

Special Section

Origins and structure of the Solar System II.

Symposium “Origins and Structure of the Solar System”
Instituto de Astronomía, Instituto de Geofísica and Instituto de Geología,
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Preface

Over the last three decades, studies of the Solar System have become a well-established research tradition at the Universidad Nacional Autónoma de México (UNAM). Investigation has been conducted in the fields of solar physics, asteroids and meteorites, but recently, lines of investigation have diversified to include the study of protoplanetary objects, as well as the evolution of the Earth and its biotic environment.

In order to promote the interaction between different specialized groups working directly or indirectly on topics related to the study of the Solar System and the Earth, the Instituto de Astronomía, Instituto de Geofísica and Instituto de Geología, UNAM, organized the symposium “Origins and Structure of the Solar System”, which provided a forum for researchers and students to discuss the results of their investigations on planetary geology and geophysics, the nature of the Earth and the interplanetary medium, and the early evolution of the environmental conditions for life. The symposium was successful in attracting many contributions on a wide range of topics, which reflected a multi- and interdisciplinary character of the solar system studies.

A selection of the contributions presented at the symposium is included in this and in the previous issue (v. 27, no. 1) of *Revista Mexicana de Ciencias Geológicas*, in the special section “Origins and Structure of the Solar System”. It is worth mentioning that these contributions are the result of the interdisciplinary collaboration between different academic groups: the Instituto de Astronomía, Instituto de Geología, Instituto de Geofísica, Instituto de Ciencias Físicas, Instituto de Investigaciones Nucleares, Facultad de Química, and the Centro de Radioastronomía y Astrofísica of the UNAM, as well as the Escuela Superior de Ingeniería Mecánica y Eléctrica and the Centro de Estudios Avanzados of the Instituto Politécnico Nacional (IPN), the Instituto Potosino de Investigación Científica y Tecnológica, the Centro de Investigaciones Científicas de Yucatán, the Centro de Investigaciones en Energía de Temixco and the Max Planck Institute for Solar System Research.

The first part of the special section included six papers focused on two main topics: (1) conditions and processes in the early Solar System as recorded by chondritic meteorites; and (2) features of craters resulting from the impact of interplanetary bodies on the Earth’s surface.

In this issue, the first paper deals with the first stage in the evolution from a protoplanetary disk to a set of planetesimals for a two dense-rings patterned stationary disk. Results presented by Nagel-Vega indicate that dense rings can acquire enough mass to be susceptible to gravitational instabilities, which result in the fragmentation of the disk and the formation of planetesimals. Estimations of the typical sizes and masses of collapsed bodies indicate that they can achieve masses typical of planets in the solar system.

Haro-Corzo and Binette report on a method to reproduce the ultraviolet break and the softness problem observed in the ionizing continuum spectra of quasars by considering a universal intrinsic spectral energy distribution attenuated by dust screens composed of cubic nanodiamonds and amorphous carbon grains.

Information about the early story of the Solar System is provided by Flores-Gutiérrez *et al.* Based on the analysis of the spatial distribution of Fe, Ni, and S and their mineral phases in different chondrules of the Allende meteorite, they found major differences in composition and mineralogy between closely spaced chondrules, supporting an origin of the chondrules through distinct thermal, shock, and alteration processes.

Benet and Merlo review some open questions related to the stability and structure of narrow planetary rings like those found in Jupiter and Uranus, and use the scattering approach to qualitatively reproduce some of the structural properties of such rings.

The next two papers deal with the most energetic eruptive phenomena in the Solar System, which induce complex interactions of the solar plasma with interplanetary medium, as well as geomagnetic storms in the Earth's magnetosphere. Muñoz *et al.* present a statistical analysis of the main parameters (angular position, angular width, speed and acceleration) of coronal mass ejections during solar cycle 23 (January 1996 to December 2006), and Cipagauta-Lara and Durand-Manterola analyze the effects on the ionosphere of geomagnetic storm events registered at two ionospheric stations: El Cerrillo (Mexico) and Boulder (Colorado). The analysis includes three individual geomagnetic storm events, as well as 35 intense magnetic storms reported for the period of January, 1972 to December, 1982.

In the last paper, a review of the characteristics of the Earth that can be used in the search for habitable worlds around other stars is presented by Segura. Besides, in order to account for possible variations in those characteristics, simulations of the electromagnetic spectrum in the visible and infrared regions are reported for two cases: (1) changes in the composition of the terrestrial atmosphere from the Archean to the Present; (2) an Earth-like planet orbiting in the habitable zone of stars of spectral type different to that of the Sun.

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