

Group 3:

How do volatile release and transfer affect the rheology and dynamics of the plate interface

Linkages between volatile release and the rheology of the plate boundary interfaces (& mantle wedge)

How does volatile release from subducting plate affect the slip behavior of the subduction megathrust?

What is the role of serpentinization in weakening the incoming plate and the plate interface?

How does dehydration of the slab influence mantle wedge dynamics?

What physical processes are associated with intermediate and deep earthquakes?

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Priority

How does volatile release from subducting plate affect the slip behavior of the subduction megathrust?

1

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1

How does dehydration of the slab influence mantle wedge dynamics?

1

What physical processes are associated with intermediate and deep earthquakes?

2

1. How does volatile release from subducting plate affect the slip behavior of the subduction megathrust?

- Readiness (e.g. Cascadia Initiative, NatroSeize)
- Fluid distribution
 - Pore collapse
 - Slab dehydration
- Geophysical/geochemical observations for fluid distribution
- Petrological and deformation experiments
- Focus-site studies: E.g. warm-slab and cold-slab subduction zones because of the difference in the fluid supply, E.g. variation in sediment input

2. What is the role of serpentinization in weakening the incoming plate and the plate interface?

- What is the role of serpentinization in the subducting slab in weakening the incoming plate

2

- What is the role of serpentinization in the mantle wedge on weakening the interface?

1

- Extension of Sub-question 1.
- Interface strength is important to slab-mantle coupling and mantle wedge dynamics
- Distribution of fluid flux from the slab (Group 4)
- Complex geology/lithology along the interface

2. What is the role of serpentinization in weakening the incoming plate and the plate interface?

- What is the role of serpentinization along the plate interface on weakening the interface?

- Field observations, exhumed slab-mantle interface material
- Seismic observations – Resolution issues
- Deformation and petrological experiments, including kinetics

3. How does dehydration of the slab influence mantle wedge dynamics?

- Big question!
- Links the interface strength (Sub-question 1&2) and mantle dynamics
- Distribution of fluid flux from the slab is critical (Group 4)

3. How does dehydration of the slab influence mantle wedge dynamics?

- Integration of observations and experimental results
 - Experimental results on the effect of volatile on rock physics (e.g. seismic properties)
 - Interpretation of geophysical observations (e.g. seismic attenuation)
- Numerical modeling that incorporates the interface-mantle feedback

4. What physical processes are associated with intermediate and deep earthquakes?

- Why and how do slabs deform in the deep mantle?
 - Localized (unstable) deformation caused by:
 - Dehydration embrittlement?
 - Dynamics weakening
 - “Phase transformation instability”?

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1

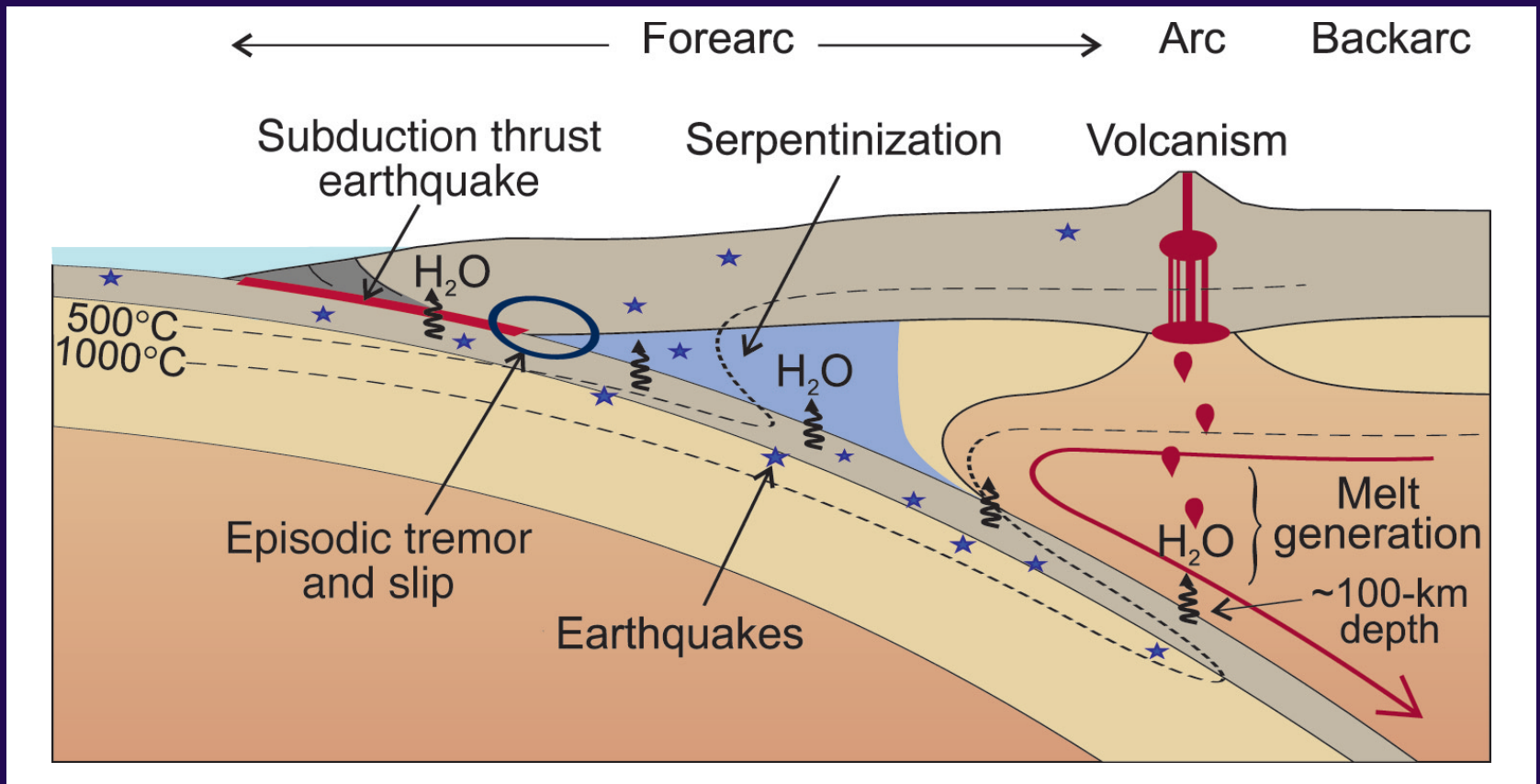
How does dehydration of the slab influence mantle wedge dynamics?

1

What physical processes are associated with intermediate and deep earthquakes?

2

The availability of aqueous fluids at depth affects many important processes in subduction zones.



The depth of fluid release from the slab depends strongly on the thermal structure of the slab.

- When writing the science plan, state the objective instead of questions.