

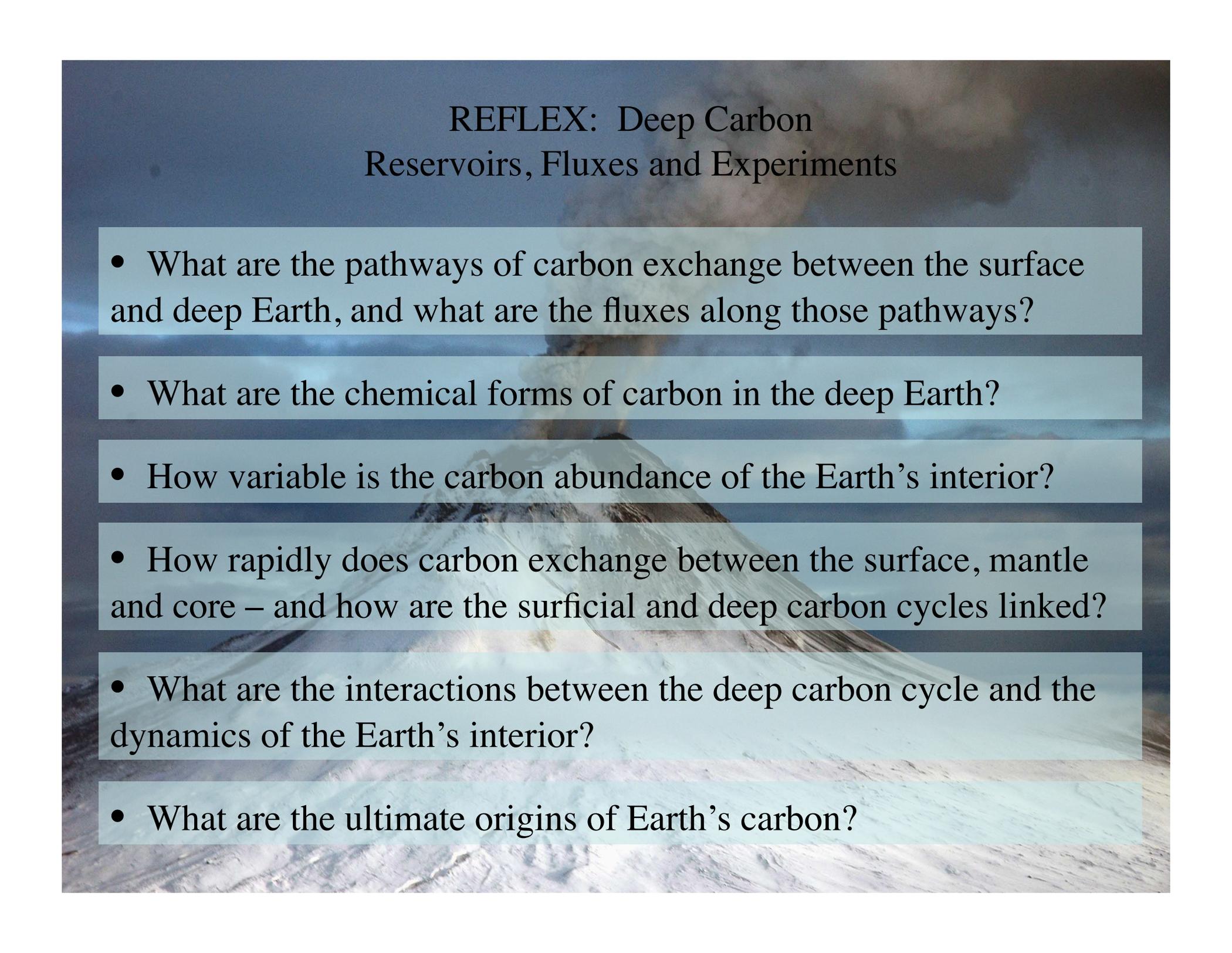
REFLEX: Deep Carbon Reservoirs, Fluxes and Experiments

Goal

To advance understanding of the deep-Earth carbon cycle from atomic to global scales

Science Plan

- Deep Earth carbon reservoirs (mantle reservoirs, diamonds, C-O-H fluids)
- Deep Earth carbon fluxes (hi-res mapping input & output fluxes)
- Deep Earth carbon chemistry (P-T-X lab experiments, mantle samples)

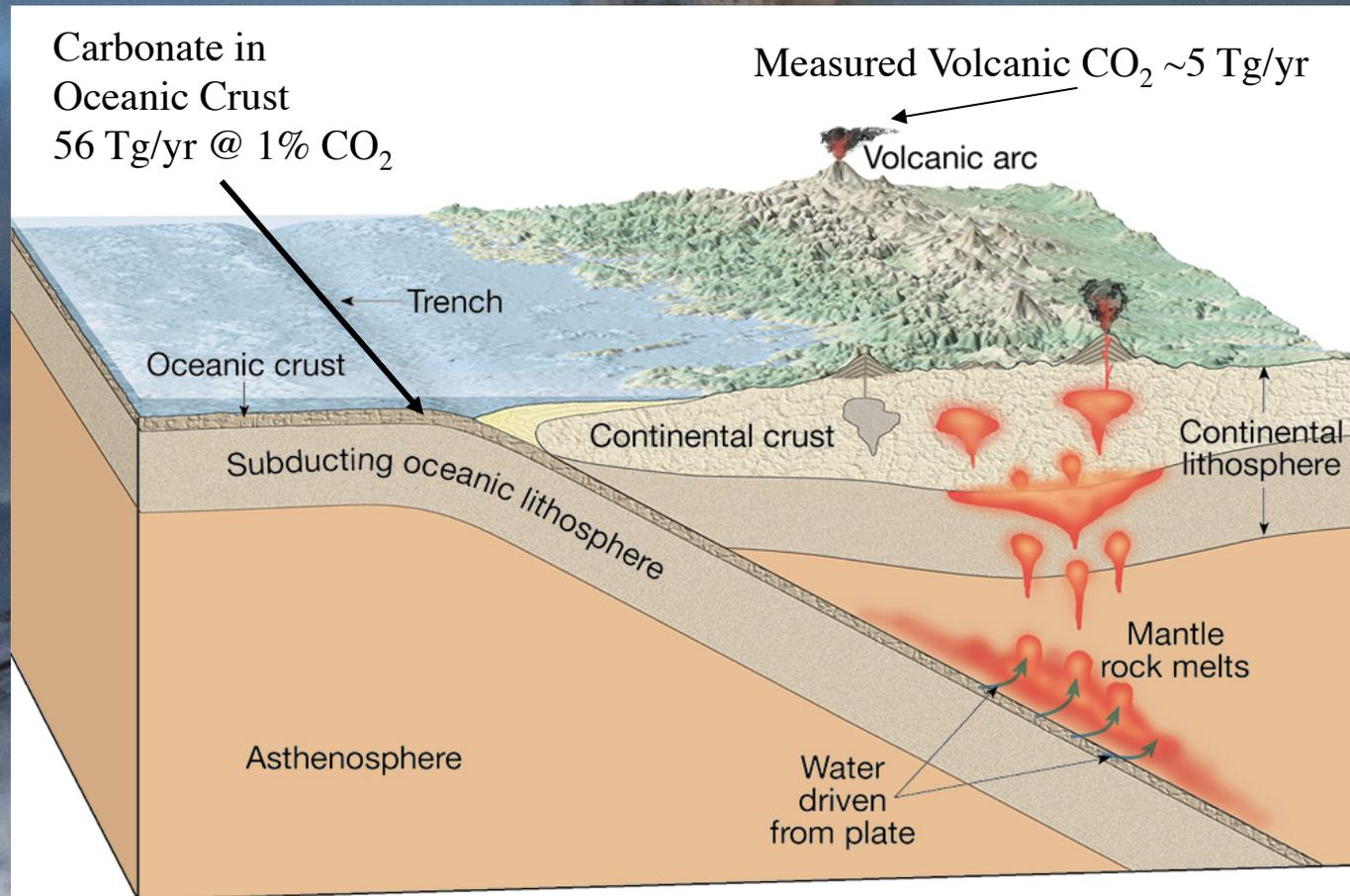


REFLEX: Deep Carbon Reservoirs, Fluxes and Experiments

- What are the pathways of carbon exchange between the surface and deep Earth, and what are the fluxes along those pathways?
- What are the chemical forms of carbon in the deep Earth?
- How variable is the carbon abundance of the Earth's interior?
- How rapidly does carbon exchange between the surface, mantle and core – and how are the surficial and deep carbon cycles linked?
- What are the interactions between the deep carbon cycle and the dynamics of the Earth's interior?
- What are the ultimate origins of Earth's carbon?

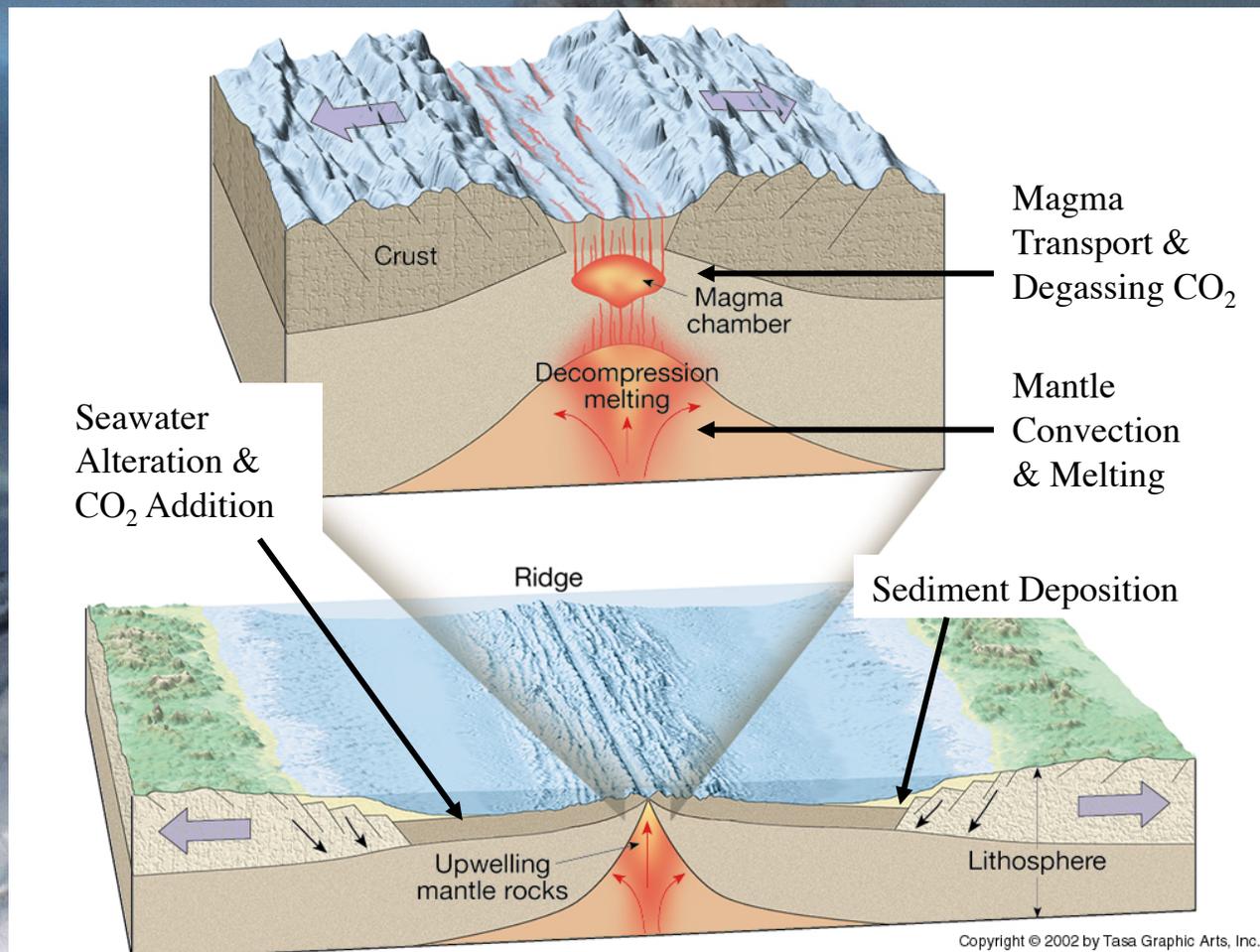
REFLEX: Deep Carbon Reservoirs, Fluxes and Experiments

- What are the pathways of carbon exchange between the surface and deep Earth, and what are the fluxes along those pathways?



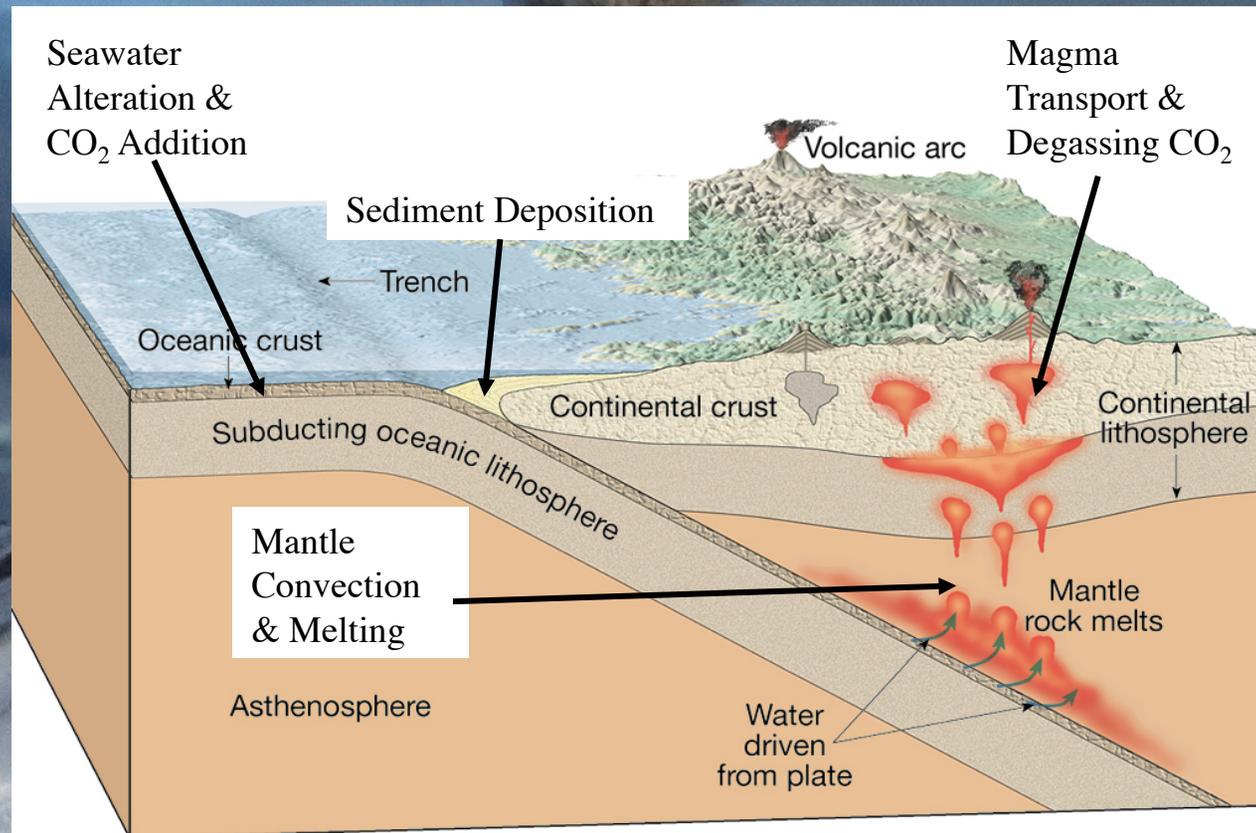
REFLEX: Deep Carbon Reservoirs, Fluxes and Experiments

- What are the pathways of carbon exchange between the surface and deep Earth, and what are the fluxes along those pathways?



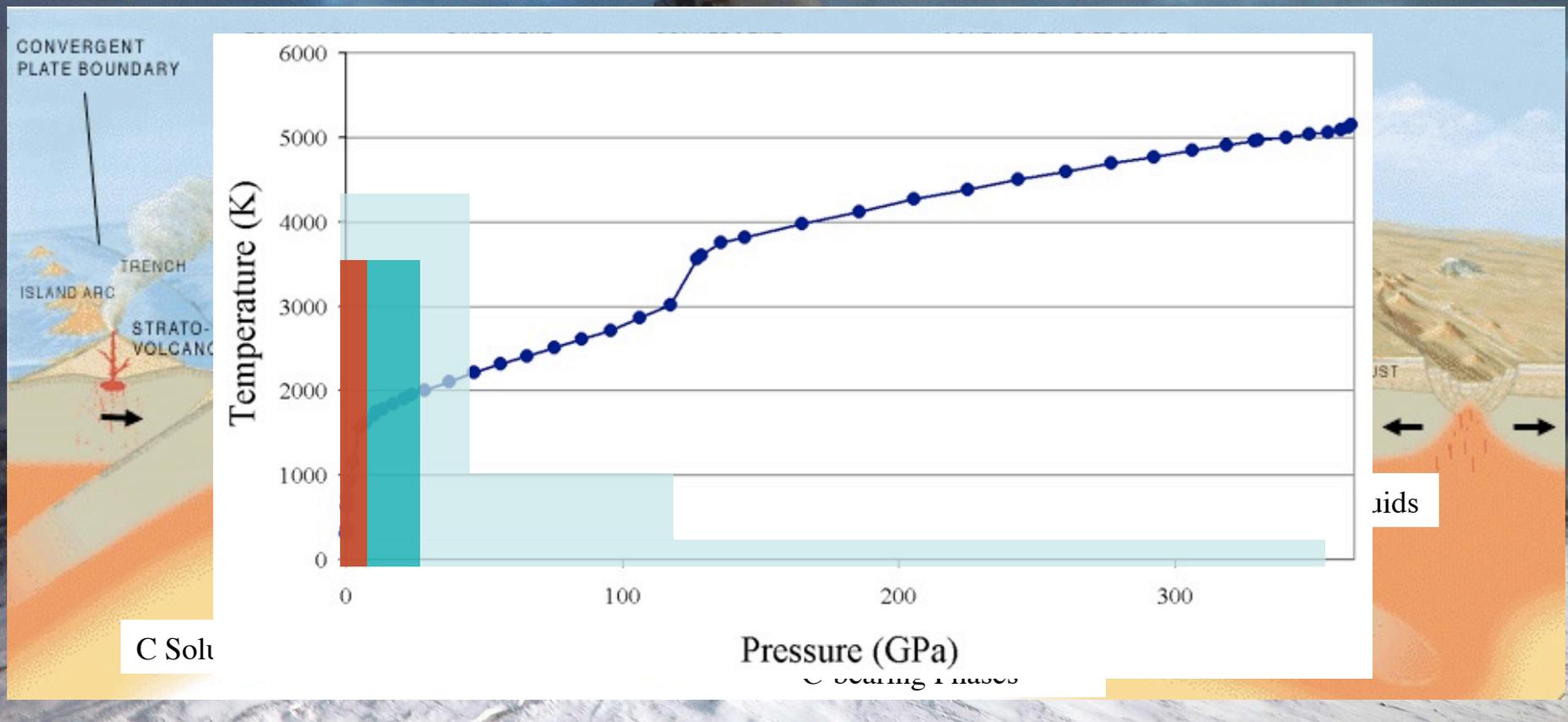
REFLEX: Deep Carbon Reservoirs, Fluxes and Experiments

- What are the pathways of carbon exchange between the surface and deep Earth, and what are the fluxes along those pathways?



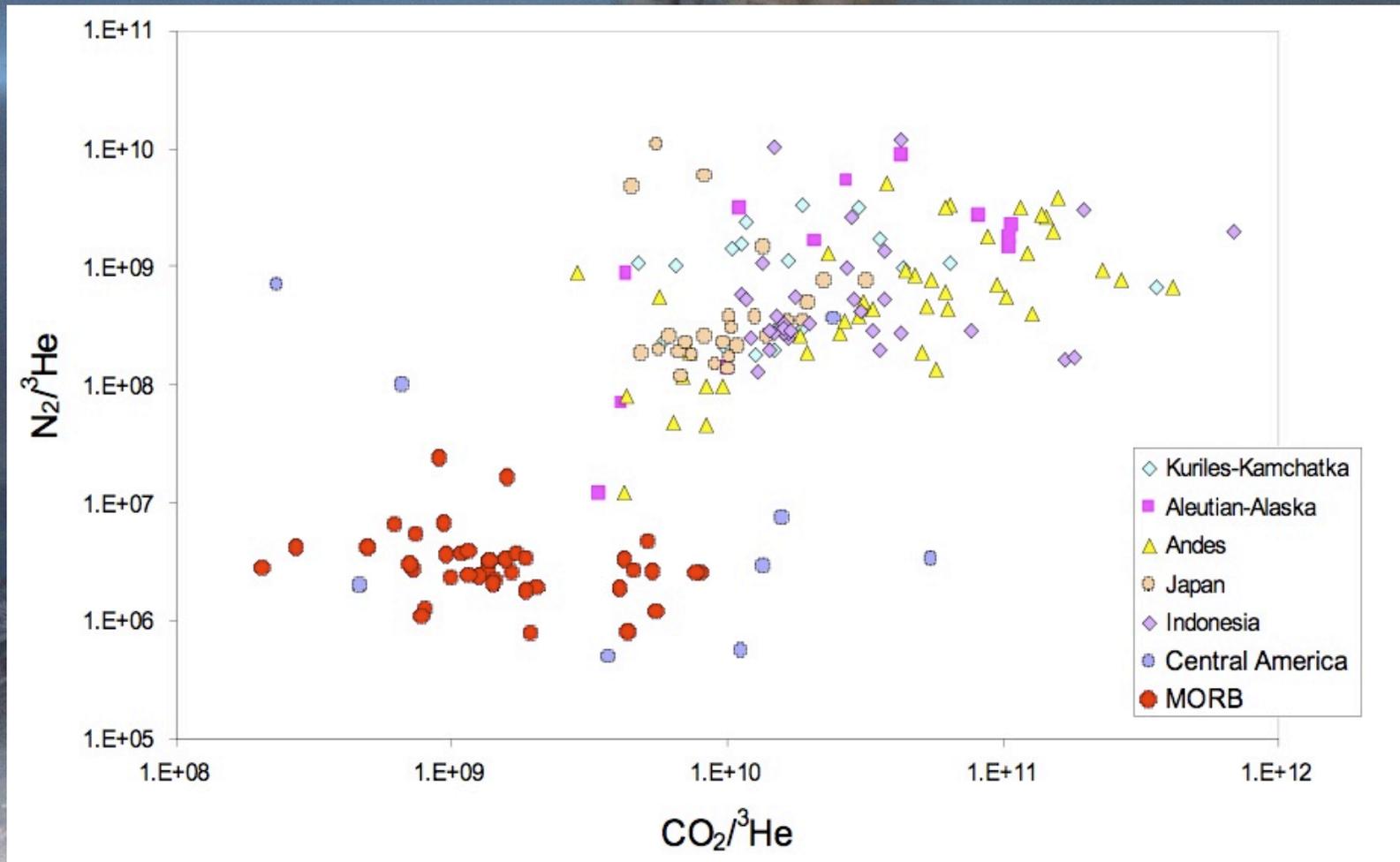
REFLEX: Deep Carbon Reservoirs, Fluxes and Experiments

- What are the chemical forms of carbon in the deep Earth?
- hydrocarbons, fluids, melts, silicate minerals, C phases



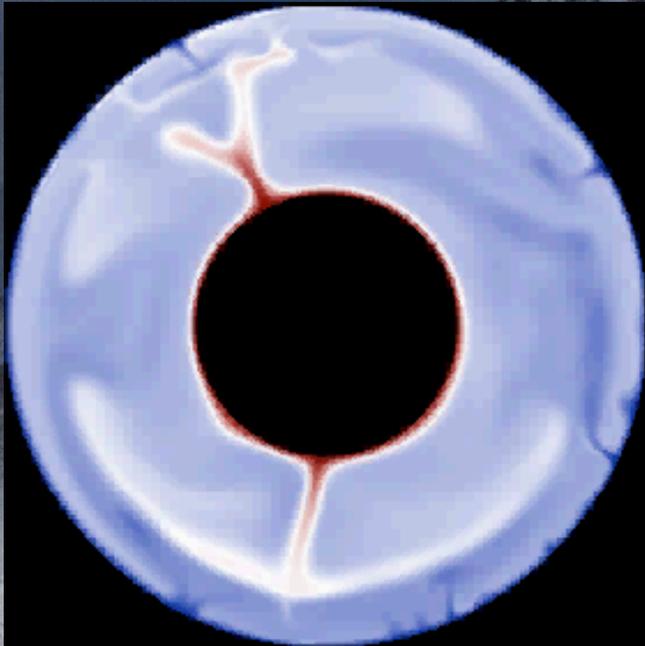
REFLEX: Deep Carbon Reservoirs, Fluxes and Experiments

- How variable is the carbon abundance of the Earth's interior?



REFLEX: Deep Carbon Reservoirs, Fluxes and Experiments

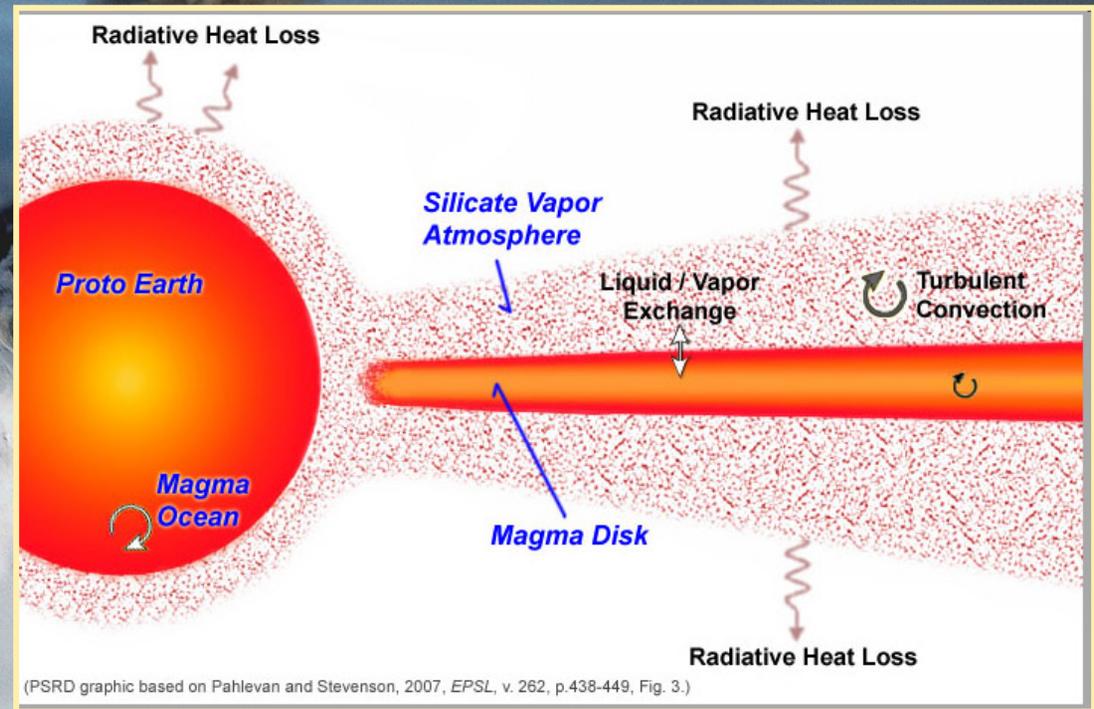
- How rapidly does carbon exchange between the surface, mantle and core – and how are the surficial and deep carbon cycles linked?
- What are the interactions between the deep carbon cycle and the dynamics of the Earth's interior?

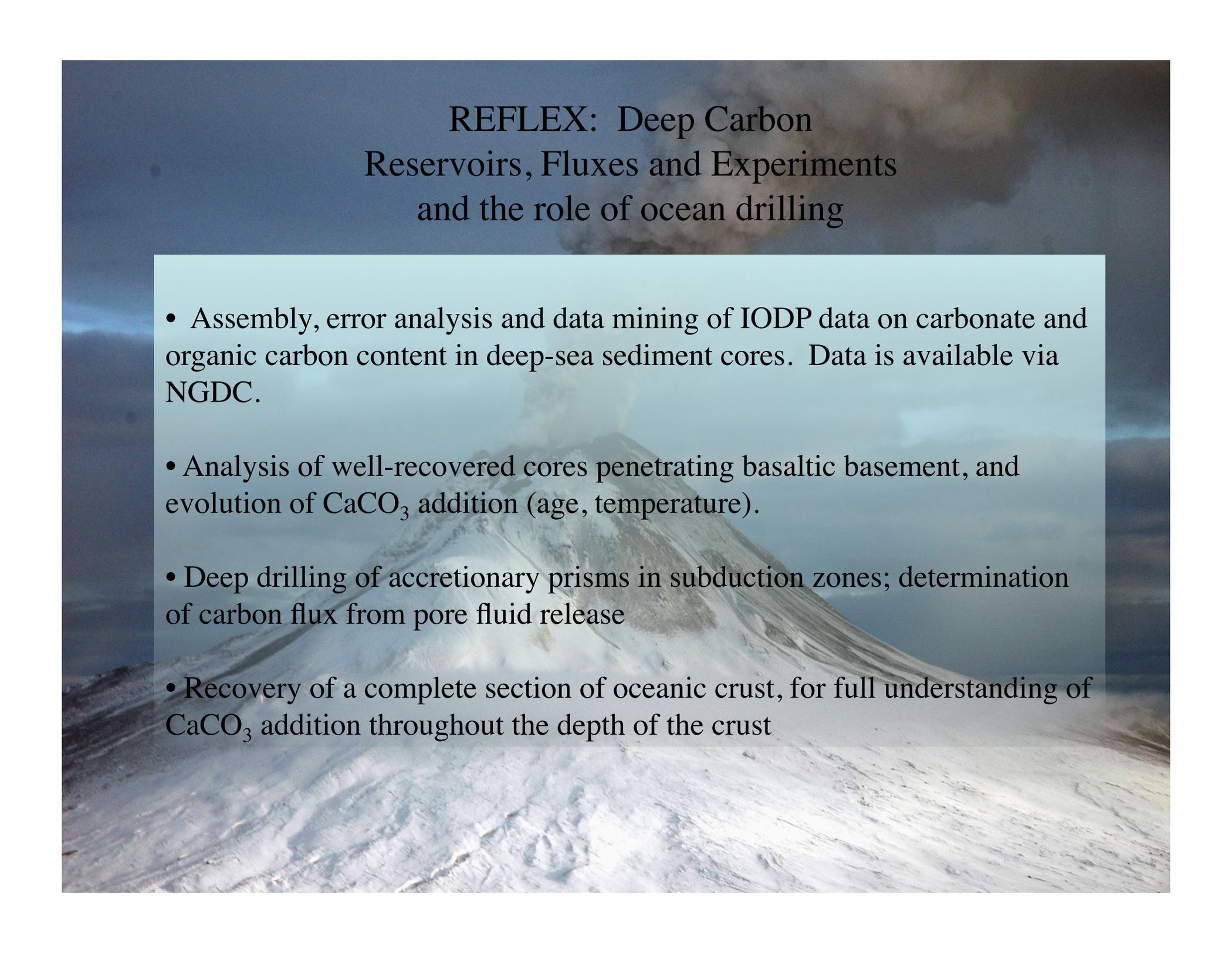


- C phase stability
- C influence on physical properties
- tracing C variability
- tracing core-mantle-surface exchanges

REFLEX: Deep Carbon Reservoirs, Fluxes and Experiments

- What are the ultimate origins of Earth's carbon?





REFLEX: Deep Carbon Reservoirs, Fluxes and Experiments and the role of ocean drilling

- Assembly, error analysis and data mining of IODP data on carbonate and organic carbon content in deep-sea sediment cores. Data is available via NGDC.
- Analysis of well-recovered cores penetrating basaltic basement, and evolution of CaCO_3 addition (age, temperature).
- Deep drilling of accretionary prisms in subduction zones; determination of carbon flux from pore fluid release
- Recovery of a complete section of oceanic crust, for full understanding of CaCO_3 addition throughout the depth of the crust