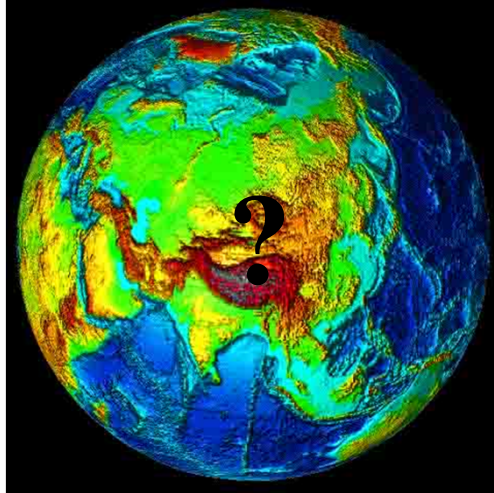


# Ultrahigh-Pressure Tectonics



Bradley Hacker

University of California, Santa Barbara

## Schedule

09:00–12:00/12:30 and 14:00–17:00/17:30

### April 28th

Introduction

Petrology of UHP rocks: phase relations at high pressure and temperatures

Rates of phase transformations: sluggish reactions

Rheology of UHP rocks

*Study of thin sections*

### April 29th

Experimental techniques (M. Schmidt)

Melting at high pressure (M. Schmidt)

Fluids–melts (M. Schmidt)

Geochronology of UHP rocks: isotopic systems and techniques

Rates of UHP subduction and exhumation: fast and slow

*Perple\_X* exercise

### April 30th

Fluxes in subduction zones (M. Schmidt)

Thermal relaxation at high P (M. Schmidt)

Tectonic settings for UHPM

Exhumation mechanisms

Relevance of UHP tectonism to Earth evolution

Closing: Controversies in UHP tectonics

# Global Perspective

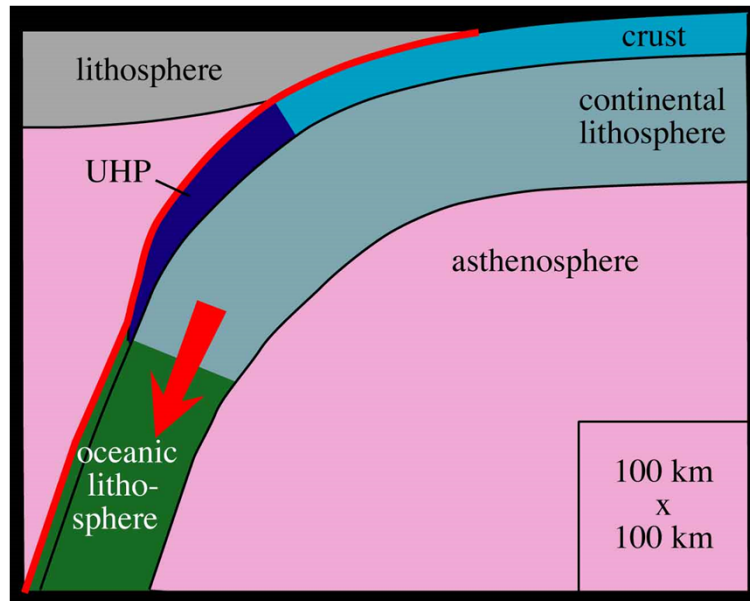
## Specific UHP domains to be addressed

- Taiwan
- Timor
- Himalaya
- Tibet
- Pamir
- Alps
- New Guinea
- Norway
- China
- Kokchetav
- Erzgebirge
- Oman

# Introduction

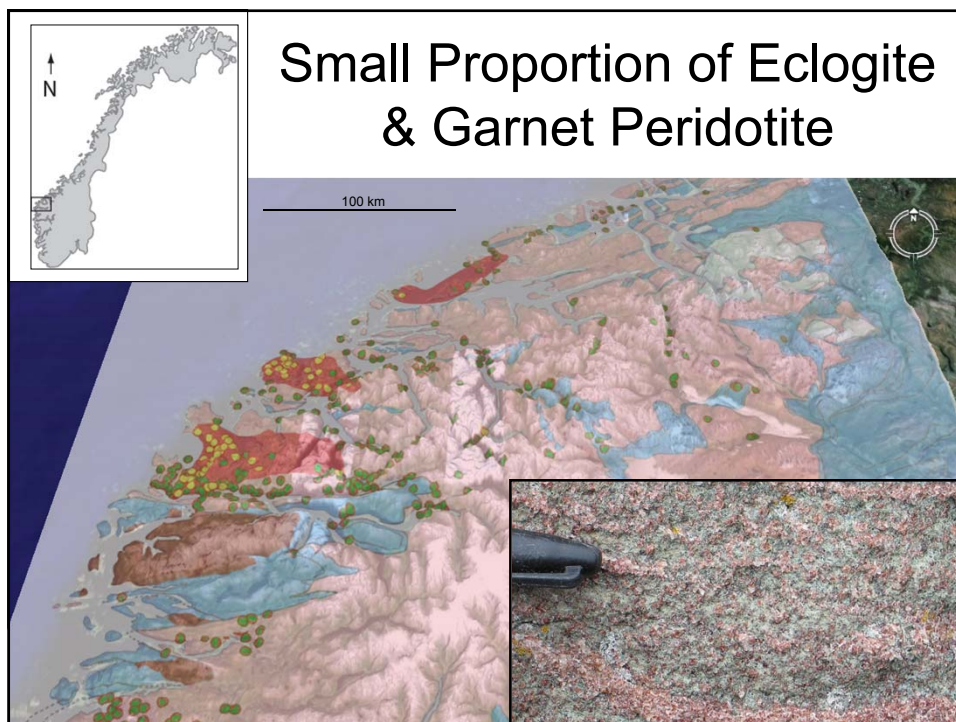
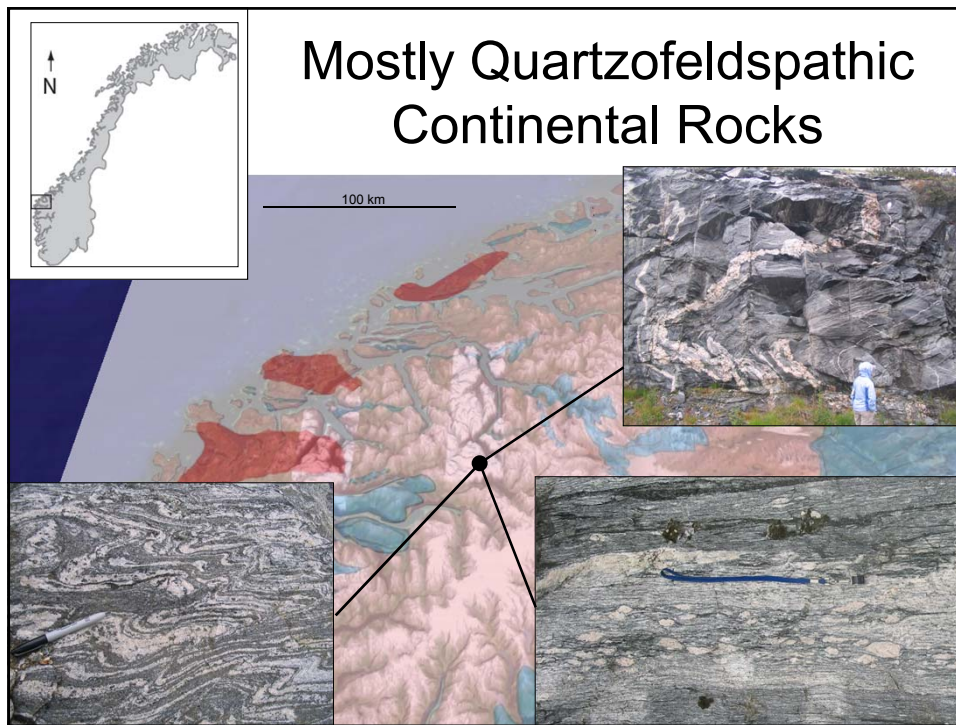
- What is UHP?
- How was it recognized?
- General features of UHP
- Controversies in UHP tectonics

## UHP= continent subduction

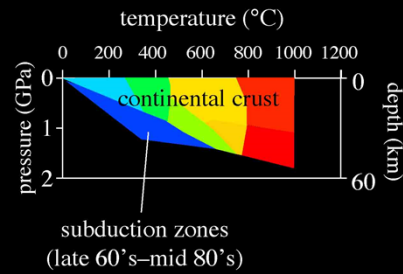
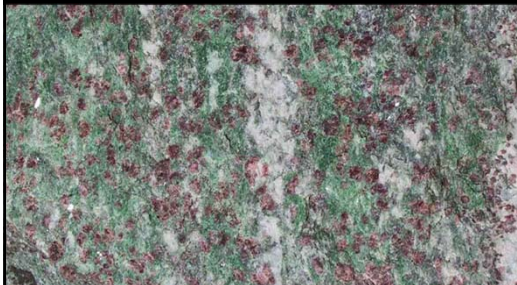


## Understanding Subduction of Continents is Important

- ❖ generation & collapse of mountain belts
- ❖ arc/continental magmatism
- ❖ continent growth & modification
- ❖ mass cycling through Earth

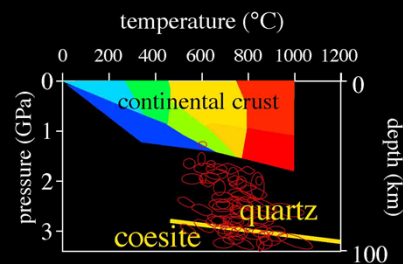
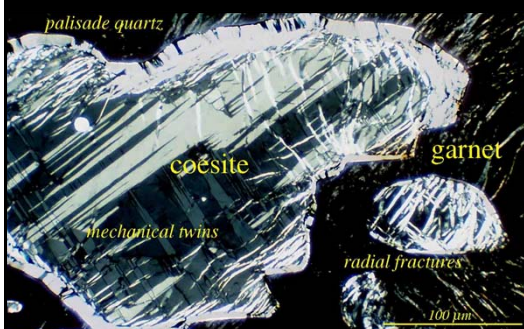


## How do we know continents are subducted?



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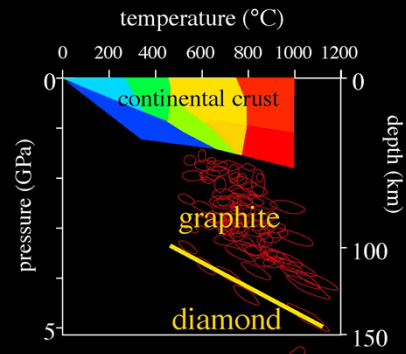
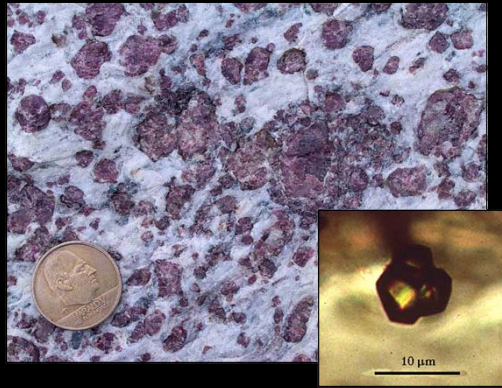
1984: coesite





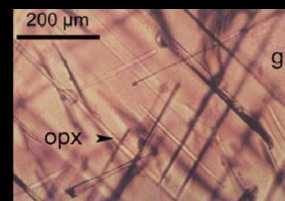
## How do we know continents are subducted?

1990: diamond



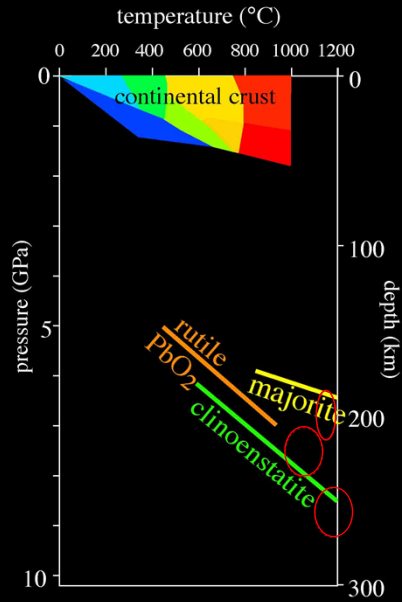
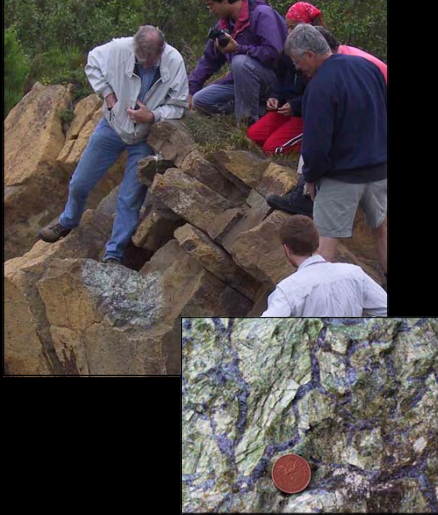
## How do we know continents are subducted?

2000: majorite (supersilicic garnet)

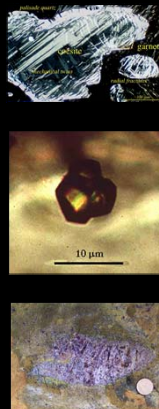
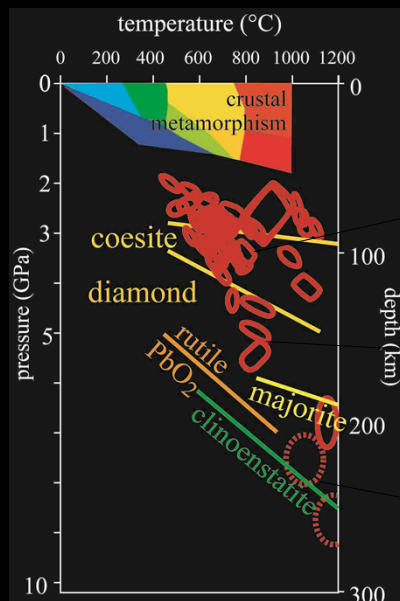


# How do we know continents are subducted?

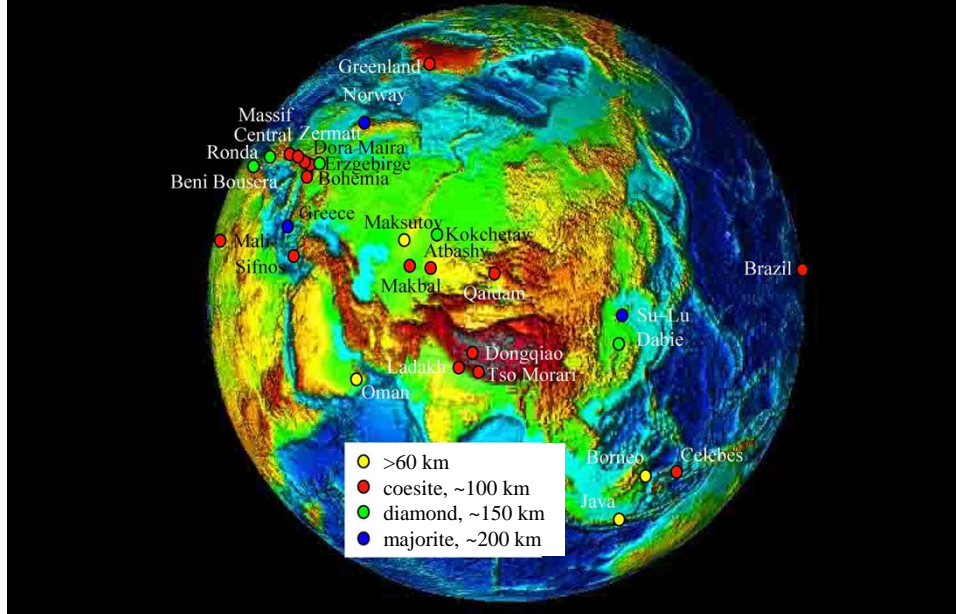
2000: majorite (supersilicic garnet)



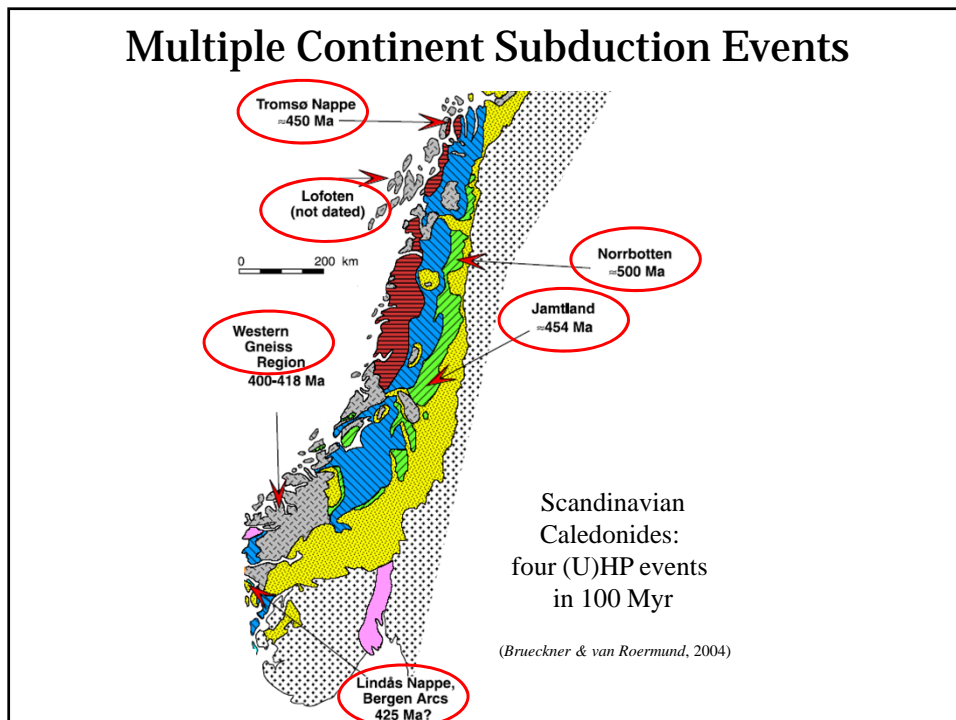
## Evidence of Continental Subduction



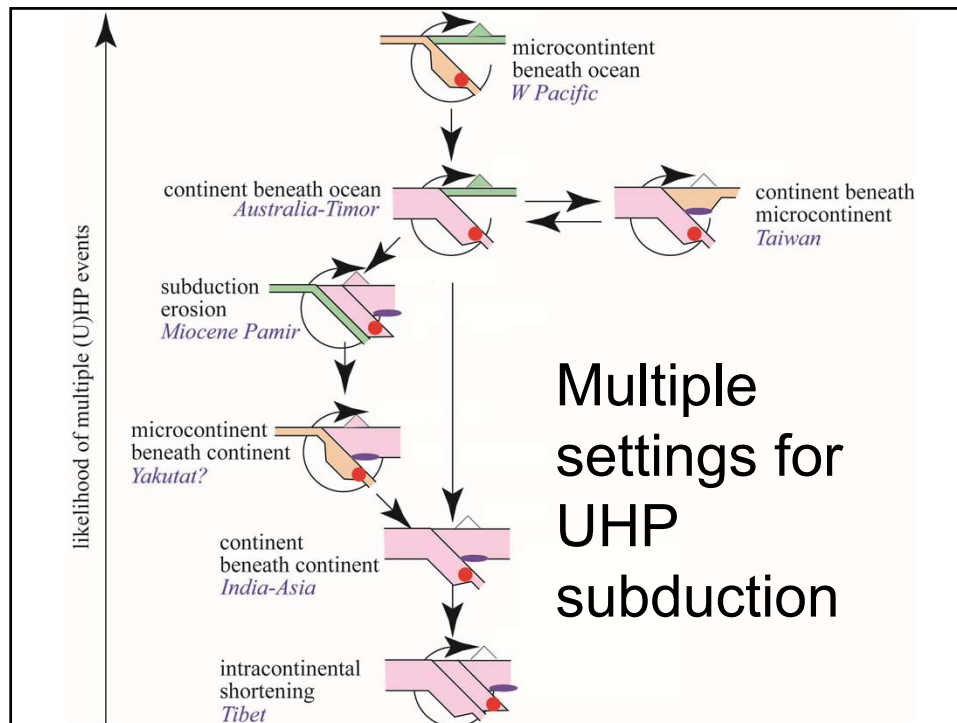
## Frequent Phanerozoic Continent Subduction



## Multiple Continent Subduction Events







## Controversies in UHP Tectonism

- maximum pressures
- maximum temperatures
- rates of exhumation
- sizes of UHP terranes
- scale of geochemical effects
- scale of geodynamic effects