

The Moon continues to provide scientific answers – and pose new questions – over 40 years after the last Apollo mission. While the Moon provides the most clear and complete history of impact events in the inner Solar System since its formation ~4.5 billion years (Ga) ago, the timing is not well understood and has been a topic of continued interest and persistent uncertainties. As our closest planetary neighbor, the Moon's impact record, if properly interpreted, can be used to gain insights into how the Earth has been influenced by impacting events over billions of years.

Lunar impact glasses, pieces of melted lunar regolith created by energetic impacting events, can offer information about the Moon's impact history. These samples possess the composition of the target material and can be dated by the $^{40}\text{Ar}/^{39}\text{Ar}$ (argon) method in order to determine their formation age. Understanding the ages of impact glasses, along with their compositions, allows us to begin to piece together information about the rate of impact events in the inner Solar System and their effects on Earth. Important questions that can be answered include determining the form of the large-impact distribution with respect to time (e.g., smooth decline versus cataclysmic spike), whether there is periodicity in Earth-Moon cratering history, and the applicability of the lunar record to other planets. Of great interest to astrobiology and the study of the origin of life is the impact flux prior to ~3.7 Ga ago, and specifically, whether or not early life, if it existed on Earth before 4.0 Ga ago, may have been destroyed during these early impact events.