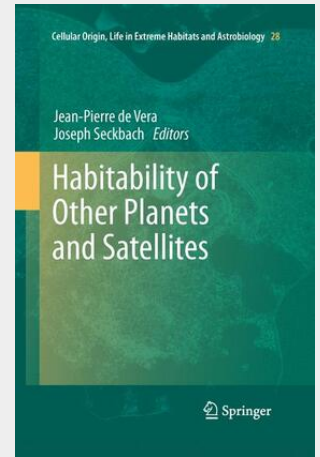


Habitability of Other Planets and Satellites

Is the Earth the right model and the only universal key to understand habitability, the origin and maintenance of life? Are we able to detect life elsewhere in the universe by the existing techniques and by the upcoming space missions? This book tries to give answers by focusing on environmental properties, which are playing a major role in influencing planetary surfaces or the interior of planets and satellites. The book gives insights into the nature of planets or satellites and their potential to harbor life. Different scientific disciplines are searching for the clues to classify planetary bodies as a habitable object and what kind of instruments and what kind of space exploration missions are necessary to detect life. Results from model calculations, field studies and from laboratory studies in planetary simulation facilities will help to elucidate if some of the planets and satellites in our solar system as well as in extra-solar systems are potentially habitable for life.

Is Earth the right model and therefore our Earth-centric view the only universal key to understand habitability, the origin and maintenance of life? This book tries to give answers on this question. It gives insights into the nature of planets and their potential to harbor life as well as the role of life itself as an engine to increase the habitability of planets and satellites. Knowledge of different disciplines in Astronomy, Biology, Chemistry, Geology, Planetology and Physics are the driving force for the discussion what might be the clues to classify a planetary body as a habitable object. The role of the atmosphere, solar radiation, magnetism, tectonics, mineral composition, liquid water availability and the interactions with life are in the focus of the general discussion. Earth serves as the reference system to get an approximation of the factors which might be important for classification of a celestial body as a habitable object. Results from field studies and those obtained from laboratory studies in planetary simulation facilities will help to elucidate if some of the planets and satellites in our solar system are potentially habitable for terrestrial life forms. The discussion is also enlarged in particular to exoplanets and their potential to be habitable. Further, recent technologies are presented in this book which might be suitable for remote or in situ identification of habitable environments and life as we know it. Instrumentation, detection devices, space projects and space mission designs to search for habitable niches and life is part of this work and gives insights into the challenges we might confront if we pursue the main task to detect life. The initial step of these exploration endeavors might be to discover first habitable environments and then to look after life forms with life detecting instrumentation in the discovered habitable niches.



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