Foreword

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“Quantifying the Martian Geochemical Reservoirs” is the fourth publication of its kind in the Space Science Series of ISSI, published as a result of the very successful collaboration between ISSI and Europlanet.

Europlanet started in 2005, the year of the successful landing of the Huygens probe on Titan’s surface, as a network of over 110 European and U.S. laboratories deeply involved in the development of planetary sciences and the support to the European programme of space exploration of planets. Since 2005, Europlanet obtained support from the European Commission to strengthen the planetary science community worldwide, and to amplify the scientific output, impact and visibility of the European space programme, essentially ESA’s Horizon 2000 and Cosmic Vision programmes. Its first contract with the Commission under the FP6 programme was a “Coordination action”. It extended from 2005 to 2008 and included 7 networking activities, among which the set-up of disciplinary working groups covering the main areas of planetary sciences. A new contract with the Commission, this time as a full “research infrastructure network” under the FP7 programme, extended Europlanet’s activities into the period 2009–2012. For the first time ISSI became a participant in this extended programme.

With the broad community connection made through its Discipline Working Groups and other activities, Europlanet offers an ideal base from which to identify new fields of research for planetary sciences and to stimulate collaborative work among its member laboratories. For Europlanet, developing collaboration with ISSI in holding workshops and producing books on these new and emerging subjects is both natural and extremely stimulating, considering the high profile, international standing and proven success of ISSI. For ISSI, collaboration with Europlanet offers a very interesting opportunity to extend its successful series

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of workshops and books within the area of planetary sciences and to reinforce its links with this community.

Under the FP7 contract, ISSI and Europlanet committed themselves to produce four workshops (one per year) and one summer school: the 2012 Alpbach summer school on “the exploration of giant planets and their systems”. The selection of workshops followed the same scheme as under FP6: the five disciplinary working groups of Europlanet were each invited to propose ISSI workshop concepts. These concepts were validated by the management of Europlanet, and then presented to the Science Committee of ISSI. The first such presentation was made to the science committee on January 13–14 2009, at the beginning of the FP7 contract. Four candidate workshops were presented. After due discussion it was recommended that the first workshop to be implemented be that on “Quantifying the Martian Geochemical Reservoirs”, proposed by Dr. Michael Toplis. After two years of preparation, the workshop was held in Bern in April 2011. The workshop preparation started with a complementary analysis of the timeliness of the subject and of its relationship to the past and future programme of space missions to Mars.

Indeed, this was a very timely choice, in the tradition of Europlanet whose scientific purpose with respect to the space programme is to capitalize on the outcome of past and present space missions to help optimize the preparation of future missions. The planet Mars has now been studied for decades, by space missions of increasing complexity. Most recently, the combination of orbiting missions (Mars Global Surveyor, Mars-Odyssey, Mars Express, Mars Reconnaissance Orbiter) and lander/rover missions (Sojourner, Mars Exploration Rovers, Phoenix, to which one should now add the Curiosity rover of the Mars Science Laboratory mission which was launched after the workshop) has provided a multi-scale approach to the study of Mars, in which the local in situ measurements provided by landers and rovers could be placed in the context of remote sensing cartography from orbit. These space-based data can also be put in synergy with Earth-based measurements such as data from numerical simulations, laboratory studies, and geochemical data from the SNC meteorites which are believed to be of martian origin. Altogether, these Earth-based and Mars-based data provide complementary pieces of information on the history of the formation and evolution of Mars, from accretion times to the present age, and also make it possible to study each of the major geochemical reservoirs of the red planet (core, mantle, crust and atmosphere) and make progress in our understanding of its chemical composition and its history.

The success of the workshop on “quantifying the Martian geochemical reservoirs” and the value of the corresponding book are due to the fact that it has brought together scientists from a wide variety of scientific backgrounds, space scientists, Earth science specialists, specialists of numerical or laboratory simulations, meteoriticists specializing in SNC meteorites, to review the different geochemical reservoirs of Mars, their role in the dynamics and evolution of the planet, and to address some overall “big” questions, such as the still unsolved question of the reservoir of water on Mars and its history. By working closely together, this group of almost 50 specialists was able to summarize their views of the geochemistry of Mars in a nicely designed set of chapters which covers all main geochemical reservoirs as well as some cross-disciplinary issues. At a time when the new generation rover Curiosity has started its detailed exploration of Gale crater, we are convinced that this book will remain for some significant time a key reference for whoever will be preparing his/her involvement in the future missions to Mars: MAVEN, Exomars, Insight, and their successors.

The likely success of this book will be due to all those whose hard work and dedication made this fourth joint publication of ISSI and Europlanet possible. Many thanks, first, to

the leaderships of ISSI and Europlanet who designed this collaborative project, and to the leaders of the Discipline Working Groups of Europlanet, Norbert Krupp and Ari-Matti Harri. Many thanks to the Science Committee of ISSI, chaired by Prof. Len Culhane, who made the selection and provided useful suggestions on the workshop content. Our special gratitude goes to Michael Toplis, who originally proposed the workshop's topic and masterly led the whole process, from the first Conveners Meeting to book production. The team of conveners and editors did a fantastic job in defining the structure of the book and in managing the writing and the overall review process: as usual, all chapters were carefully reviewed by independent experts to whom we would also like to extend our gratitude.

Last, but not least, we would like to extend our appreciation to the staff of ISSI, Maurizio Falanga, ISSI's programme manager, Andrea Fischer, Saliba Saliba, Irmela Schweizer, Silvia Wenger, Jennifer Zaugg who managed the organisation of this workshop with dedication and efficiency, and made it possible for this important collaboration between ISSI and Europlanet to develop and flourish over the years.