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# Introduction to special section: Early Mars

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Ongoing studies of the evolution of the Martian cratered highlands, the nature of the planet's early climate, and the recent announcement of possible evidence of ancient life in the ALH 84001 meteorite have reinvigorated interest in the conditions that prevailed on Mars during its first billion years of geologic history. To address this interest and assess our current understanding of these issues, the Lunar and Planetary Institute hosted a 4-day Conference on Early Mars in Houston in April of 1997. The papers contained in this special section are a product of that meeting.

The purpose of the conference was twofold: (1) to consider how impacts, volcanism, and the presence of abundant water affected the physical and chemical environment that existed on Mars 4 Gyr ago, particularly as it related to the nature of the global climate, the origin of the valley networks, the geologic and mineralogic evolution of the surface, the aqueous geochemistry of groundwater, and the existence of local environments that may have been conducive to the development of indigenous life and the preservation of its signature in the geologic record; and (2) to discuss what observations or experiments might be included in future spacecraft missions to test the ideas and expectations arising from purpose 1. While pertinent issues of early atmospheric and solar evolution were also addressed, the primary discussion at the conference focused on the evidence and constraints provided by the geologic records of Earth, the Moon, and Mars and analysis of the SNC meteorites.

The papers contained in this special section span the full range of these topics, including the stability of the early atmosphere to erosion by the solar wind, the geologic environment from which the SNC meteorites originated, geomorphic evidence regarding the nature of the early Martian climate and hydrologic cycle, the potential impact of the past and present environment on the preserved signature of ancient life, and a discussion of the capabilities of a lander-based X ray diffraction and fluorescence instrument to assess the potential for past fossilization from the mineralogy of the current local surface environment.

The issues raised at the conference, and by the papers included in this special section, will be the focus of ongoing attention as the intensity and scope of Mars exploration increases over the next decade.

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