Weekly CEAFM Seminar: Fall 2015

JOHNS HOPKINS
Center for Environmental & Applied Fluid Mechanics

Date: **Friday, October 9, 2015**

Time: 11:00 AM

Location: Gilman Hall # 132

Speaker: **Dr. Maylis Landeau** (Earth and Planetary Science, JHU)

Title: ***"Planet Formation in the Lab: Fragmentation and Impacts in Immiscible Liquids"***

Abstract

Fragmentation and impact processes in immiscible liquids occurred on a massive scale during the formation of the Earth and other terrestrial planets, when the metallic cores of impacting planetary bodies were released into molten silicate magma oceans. We study these two-phase flows with analog lab experiments, using dimensional analysis to scale down the system. I will present two series of experiments on (1) the fragmentation of blobs of a heavy liquid released into a lighter immiscible liquid, and (2) their impacts with an interface between two immiscible liquids. We find a previously unobserved regime where fragmentation into drops occurs as a brief and global event inside a turbulent, self-similar cloud. Our scaling laws for turbulent entrainment and mixing have important implications for the composition and the stratification of Earth's core.

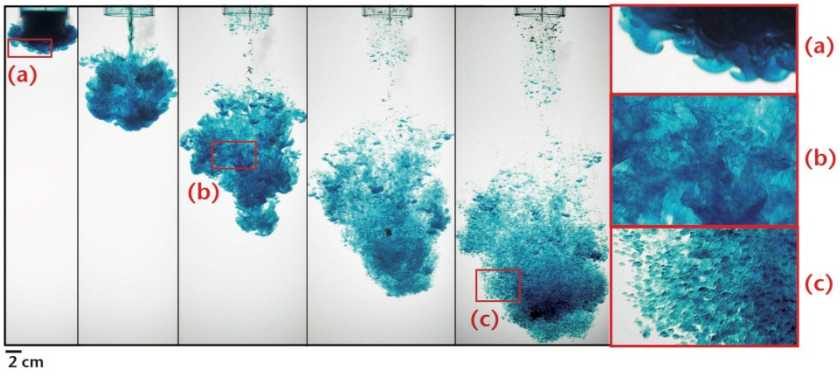

Figure: Sequence showing the turbulent fragmentation of a buoyant liquid volume in another immiscible liquid.