Composition-dependent Thickness of Basaltic Lava Flows in Planetary System

RAEGYUNG HA[1], YONGJAE YU[1]

[1] Department of Astronomy, Space Science, and Geology, Chungnam National University, Daejeon, South Korea, yongjaeyu@cnu.ac.kr

As a ubiquitous activity in the Solar System, volcanism is a dynamic process that involves interaction among highly refractory solid phase, partially molten liquid phase, and volatile gas phase. At an ambient depth (by implication pressure), incompressibility of liquid magma determines the relative fraction of partially molten phase out of originally solid phase. As magma rises towards the surface of planetary bodies, decompressional melting leads the gas phase to expand the magmatic volume. Changes of bulk density of magmatic body were compared for Terrestrial H_2O-rich basaltic magma, Martian CO_2-rich basaltic magma, and IO's SO_2-rich basaltic magma. Amount of exsolved gas fractions were far more important in planetary magmatism than the compositional variation of magma. Thickness of lava flows was also compared in a planetary setting. While gravity and slopes were pivotal, volatile content was a contributing factor in planetary magmatism.