IPG PARIS


OBSERVATORIES
Volcanologic
Magnetic
Geoscope


RESEARCH
Teams
Themes
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IPG PARIS


TEACHING
la terre...la terre...la terre...la terre
Doctoral school
Masters in geophysics
Masters in geochemistry
Masters inapplied geosciences
Information

SEISMOLAB - IPG Paris France

(director Jean-Pierre Vilotte)

6 Laboratories

- Broad-band Seismology (Jean-Paul Montagner)
- Modeling - Tomography (Jean-Pierre Vilotte)
- Seismogenesis (Pascal Bernard)
- Experimental Seismology (Alfred Hirn)
- Geodesy (Pierre Briole)
- Rock Mechanics (François Cornet)

Duality wave - particle:

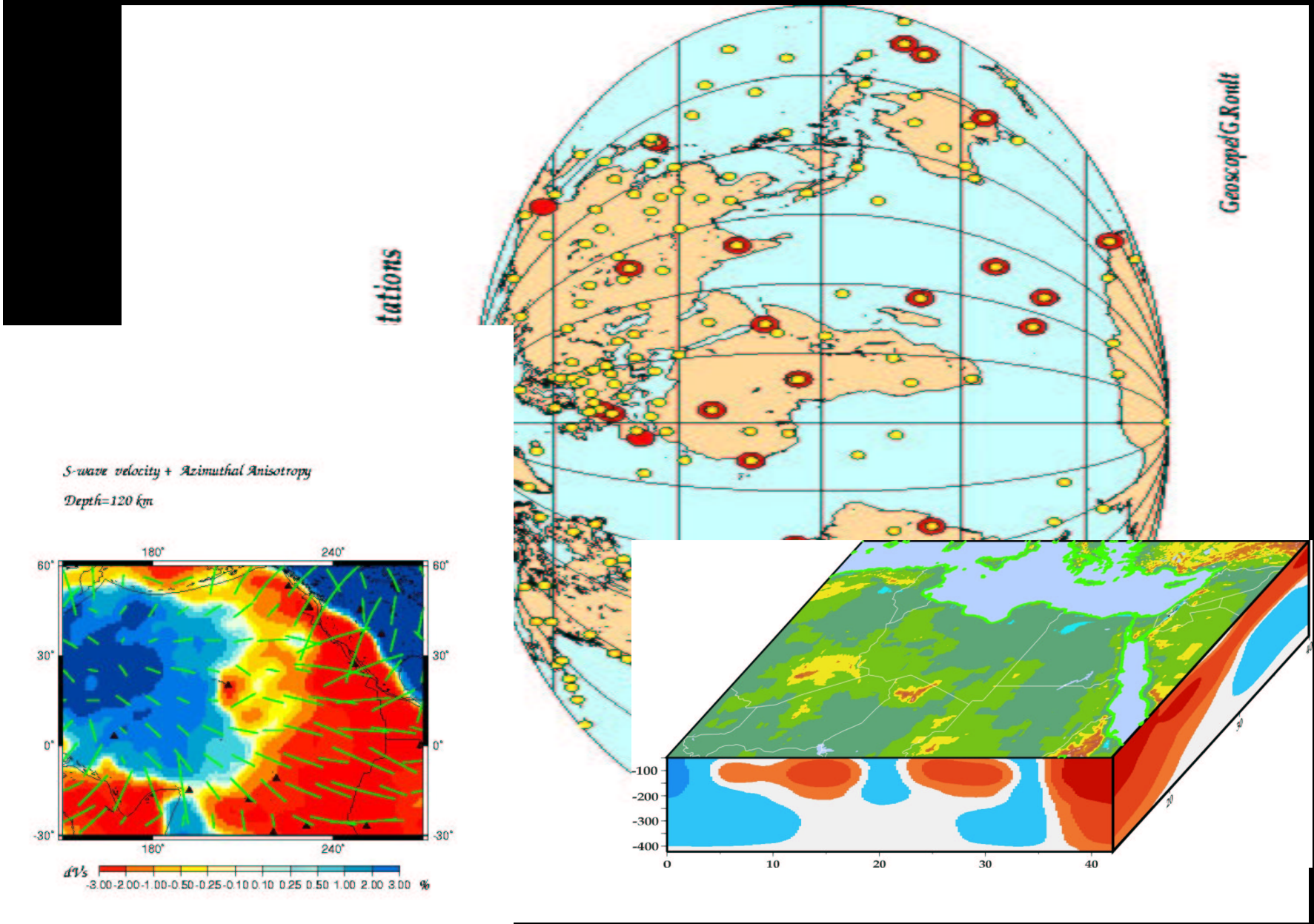
- Particle: Ray theory (XXth century)
- Wave: Normal Mode Theory (>1980)

Numerical modelling of wave equation: >2000

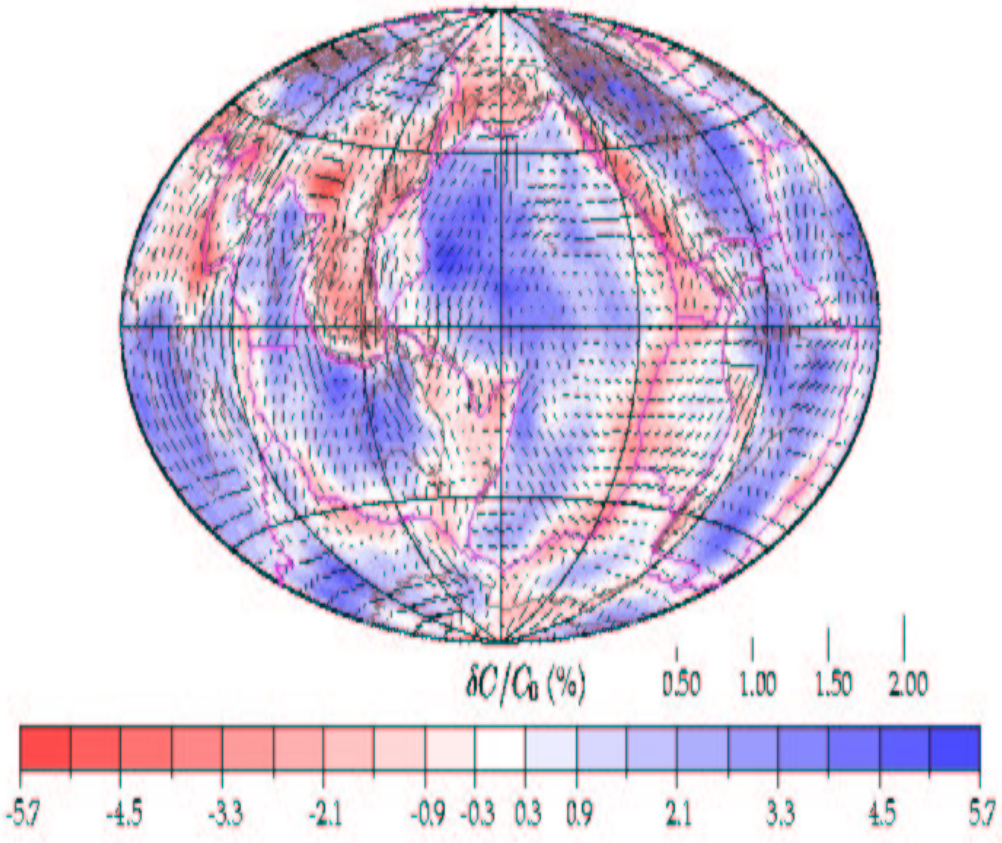
- Finite differences
- Spectral Element Method (SEM)
- Coupled SEM-NM method

Heterogeneous, anisotropic, anelastic media

Inverse Problem Theory -> Imaging Techniques


tations
Geoscope/G.Roult
S-wave velocity + Azimuthal Anisotropy
Depth=120 km
180°
240°
60°
30°
0°
-30°
dV/s
-3.00 -2.00 -1.00 -0.50 -0.25 -0.10 0.10 0.25 0.50 1.00 2.00 3.00 %
-100
-200
-300
-400
0
10
20
30
40

ÉRIC BEUCLER 2002

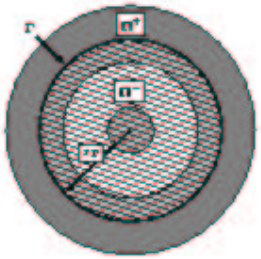


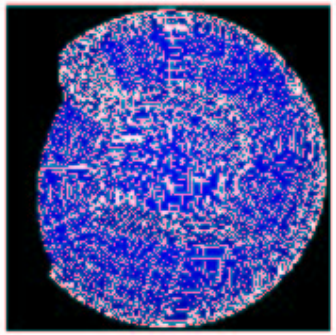
Anisotropic model resulting from phase velocities inversion (C.L.A.S.H., including 2Ψ and 4Ψ terms), $n = 0$, $T = 50$ s.

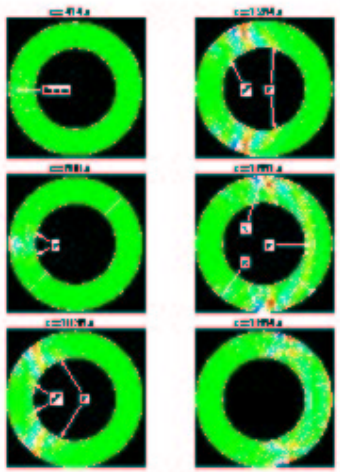
Coupled method of Spectral Elements and Modal Solution

Principle:

- Ω^+: Spectral Element area: 3D model
- Ω^-: Modal Solution area: 1D model





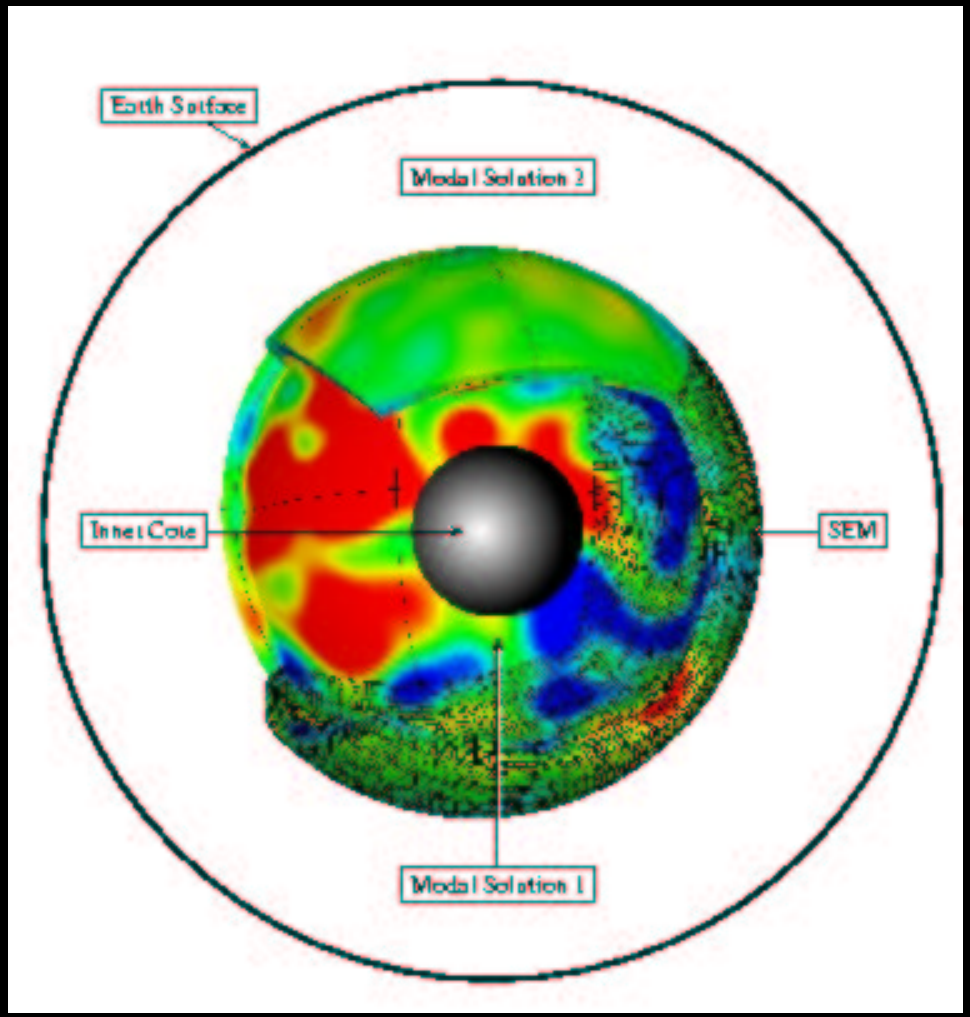


Capdeville et al., 2003

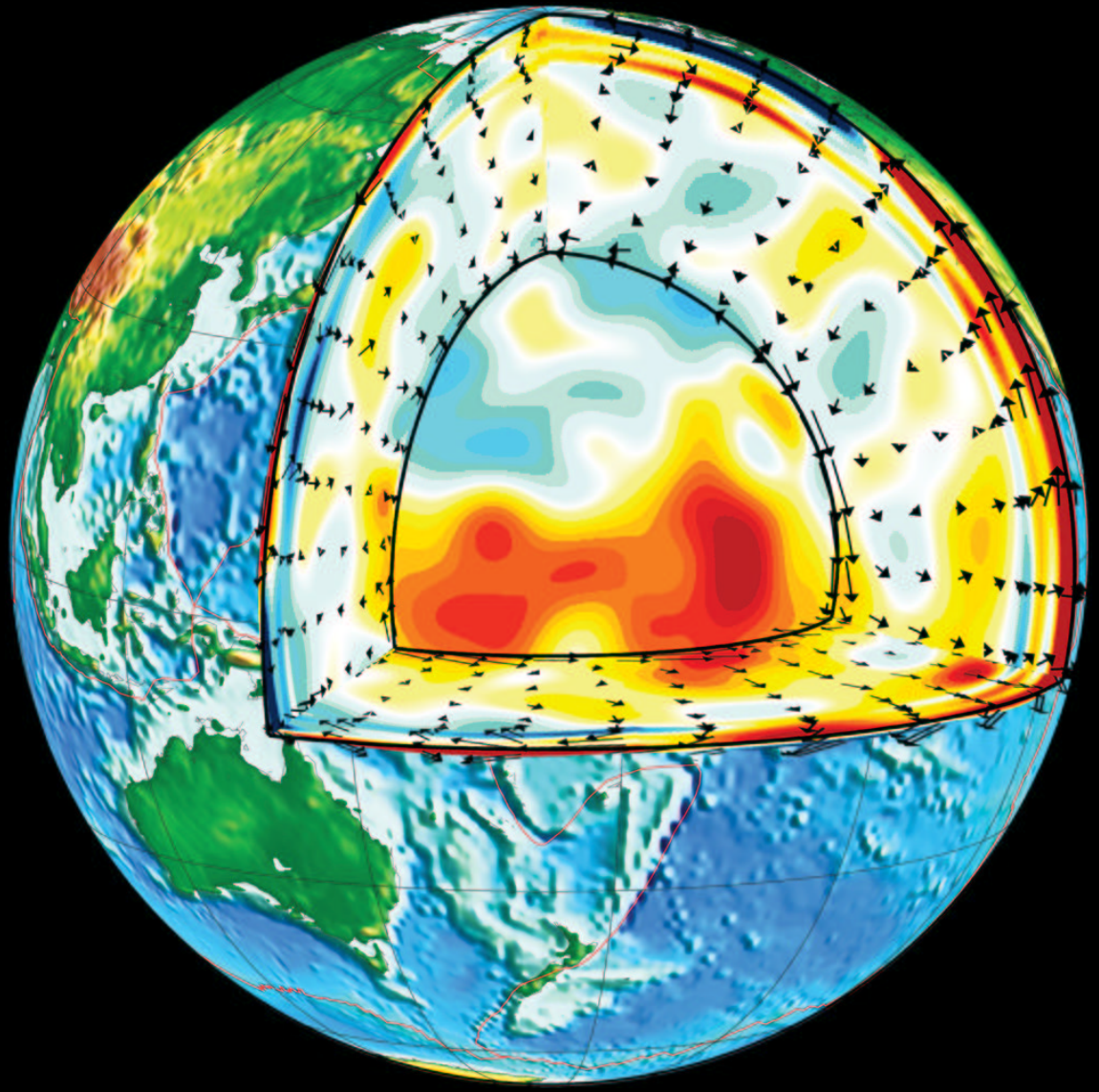
D" Layer

Modeling by SEM-NM

(Capdeville et al., 2003)



Understanding Global geodynamics



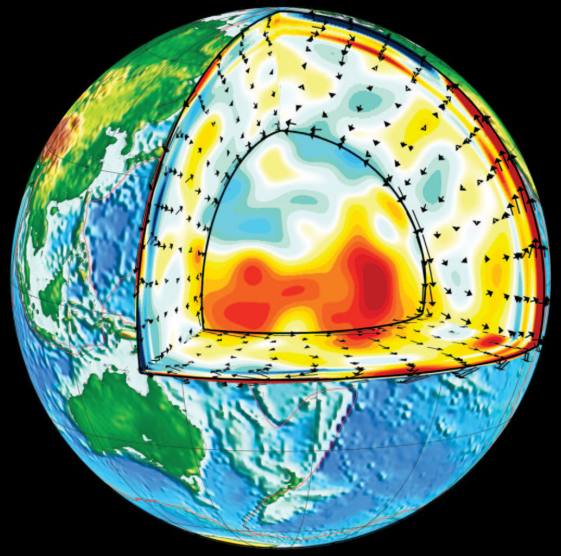
Gaboret et al., 2003

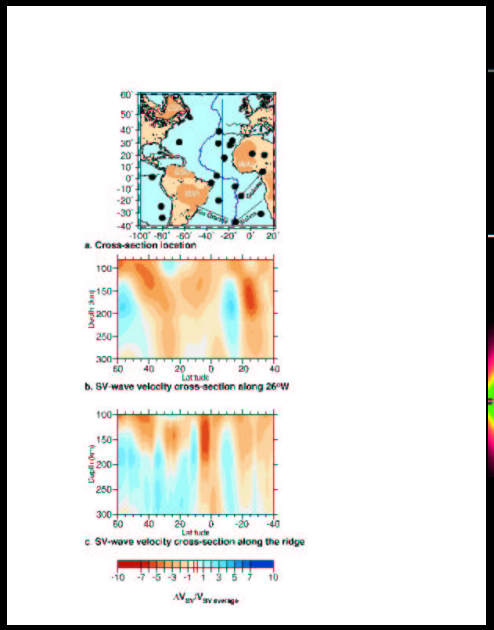
Scientific Issues

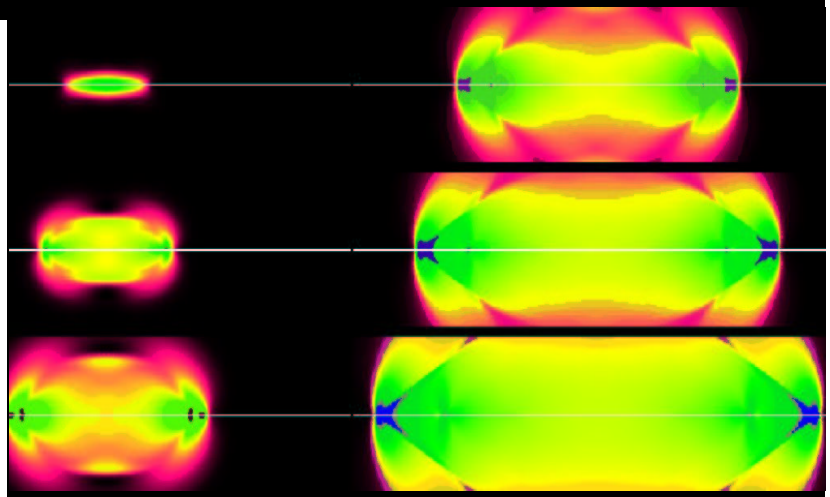
Global scale
(mantle convection)

Regional Scale
(Plumes, slabs)

Local Scale
(Seismic rupture)







Gaboret et al., 2003

Silveira and Stutzmann, 2002

Festa et al., 2003

PEOPLE INVOLVED In SPICE in the Seismolab (IPG Paris)

- Ray Theory (Anisotropy):Veronique Farra
- Normal Modes (Perturbation Theories): Eric Clévédé
- Spectral Elements- Normal Modes: Yann Capdeville
- Theory of inverse problems: Albert Tarantola
- Simulation and modeling: Jean-Pierre Vilotte
- Earthquake modeling: Pascal Favreau, Pascal Bernard
- Data Processing and imaging: Jeroen Ritsema, Eleonore Stutzmann, Jean-Paul Montagner

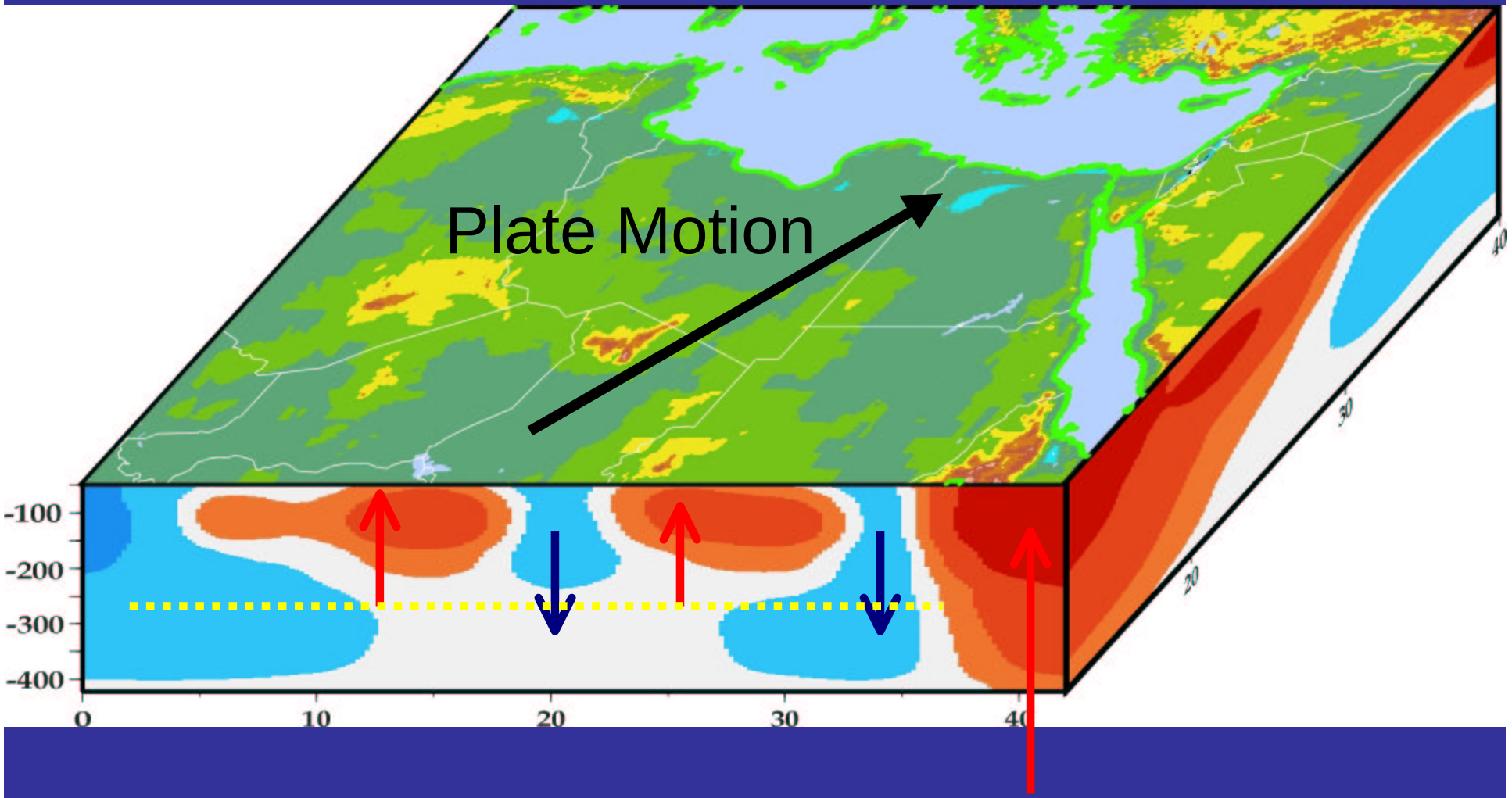


Plate Motion
-100
-200
-300
-400
0
10
20
30
40
20
30
40