School of Earth and Environmental Sciences Spring 2025 Colloquium Series

Zoom ID: 843 0287 5858 Passcode: 672323

Wednesday, April 30, 2025 12:15 PM -1:30 PM Science Building C-207

Franco Cortese

PhD Candidate, CUNY Graduate Center Queens College

Volcanic Crystals in Four Dimensions from the 2021 Eruption of Cumbre Vieja, Canary Islands

Understanding crystal cargoes in basaltic magmas offers insights into magma evolution and eruption dynamics and enhances our ability to mitigate volcanic risk. Crystals grow, settle, and accumulate in mushes, which can be remobilized when "fresh" magma invades the system. Combining foundational 2D (BSE-EPMA) and advanced 3D (μ CT) techniques, we explore the 2021 eruption of Cumbre Vieja (Canary Islands) by analyzing carefully oriented clinopyroxene and olivine crystals from four eruptive phases. We reveal that crystals

record a complex history of interaction with primitive mantle sourced magma, which intrudes crystal mushes 2 weeks to 2 months prior to eruption. The contribution of these mushes reaches up to 66% of the crystal cargo's volume and contaminates bulk rock analyses. Furthermore, we can resolve temporal changes in the magmatic plumbing system, and find that later crystals react with a rejuvenated, primitive magma batch. This research showcases how modern analytical methods can deepen our understanding of volcanic processes.

