

MAGMATIC EVOLUTION 2: A NEW VIEW OF POST-DIFFERENTIATION MAGMATISM.

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Introduction: This chapter focuses on the post-differentiation magmatism on the Moon. It includes a summary of our knowledge of this stage of lunar magmatism up to 2006. It then focuses on advances in understanding the following stages of magmatism: (1) the earliest stages of post-differentiation magmatism such as the Mg-suite, alkali suite, and associated volcanism, (2) mare basaltic magmatism and pyroclastic deposits, (3) KREEP basaltic magmatism, and (4) silicic-felsic magmatism. The list of co-authors for this abstract has thus far been identified as participants that will be involved in contributing to this chapter. Other co-authors will be added based on their unique contributions and insights. Please contact C. Shearer during or following this workshop with additional potential contributions (cshearer@unm.edu).

Overlap with other chapters: There are numerous topical chapters that overlap with Lunar Magmatism 2. These chapters include (1) *Origin of the Earth-Moon System*, (2) *Magmatic Evolution 1: Initial differentiation and late-accretion*, (3) *Evolution of the Lunar Crust*, (4) *The Structure of the Lunar Interior*, (5) *Lunar volcanism*, (6) *The Contributions of Lunar Meteorites*, (7) *Lunar Tectonics*, and (8) *Endogenous Volatiles*. Our intent for this chapter is not to duplicate or compete with these chapters but to integrate recent observations to establish an updated foundation for reconstructing the petrogenesis and chronology of lunar magmatism. Further, this chapter will feed into the chapters on *Lessons Learned and Future Goals of Exploration* and the *Development of the Moon and cis-Lunar Space*.

Important Questions Tied to Lunar Magmatism 2: Through the integration of a variety

of data sets (e.g., distribution of rock types, volatiles in various magmatic lithologies, chronology of emplacement and eruption, styles, compositions, and duration of volcanism, models for primordial differentiation, models for the structure of the lunar interior), a new understanding about the magmatic evolution of the Moon will be produced. Numerous important questions will be explored that are relevant to all stages of lunar magmatism. These questions include: (1) How do endogenous mantle volatiles influence mantle melting? (2) What are the source regions for the various stages of lunar magmatism? (3) How does duration and volume of lunar magmatism reflect mantle sources, melting-transport processes, and thermal history of the Moon? (4) What is the petrogenesis of the various stages of lunar magmatism? (5) What are the “petrogenetic linkages” among all stages of lunar magmatism? (6) What processes are important in driving lunar magmatism? (7) What are the implications of potentially very young volcanics, i.e., 1 Byr or younger?

Schedule for Chapter and Initiative: Based on the schedule for NVM2, chapters should be submitted near the end of 2018. It is the intent for this chapter to be submitted by this deadline. We intend to have a chapter meeting at the 2017 Lunar and Planetary Science Conference and the NVM2 meeting in Europe 2018 to review and expand on chapter content. During the summer of 2017, we will allocate writing assignments based on this outline. During the Fall 2017 and Spring 2018, we will discuss directions of the text and potential solutions to chapter overlaps. Finally, in mid-2018 we will provide additional input to the chapter on *Lessons Learned and Future Goals of Exploration*.