



# **SOURCE INVERSION**

INTRODUCTION & MOTIVATION

**ZACHARIE DUPUTEL**

JOINT INVERSION IN GEOPHYSICS - 2015



# PRACTICAL INFORMATIONS

- Get yourself ready for the Computer practicals
  - Virtualbox (+ Extension Pack)
  - Virtual machine (lubuntu)  
Pre-installed: Octave/Python2.7/kwrite/vim/emacs/...
- Lectures (A. Sladen, H. Sudhaus, Z. Duputel):
  - Lecture 1: Tuesday 09:20-10:30
  - Lecture 2: Tuesday 14:00-15:30
  - Lecture 3: Tuesday 16:00-17:30
  - Lecture 4: Wednesday 09:00-10:30



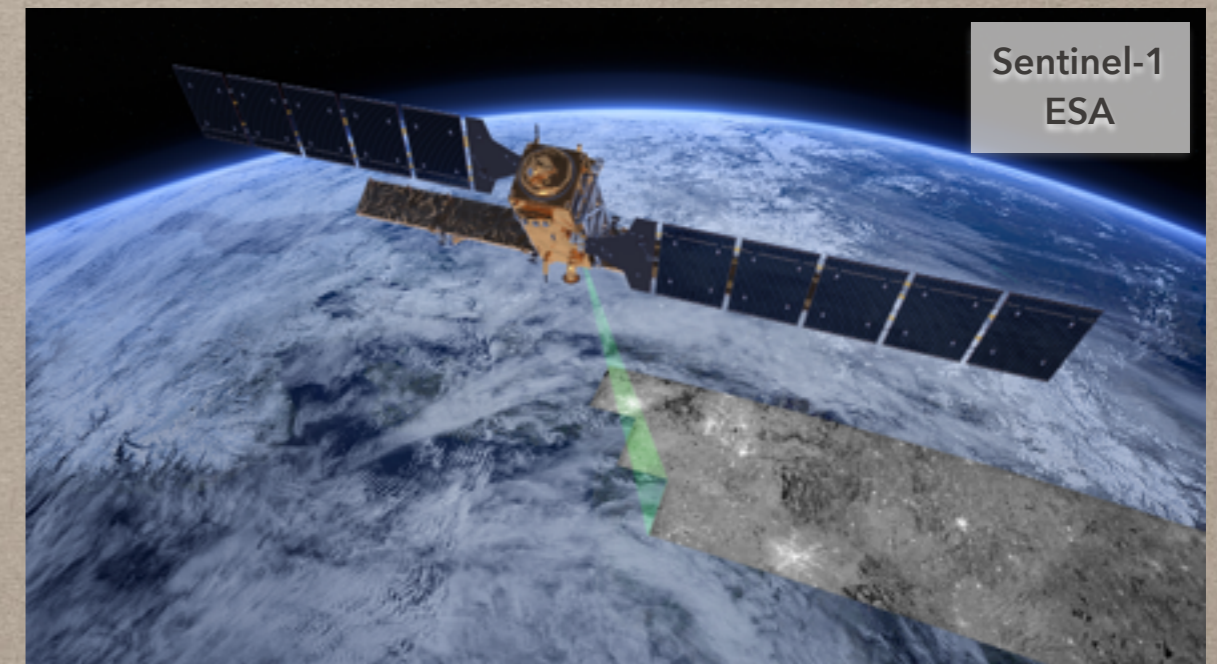
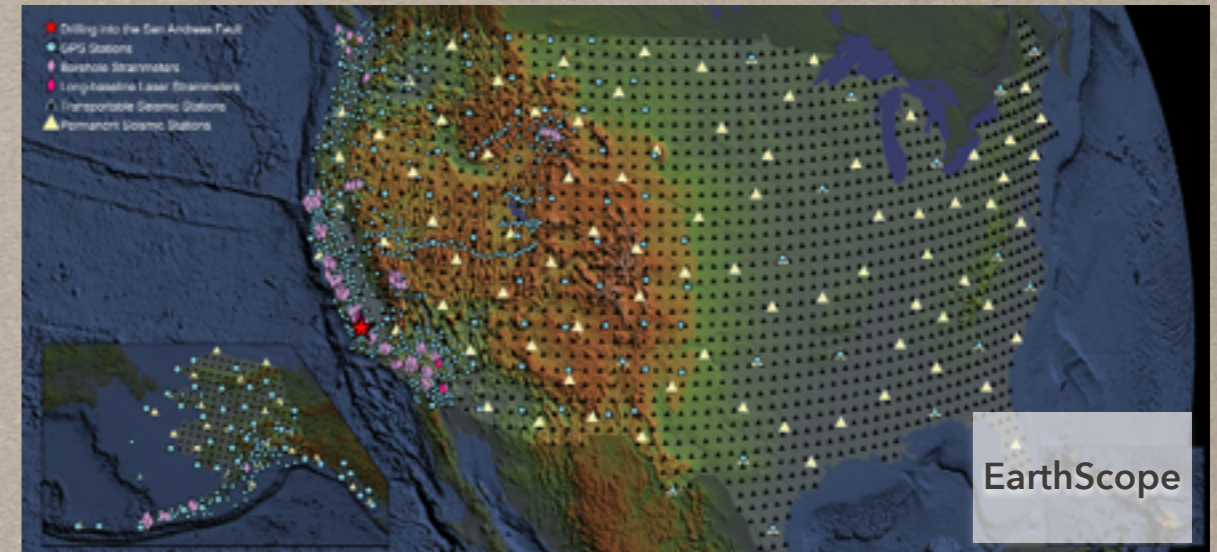
# MOTIVATION: BIG DATA IN GEOPHYSICS

## Similarity of rupture processes

- First order behavior of earthquakes
- Scaling laws

## Recent improvements

- Tremendous improvements in our ability to observe earthquakes and faults
  - Earth from space: GPS, InSAR, optic correlations
  - Seismology: dense networks
  - Tsunami
- Improvement of modeling techniques





# MOTIVATION: DIVERSITY OF EARTHQUAKES

## Similarity of rupture processes

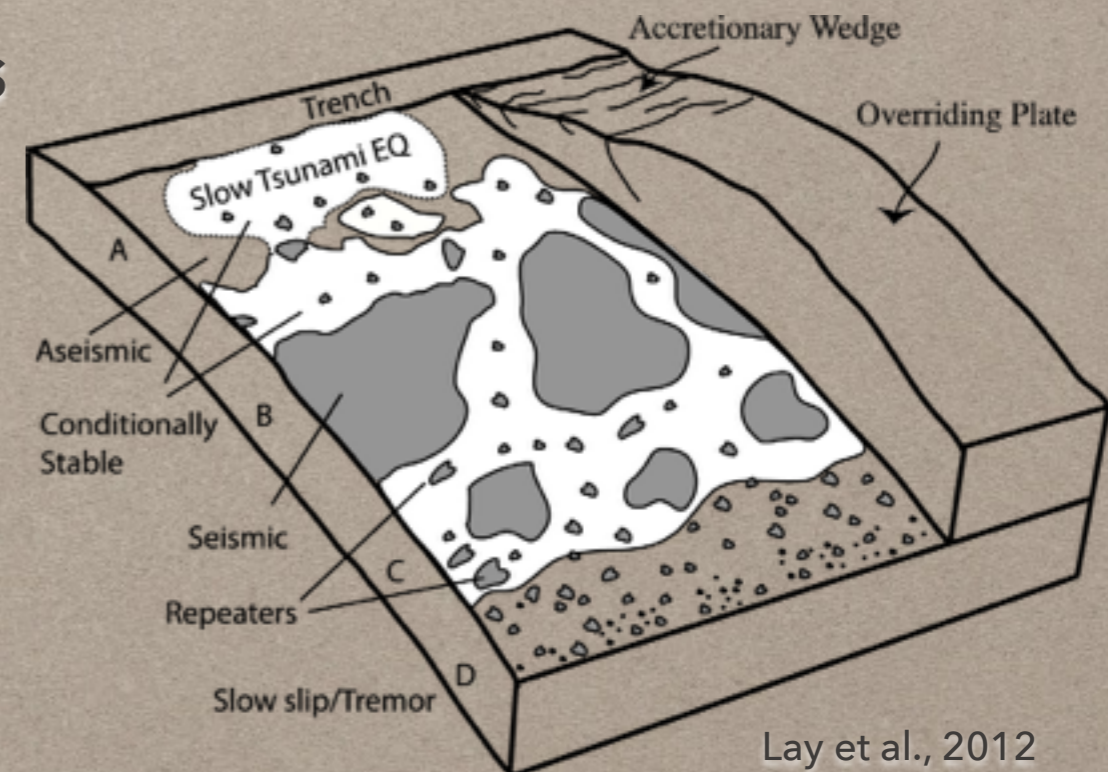
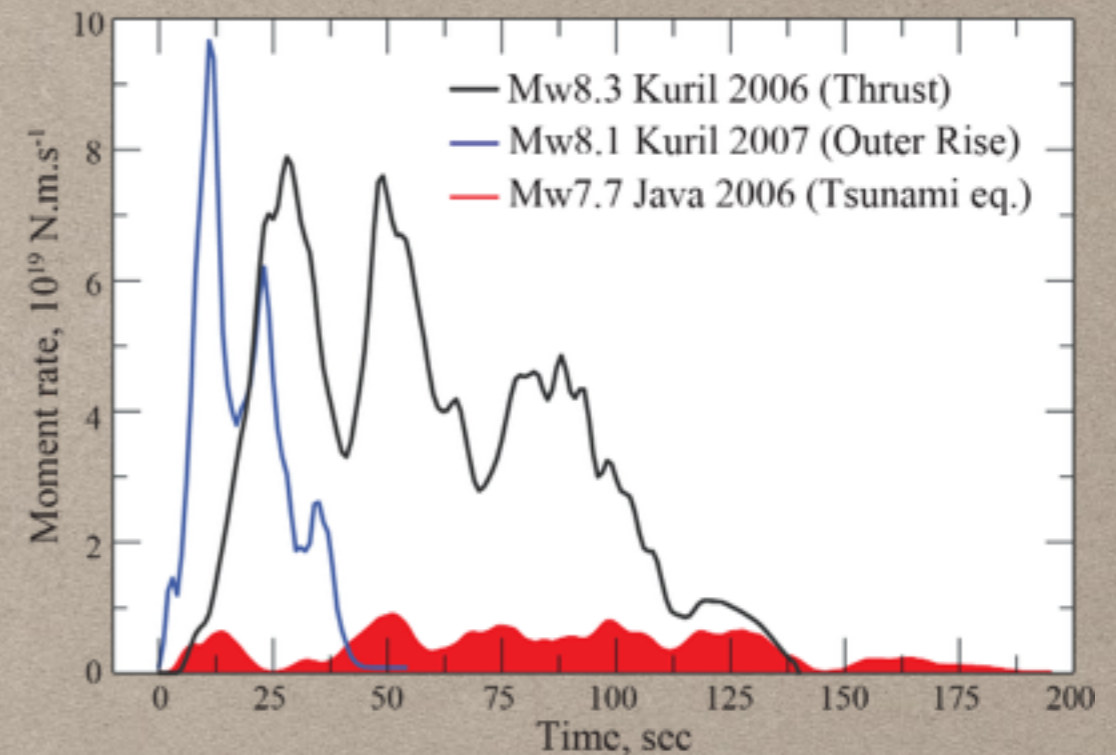
- First order behavior of earthquakes
- Scaling laws

## Recent improvements

- Explosion of available observations
- Improvement of modeling techniques

## Diversity and complexity of earthquakes

- Scaling laws not always valid
- Energy partitioning
  - ➔ Variability in terms of radiation efficiency
- Propagation on multiple segmented faults
- Aseismic slip





# LECTURES ORGANIZATION

- Tuesday 09:20-10:30: Geodesy  
*Henriette Sudhaus*
- Tuesday 14:00-15:30: Optimization techniques  
*Henriette Sudhaus & Anthony Sladen*
- Tuesday 16:00-17:30: Seismology & Tsunamis  
*Anthony Sladen*
- Wednesday 09:00-10:30: Probabilistic source inversion  
*Zacharie Duputel*