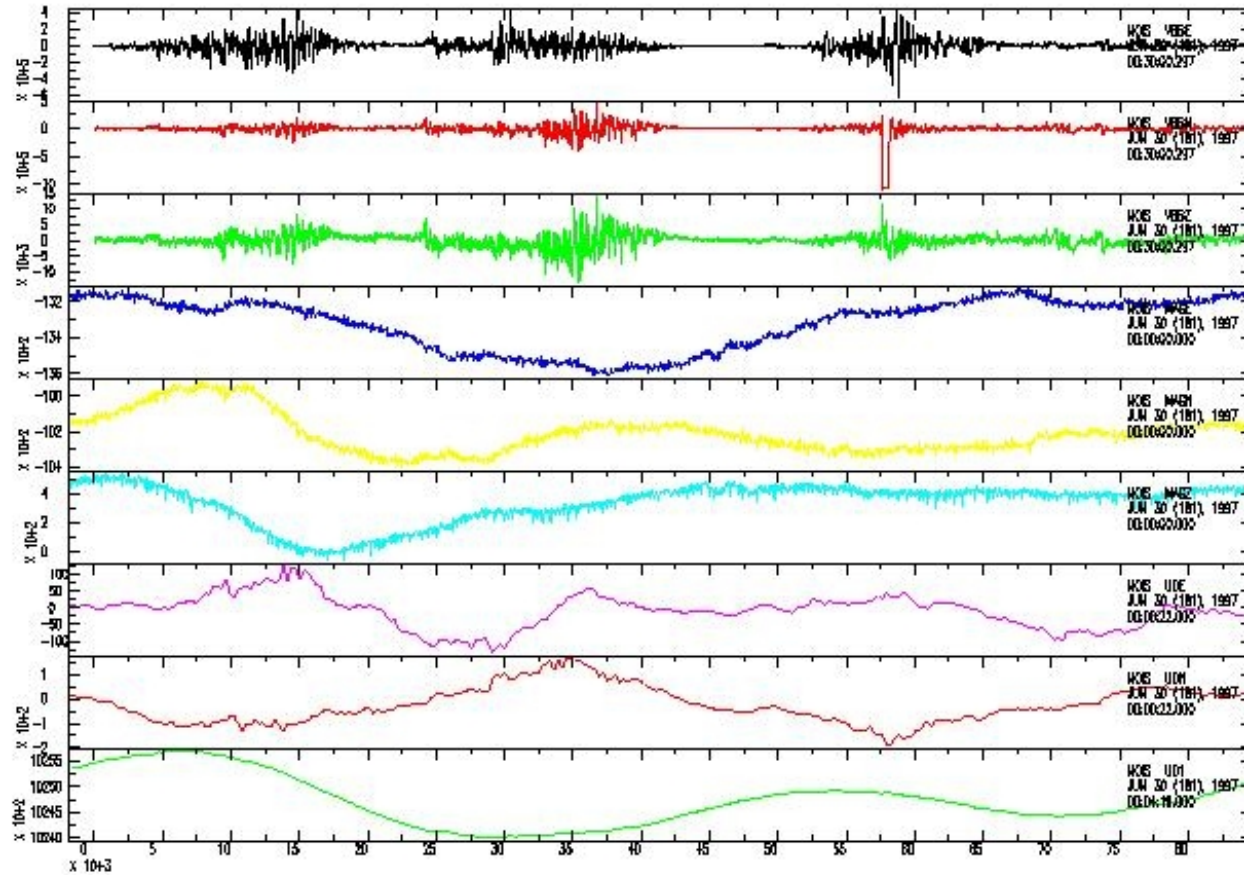
(Monterey bay Ocean bottom International Experiment)

MBARI, UC Berkeley, IPG-Paris, UBO-Brest





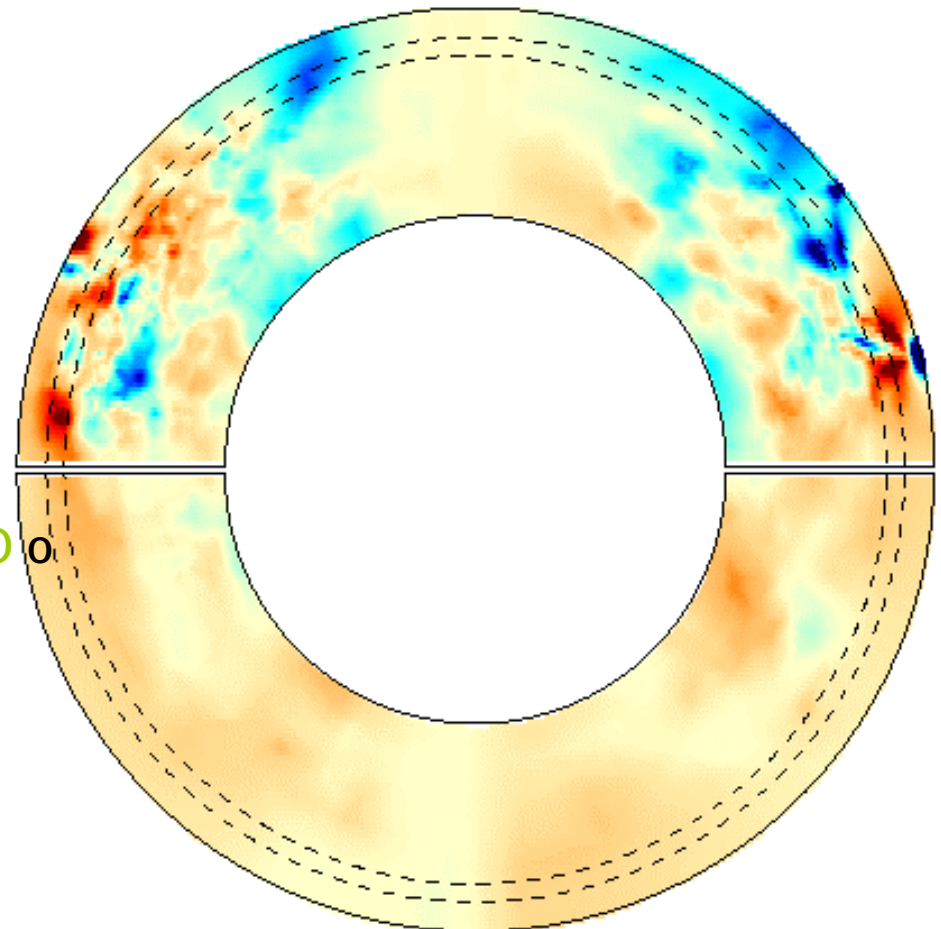
Multiparameter signals





NERO:
Scientific Interest
Global scale

- To fill a gap in global station coverage
- To improve global tomographic model resolution
- To improve azimuthal distribution in determination of large earthquakes focal



NERO observatory (in 2009)



Projet Sismomètres Portables Fond de Mer

