



© Jan Sopaheluwakan, 2007

Workshop C of the 7th Science Council of Asia (SCA) Conference

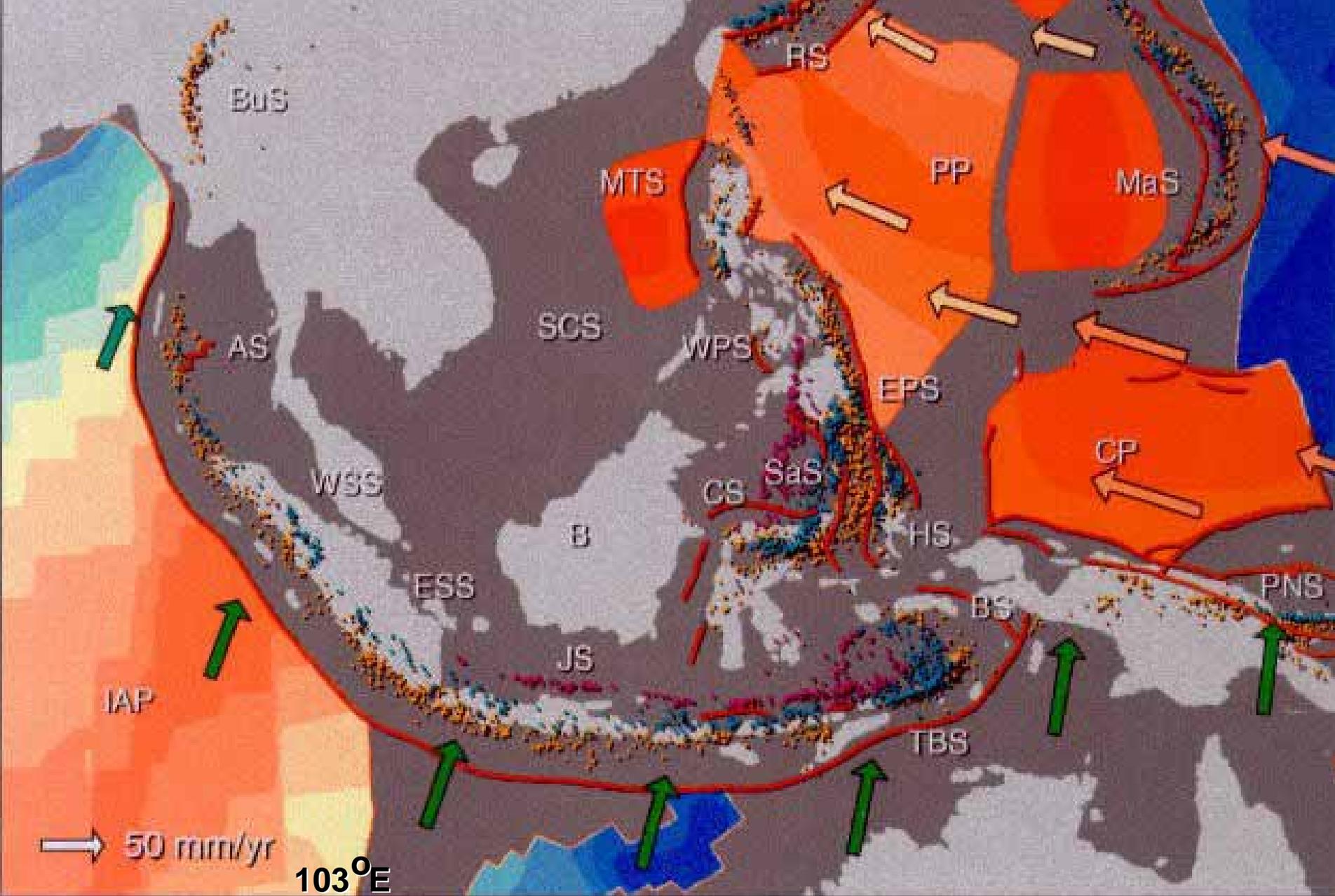
*Construction of Secure and Safe Society against Global Changes of Natural Disasters*

Okinawa, June 14<sup>th</sup>, 2007

# Building Disaster Resilience Community in Asia: *Indonesian perspective*

**Jan SOPAHELWAKAN**

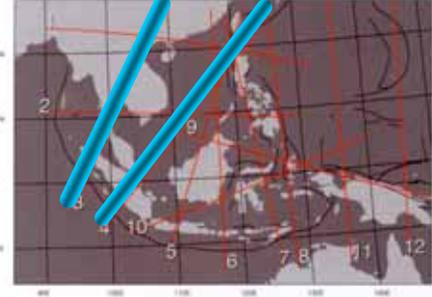
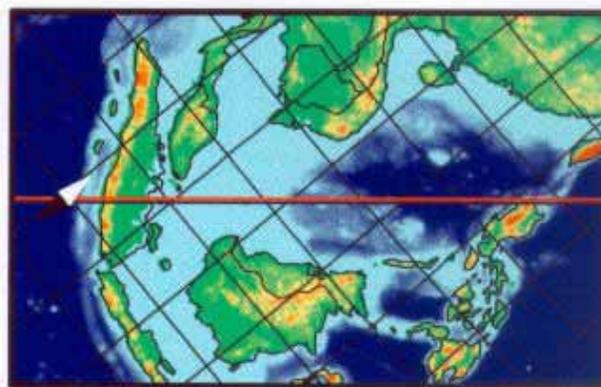
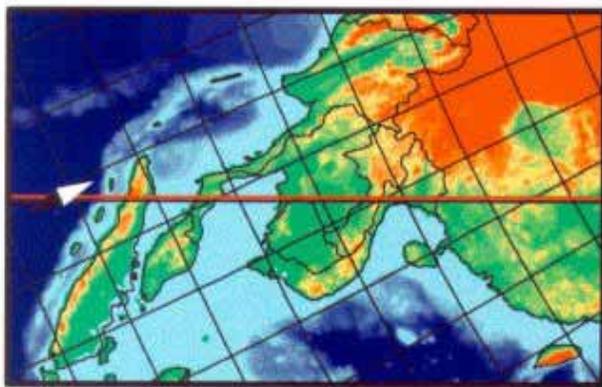
Deputy Chair for Scientific Services  
Indonesian Institute of Sciences (LIPI)



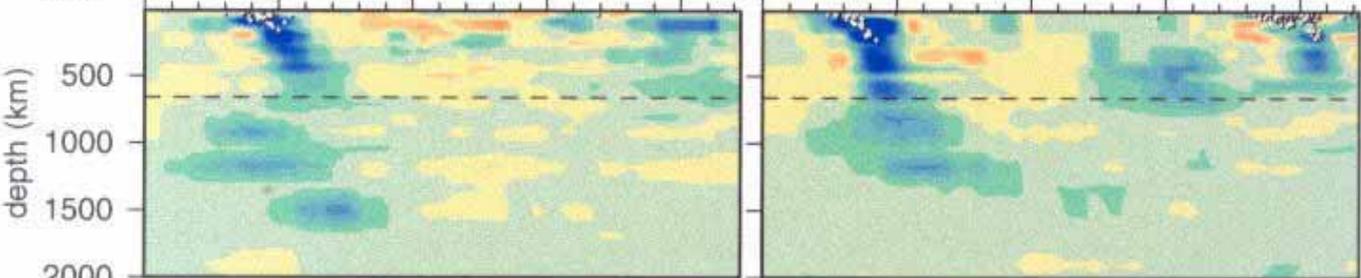
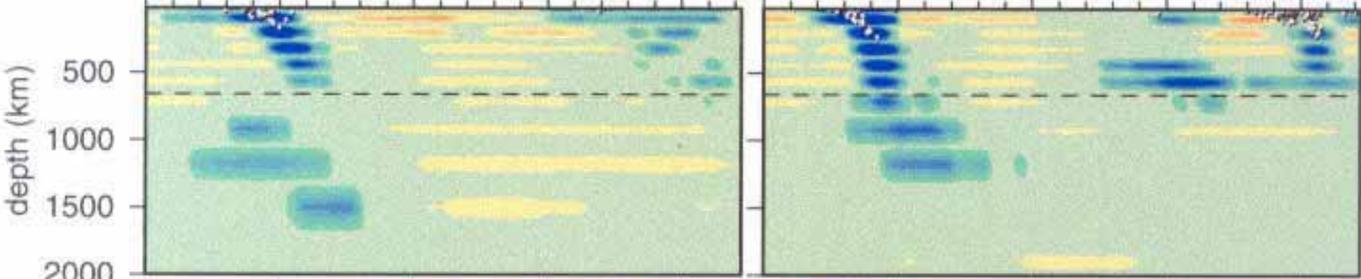
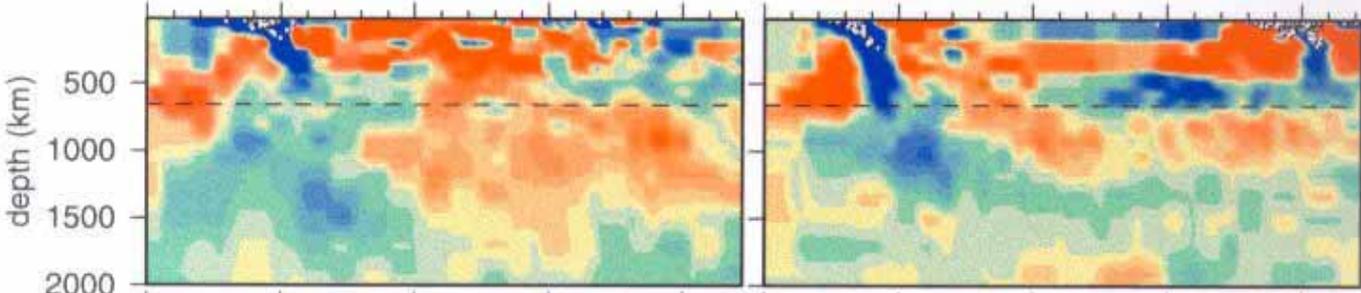
17 Ma



170 Ma

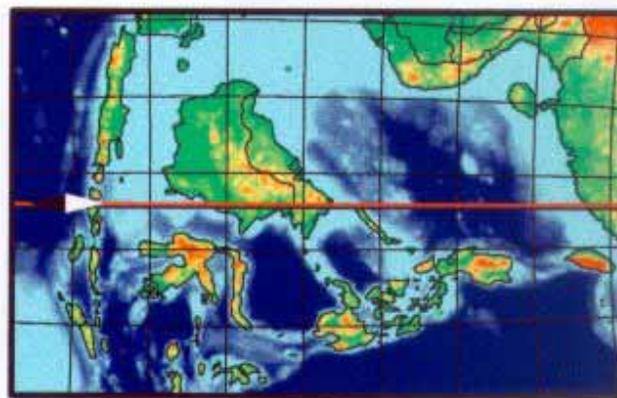
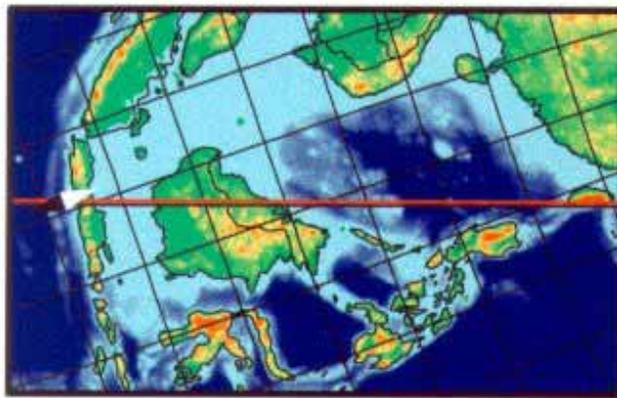


0 1000 2000 3000 4000 0 1000 2000 3000 4000



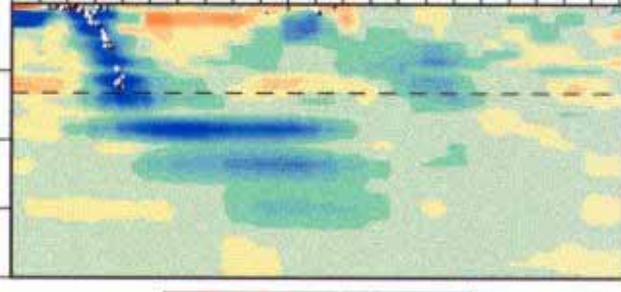
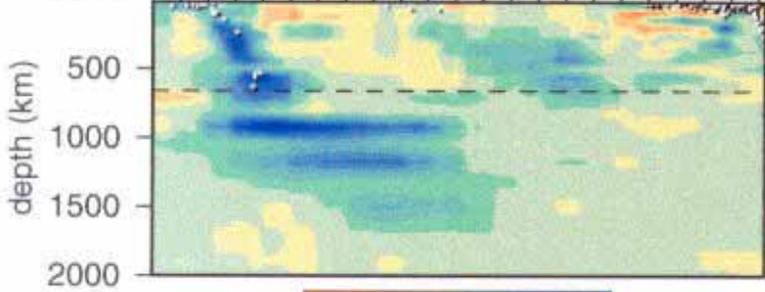
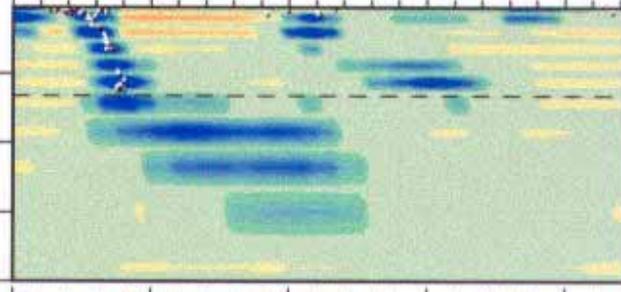
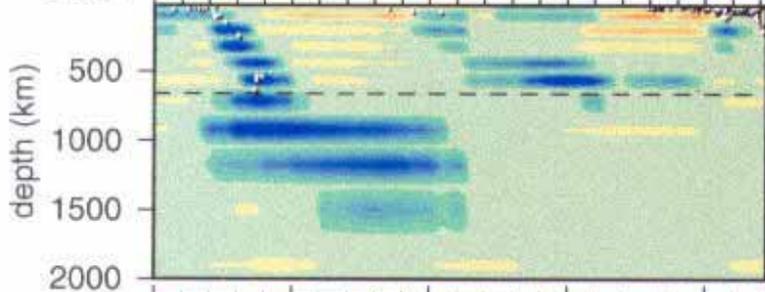
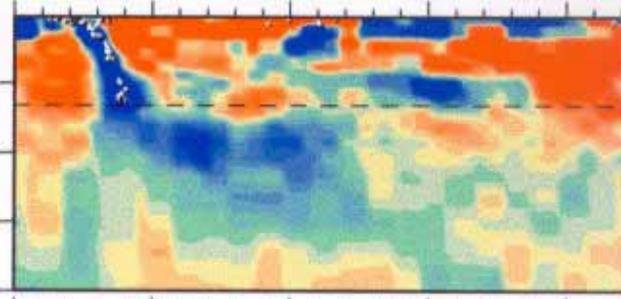
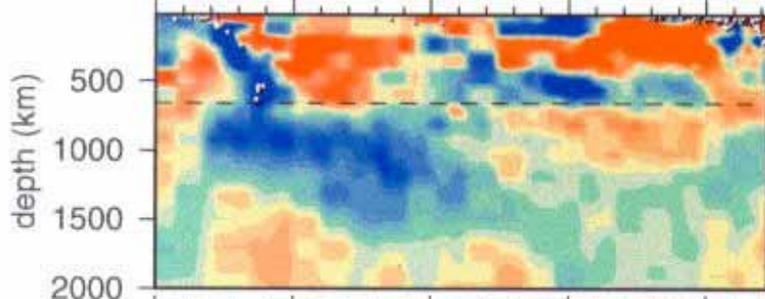
-1.0% +1.0% -1.0% +1.0%





0 1000 2000 3000 4000

0 1000 2000 3000 4000



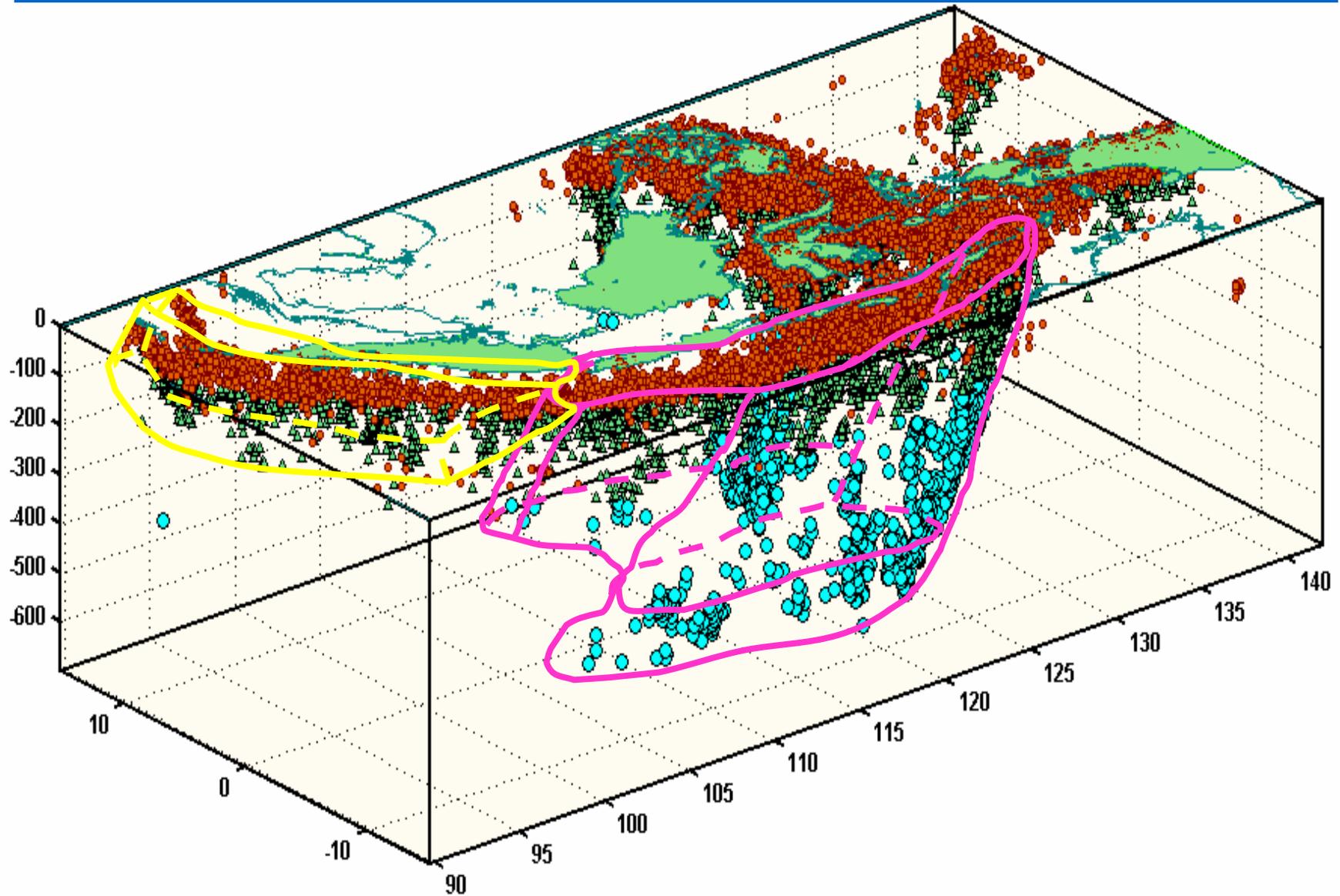
-1.0% +1.0%

-1.0% +1.0%





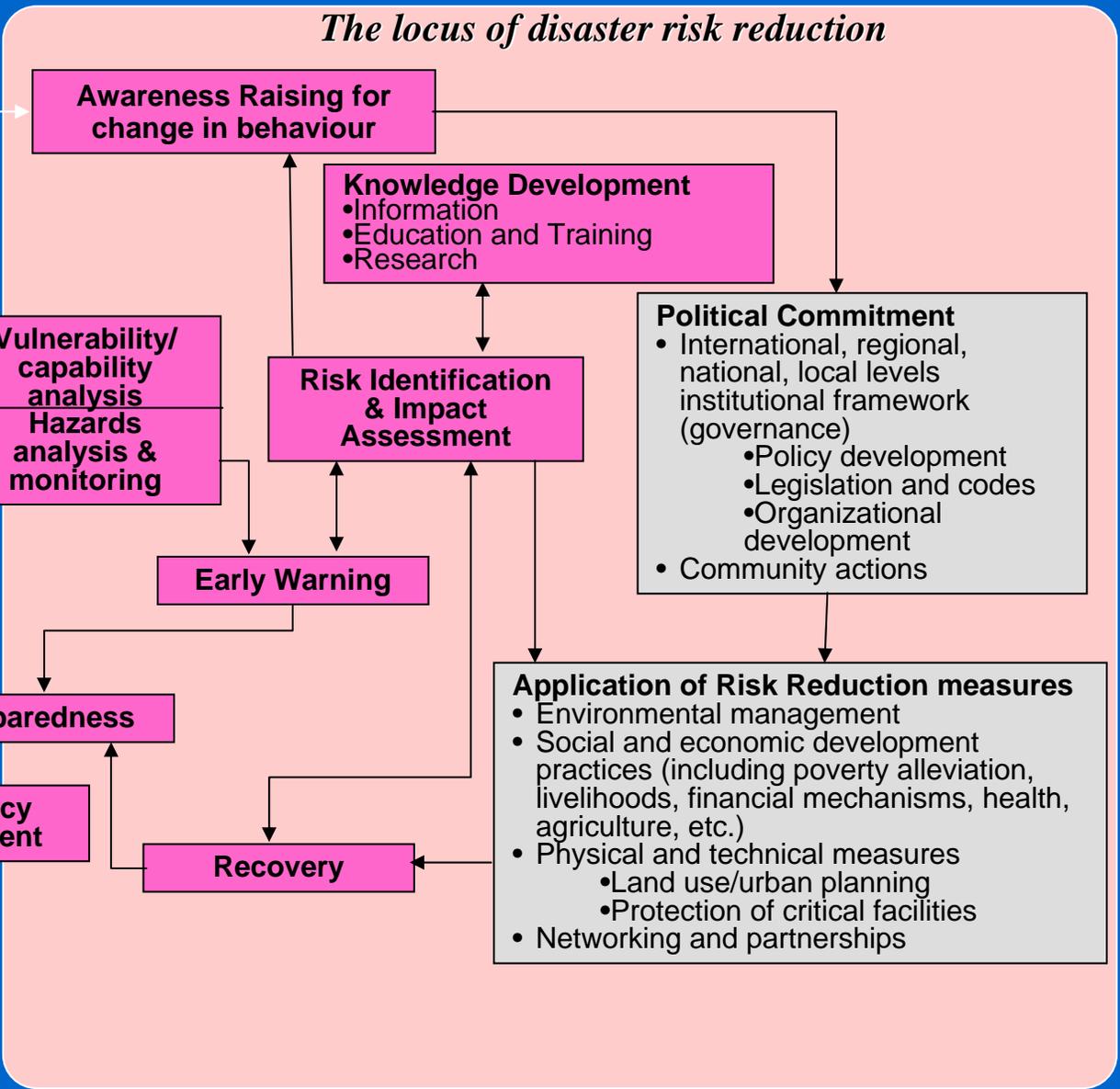
# Subduction slab geometry beneath Sumatra and Java





Political

Ecosystems/environmental



Economic

# Vertical and horizontal dimensions of security

(Brauch, 2005)

Security dimension	Military	Political	Economic	Environmental	Social
Level of interaction				↓	
Human →			Energy, food, health, livelihood threats, challenges and risks may pose a <i>survival dilemma</i> in areas with high vulnerability		
Societal/ Community				↓ ↑	
National	"Security dilemma of competing states" (National Security Concept)		"Securing energy, food, health, livelihood etc." (Human Security Concept) that combines all levels of analysis and interaction		
				↓ ↑	

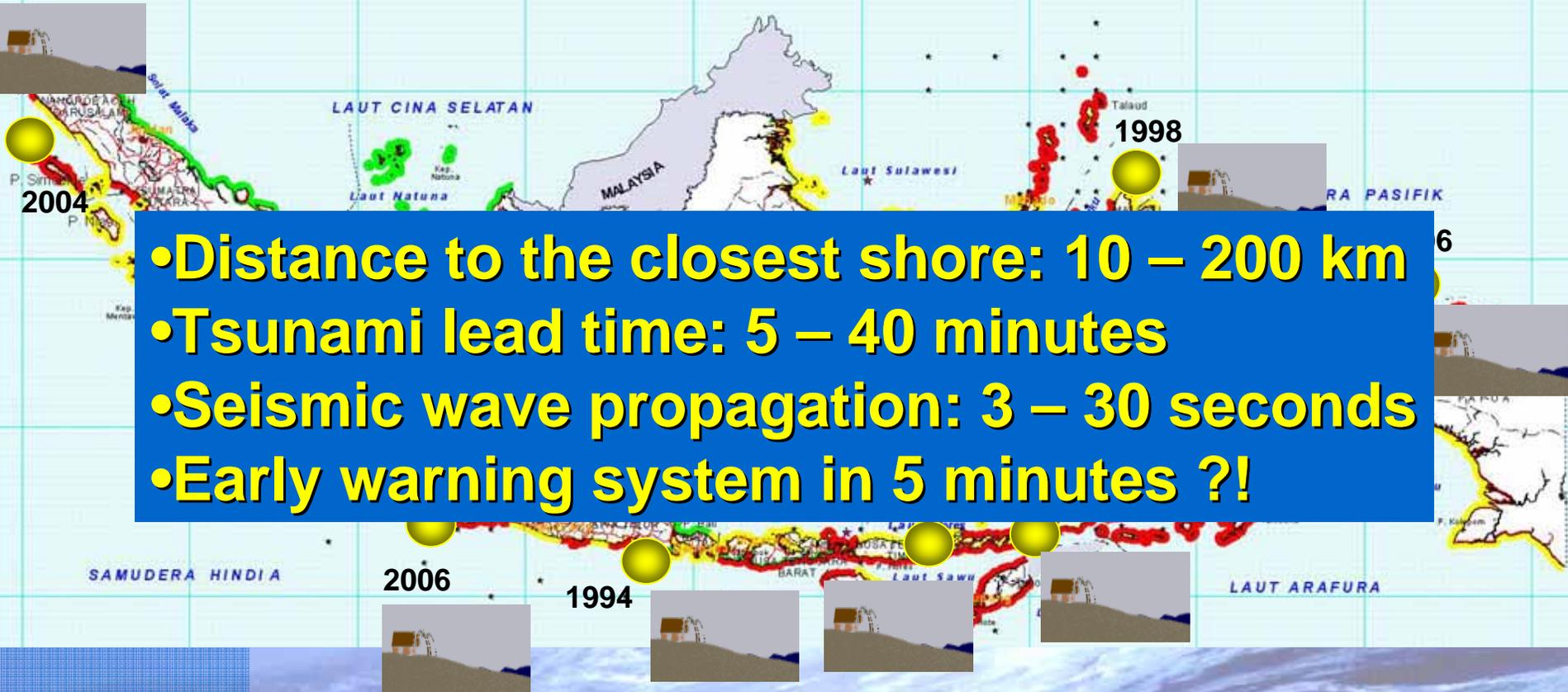
# **Environmental threats to human security: *Indonesian perspective***

- **Rapid onset hazards of natural origin**
  - Earthquakes, tsunamis, floods, droughts, landslides, volcanic eruptions, wildfires
  - Destructiveness level depends usually more on the number of vulnerable people impacted than on the magnitude of the event *per se*.
- **Creeping changes in the environment**
  - Natural and human induced processes occurring at slower and unnoticed rate, interact with and are aggravated by continuing and unsustainable human activities
  - Coastal changes, deforestation, land degradation, erosion, soil salinity, estuarine water acidification, sedimentation, climate changes, water availability
- **The threat from within: creeping changes in socio economic systems**

# Indonesian contribution to the construction of secure and safe society

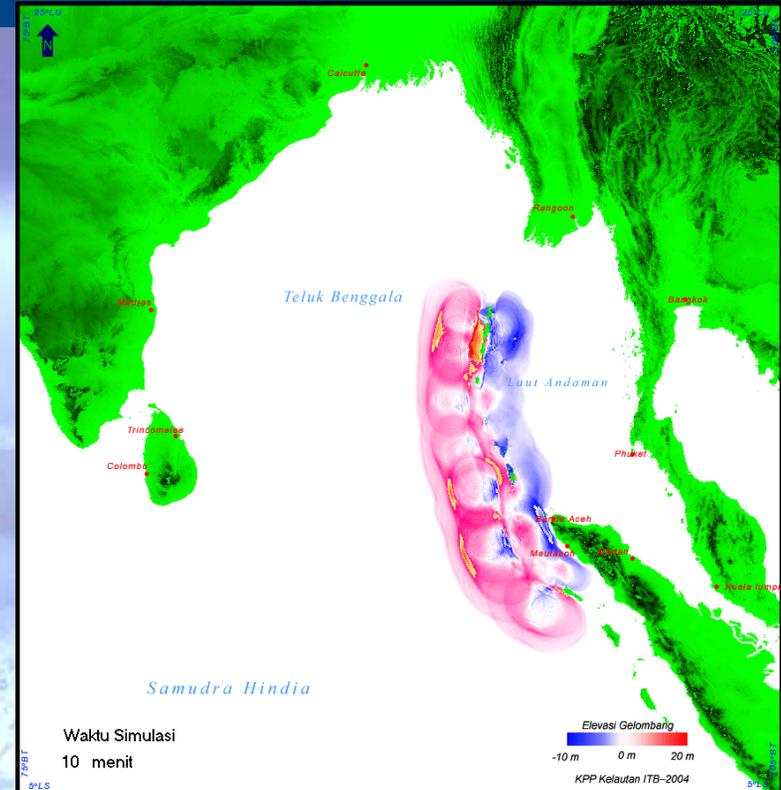
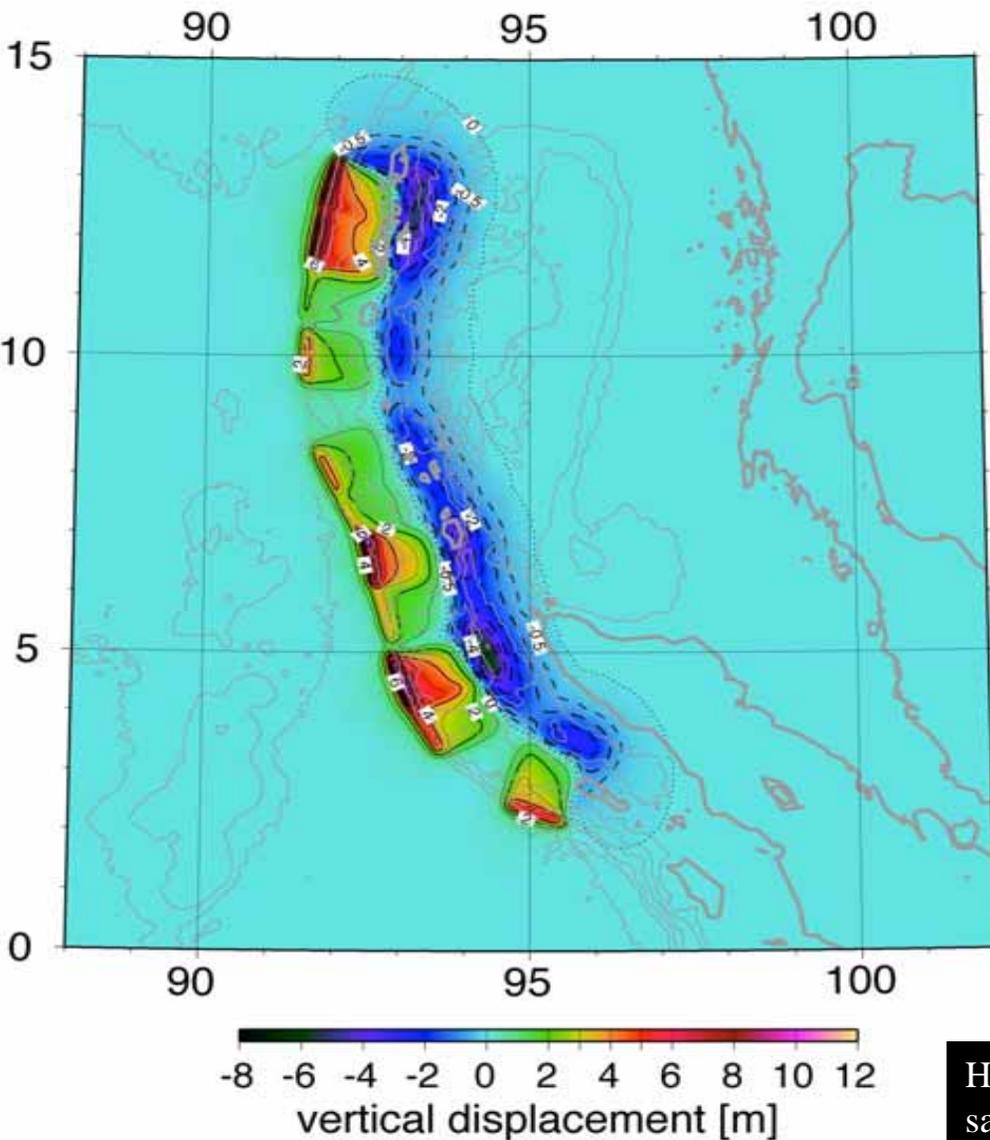
- **Continuous fundamental research on the mechanisms and impacts of natural disasters**
  - Risk assessment of the past, recent and future disasters
- **Development of the nation wide end-to-end INA TWS as part of the global TWS**
  - Upstream components
- **Public education and community preparedness**
  - Vulnerability assessment
  - Public education
  - Community preparedness
    - Development of the “last mile SOPs”
- **Current focus on earthquake- and tsunami-related disasters**

# Tsunami prone coasts in Indonesia and destructive earthquake and tsunami during the last decade



- Distance to the closest shore: 10 – 200 km
- Tsunami lead time: 5 – 40 minutes
- Seismic wave propagation: 3 – 30 seconds
- Early warning system in 5 minutes ?!

# The 2004 Aceh Tsunami and vertical displacement of seafloor



**Tsunami animation**  
**(Tsunami Research Group**  
**Marine Research Center, Bandung**  
**Institute of Technol.)**

Hirata et al. [2005] from  
 satellite altimetry data.



Haloban in  
Banyak Island  
Sunked about 30 cm



Desa HALOBAN, P. Tuanku, Kep. Banyak



**New  
coast line**



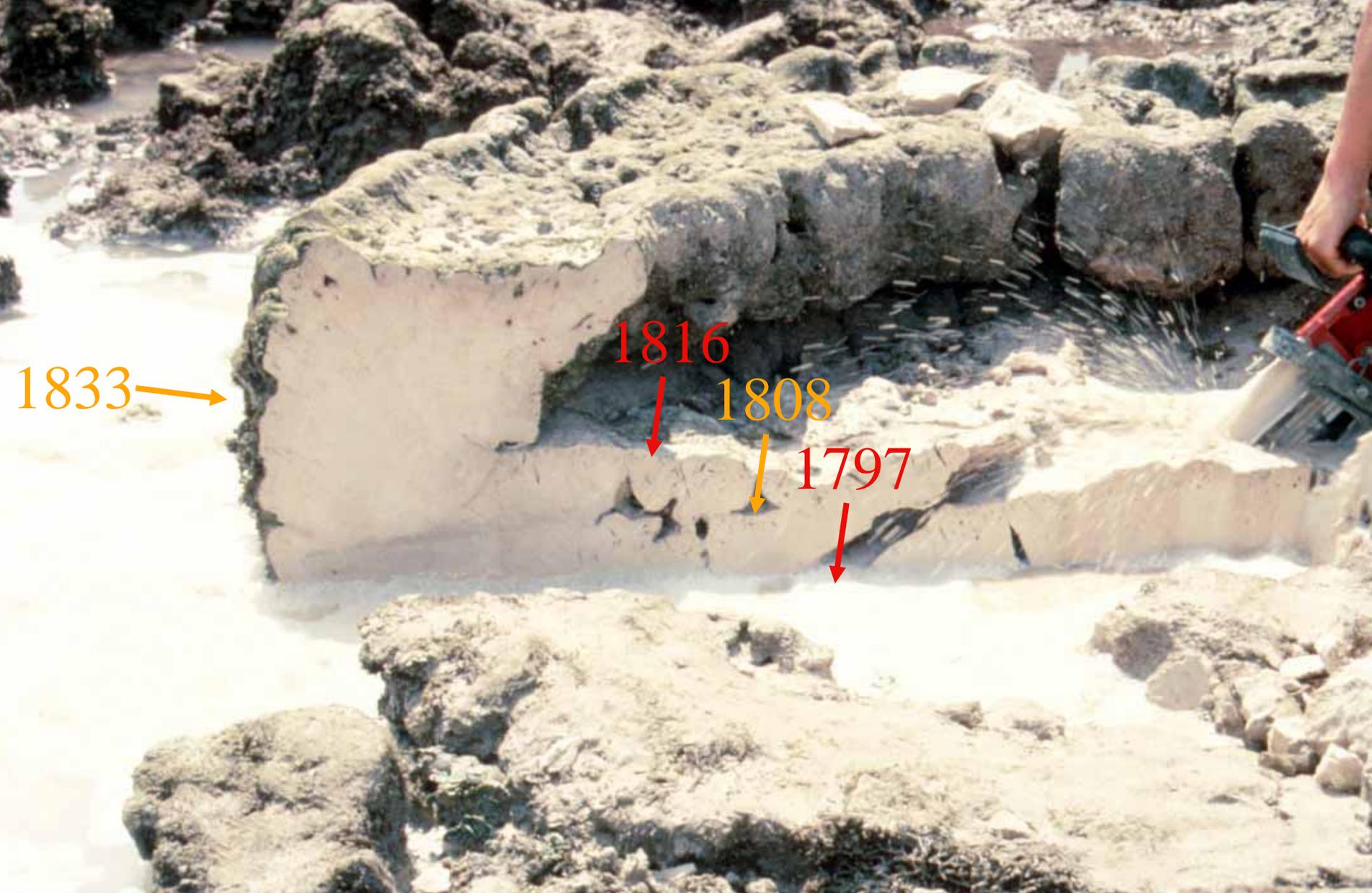
**Old beach**



**Rising island creating new land in Simelue  
during Aceh-Andaman earthquake**







1833 →

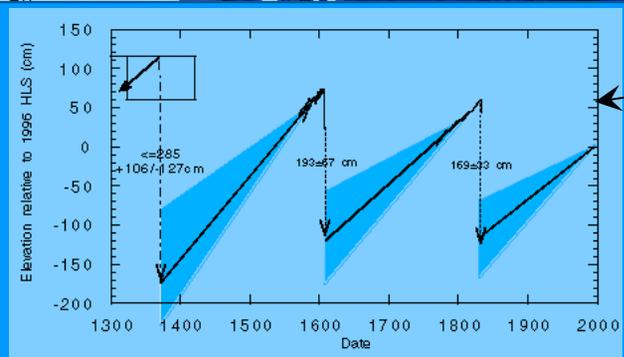
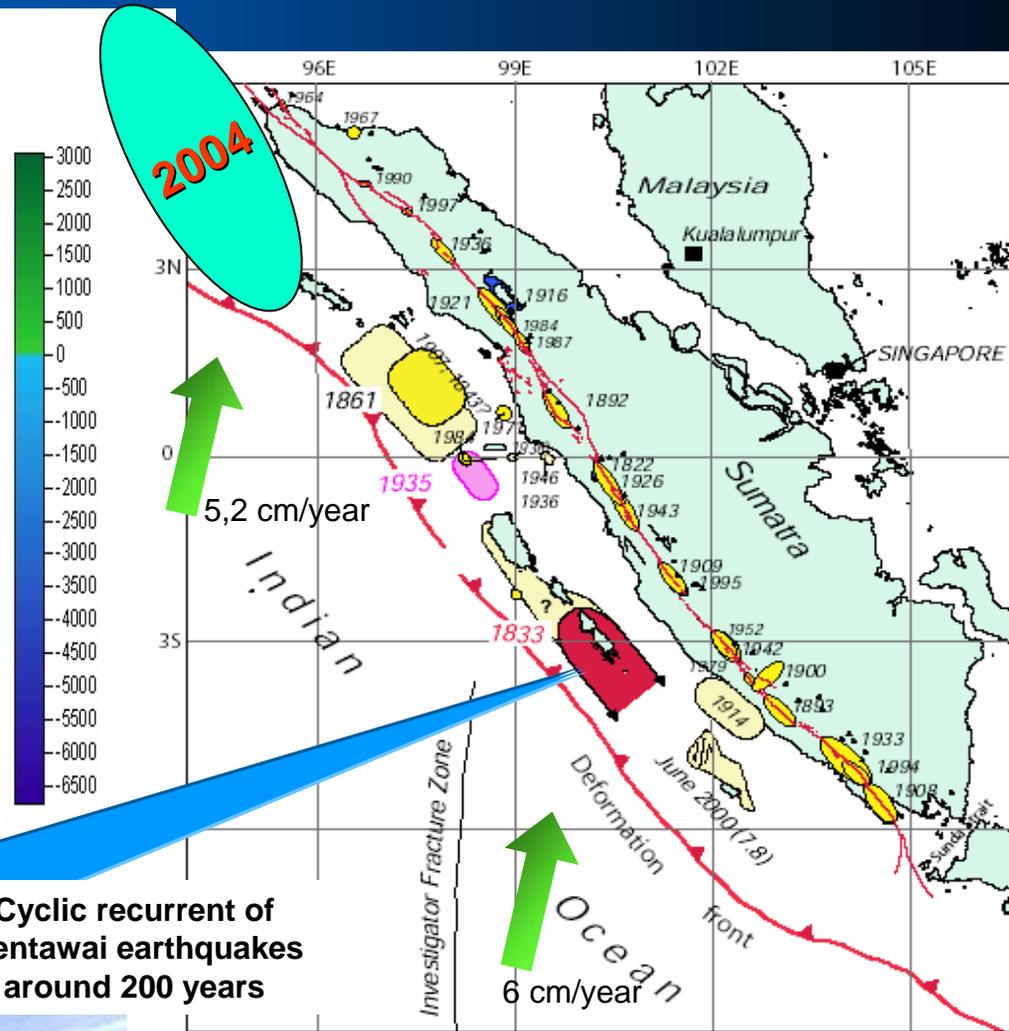
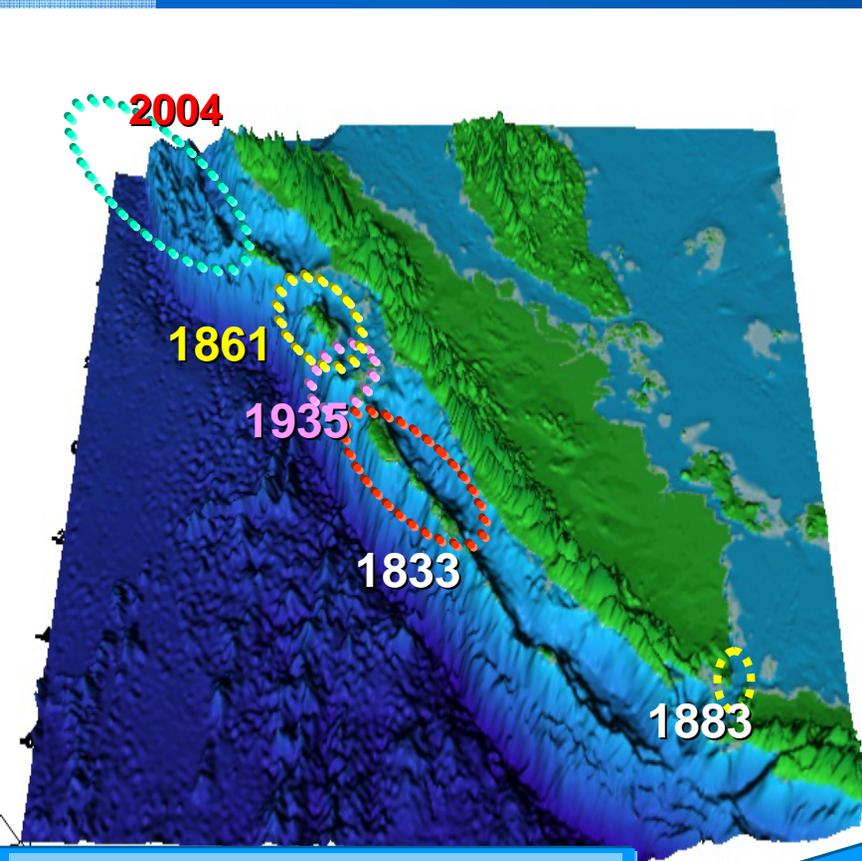
1816 ↓

1808 ↓

1797 ↓



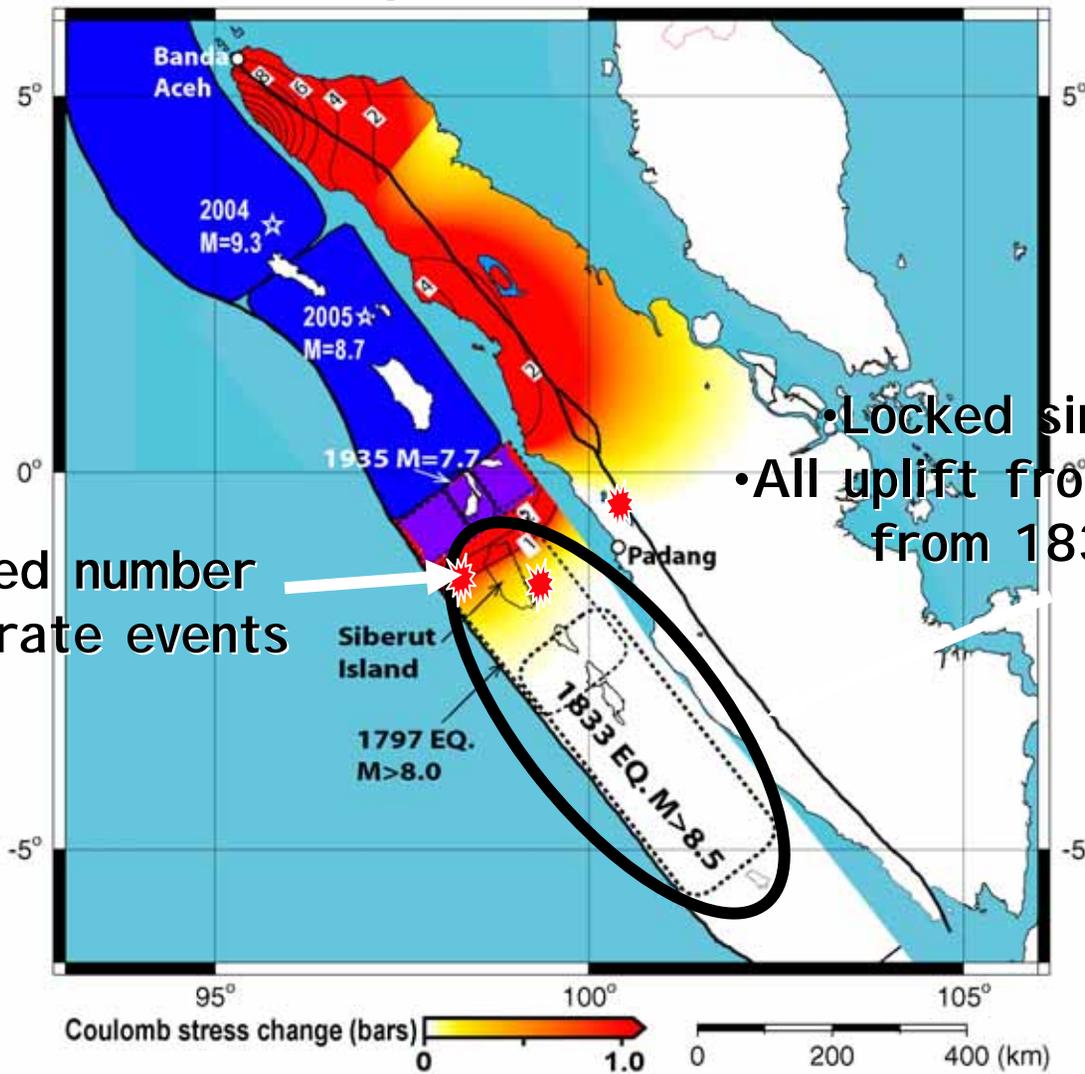
# Earthquake epicenters of Sumatra (Natawidjaja, 2002)



Cyclic recurrent of Mentawai earthquakes around 200 years

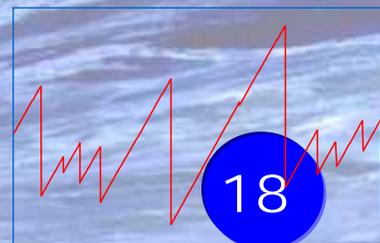
Earthquake +Tsunami:1381 (coral reef), 1608 (coral reef) 1833 (coral reef &book), **2004**  
Interval 200-220 years (Natawidjaja, 2000, LIPI – Caltech)

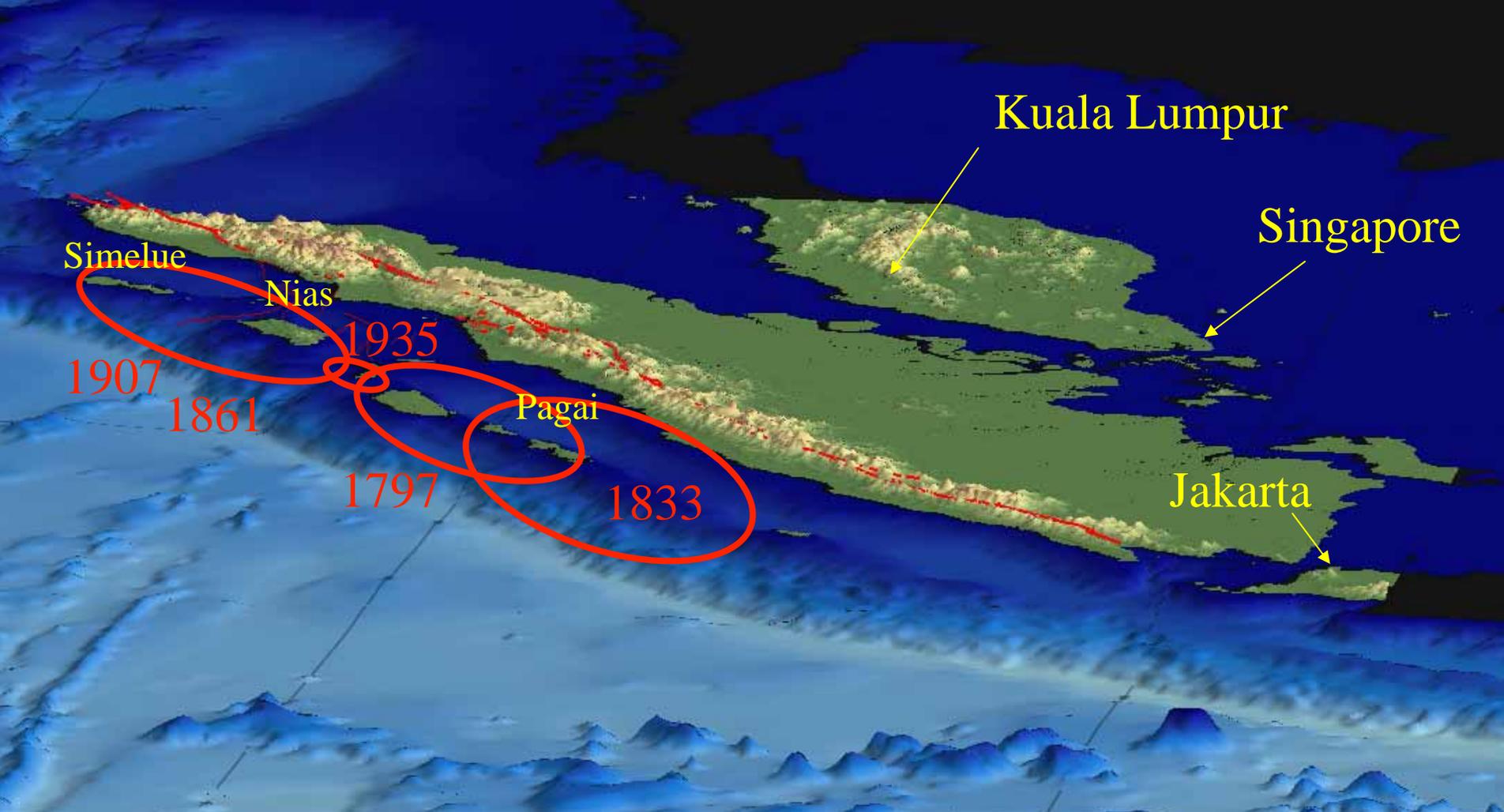
# Including post-seismic slip + aseismic slip under Batu Islands



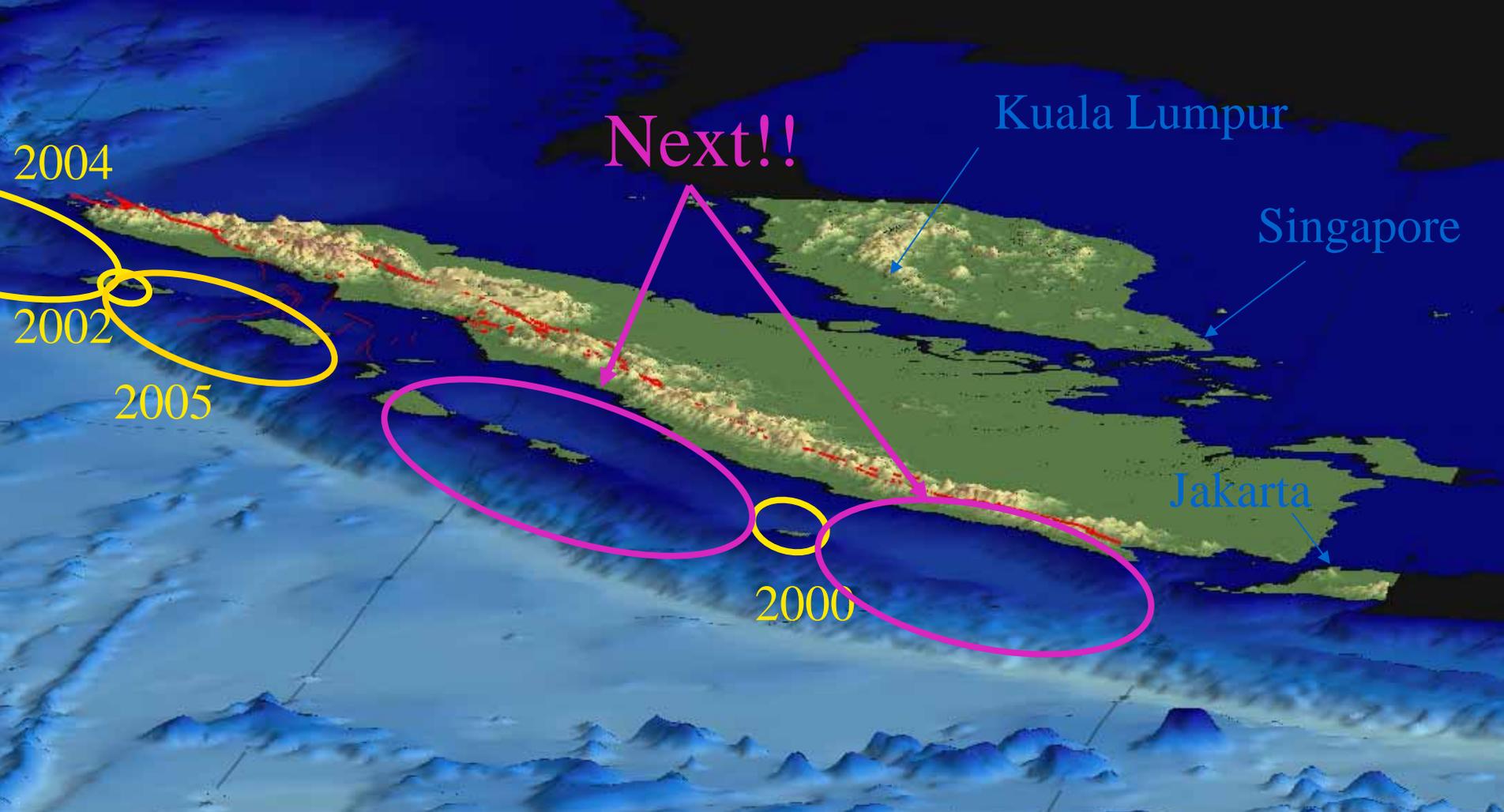
Increased number of moderate events

- Locked since last events
- All uplift from 1797 and most from 1833 recovered





Most of the megathrust failed  
between 1797 and 1907



**This is WHAT likely to happen in the future**

**The question is WHEN?**

**and WHAT CAN WE DO ABOUT IT !!!**

# Public campaign and education

The image features a dramatic, monochromatic blue scene of a stormy sea. Large, powerful waves are crashing, with white foam visible as they break. The sky is dark and filled with heavy, textured clouds, suggesting an intense weather system. The overall mood is one of power and urgency. Overlaid on the upper left portion of the image is the text 'Public campaign and education' in a bright yellow, sans-serif font. The text is arranged in two lines, with 'Public campaign' on the top line and 'and education' on the bottom line.

# Indonesian National Public Preparedness Grand Strategy

Main Components	2005 (short term)	2006 – 2008 (mid term) Aceh, Nias, Padang, Bengkulu, Nabire, Alor (as pilot sites)	2009 – 2012 (long term) Nationwide
Public Awareness Campaign			
Public Education			
Early Warning Dissemination			
Community Based Livelihood Activities			
Capacity Building			
Monitoring and Evaluation			
Warehouse & Logistics			

# The Early Days of Public Education and Awareness on the Importance of Early Warning System

January 5<sup>th</sup>, 2005



August 28<sup>th</sup>, 2005



June 14<sup>th</sup>, 2007

Workshop C-7th SCA

Pemerintah Provinsi Sumatera Barat - Pemerintah Kota Padang, Universitas Andalas - Universitas Bung Hatta

# INTERNATIONAL MEETING ON THE SUMATRAN EARTHQUAKE CHALLENGE

Padang, August, 24-28, 2005, WEST SUMATRA



PT. Garuda Indonesia



AUG 28 2005



60

AUG 28 2005



60

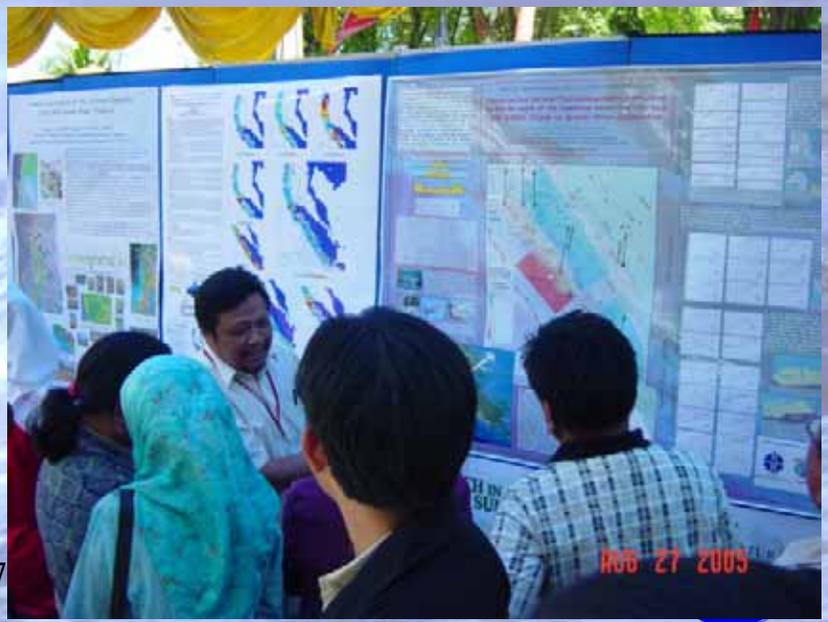
RANAH MINANG

BURUKNYA CUACA SEJAK EMPAT BULAN T



AUG 27 2005

op C-7



AUG 27 2005