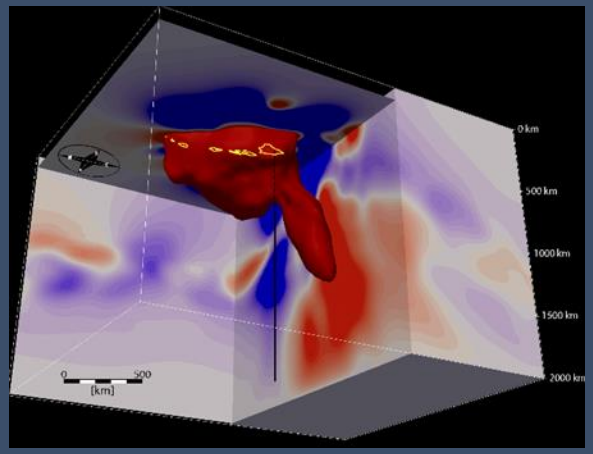
Research in GG Department, SOEST, University of Hawaii

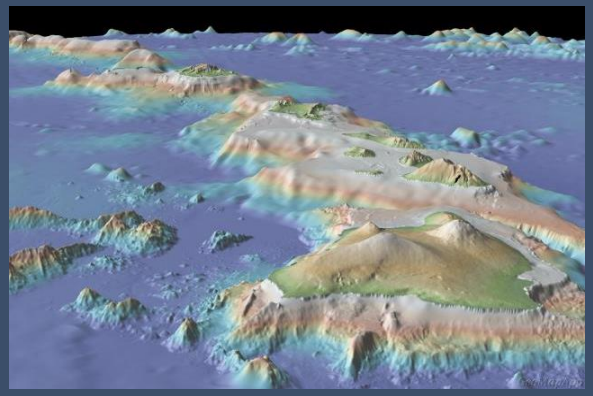
Composition & Dynamics of Earth's Deep Interior



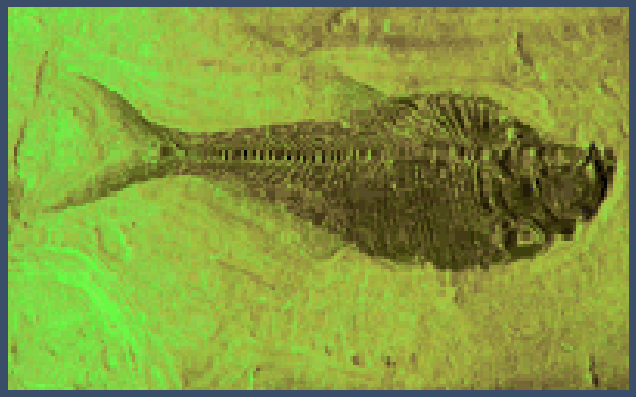
Earth's Surface: Water, Sediments, Life

Solar System

Formation, Motion, Recycling of Earth's Crust



Earth History

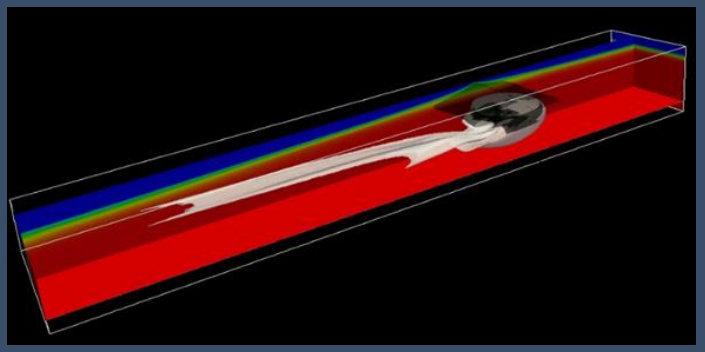


Hazards, Resources, Sustainability

Cutting-edge research on interesting and societally relevant topics

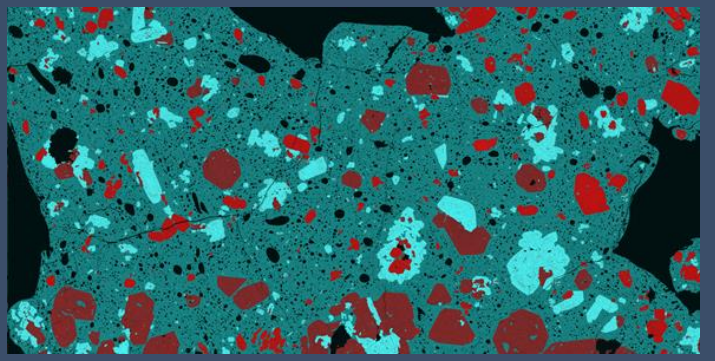
Some examples:

- Coastal Geology
- Climate Change
- Environmental
- Geological Hazards
- Hydrology
- Mantle Geochemistry
- Igneous petrology
- Paleo-oceanography
- Paleobiology
- Planetary geology
- Plate tectonics
- Seismology
- Structural Geology
- Volcanology



Numerical modelling

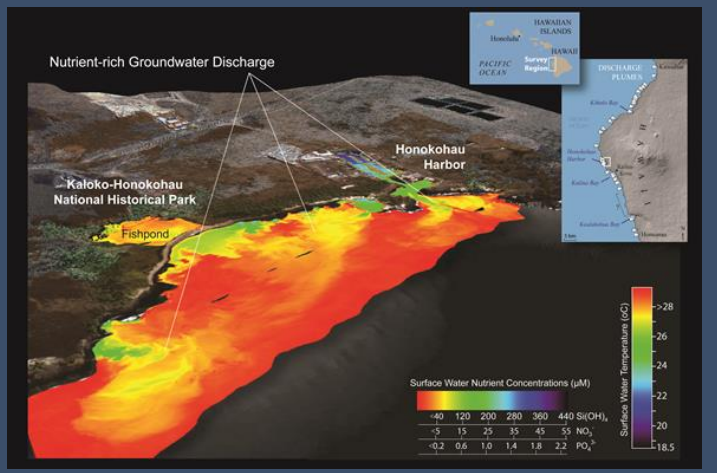
IODP
Drill core



Petrological element mapping

Near-shore geology

Kilauea lava lake

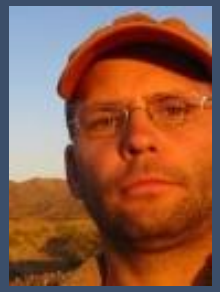


Submarine groundwater discharge

Large and diverse faculty - Geophysics and Tectonics

Janet Becker
Associate Professor
Geophysics , Applied Mathematics

Clint Conrad
Associate Professor
Geophysics, Geodynamics



Robert Dunn
Associate Professor,
Seismology

Neil Frazer
Professor
Geophysics

Garrett ito
Professor
Geophysics, Geodynamics

Steve Martel
Professor
Engineering geology, structural geology

Greg Moore
Dept. Chair, Professor
Structural Geologist, Seismologist

Bridget Smith-Konter
Assistant Professor,
Crustal Deformation, Planetary Tectonics

Paul Wessel
Professor,
Plate Tectonics, Marine Geophysics
Scientific Software

Large and diverse faculty - Marine and Environmental Geology

Chip Fletcher
Assoc. Dean
Coastal Geology

Henrieta Dulaiova
Assistant Professor,
Environmental Geochemistry

Aly El Kadi
Professor,
Hydrology

Eric Gaidos
Professor
Geobiology, Astrobiology, Planetary

Craig Glenn
Professor
Paleooceanography, hydrology

Hope Jahren
Professor
Paleobiology, Environmental Geology

Brian Popp
Professor,
Stable Isotope Biogeochemistry

Greg Ravizza
Associate Professor,
Marine Geochemistry, Paleoceanography

Large and diverse faculty - Volcanology, Geochemistry, Petrology

Bruce Houghton
Macdonald Professor of Volcanology
Volcanology, Hazards & Society

Ken Rubin
Dept. Chair, Professor
Submarine Volcanology, Sea-level, Geochemistry

Jasper Konter
Assistant Professor
Geochemistry, Petrology

Mike Garcia
Professor
Petrology, Volcanology

Christian Miller
Asst. Specialist
Geochemistry

Julia Hammer
Associate Professor
Experimental Petrology

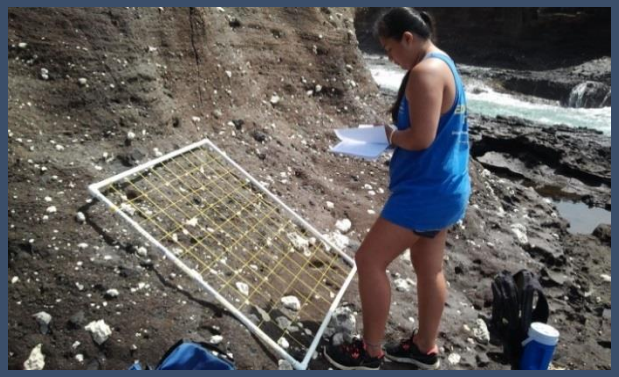
Scott Rowland
Specialist
Volcanology, Hawai'ian Geology, Remote sensing

Eric Hellebrand
Associate Specialist
Petrology

John Sinton
Professor Emeritus
Petrology, Hawai'ian Geology

Opportunities for Field Work in Hawaii

On land



Hanauma Bay

Kilauea

Kilauea

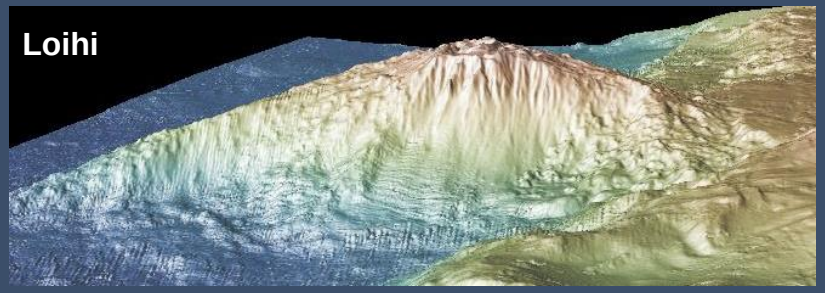
Oahu shoreline survey

Stream flow

Infrared camera

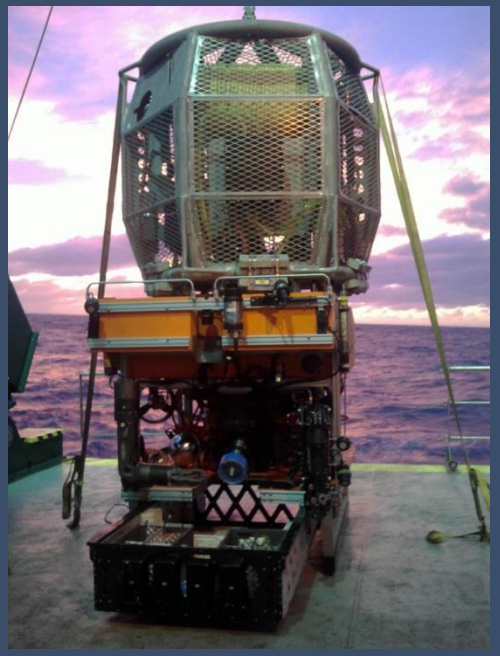
Opportunities for Field Work in Hawaii

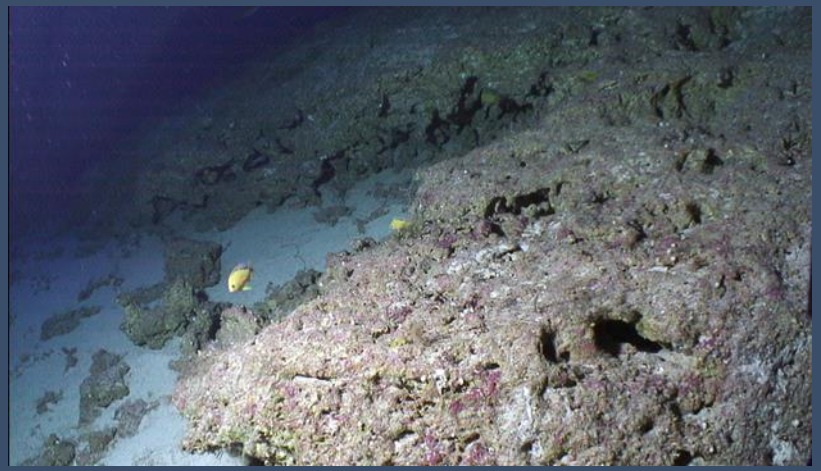
Under water and at sea



R/V Kilo Moana

Pisces V





Submerged coral reefs

Scuba

ROV Lu'ukai

Opportunities for Field Work - Around the world, *on land and at sea*

South America

Italy

Ocean Drilling

Samoa

Galapagos Islands

Marine Seismics

White Island, New Zealand

Iceland

Antarctica

World Class Laboratories

Light Stable isotope lab

Akua -176 core cluster

Seismic Visualization

Experimental petrology

Clean room wet labs

Plant lab

Electron Microprobe

Thermal ionization mass spec

Multi-collector plasma mass spec

Some GG Research Project Examples

Geological Hazards/Disaster Preparedness

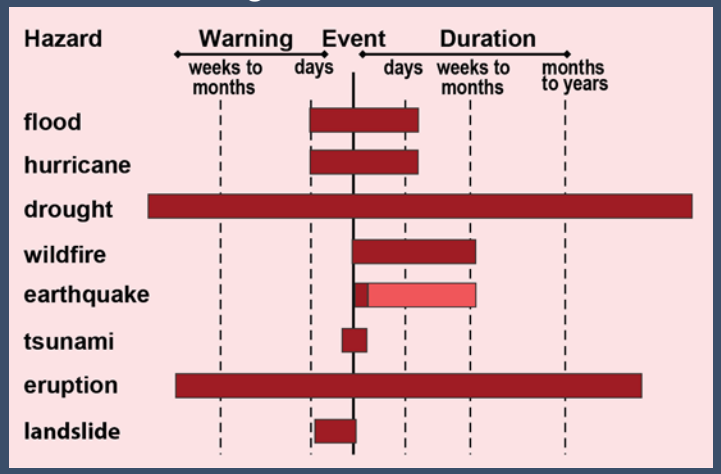
Example from Bruce Houghton

Volcanic Eruptions *image source: USGS, 1980*

Landslides *image source: Wyoming DoT, 2011*

Earthquakes *image source: USGS, 1971*

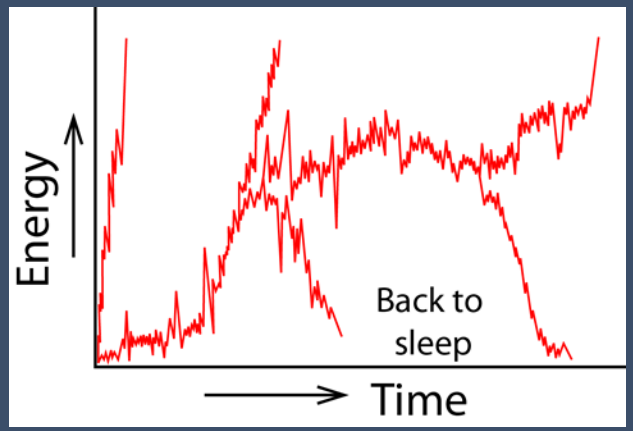
Understanding Event Duration



Precursors and decision making

image source: USGS, 2009

Precursors and Uncertainty

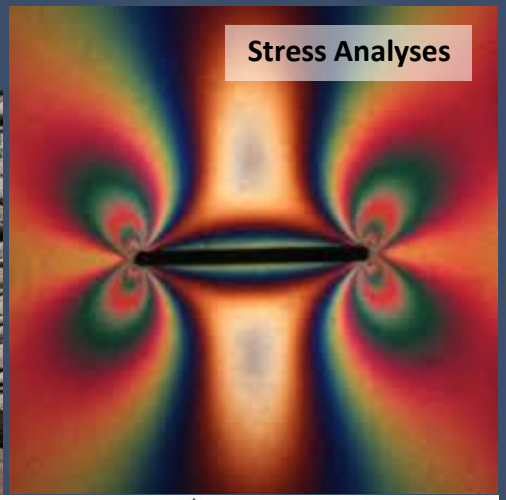


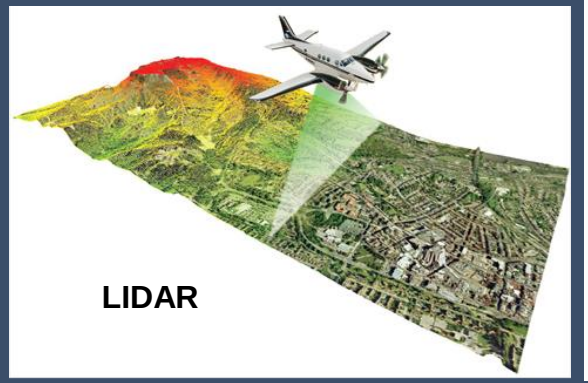
Studies in Structural Geology

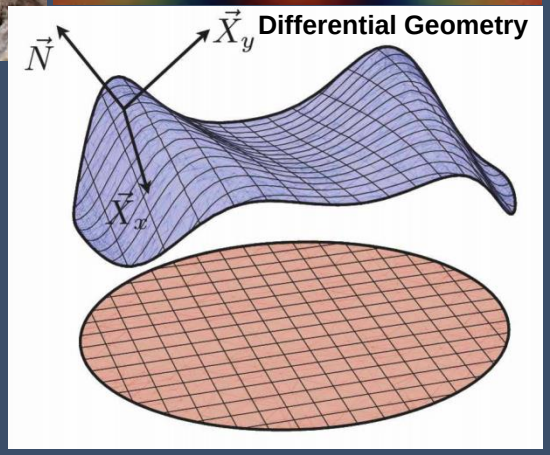
Examples from

Steve Martel and Greg Moore

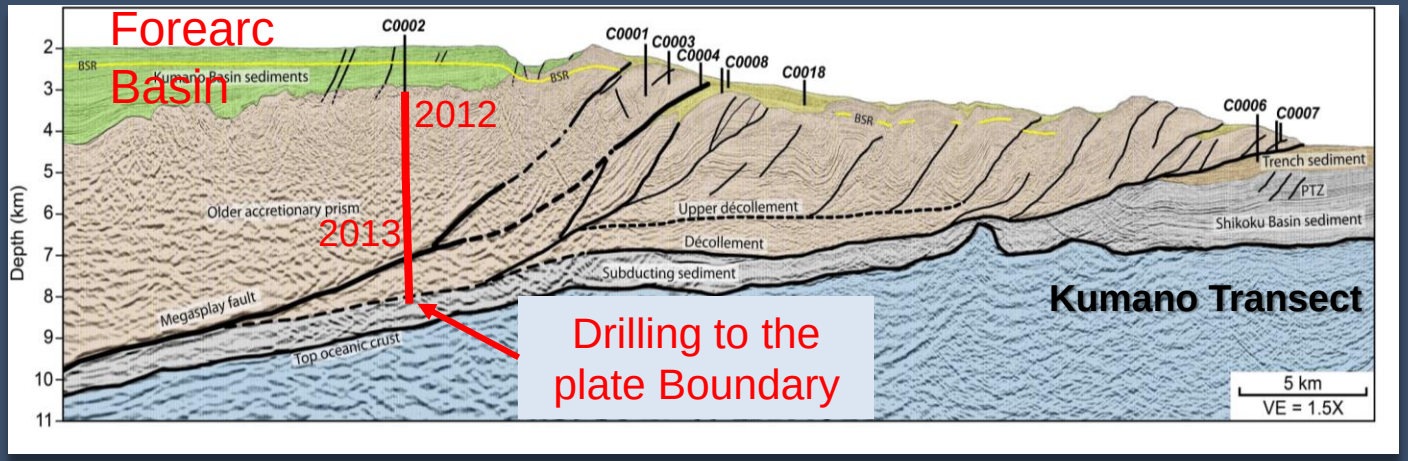
Faults and
Fractures
Mechanics







Tectonic studies of the
Nankai Trough

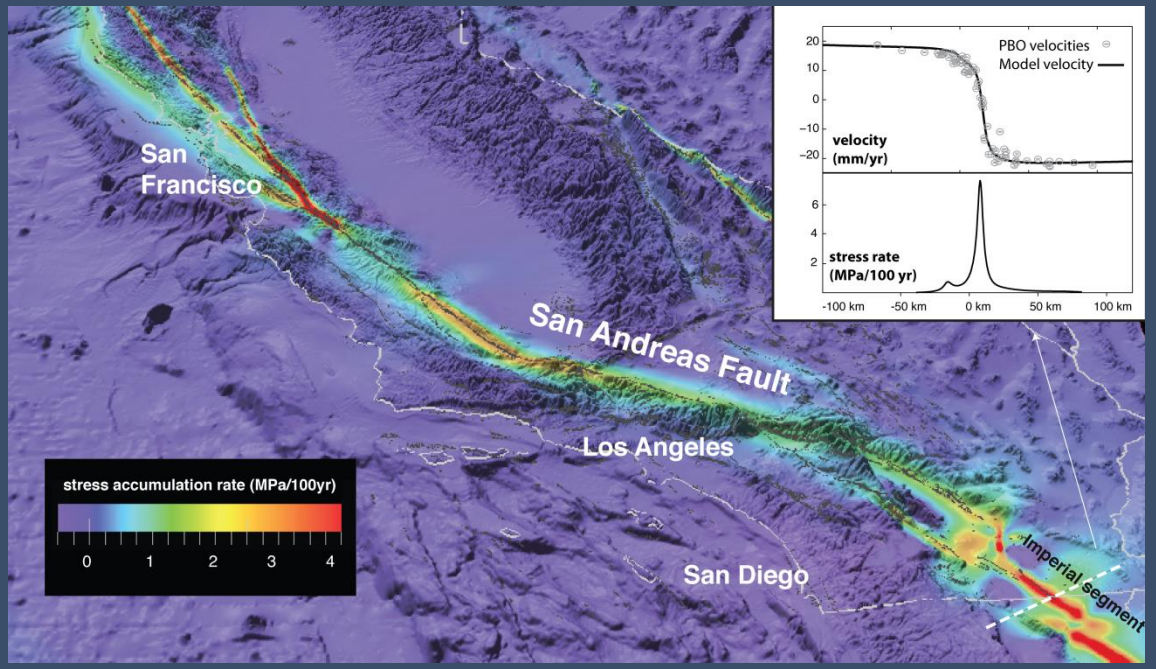


Studies in Seismology

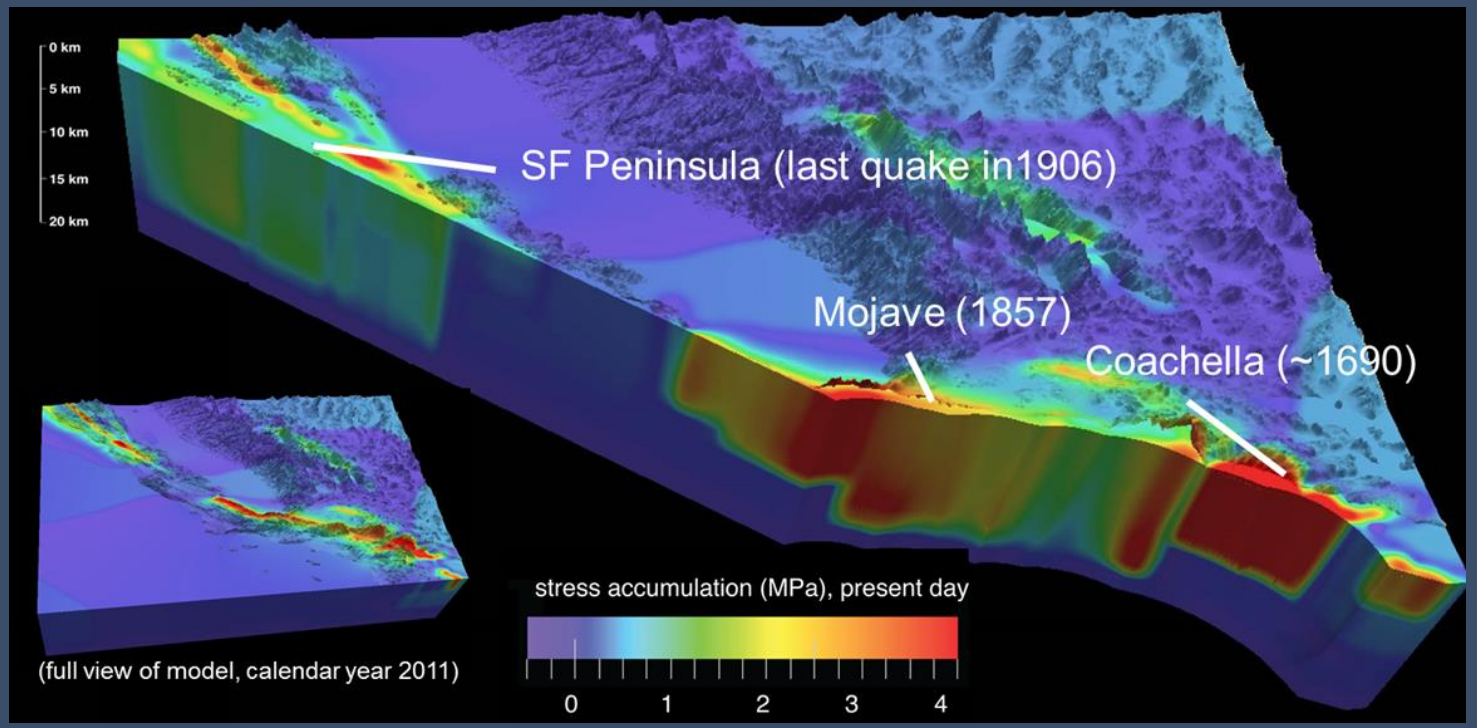
Example from

Bridget Smith-Konter

San Andreas Fault System Stress Accumulation Rates - How Does Stress Vary With Depth and Time?



Models of present-day earthquake cycle stress accumulation are sensitive to the time since the last major earthquake on each fault segment.



Studies in Geophysics and Tectonics

Examples from

Clint Conrad and Rob Dunn

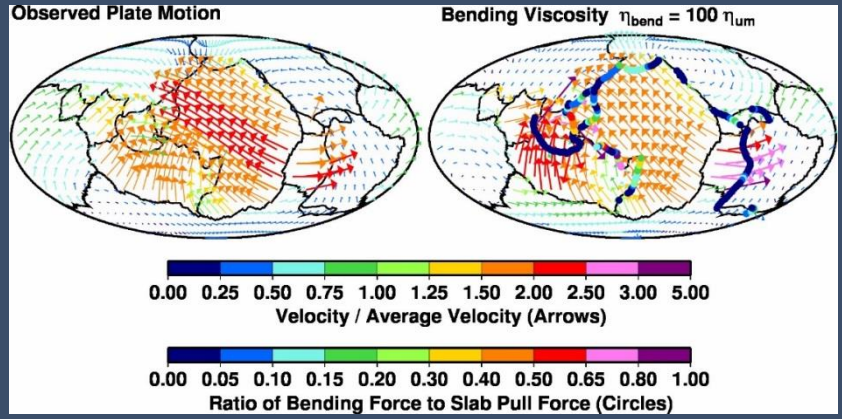
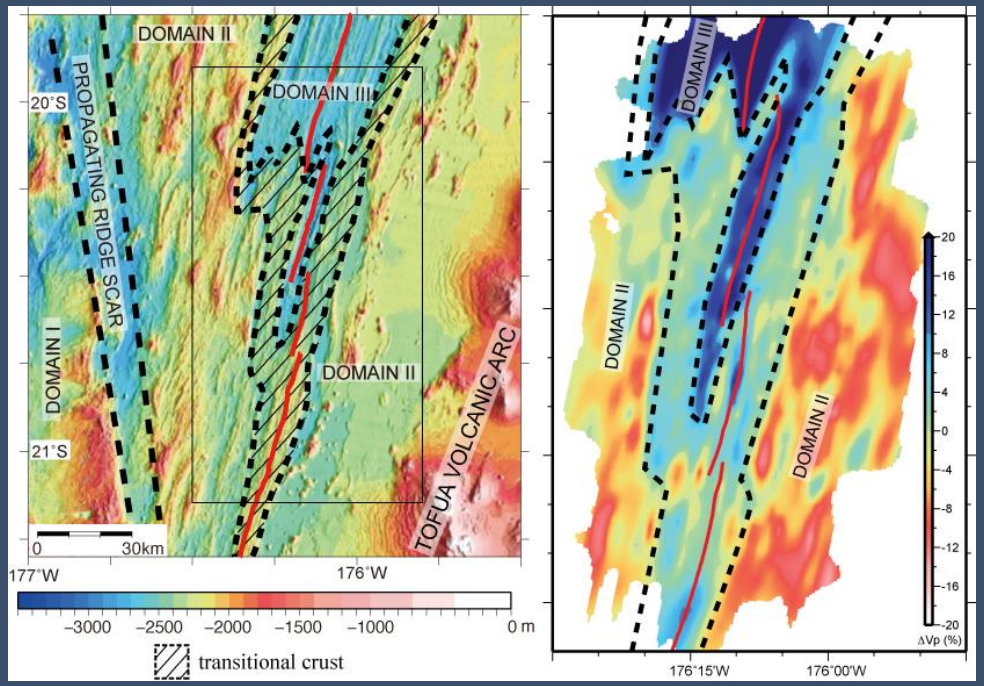
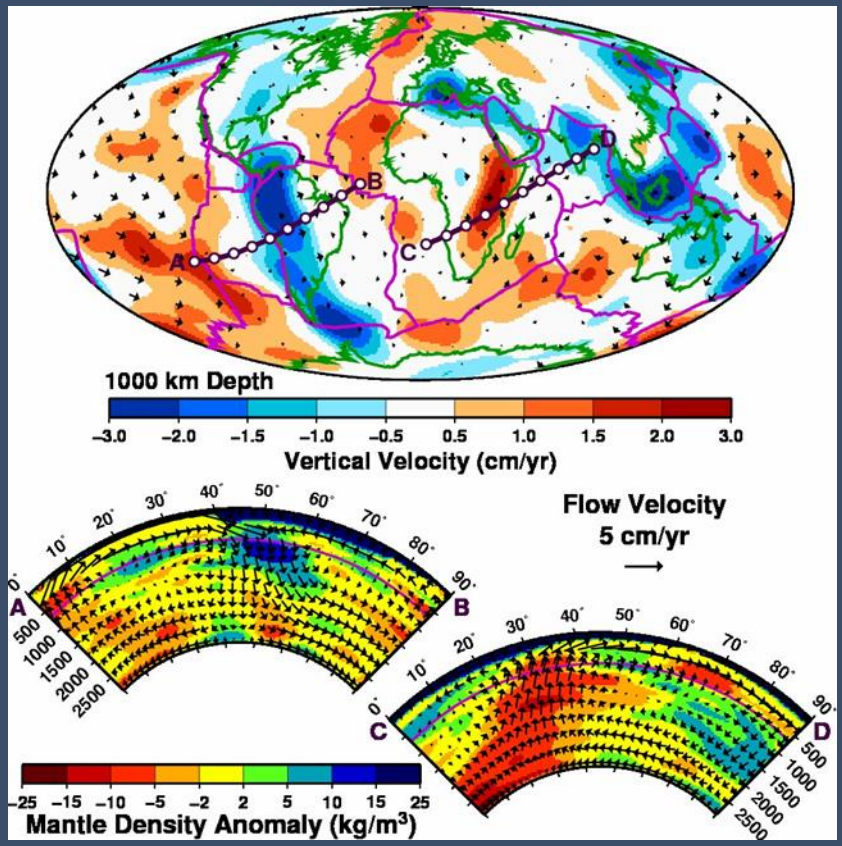


Plate Tectonics & Subduction



Seafloor bathymetry and seismic structure of the crust in the in the Lau back-arc basin.

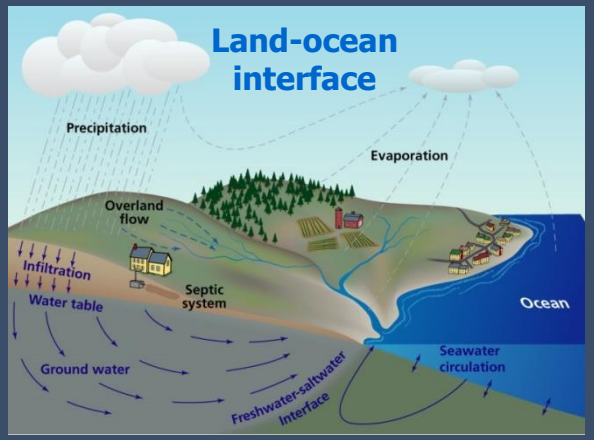


Global Mantle and Seismic Anisotropy

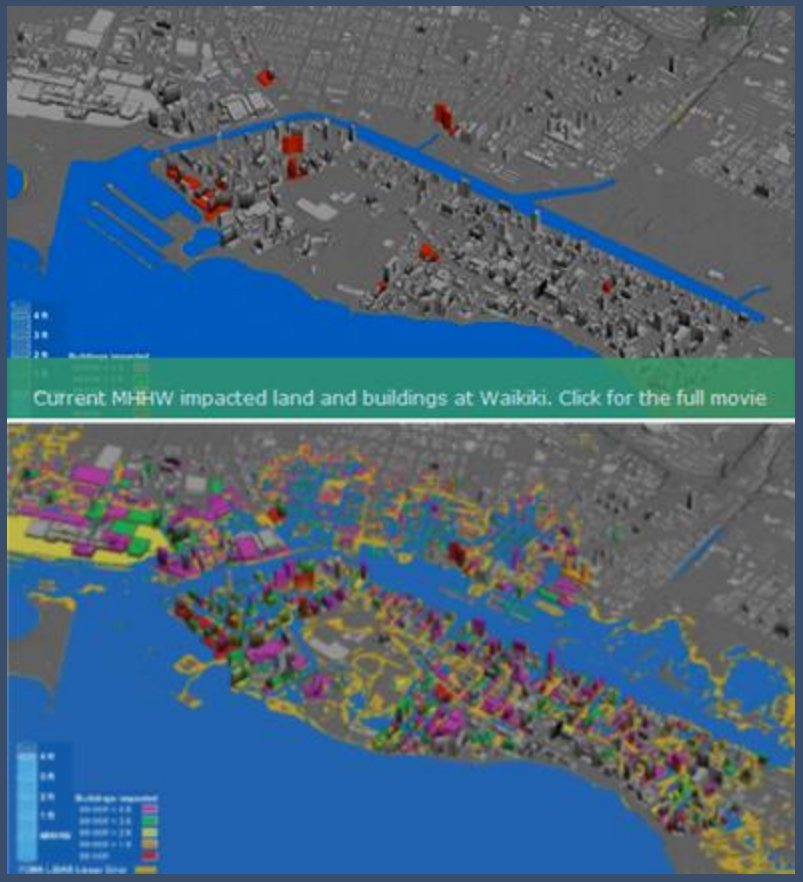
Sea Level and Coastal Research

Examples from
Chip Fletcher,
Janet Becker,
Henrieta Dulaiova

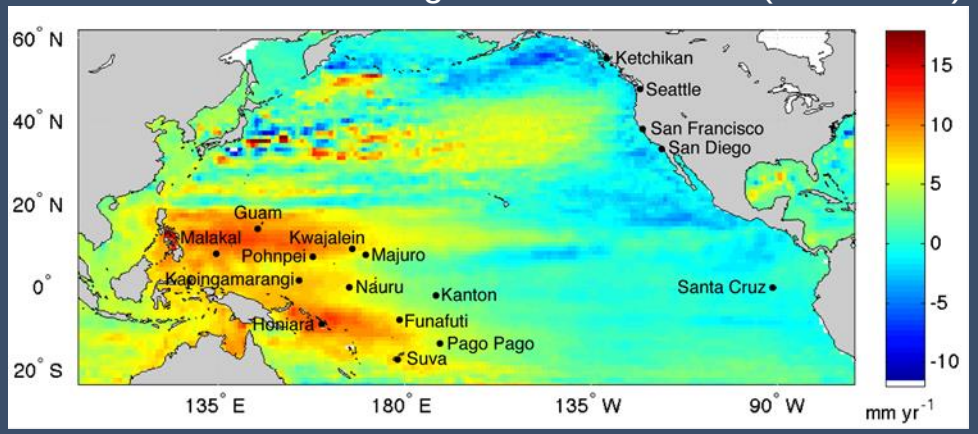
groundwater discharge at the coastal zone: source of nutrients, trace metals, pollutants into the ocean.



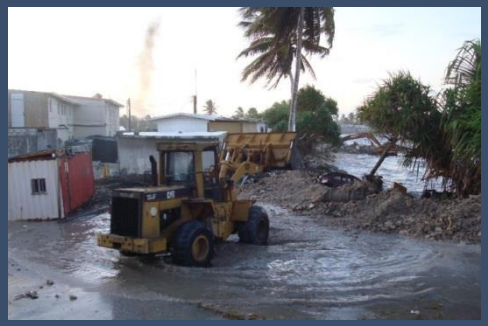
Waikiki Sea future level prediction



Regional sea level rise (1993-2010)



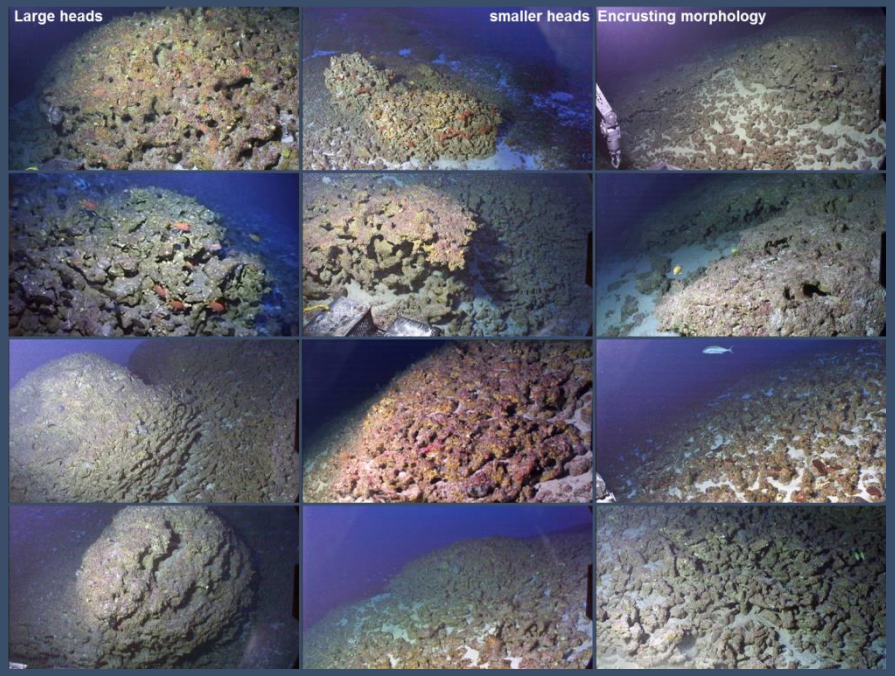
Water level effects on wave-driven inundation for reef fringed islands



Sea Level Research

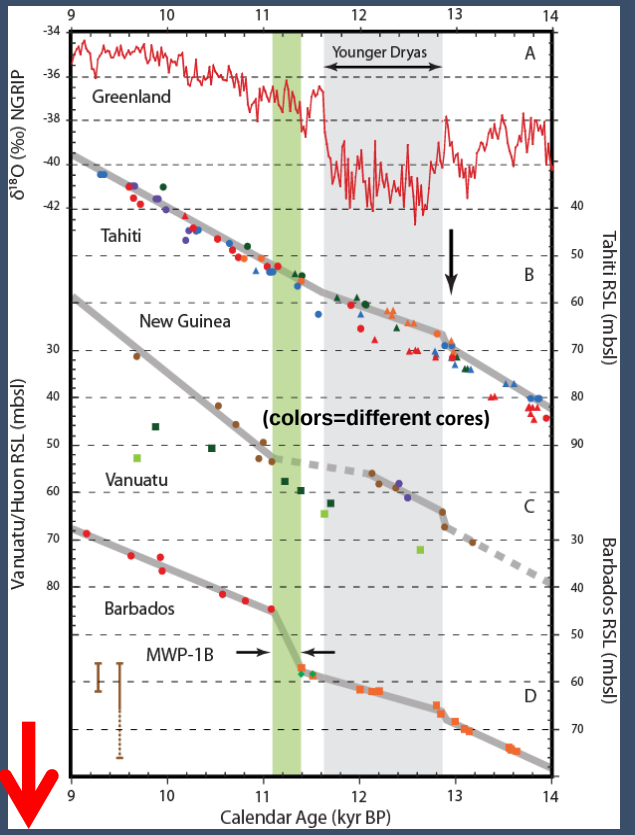
Examples from Ken Rubin and Chip Fletcher

Hawaii paleo-sea level reconstruction: constraining ice melt fingerprints and future ice loss predictions

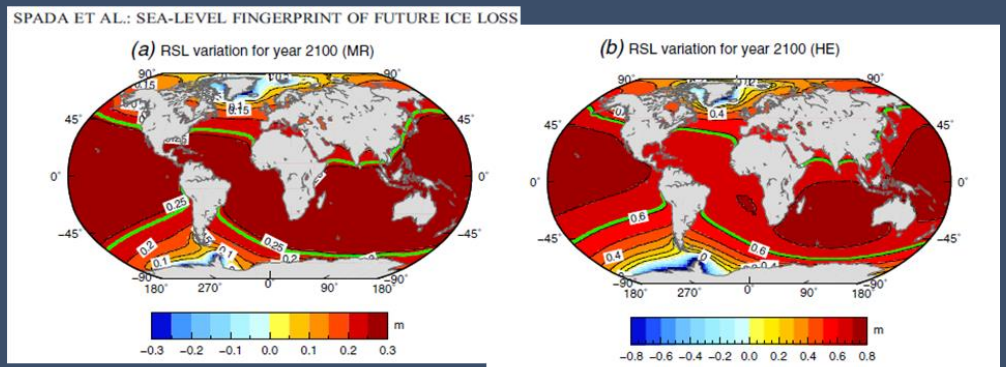


Hawaiian Deglacial coral reef

1 observations of the past

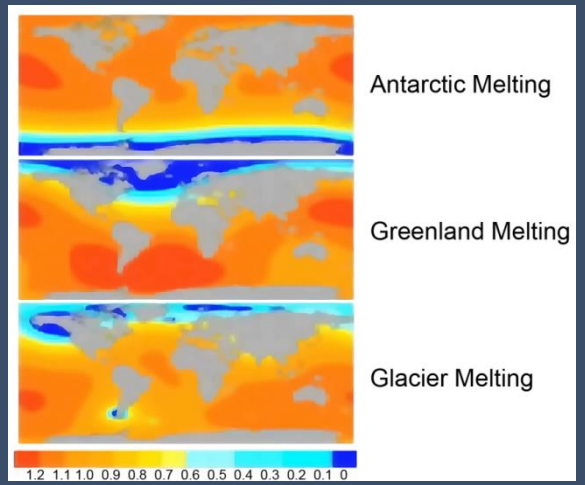


2 Model predictions to explain them



3 Predictions of future change

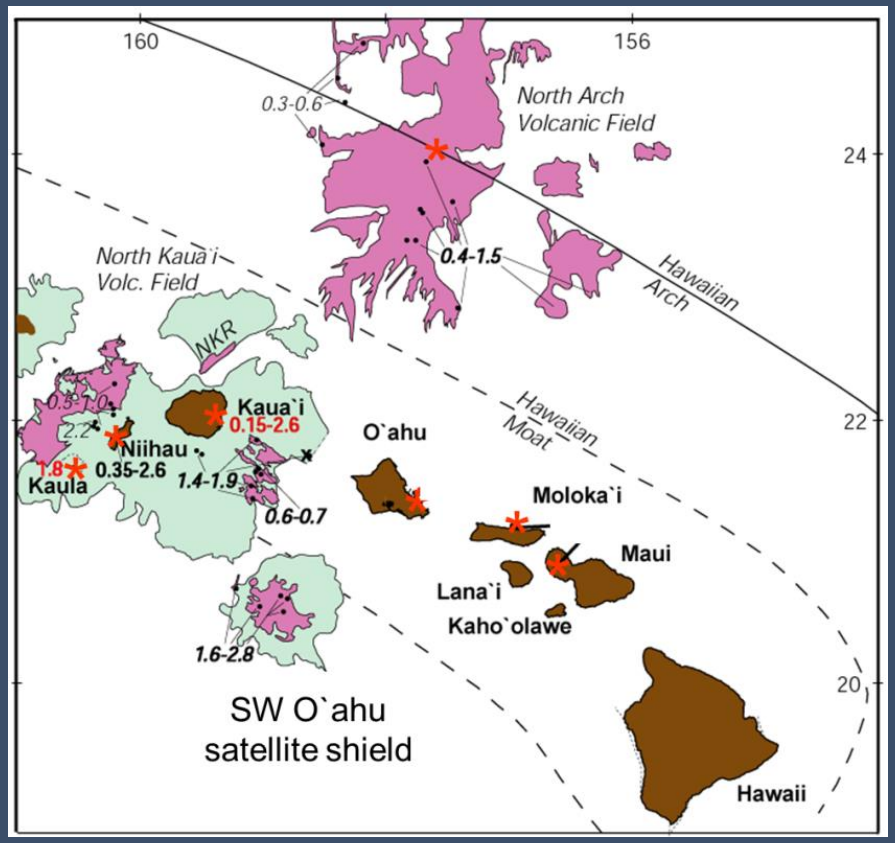
Figure 1. Fingerprint of the TIM RSL variation (m) for the year 2100 (relative to year 1992) pertaining to the MR (a) and HE (b) scenarios. The green contour shows the ocean-averaged value (eustatic variation). GIA is not considered here.



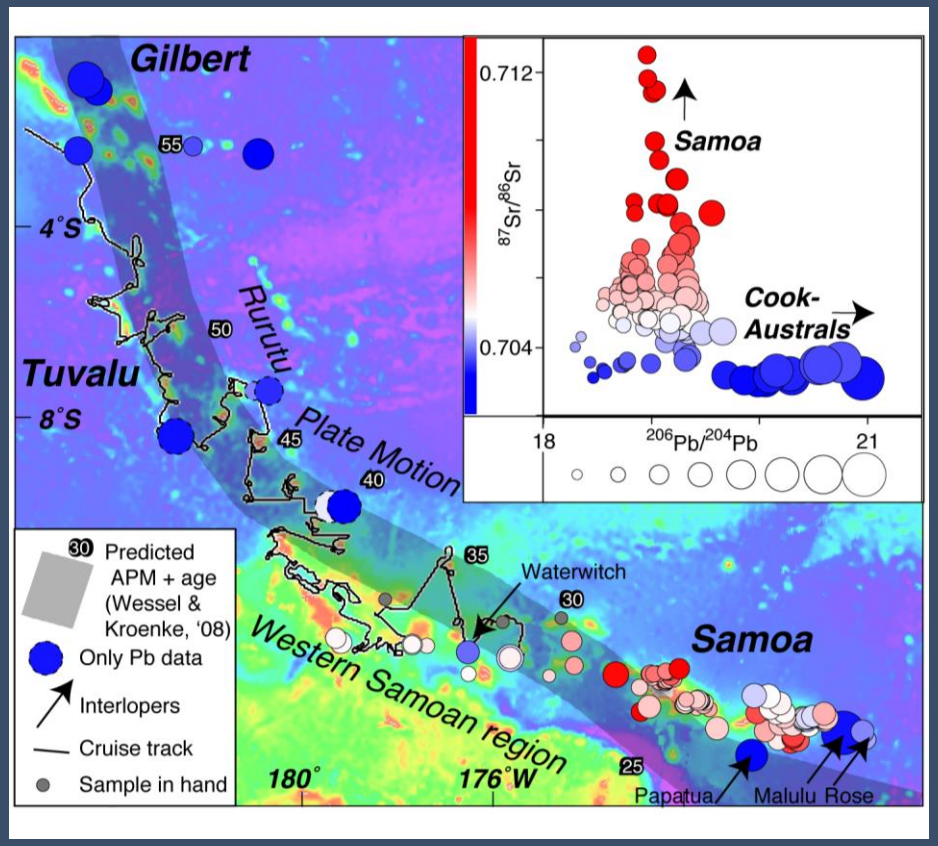
Studies in Hot spot volcanism

Examples from

Mike Garcia and Jasper Konter



Hawaiian Rejuvenation Volcanism



Geochemistry of Western Pacific Hotspots

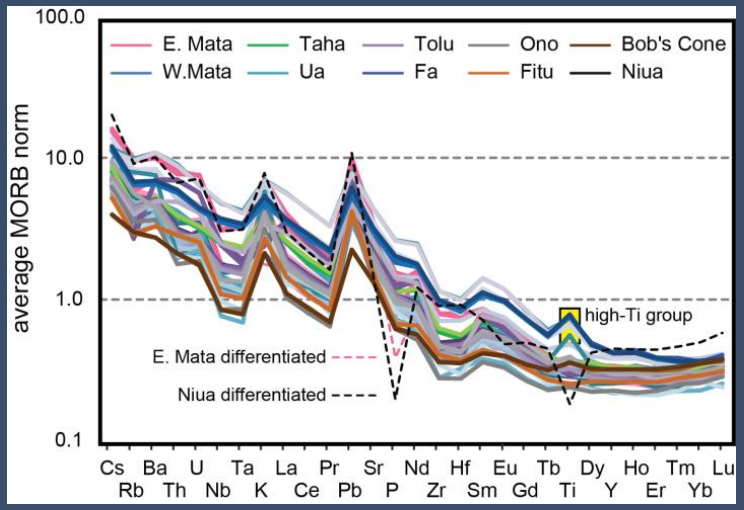
Studies in Volcanology, Petrology and Geochemistry

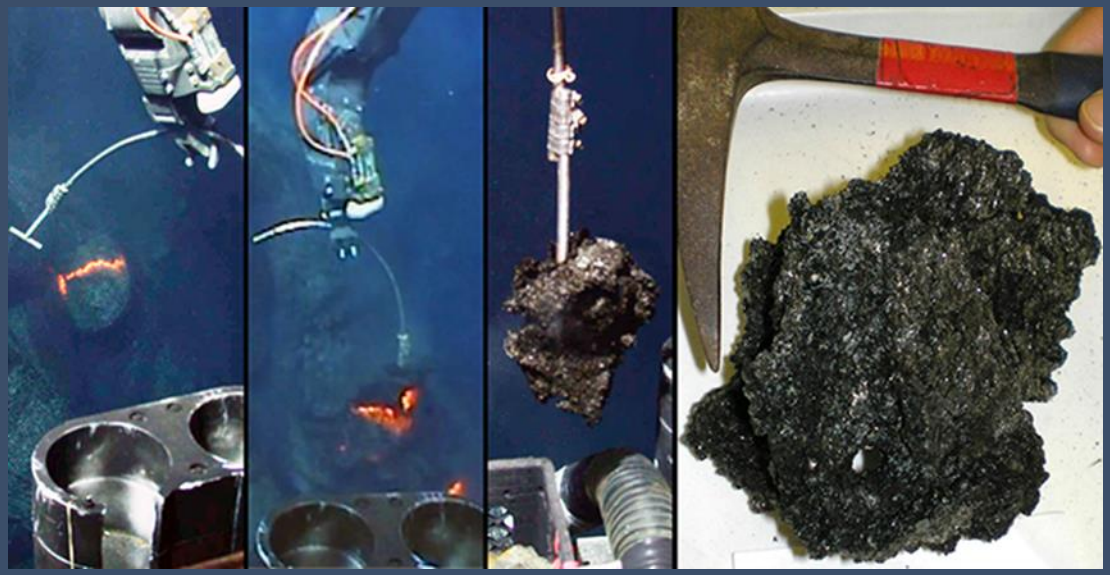
Examples from

Ken Rubin and Julia Hammer

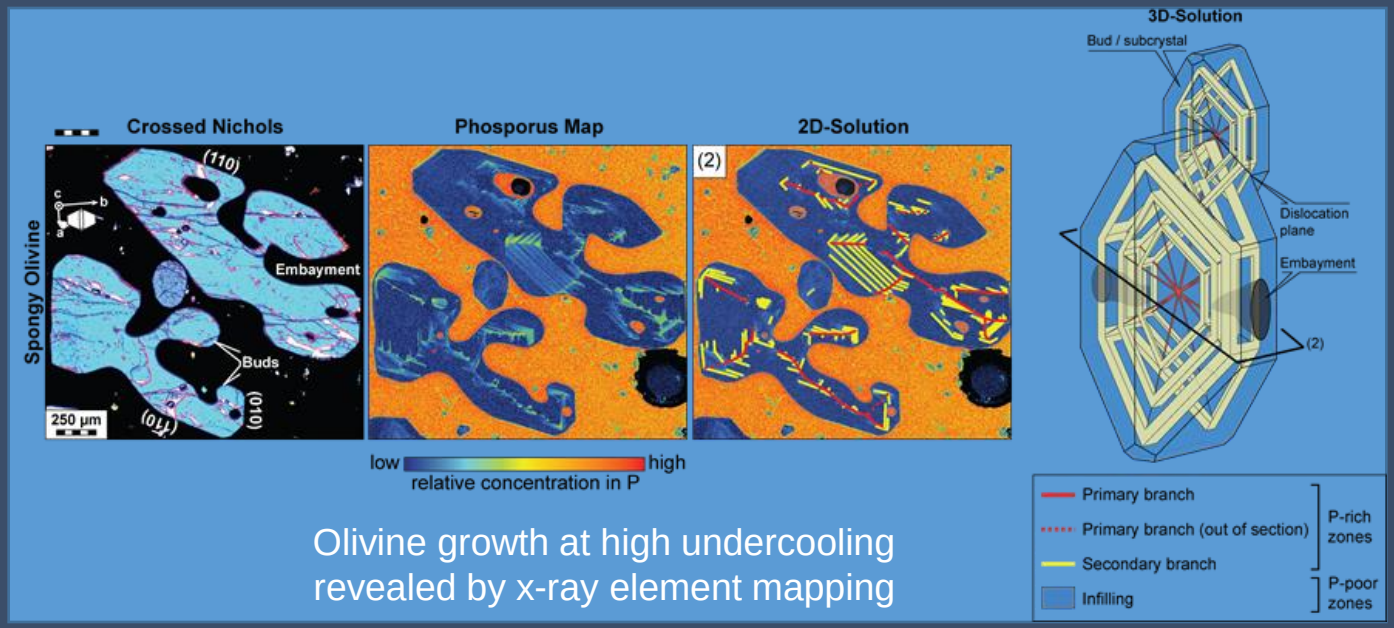
W. Mata 2009

First molten lava sampled in the deep sea





Rarest volcanic rocks on the planet – *only known modern example of boninite*



Olivine growth at high undercooling revealed by x-ray element mapping

UH Department of Geology & Geophysics, SOEST

www.soest.hawaii.edu/GG

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- http://www.soest.hawaii.edu/soest_web/soest.videos.htm
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