

CIPS Graduate Seminar - Meteorites & the Solar System

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11am, 365 McCone

What are lunar mare meteorites telling us about volcanism on the Moon?

Abstract

Mare basalts cover ~17% of the lunar surface, and represent flows that filled the large basins formed by earlier bolide impacts. Most of these maria are found within the great basins on the nearside with a few others filling smaller basins in the farside. Mare volcanism is the continuous expression of mantle evolution after differentiation and formation of the lunar crust. With the Apollo and Luna samples, it was generally thought that volcanism occurred during a period of ~700Ma, from ~3.85 (and a less clear age of ~4.2 Ga) to ~3.15 Ga. With the advent of new lunar remote sensing data (surface chemical composition), new work with older data from the Orbiter I-IV images (crater counting statistics) and the finding of new lunar mare basalt meteorites (presently a total of 10), much progress has been achieved regarding the complex composition and geological evolution of the Moon. Currently, based on new age determination of lunar mare basalts, it is believed that lunar volcanism extended over a longer period of about 1.5 Ga: between 4.3 Ga (Kalahari 009) and 2.8 Ga (NWA032/479). Based on remote sensing data, mare volcanism should have occurred to even more recent times, ~1.2 Ga.

In this seminar, I will present recent Ar-Ar age determination for lunar mare meteorites, which in most cases are comparable to other isotopic systematics. In those cases Ar-Ar results are not comparable, it is still possible to learn more about the history of the meteorite being studied and ultimately about the geological history of the Moon.