Workshops

ExoOceans: Space Exploration of the Outer Solar System Icy Moons Oceans (in Collaboration with the European Science Foundation ESF)

18–22 June 2018

Workshop Participants (picture taken by S.F. Saliba)

We are at the beginning of a new era in the exploration of the Outer Solar System. Spacecraft have visited each of the giant planets and made detailed observations of their major satellites. It is now well-recognized that several of the icy satellites have the potential to possess subsurface liquid water, are geologically active today and have in some cases organic materials present in considerable abundance, including large and complex molecules. This combination holds promising prospects for the astrobiology research field and further exploration of these objects are likely to provide relevant results to better understand the emergence of life and habitability in the solar system and beyond.

Understanding the astrobiological potential of the icy moons requires thorough investigation of the origin and evolution of these objects, the chemical processing that has occurred, and the potential habitability of their environments. In order to better understand these environments, it is important to bring forward and use our knowledge of the Earth's oceans. To progress investigations on these subjects, space agencies have inserted the possibility for future exoocean exploration in their agendas.

The astrobiological implications of exooceans are now clear and in view of current ESA and NASA future space missions, an interdisciplinary Workshop to address this topic was timely. This Workshop gathered 40 worldwide leading scientists from around 11 countries as well as ISSI and European Space Sciences Committee and European Marine Board staff. The scientists attending were from the planetary field, from the astrobiology domain and experts in terrestrial ocean investigations. Of the attendees, 4 were Young Scientists. The Workshop was structured around 8 themes, namely i) Origin of life ii) Icy moons with core-ocean connection iii) Comparative planetology iv) Habitability of early earth v) Earth analogs vi) Icy moons trapped between two ice layers vii) Experimental and simulation efforts viii) Relevant technologies. A total of nearly 45 presentations were made within this scheme including the ones from participating Young Scientists.

Because this Workshop was unique in bringing together experts from science communities dealing with both Earth and planetary, it is to be hoped that the Space Sciences Series of the ISSI book by Springer will be original and provide a coherent view of the astrobiological knowledge on the outer solar system paving the way for future astrobiological research and space missions. The Workshop was convened by (in alphabetical order) P. Cabezas (ESF, Strasbourg), A. Coustenis (Obs. de Paris-Meudon), J. de Leeuw (Utrecht Univ.), K. Hand (NASA JPL), A. Hayes (Cornell Univ.), K. Olsson-Francis (Open Univ.), F. Postberg (Univ. of Heidelberg), F. Raulins (LISA, Paris-Est Créteil Univ.), R. Rodrigo (ISSI), C. Sotin (NASA JPL), G. Tobie (Univ. de Nantes), and N. Walter (ESF, Strasbourg).

Athena Coustenis, Nicolas Walter and Patricia Cabezas