Talk 2.

**Rheology experiments at extreme conditions: Understanding the mechanical properties of Earth’s interior.**

**Description:**

This talk will cover experimental advances in rheology studies of mineral phases in the mantle transition zone and lower mantle. Implications for large scale processes like mantle convection and slab subduction will be discussed.

**Abstract:**

Rheology of Earth materials is fundamentally linked to large scale processes such as mantle convection and slab subduction. Thus knowledge of the mechanical properties of the Earth’s interior provides valuable insight into the dynamic behavior of our planet. However, deformation studies of mineral phases that exist in the mantle transition zone and lower mantle are technically challenging. The stability fields for these phases are beyond the reach of conventional deformation devices, and many of these phases are unquenchable to ambient conditions. This means that these phases must be studied *in-situ*, while they are under high-pressure and temperature. Innovative devices such as the Deformation-DIA and the Rotational Drickamer Apparatus allow quantitative rheology studies at pressures and temperature up to transition zone conditions. However for greater depths, i.e. lower mantle, the diamond anvil cell remains the only device capable of attaining these pressures. By combining these devices with brilliant synchrotron x-rays, the mechanical properties of deep earth mineral phases can be studied as the sample deforms at high pressure and temperature. This talk will outline the current status of rheology studies on deep Earth materials and the implications of these studies for large scale processes and observations.