



**Advanced Conference on Seismic Risk Mitigation and Sustainable
Development**

10 - 14 May 2010

**ACEH GEODYNAMICS AND GPS OBSERVATION:
investigate post-seismic deformation in Aceh after 2004 Sumatra Earthquake
*(Presentation)***

NURDIN Irwandi
*Jurusan Fisika Physics Department
Fakultas MIPA Basic Science Syiah Kuala University
Jl. Syech Abdul Rauf No. 5 Banda Aceh 23352
Aceh
INDONESIA*

A G G O

ACEH GEODYNAMICS AND GPS OBSERVATION: investigate post-seismic deformation in Aceh after 2004 Sumatra Earthquake



Irwandi*, Syukri Usman*, Nazli Ismail*, Irwan Melano#
Fumiaki Kimata**, Takeo Ito**, Endra Gunawan**, Takao Tabei ##
**CS3RG, (Computational Seismology and Risk Reduction Research Group)
Faculty of MIPA, Syiah Kuala University, Indonesia, email: wandiufu@yahoo.com,
#Geodesy Department, Institut Teknologi Bandung, Indonesia
**RSVD, Graduate School of Environmental Studies, Nagoya University, Japan.
##Graduate School of Science, Kochi University, Japan

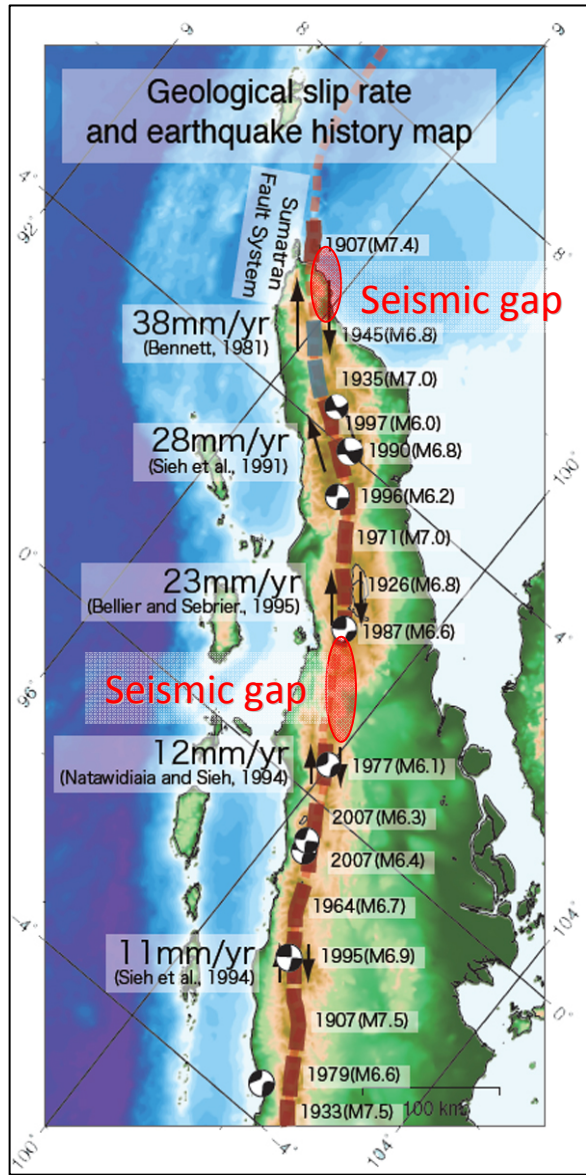


Advanced Conference on Seismic Risk Mitigation & Sustainable Development, ICTP Trieste, Italy 10 - 14 May 2010

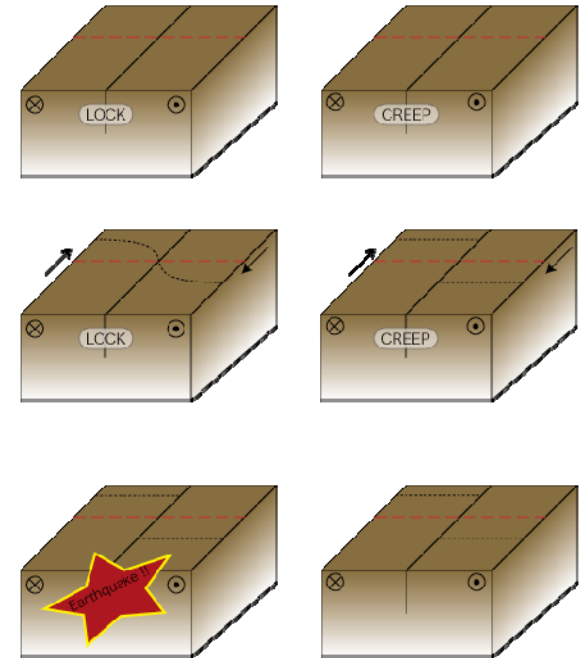
Sumatra Fault System

Long: 1200 km length
Slip rates: 2-4 cm/yr

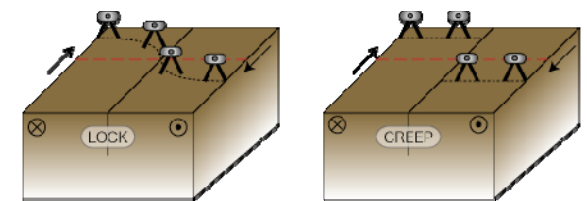
Right-lateral
Seismic gap



Lock or Creep?

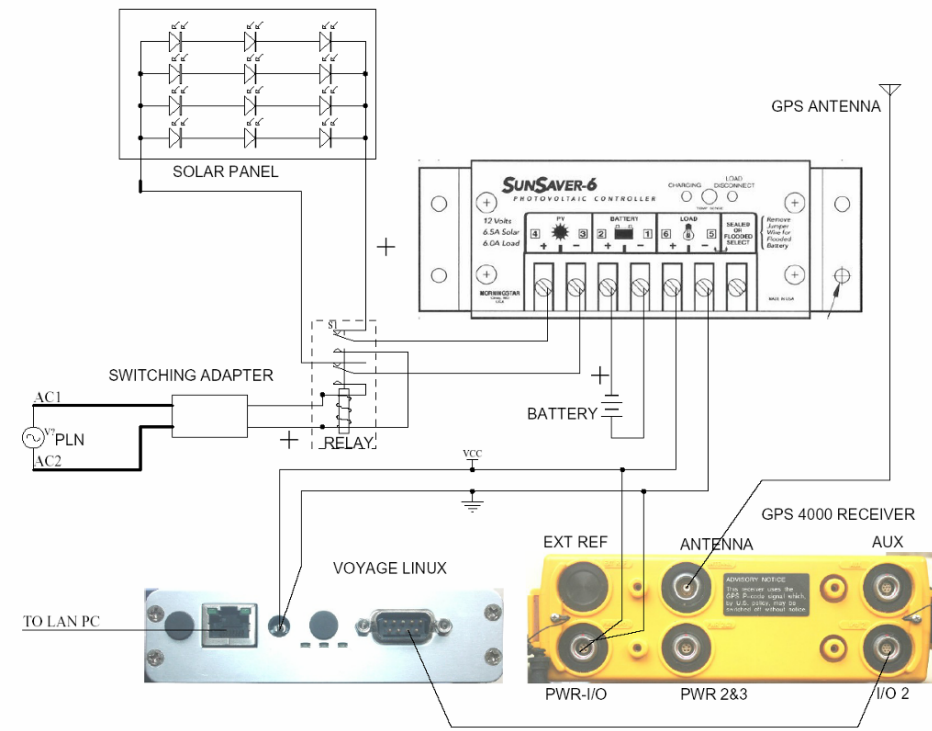
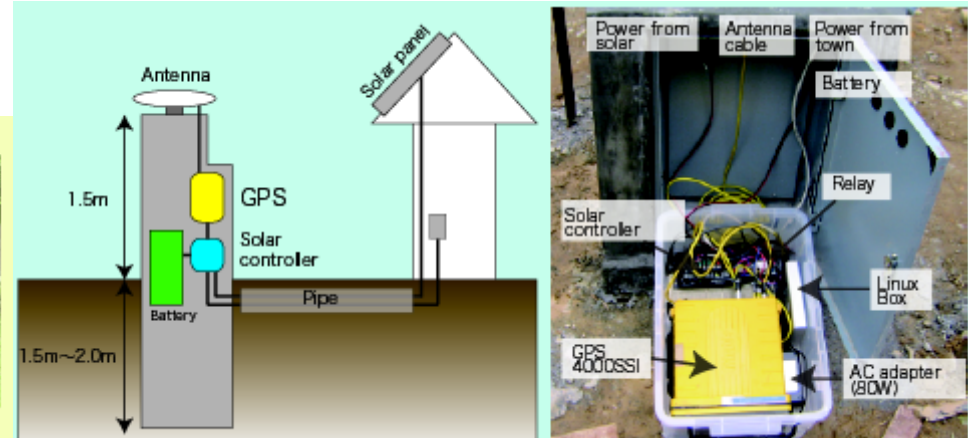
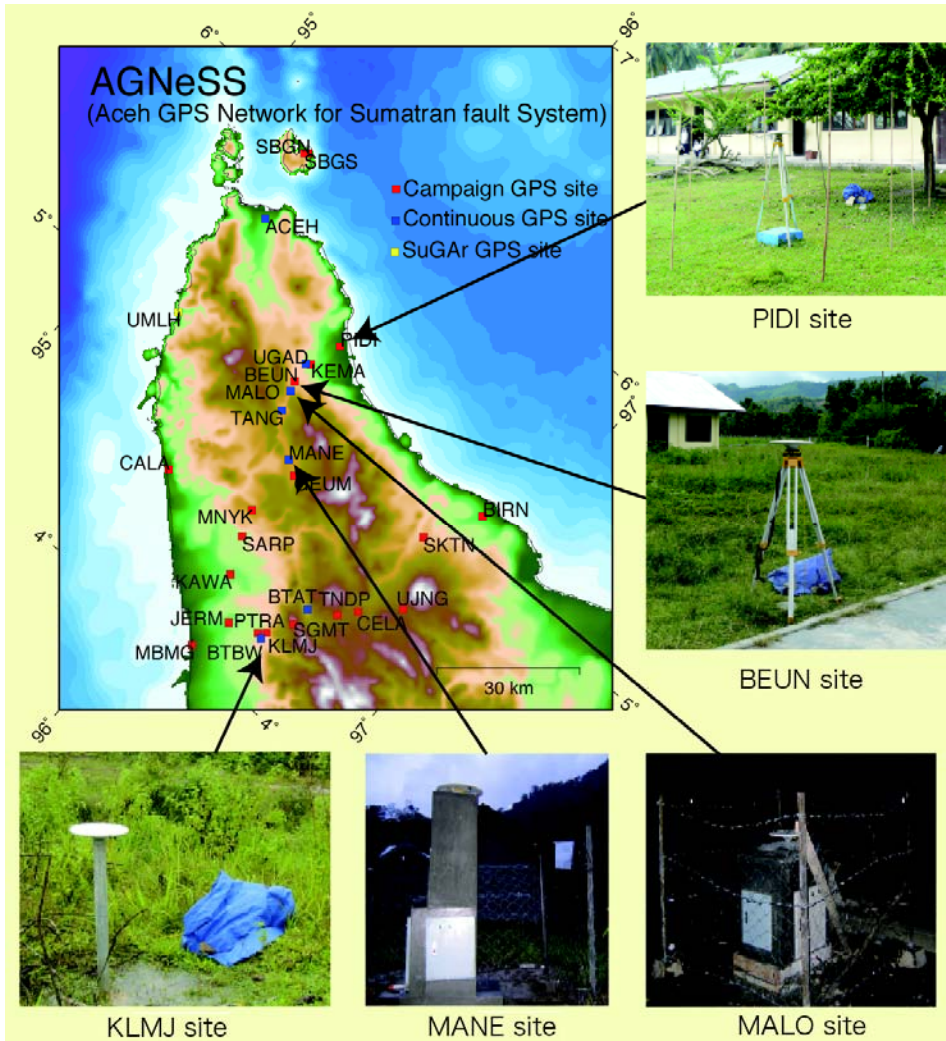


Setup :
a New Dense GPS Network



GPS Field Survey Methodology

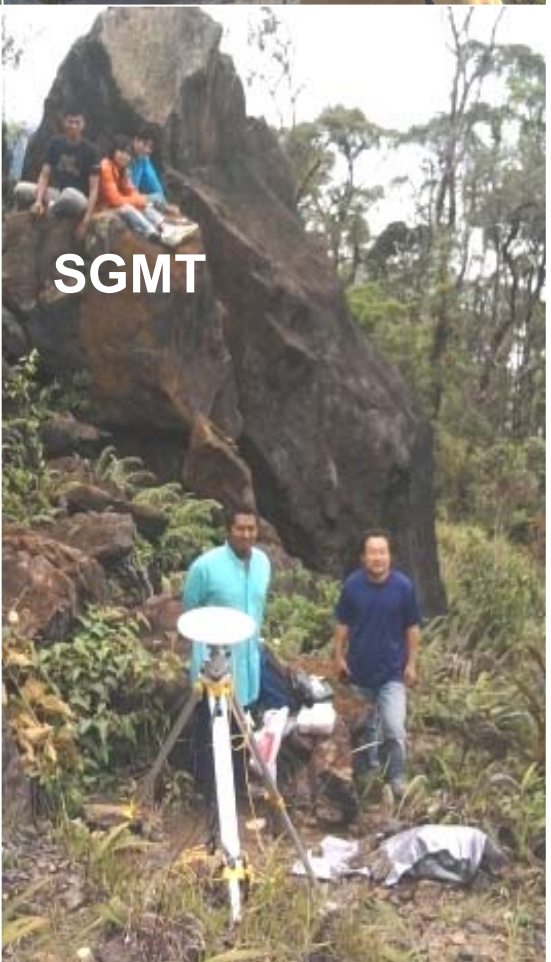
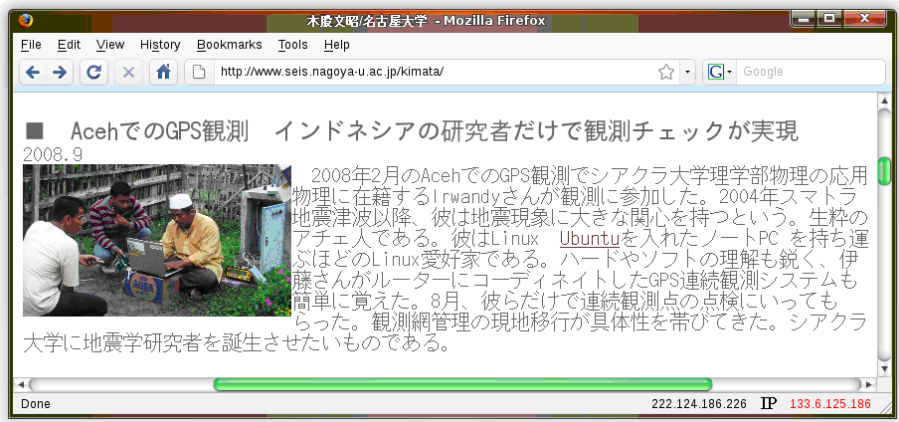
Hardware: Trimbel 4000 SSI and 5700
 Software: Bernese 5



AGOGO

Aceh Geodynamics and GPS Observation (Extensional AGNeSS)



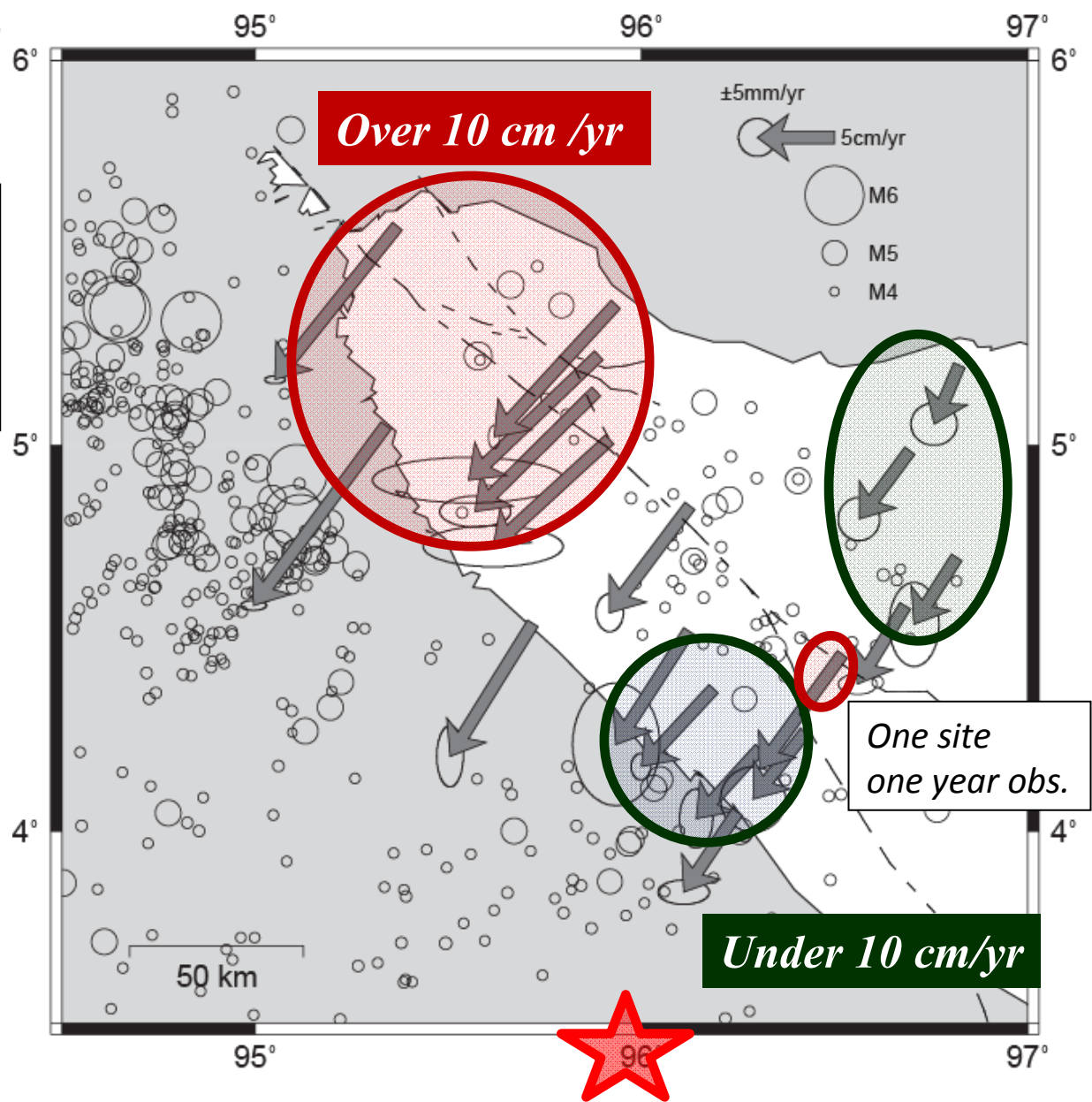


Station Velocities

Post seismic deformations of 4 cm/yr in south part are increasing to 14 cm/yr in north part

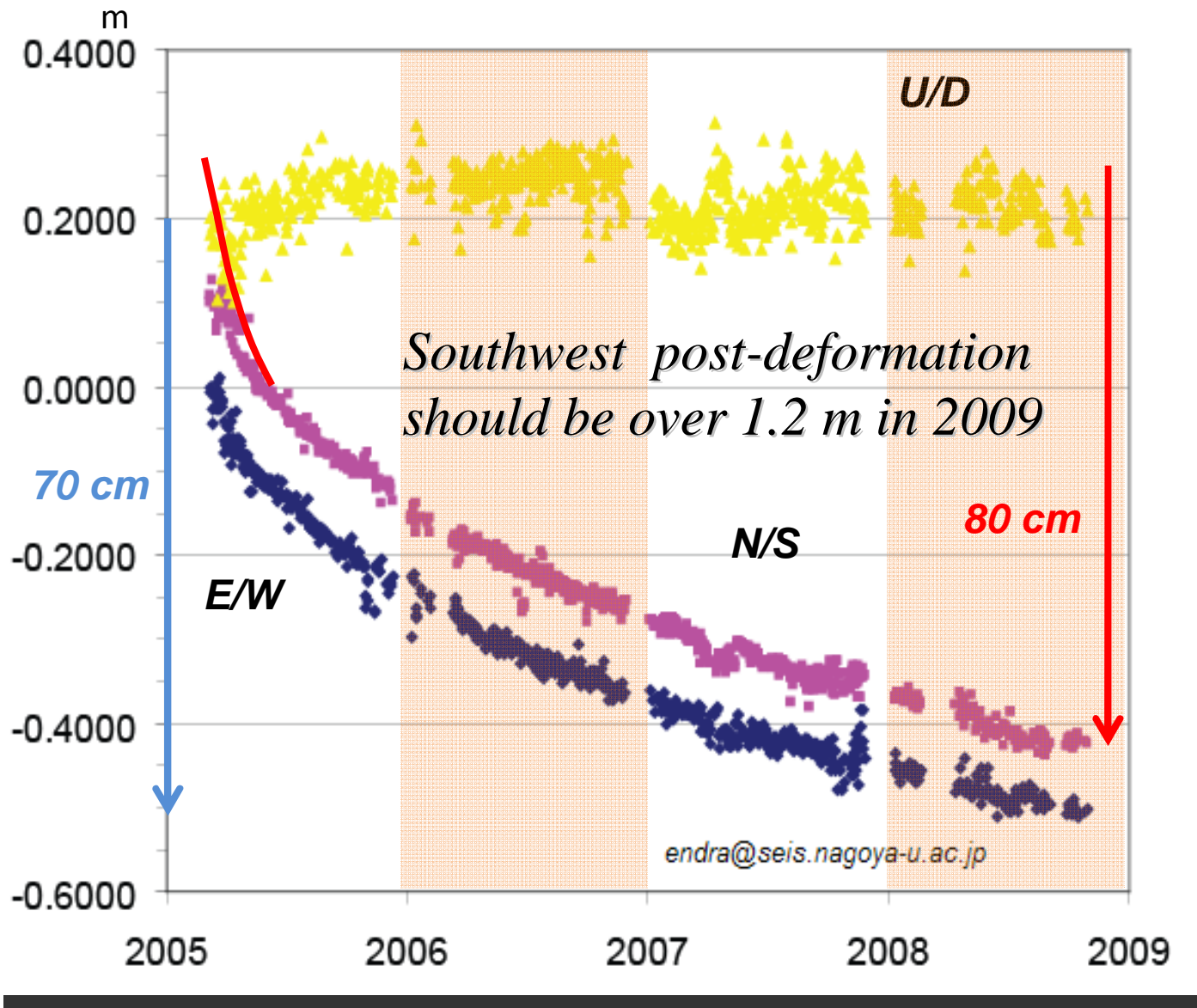
relative to Sunda block by Simons et al. [2007] with 95% confidence ellipses

Aftershock epicenters determined by USGS

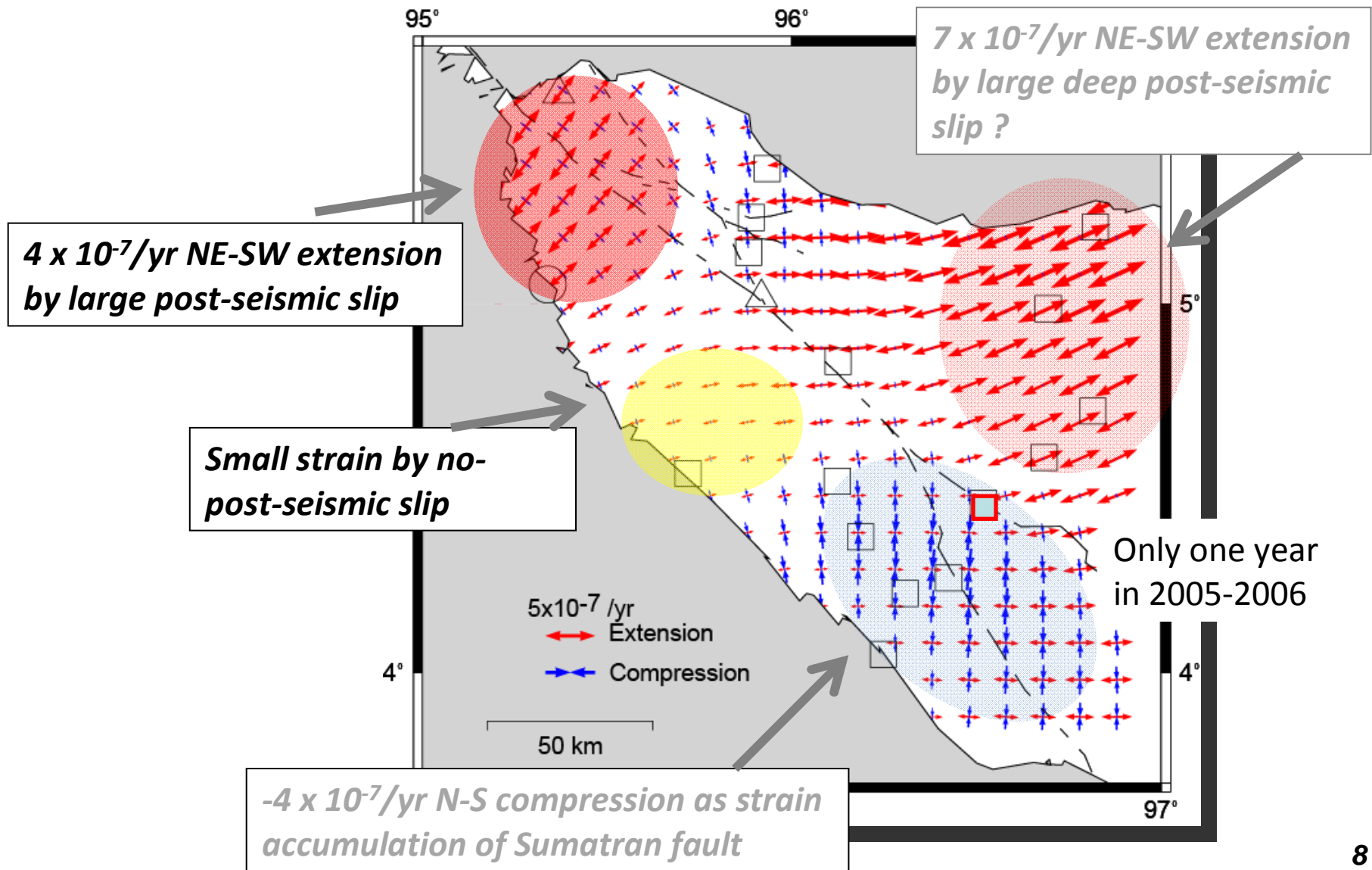


Except for nine stations because of short observation period less than one year

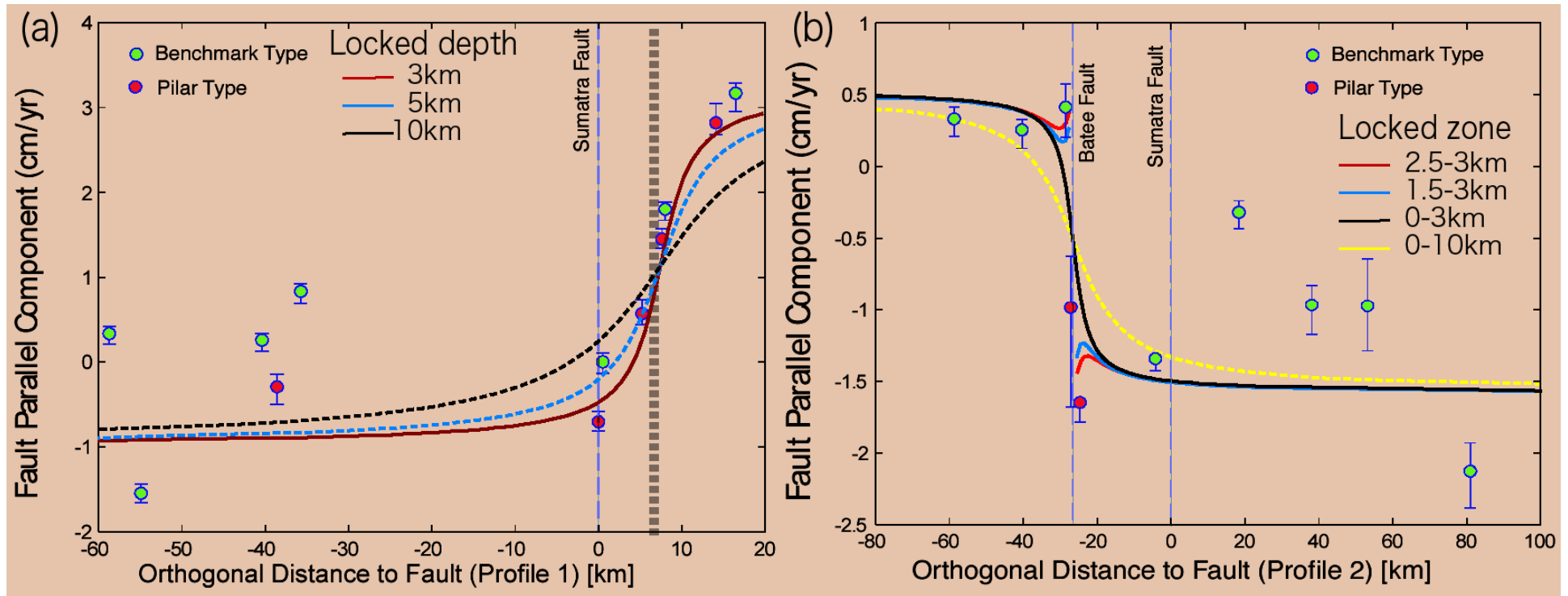
Post-seismic displacements observed at Banda Aceh in March 2005 – November 2008



Principal Strain Calculated from Station Velocities



Lock and Creep Detected



Conclusion: Velocity fields in profile1 line indicates that it is not creeping segment. On the other hand, we can find creep fault in profile 2 line area.

Preliminary conclusion: creeping fault is Batee fault, not Sumatra fault.

In future work: We will continuing and extending the GPS observation and make model that considering the effect of subducting plate, post-seismic deformation and creeping segments.

