Comparative Climatology of Terrestrial Planets (Space Science Series)

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The early development of life, a fundamental question for humankind, requires the presence of a suitable planetary climate. Our understanding of how habitable planets come to be begins with the worlds closest to home. Venus, Earth, and Mars differ only modestly in their mass and distance from the Sun, yet their current climates could scarcely be more divergent. Only Earth has abundant liquid water, Venus has a runaway greenhouse, and evidence for life-supporting conditions on Mars points to a bygone era. In addition, an Earth-like hydrologic cycle has been revealed in a surprising place: Saturn’s cloud-covered satellite Titan has liquid hydrocarbon rain, lakes, and river networks.

Deducing the initial conditions for these diverse worlds and unraveling how and why they diverged to their current climates is a challenge at the forefront of planetary science. Through the contributions of more than sixty leading experts in the field, *Comparative Climatology of Terrestrial Planets* sets forth the foundations for this emerging new science and brings the reader to the forefront of our current understanding of atmospheric formation and climate evolution. Particular emphasis is given to surface-atmosphere interactions, evolving stellar flux, mantle processes, photochemistry, and interactions with the interplanetary environment, all of which influence the climatology of terrestrial planets. From this cornerstone, both current professionals and most especially new students are brought to the threshold, enabling the next generation of new advances in our own solar system and beyond.

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