***The Department of Earth and Environmental Sciences***

***presents***



**Dr. Mark Ghiroso**

Thursday, 4/24/14

4:00-5:00 pm

Ag 109

***Triggering explosive volcanic eruptions: Windows of eruptibility***

The eruption of siliceous magma bodies that reside in the shallow crust can be gigantic and potentially a significant geologic hazard.  Triggering mechanisms for eruption are often ascribed to external perturbations of the magma body, such as earthquake activity or magma recharge.  In this talk a hypothesis is advanced that evolving phase relations associated with the cooling of a silica and fluid rich magma body naturally leads to a state of significant over pressurization. This over pressurization triggers eruption.  It will be shown that the presence of a free fluid phase in a magma body is not sufficient to induce eruption; the eruptive trigger

 requires the production of copious amounts of fluid over a narrow  temperature

interval.  The crustal pressures over which this eruptive mechanism is potentially viable correspond to the range ~ 50-400 MPa.  This pressure range constitutes an eruptibility window for fluid saturated silicic crustal magma. Coupled fluid-dynamical - thermodynamic simulations demonstrate quantitatively that this   
phase equilibrium triggering mechanism is possible.