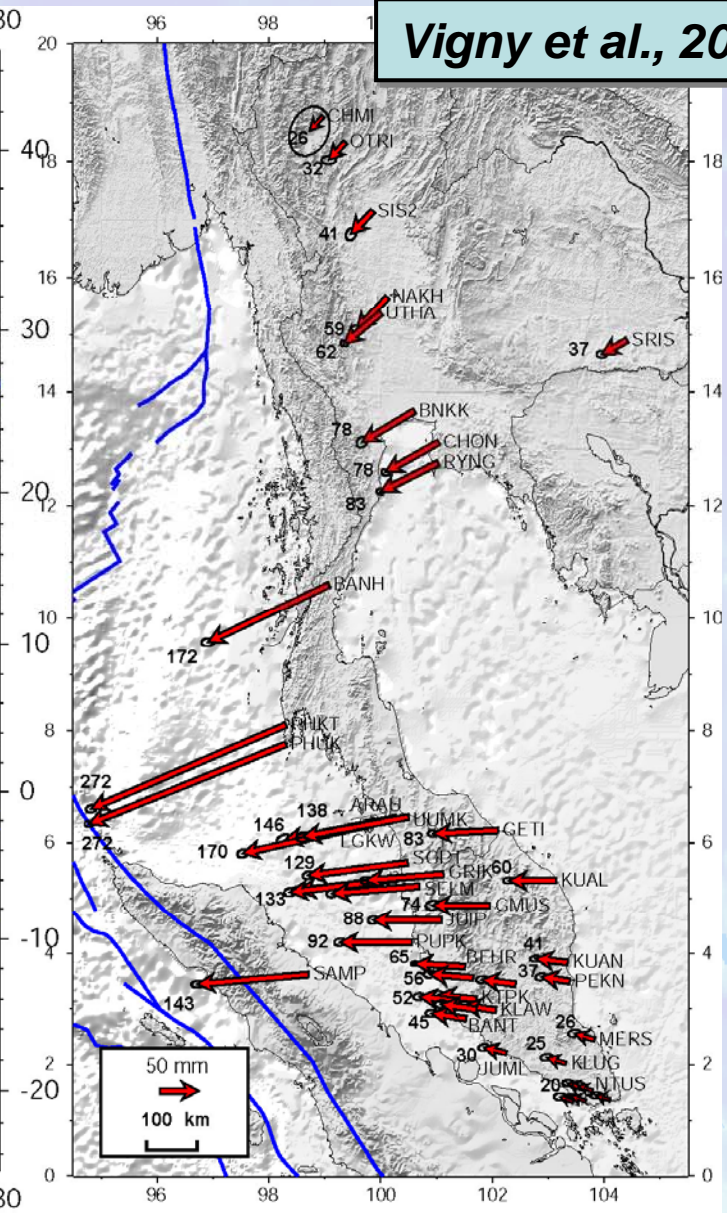
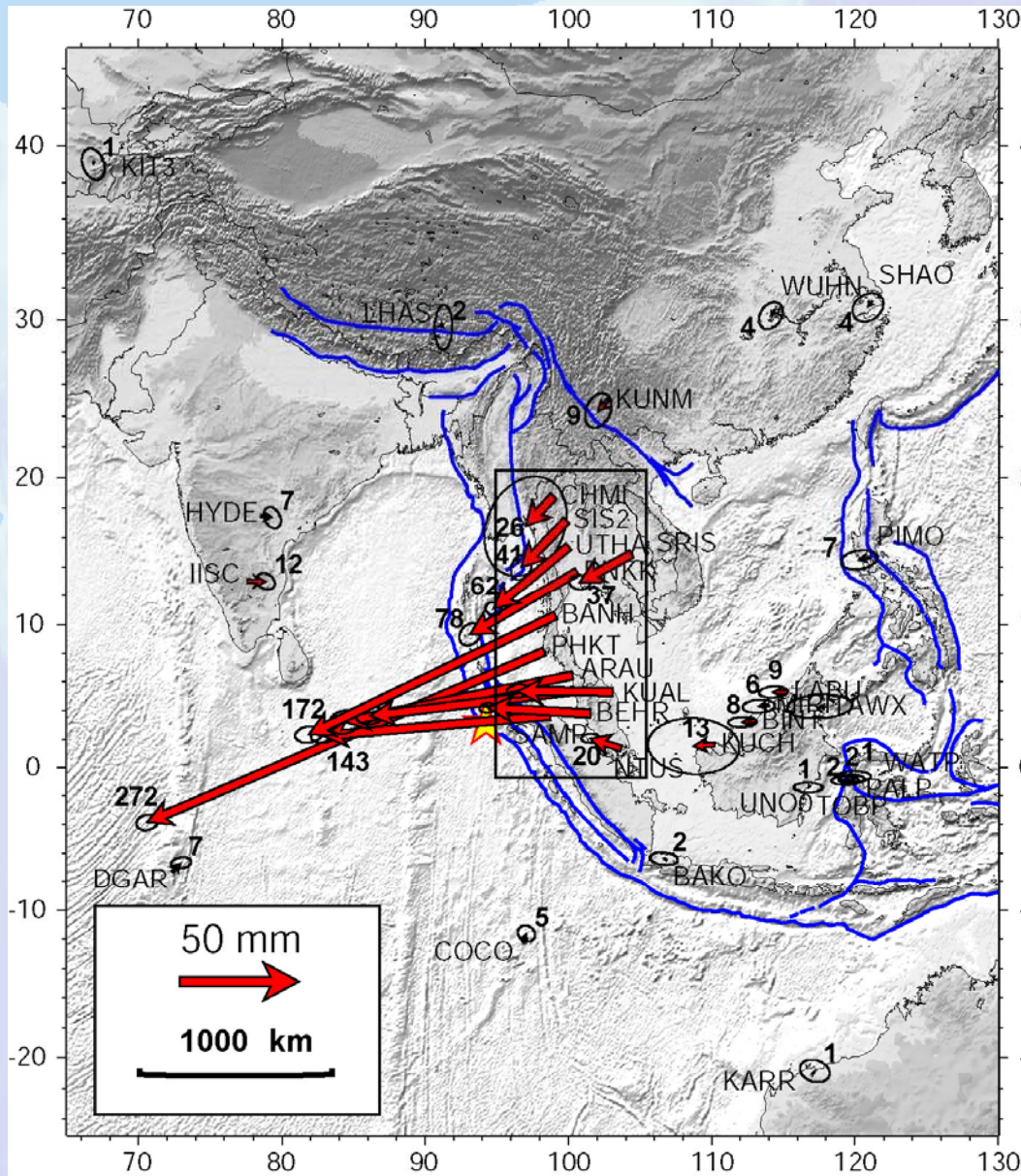


Status of GPS based investigations on the Dec. 2004 mega-thrust earthquake

C. Vigny ⁽¹⁾, W.J.F. Simons ⁽²⁾, S. Abu ⁽³⁾, Chaiwat Promthong ⁽⁴⁾, Chalermchon Satirapod ⁽⁵⁾, A. Socquet ⁽⁶⁾, R. Cattin ⁽¹⁾, N. Chamot-Rooke ⁽¹⁾, J. Pietrzak ⁽⁷⁾, Kee Tuan Chew ⁽⁸⁾, D. Sarsito ⁽⁹⁾, B.A.C. Ambrosius ⁽²⁾, and all SEAMERGES partners.

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- 2) DEOS, Delft University of Technology, Delft, The Netherlands
- 3) Department of Survey and Mapping Malaysia (DSMM), Kuala Lumpur, Malaysia
- 4) Royal Thai Survey Department (RTSD), Bangkok, Thailand
- 5) Dep. of Survey engineering, Chulalongkorn University, Bangkok, Thailand
- 6) Department of Earth & Space Sciences, UCLA, Los Angeles, 90095-1567, USA
- 7) CiTG, Delft University of Technology, Delft, The Netherlands
- 8) Faculty of Geoinformation Science and Engineering, Univ. of Tech. Malaysia (UTM), Johor, Malaysia
- 9) Geodesy Laboratory, Department of Geodetic Engineering, Inst. of Tech. Bandung (ITB), Bandung, Indonesia





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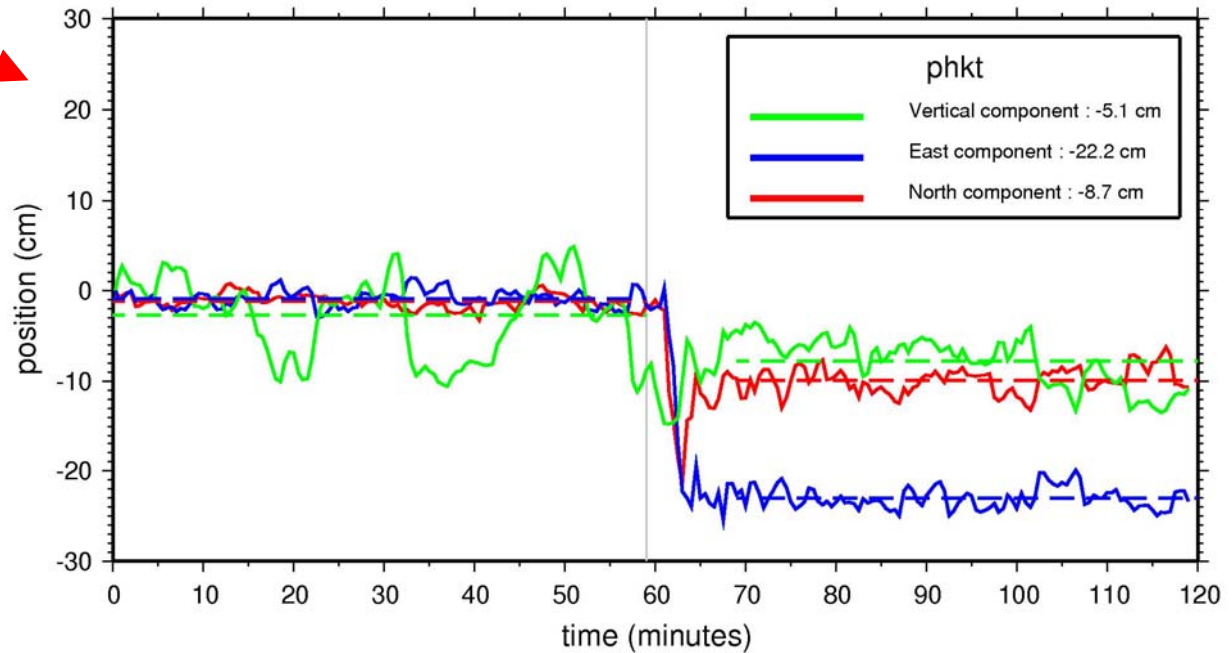
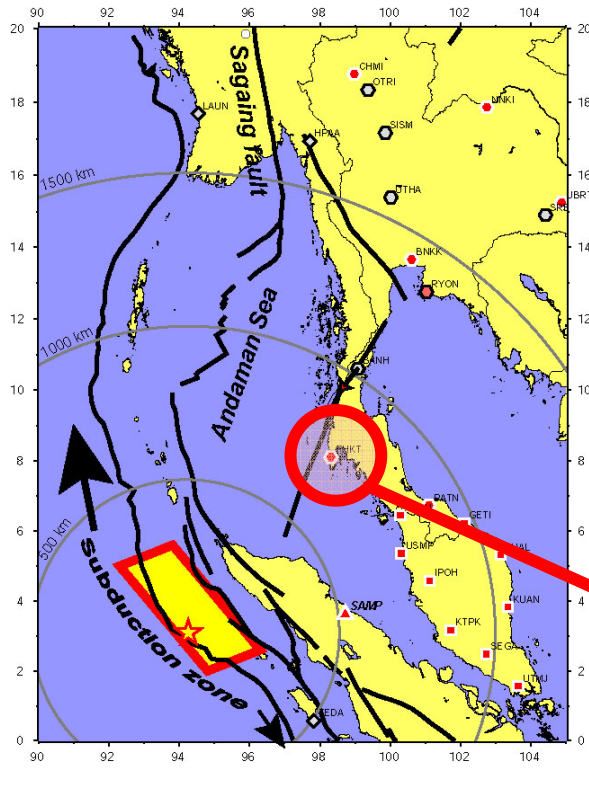
2

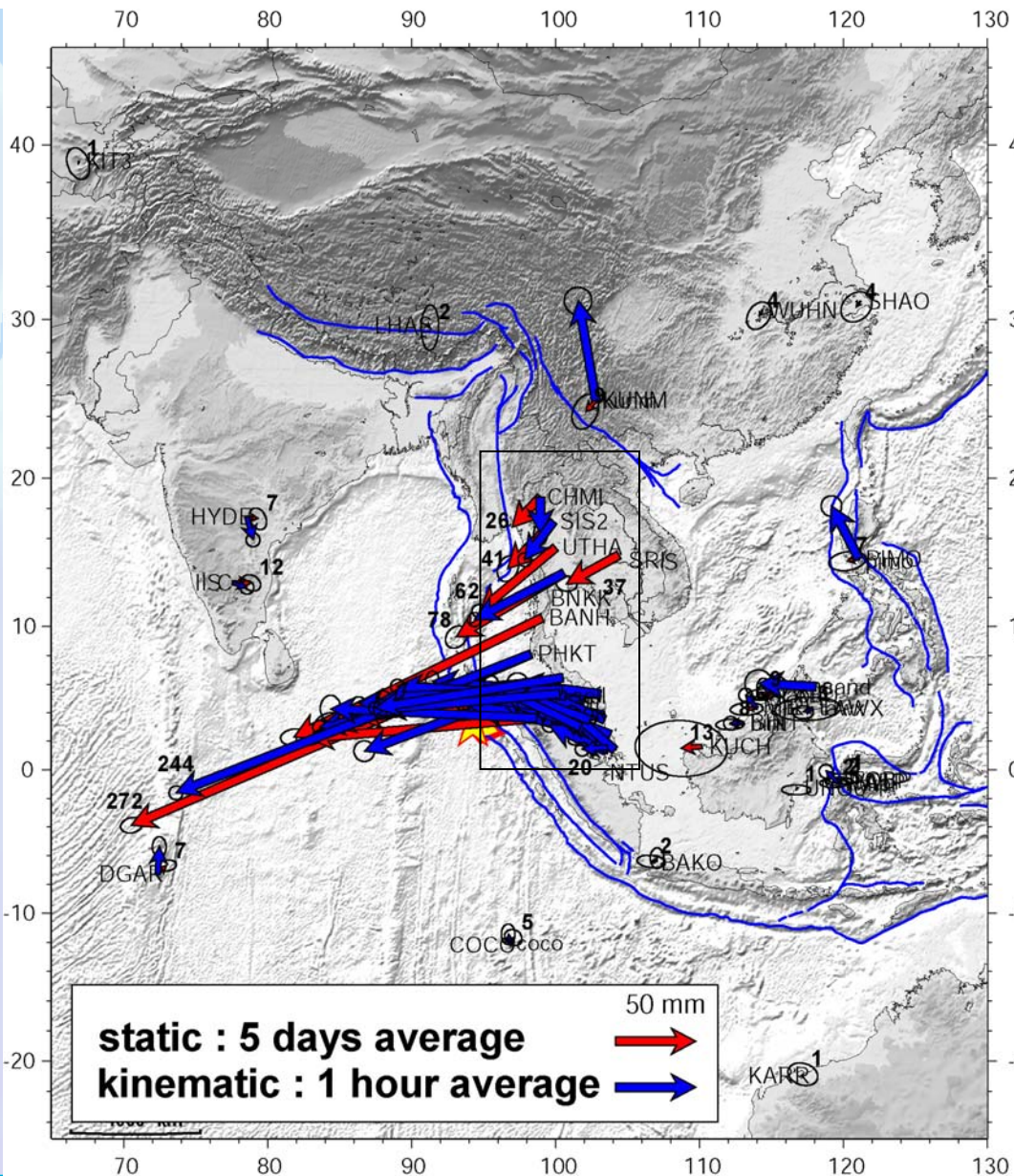
Update 1 : Co-seismic « steps » can be estimated accurately using kinematic GPS

They are 100% co-seismic (no post-seismic)

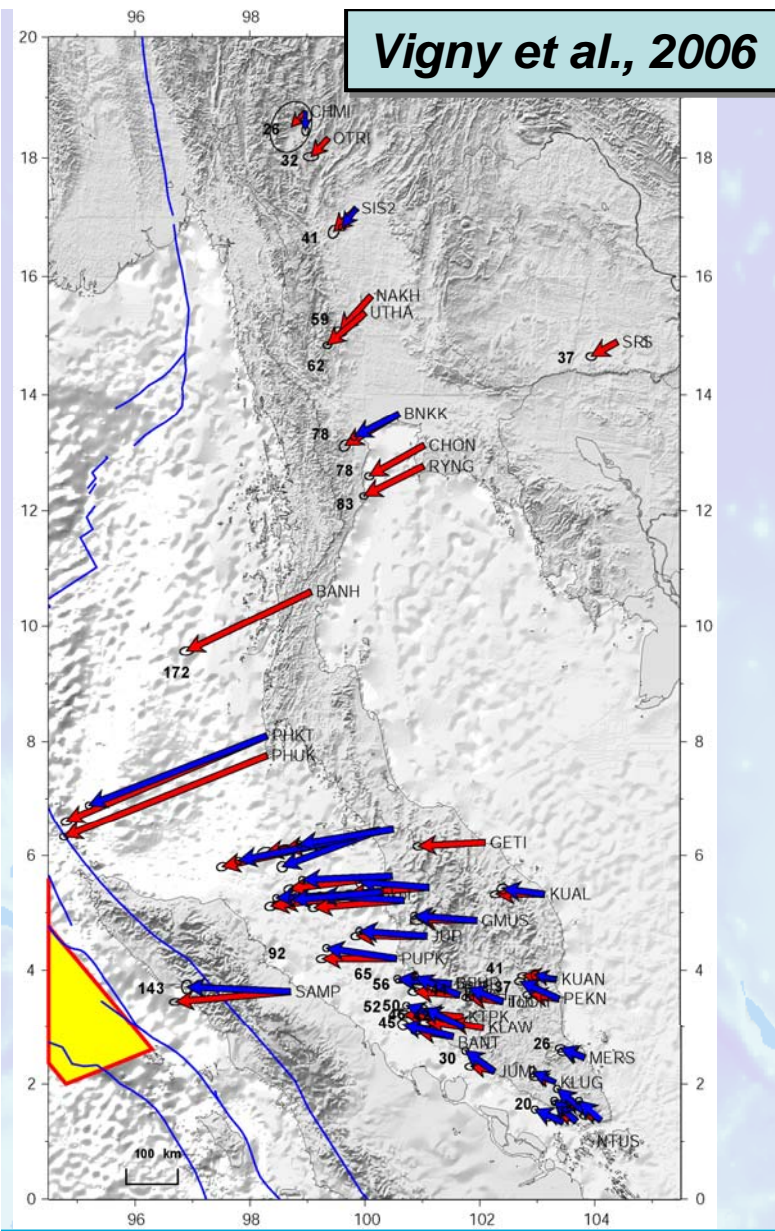
PHKT : 24 cm (5 days average 27cm)

=> 10% reduction





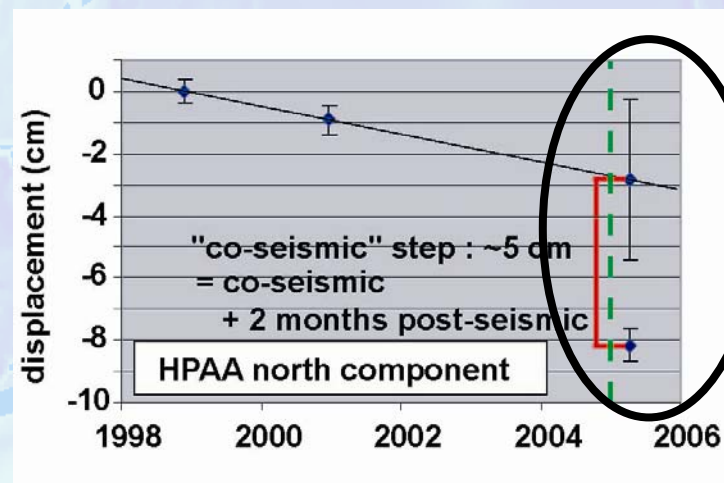
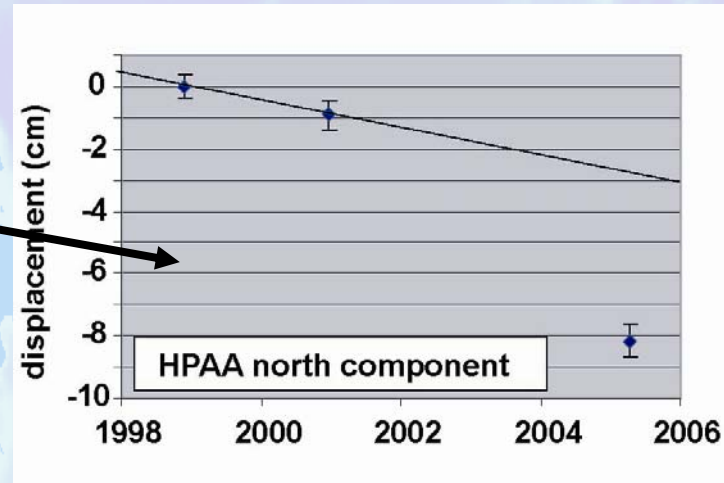
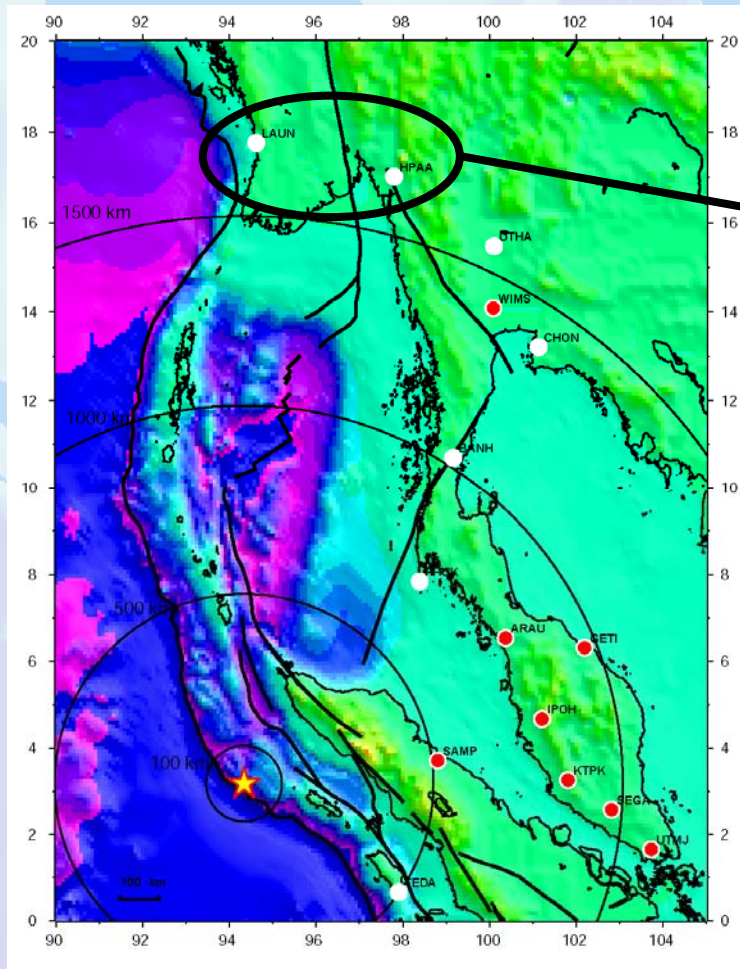
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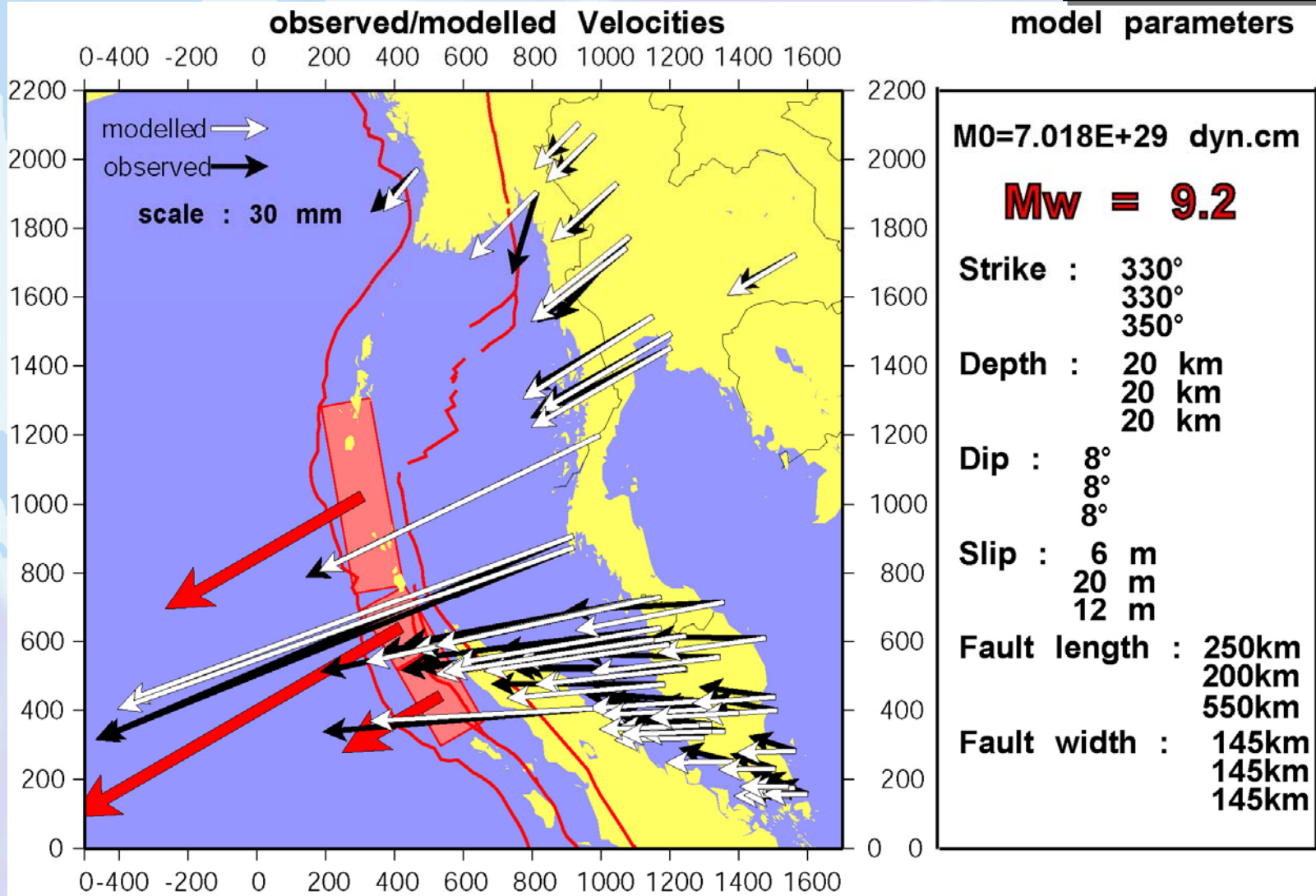


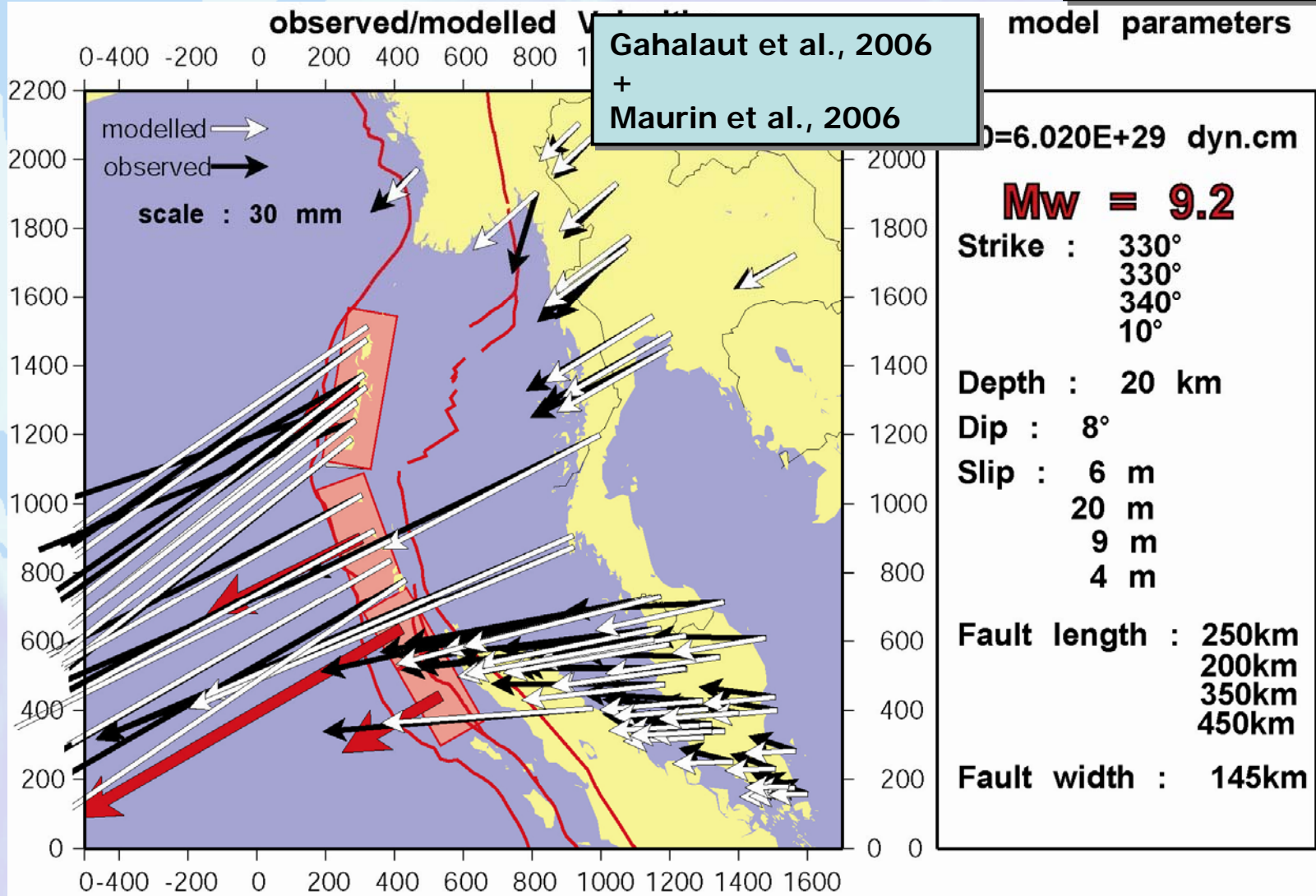
4

Update 2: Additional measurements in Myanmar

U Min Swe, T. Maurin, F. Masson and C. Rangin [*Maurin et al., 2006*]

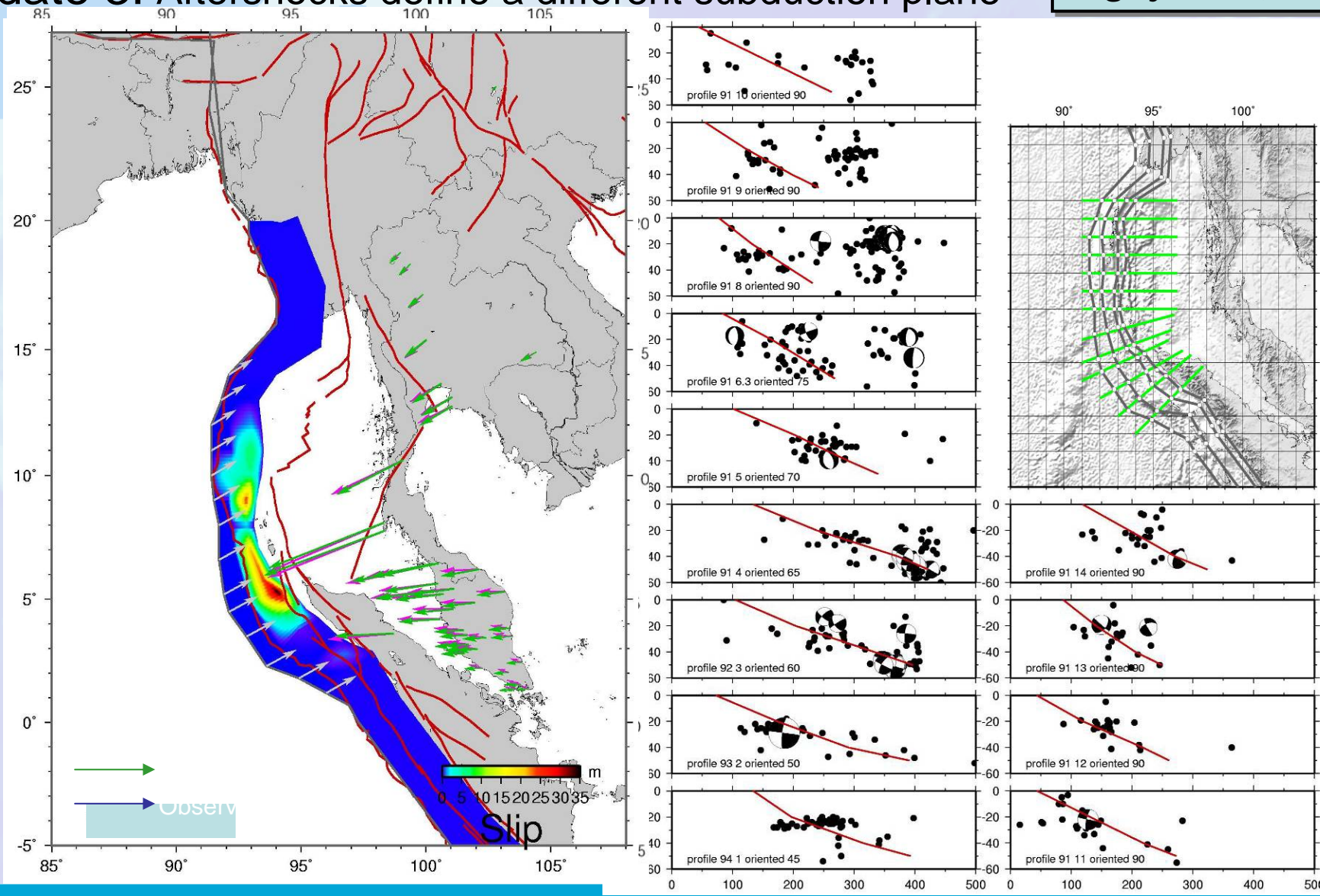






Update 3: Aftershocks define a different subduction plane

Vigny et al., 2006



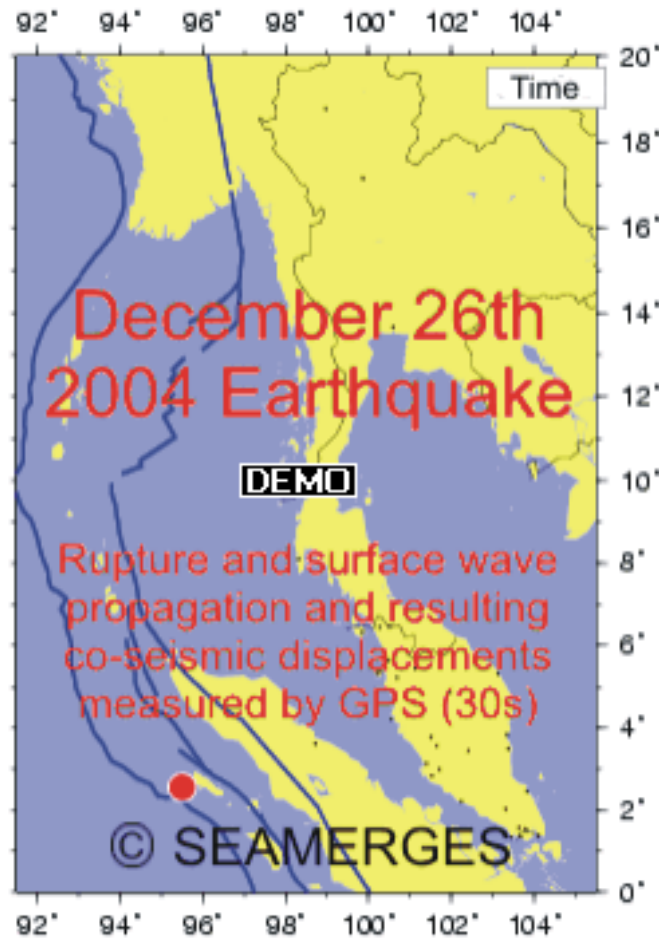
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<http://www.deos.tudelft.nl/seamerges>



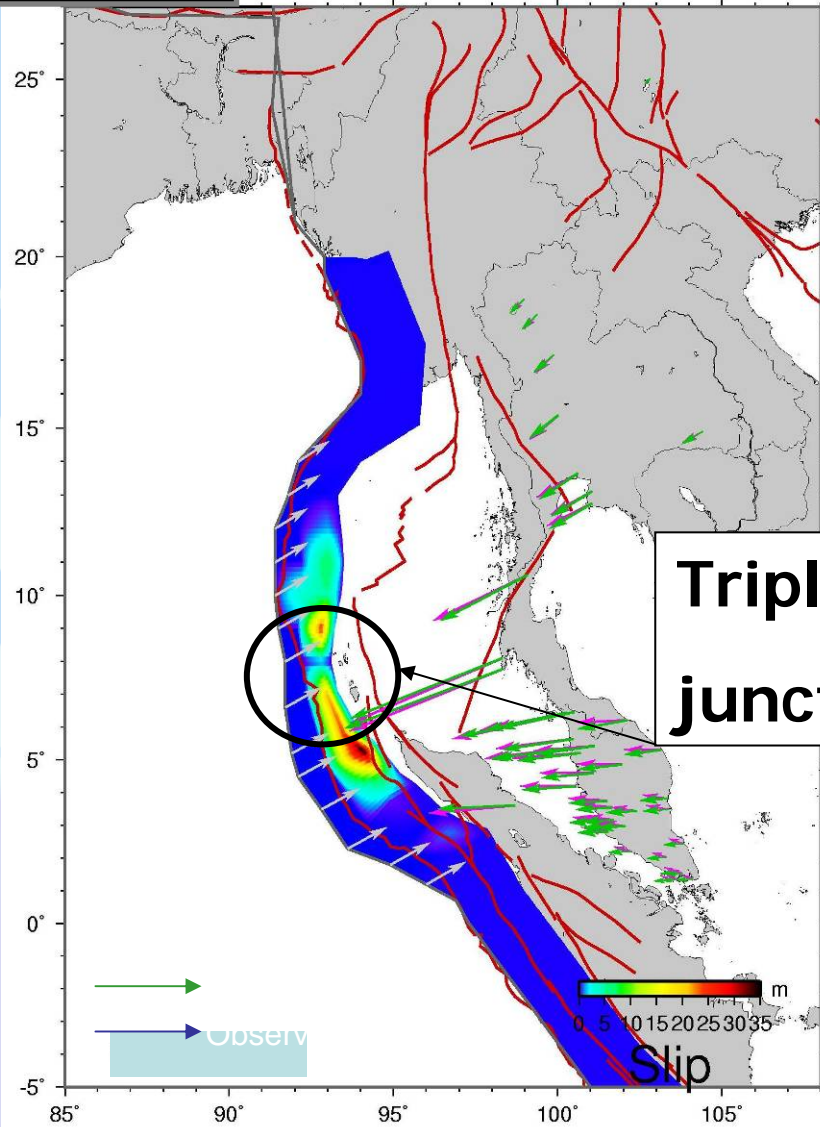
rupture

Seismic **surface** waves propagation (3.7 km/s)

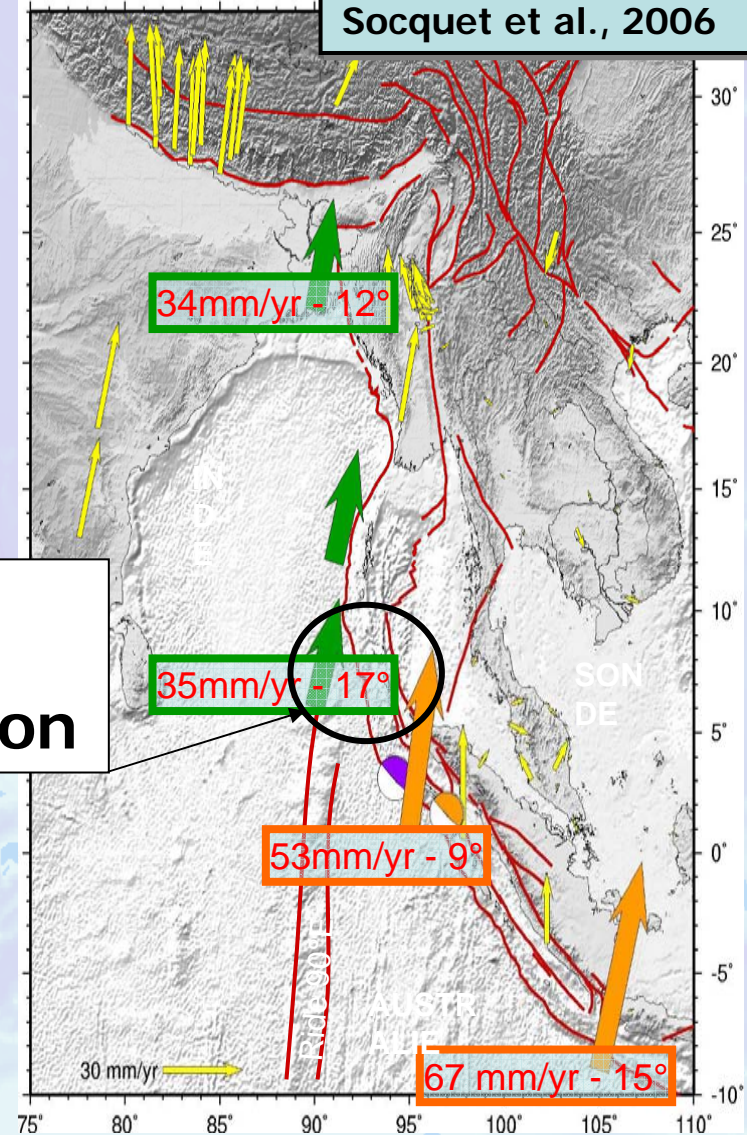
GPS stations displacements

Rupture Propagation:
3.7 km/s initially (South)
30s stop ~ 8° lat
1.8 km/s onward (North)

Vigny et al., 2006



Socquet et al., 2006



Triple junction

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Vigny et al., 2006

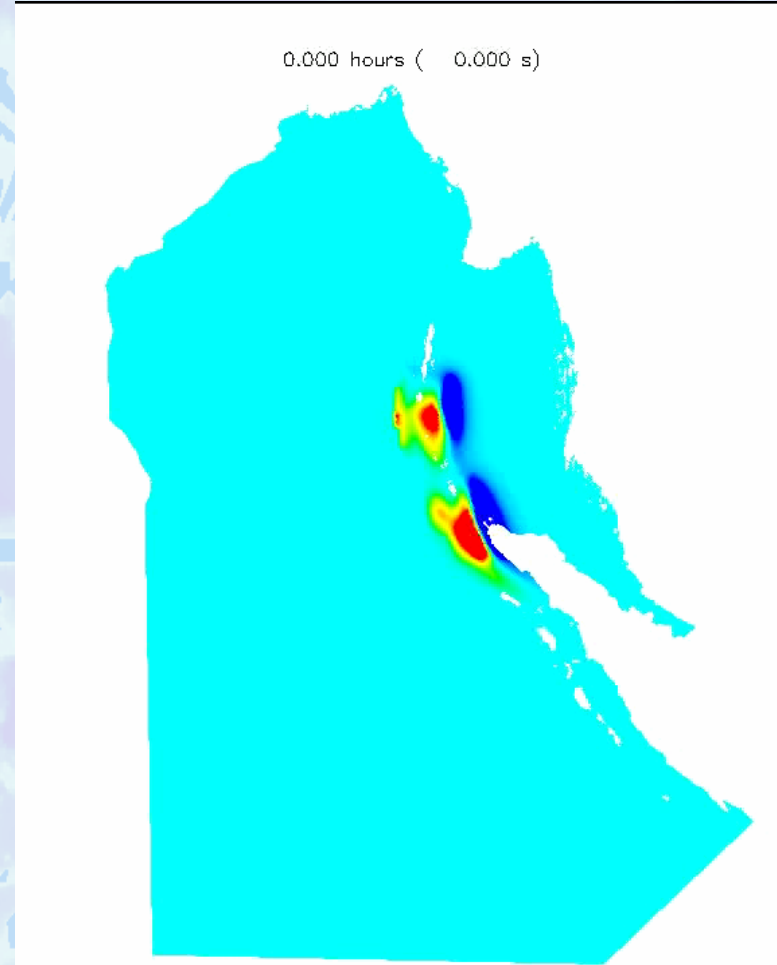
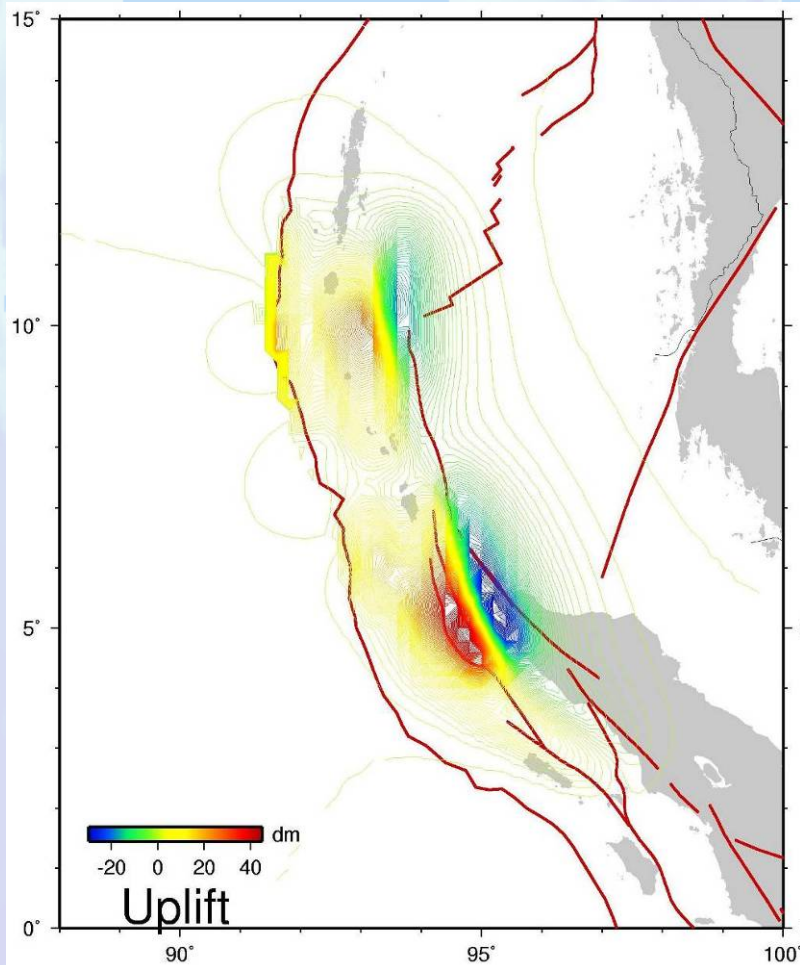
Vertical motions predicted by the models

➤ 4 m of uplift

➤ 2 m of subsidence

Tsunami modélisation

Pietrzack et al., in prep



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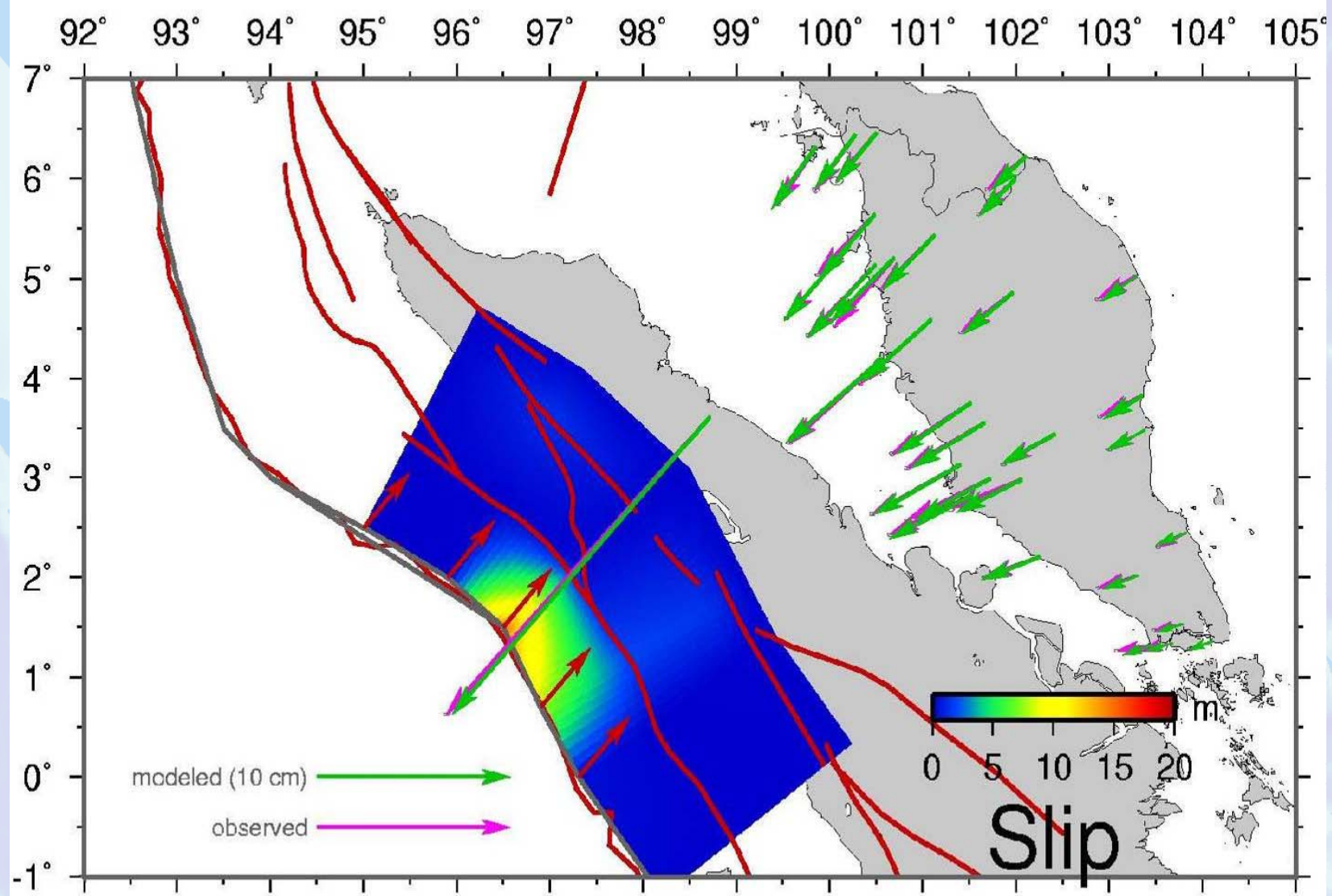
11



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Nias Earthquake, 28 Mars 2005 : Mw 8.7 Vigny et al., 2006



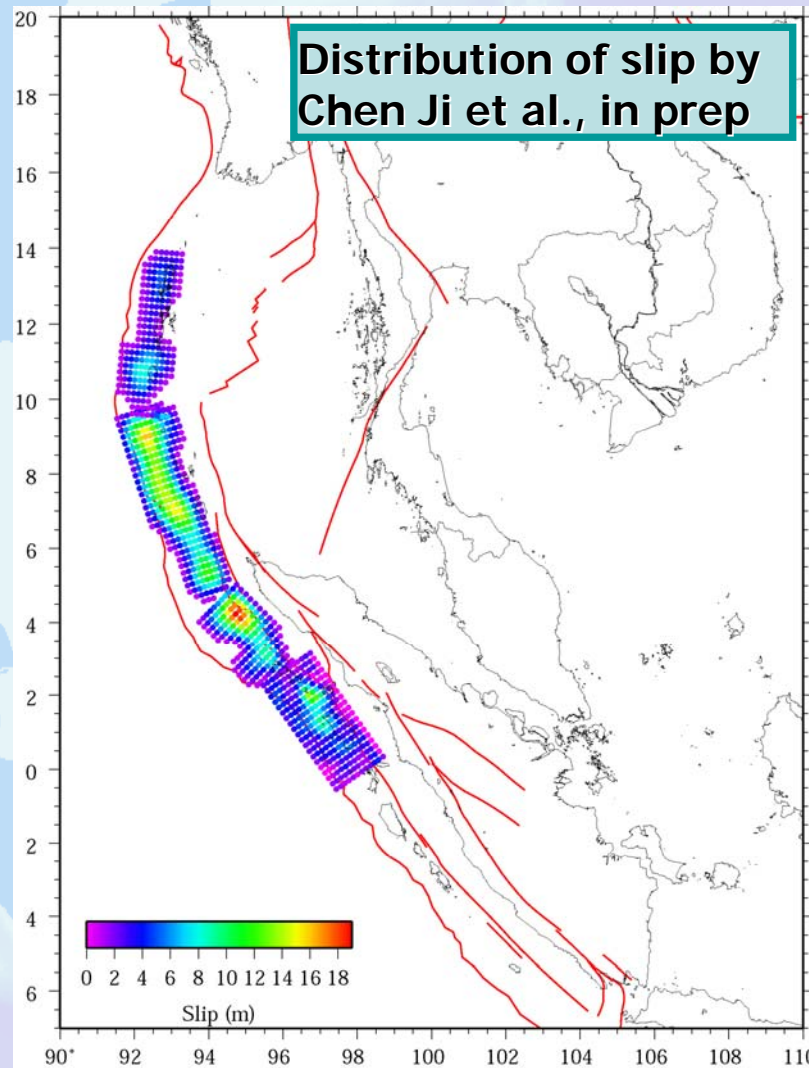
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3 ruptures :

1 - Aceh

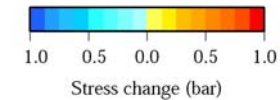
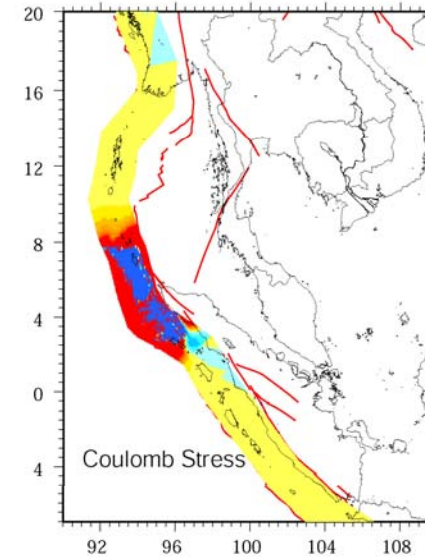
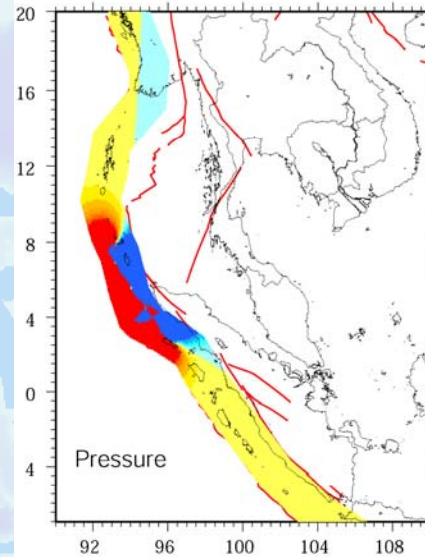
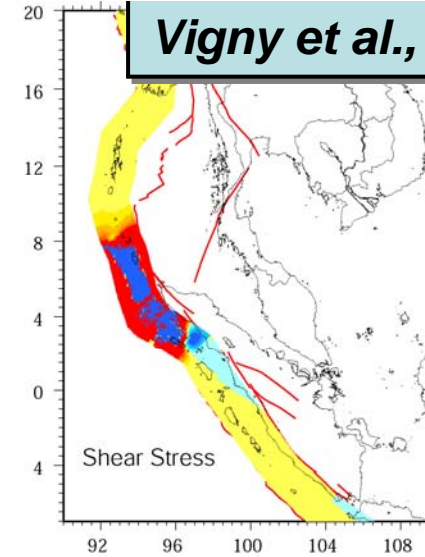
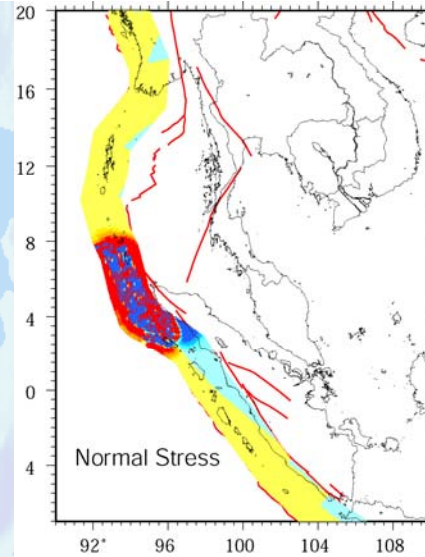
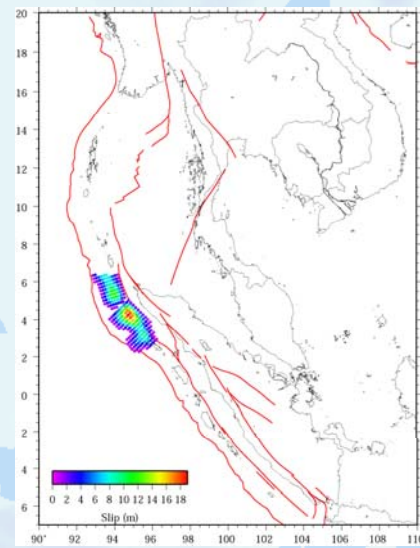
2 - Andaman

3- Nias

1 triggered
2 and **3** by
increase of
static stress

Coulomb stress increase

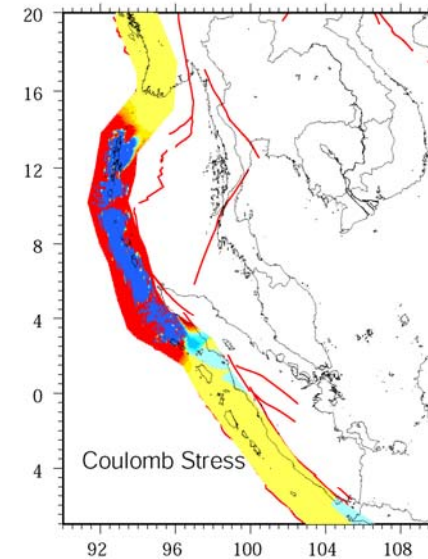
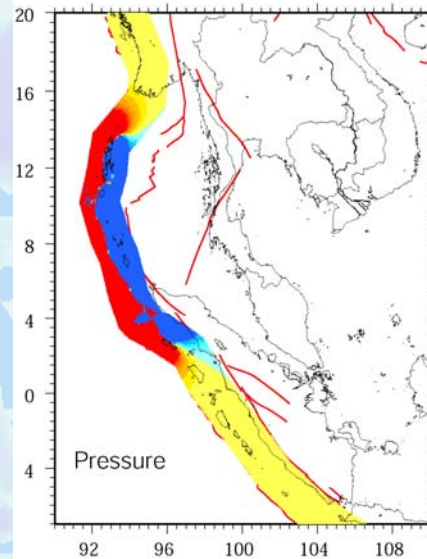
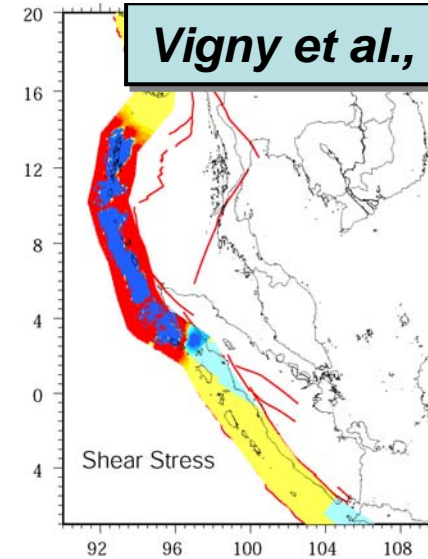
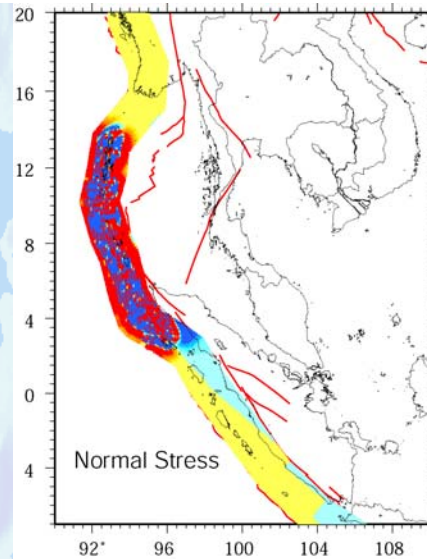
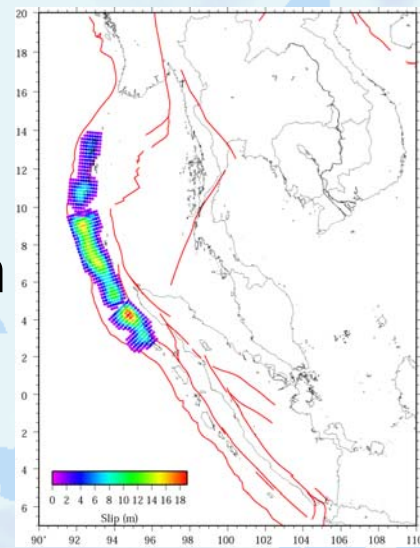
1 - Aceh



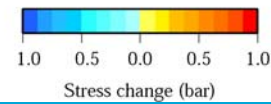
Vigny et al., 2006

Coulomb stress increase

- 1 - Aceh
- 2 - Andaman



Vigny et al., 2006



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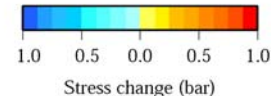
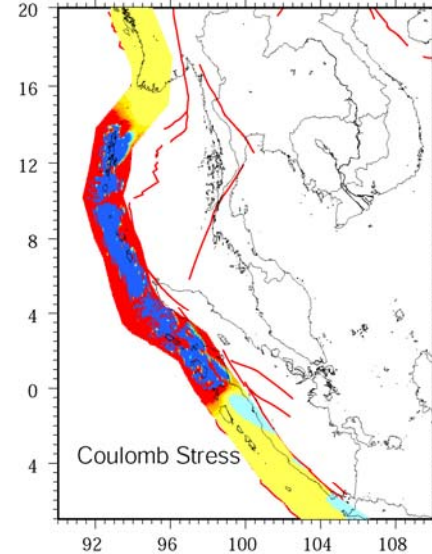
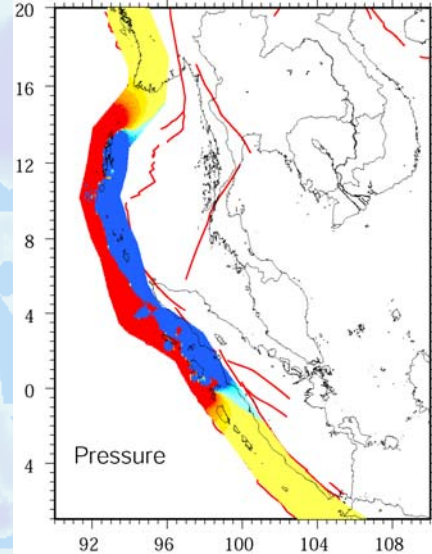
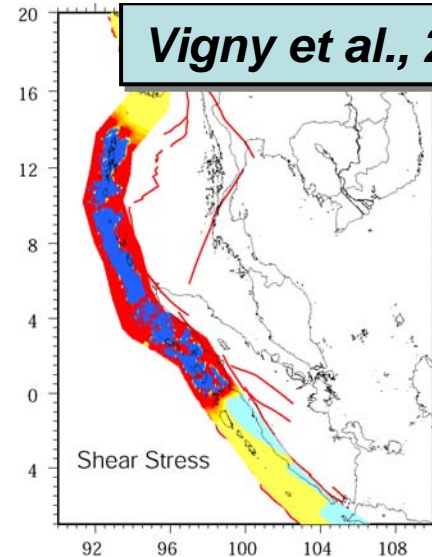
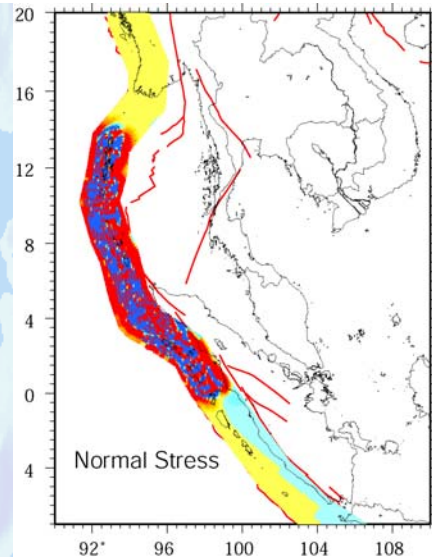
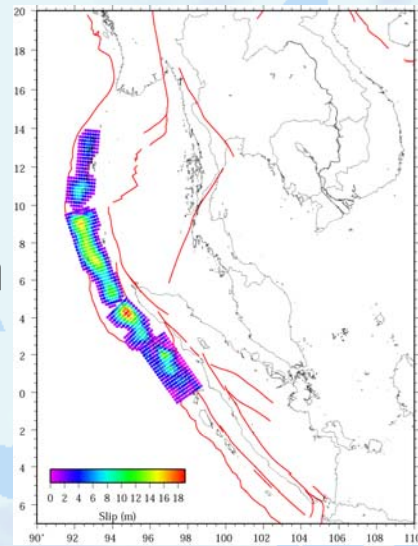
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Coulomb stress increase

Vigny et al., 2006

- 1 - Aceh
- 2 - Andaman
- 3 - Nias



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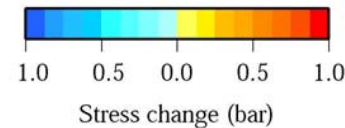
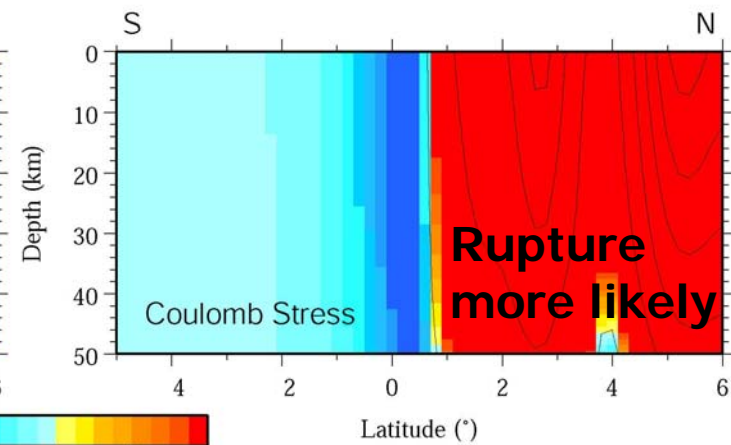
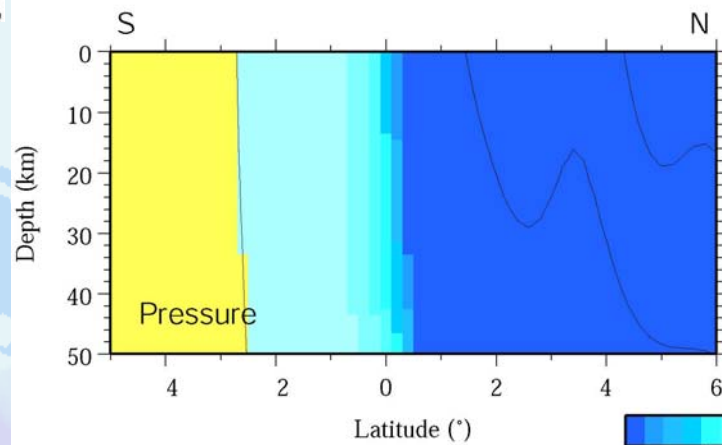
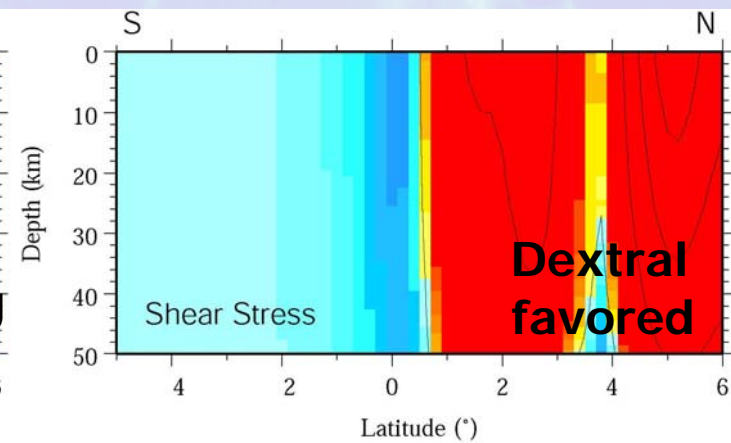
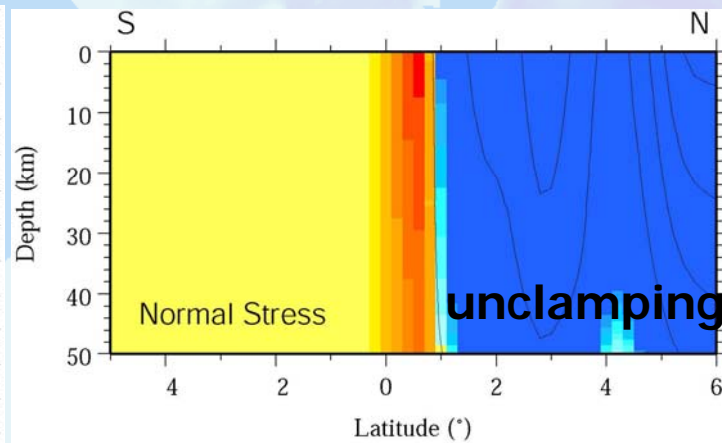
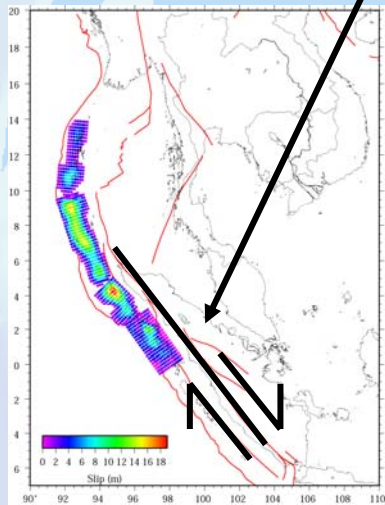
16



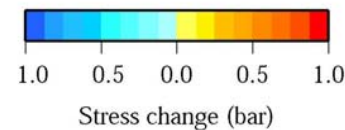
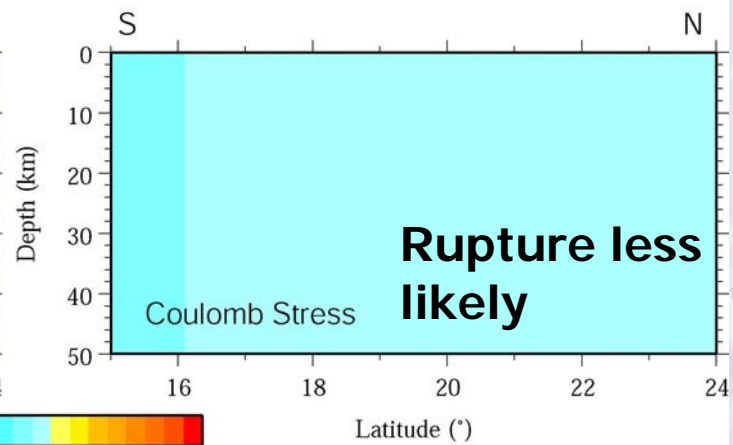
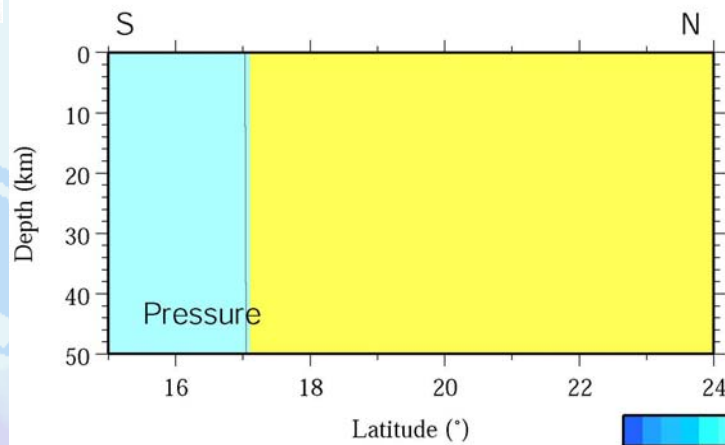
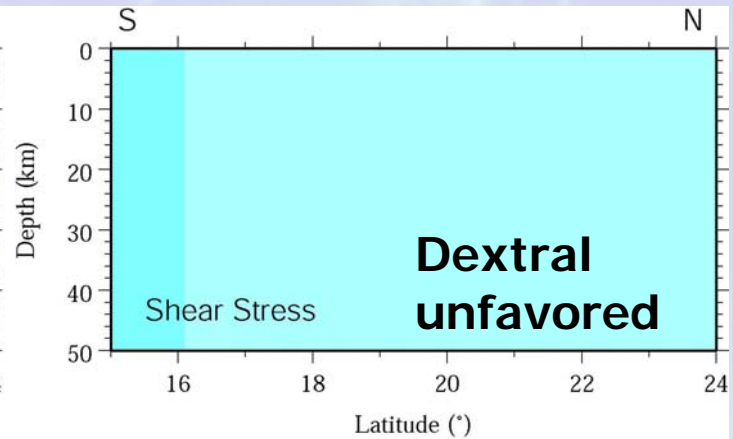
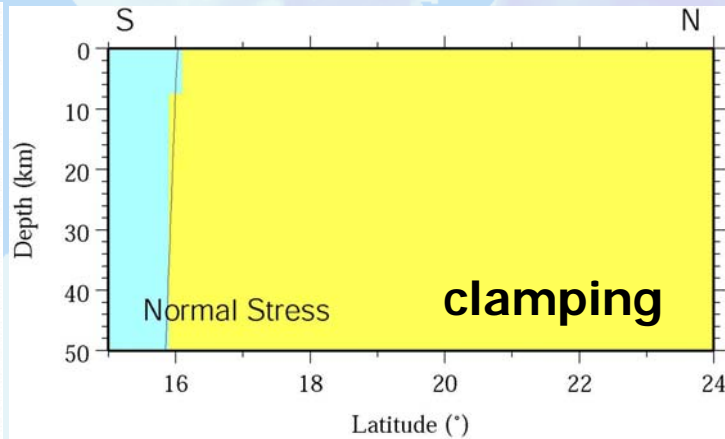
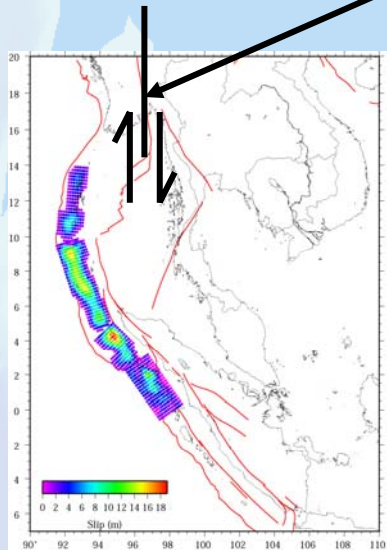
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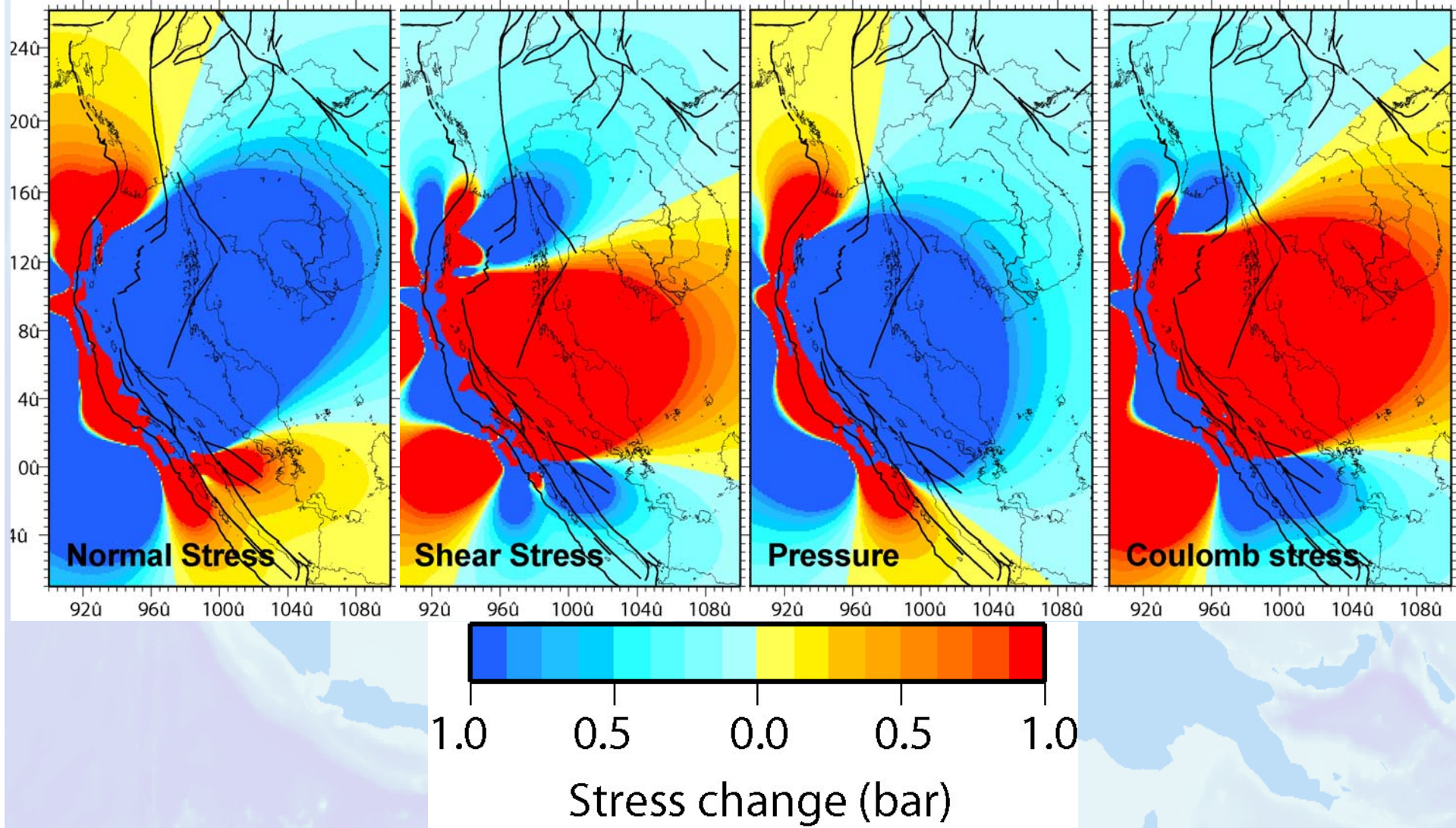


Loading of Great Sumatra fault: high above 0°N

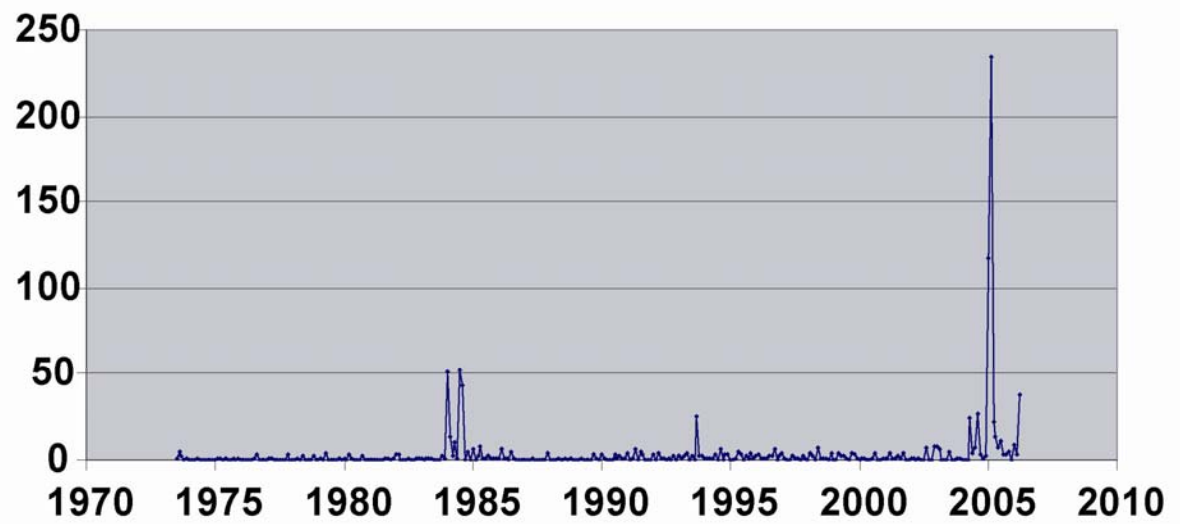
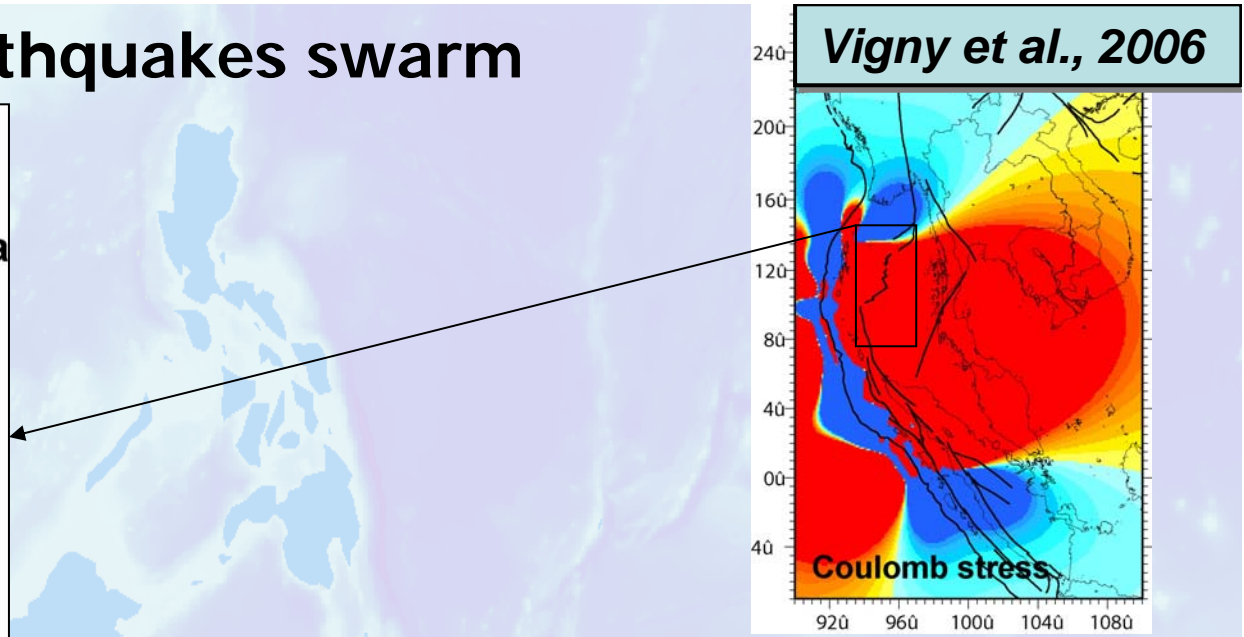
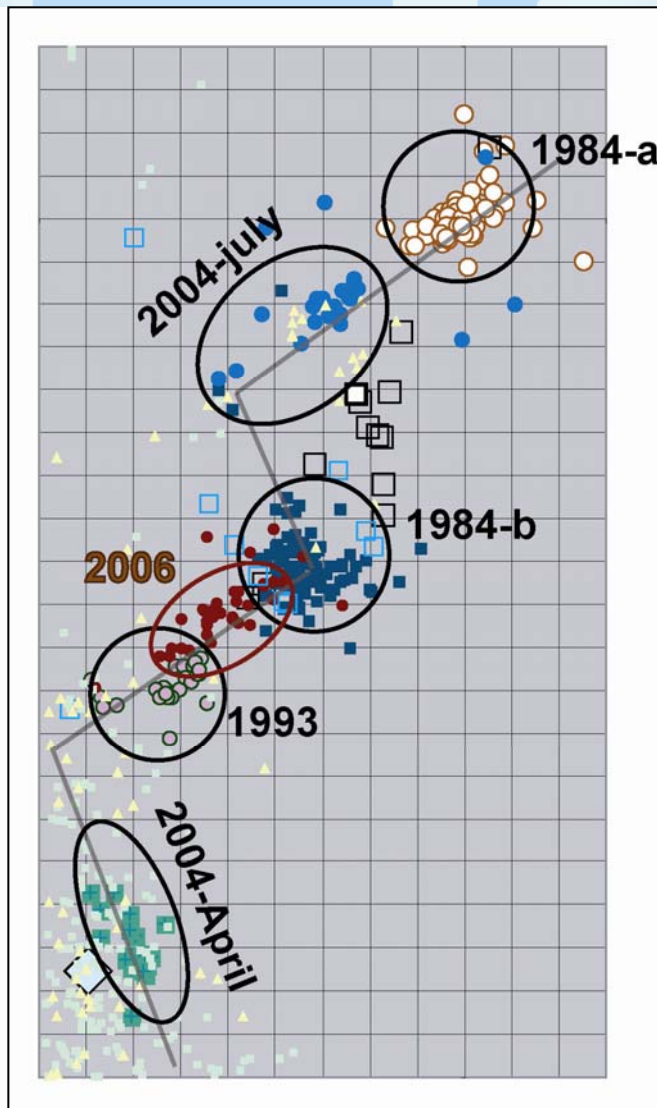


Loading of Sagaing fault: low everywhere and reverse!





Andaman recent earthquakes swarm



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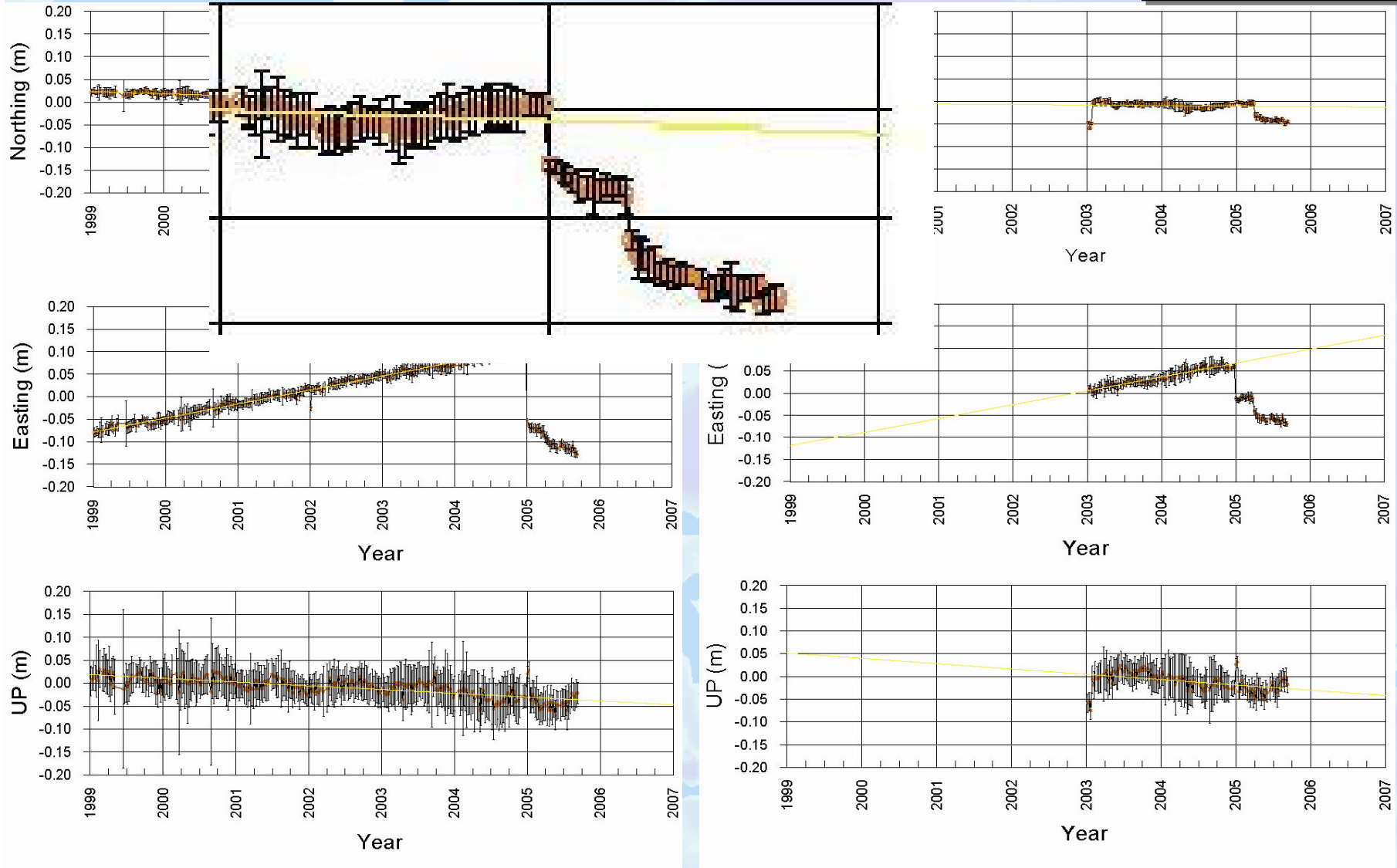


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Post seismic motions

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