1137-65-129 **Brittany A Erickson*** (berickson@pdx.edu) and **Leif Karlstrom**. *A Linearized Stability Analysis of Acoustic-gravity Waves in a Volcanic Conduit with a Spatially Variable Background State.*

Explosive volcanic eruptions involve the ascent of multiphase magma through crustal conduits towards Earth's surface at sufficiently high rates that the mixture fragments from a suspension of bubbles and crystals in a melt to a mixture of liquid and solid fragments in a gas. Eruptions are largely driven by the growth and expansion of bubbles during ascent which may accelerate the flow to high speeds, up to or perhaps even exceeding the fluid sound speed. Here we consider short-time, unsteady behavior during explosive volcanic eruptions by considering perturbations to a steady state, fragmenting flow of bubbles and liquid through an axisymmetric conduit. We study flow stability in the presence of small amplitude mechanical disturbances. The linearized governing equations form a set of hyperbolic partial differential equations that describe wave motion in an accelerating flow with strongly variable material properties, within a conduit of non-constant cross sectional area. The equations are solved numerically by applying a finite difference discretization with weak enforcement of boundary conditions (that leads to a provably stable method) and an eigenmode analysis determines the stability of perturbations to various background states. (Received January 31, 2018)