International Association of Geodesy Symposia

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Earth on the Edge: Science for a Sustainable Planet

Proceedings of the IAG General Assembly, Melbourne, Australia, June 28 - July 2, 2011

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ISSN 0939-9585
ISBN 978-3-642-37221-6 ISBN 978-3-642-37222-3 (eBook)
DOI 10.1007/978-3-642-37222-3
Springer Heidelberg New York Dordrecht London

Library of Congress Control Number: 2013956350

Preface

At the XXV General Assembly of the International Union of Geodesy and Geophysics (IUGG), held from June 27 to July 8, 2011 in Melbourne, Australia, the International Association of Geodesy (IAG) also had its quadrennial General Assembly. The IAG co-organised and contributed to several Union Symposia, as well as to Joint Symposia with other Associations. It also organised seven symposia of its own, one dedicated to each of the four commissions and three dedicated to specific scientific issues. This volume contains the proceedings of 13 symposia, which are listed below with the name of their associate editor(s):

Symposium JG01: Space Geodesy-based Atmospheric Remote Sensing as a Synergistic Link between Geodesy and Meteorology
Editors: Marcelo Santos, Jens Wickert

Symposium JG02: Application of Geodetic Techniques in Cryospheric Studies
Editor: Reinhard Dietrich, Matt King

Symposium JG03: History of Geosciences from Terrestrial to Spaceborne Observations
Editor: Jozsef Adàm

Symposium JG04: Structure and Deformation of Plate Interiors
Editor: John Dawson

Symposium JG05: Integrated Earth Observing Systems
Editor: Markus Rothacher

Symposium JG06: Tectonic Geodesy and Earthquakes
Editor: Jeff Freymueller

Symposium G01: Reference Frames from Regional to Global Scales
Editor: Zuheir Altamimi, Athanasios Dermanis, Joao Agria Torres

Symposium G02: Monitoring and Modelling of Mass Distribution and Mass Displacements by Geodetic Methods
Editors: Yoichi Fukuda, Nico Sneeuw, Frank Lemoine, Richard Gross, Herbert Wilmes

Symposium G03: Monitoring and Modelling Earth Rotation
Editors: Richard Gross, Harald Schuh, Oleg Titov

Symposium G04: Multisensor Systems for Engineering Geodesy
Editors: Dorota Grejner-Brzezinska, Hanjörg Kutterer

Symposium G05: Geodetic Imaging Techniques
Editor: Sandra Verhagen, Xiaoli Ding

Symposium G06: Towards a Unified World Height System
Editors: Johannes Ihde, Laura Sanchez

Symposium G07: High Precision GNSS
Editors: Urs Hugentobler, Mikael Lilje, Ruth Neilan

The goal of Modern Geodesy is to monitor changes in a range of physical processes in the solid Earth, the atmosphere and the oceans in order to improve our understanding of this fragile, precious and stressed planet. This is an ambitious goal, but one that all geodesists can have confidence that we are making significant progress in addressing. The range of papers presented at the IAG General Assembly is testament to the ingenuity and hard work of scientists and engineers engaged in geodetic studies and in operational geodesy. Although contributions to the so-called three pillars of geodesy—geometry,

Earth rotation and gravity field—are clearly evident, increasingly the authors of the papers are documenting the contributions of Modern Geodesy to science and society in the context of services and integrated observing systems. One notes that geodesy is applying state-of-the-art technologies (primarily, though not exclusively space-based) and methodologies to what amounts to "Earth Observation", that is the monitoring in space and time of a variety of Earth process parameters that have geometric, gravimetric or Earth rotation signatures. However, while Modern Geodesy is making enormous contributions to the geosciences as an Earth Observation science, geodesy continues to demonstrate its relevance to society in general, through the provision of fundamental reference frames, Earth observing systems and precise positioning capabilities.

The 2011 General Assembly attracted 370 geodesists from 44 countries. There were 264 oral presentations and 217 posters made at the seven IAG Symposia and six Joint IAG Symposia. Approximately 25 % of those contributions were submitted as full papers for peer review and inclusion in these proceedings. The 80 accepted papers are contained in this volume.

There are several colleagues who contributed to the success of the IAG General Assembly and should be acknowledged here. I am grateful to Hermann Drewes, the Secretary General of the IAG, who coordinated together with the IUGG and IAG Executive Committees and the Local Organising Committee the venue selection, as well as the scheduling and organisation of the symposia which IAG led or contributed to. Michael Sideris, the past President of the IAG, oversaw the planning of the IAG General Assembly. The symposia conveners and co-conveners from the IAG Commissions, Services, GGOS and the Inter-commission Committee on Theory listed on the previous page are gratefully acknowledged for the selection and organisation of the scientific content of the symposia.

Pascal Willis, the IAG Symposium Series Associate Editor, guided the reviews of the submitted papers, communicated with the symposium editors and the paper reviewers, and finally accepted the papers that comprise this volume. I am personally indebted to him, for I could not have put this volume together without his invaluable assistance and tenacity.

For the first time the complete review process (paper submission, review and acceptance) was carried out electronically using the new submission web site created by Springer: http://www.editorialmanager.com/iags.

Last, but definitively not least, I wish to sincerely thank all the participating scientists of all ages, and those who made oral and poster presentations, who came to Melbourne and made our General Assembly an unqualified success.

Sydney, NSW, Australia Chris Rizos
19 January 2013

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Part VII G02: Monitoring and Modelling of Mass Distribution and Mass Displacements by Geodetic Methods