

SECTION V—GEODYNAMICS

REPORT FOR THE PERIOD 1991- 1995

Jean O. Dickey
Jet Propulsion Laboratory
California Institute of Technology
4800 Oak Grove Drive
Pasadena, CA 91109-8099

INTRODUCTION AND STRUCTURE

Section V "Geodynamics" is concerned with a broad variety of activities, namely:

- the monitoring and study of time dependent geophysical phenomena, including Earth orientation (Earth rotation, polar motion, precession and nutation), crustal motion, variations of gravity and sea surface topography including mean sea level;
- geophysical interpretation of gravity and related data;
- reference systems;
- geodetic aspects of international geodynamic projects.

The objectives are three-fold:

- to encourage research in all relevant areas;
- to provide a forum for discussion; and
- to promote and coordinate international cooperation both within the IAG and with other international organizations.

The structure consists of two commissions and one special commission, nine special study groups and five services (see Tables B). In addition, an Ad Hoc Working Group on Global Change and an Ad Hoc Planning Group on the Global Change of Sea Level and Ice Sheet Volume Variations were formed during the term under the leadership of Section V (see Table 1). Also, a review board for the International Center for Recent Crustal Movements was established with a goal of evaluating needs and modernizing activities.

Commissions, Special Commission and Ad Hoc Groups
Commission V: Earth Tides President: H. T. Hsiao
Commission VII: Recent Crustal Movements President: T. Tanaka
Special Commission SC3: Fundamental Constants President: M. Bursa
IAG Ad Hoc Working Group on Global Change J. O. Dickey
IAG Ad Hoc Planning Group on Sea Level and Ice Sheet Volume Variations J. O. Dickey

Table 1. Commissions, Special Commission and Ad Hoc Groups

HIGHLIGHTS OF ACCOMPLISHMENTS

The past four years has been a productive period with advances on many fronts in a broad range of activities. Because of space limitation, we will only highlight a few activities; the reader is referred to the individual reports for a full discussion.

Special Study Groups

- SSG 5.143: Rapid Earth Rotation Variations
Chairman: J. O. Dickey, (Joint with IAU)
- SSG 5.144: Dynamic Effects in Earth Rotation
Chairman: S. Molodensky
- SSG 5.145: Long-Term Variations in Earth Rotation
Chairman: P. Brosche
- SSG 5.146: Processing of Optical Polar Motion in View of Plumb Line Variations
Chairman: P. Paquet
- SSG 5.147: Studies of the Baltic Sea
Chairman: J. Kakkuri
- SSG 5.148: Global Geodynamic Variations
Chairman: H. Chao
- SSG 5.149: Studies on Vertical Datums (with IAPSO)
Chairman: E. Groten
- SSG 5.150: Density Distribution within the Lithosphere
Chairman: H. G. Kahle
- SSG 5.151: Geodetic Research Toward the Reduction of Natural Hazards
Chairman: S. Okubo

Table 2. Special Study Groups

International Services Reporting to Section V "2"

- International Centre Earth Tides (affiliated with IAGS)
Director: P. Melchior
- International Centre of Recent Crustal Movements
Director: P. Vyskocil
- International Earth Rotation Service (affiliated with IAGS)
President: Y. Yatskiy
Director of the Central Bureau: M. Feissel
- Permanent Service for Mean Sea Level (affiliated with IAGS)
Director: P. L. Woodworth
- Time Section, Bureau International des Poids et Mesures
Director: C. Thomas

Table 3. International Services Reporting to Section V

An Ad Hoc IAG Working Group on Global Change, formed under the leadership of Section V as a result of discussion, held at the IUGG General Assembly in Vienna (August, 1991), recommended in a position paper presented at the IAG Executive Committee Meeting (March, 1992, Ohio State University) that the IAG take an active leadership role in global change research, particularly in the International Geosphere-Biosphere Program (IGBP). The suggested target of activity was sea level and ice sheet volume variations, which are key topics in global change and where geodesy certainly plays a critical role. As a result, an Ad Hoc Planning Group on Sea Level and Ice Sheet Volume Variations was formed with an objective of coordination of existing activities and an ultimate goal of proposing it as a separate program or linking it to an IGBP core program. This group has been successful in having "Determination of the Rates, Causes and Impacts of Sea Level Change" included as a Framework Activity within the newly formed Core Project, Land-Ocean Interactions in the Coastal Zone (LOICZ). Sea level issues have also been addressed by SSG 5.149, "Studies on Vertical Datums" and BY SSG S. 147, "Studies of the Baltic Sea,"; the latter has been active in coordinating special campaigns utilizing 35 sites bordering the Baltic Sea. These efforts will be carried forward for the next term under the leadership of W.F. Carter with a Special Committee on Sea Level and Ice Sheet Volume Variations.

Section V also deals with the mitigation of natural hazards through the SSG 5.151, formed in March, 1992. The objectives are to provide theoretical, observational and instrumental background for optimal retrieval of geodetic information on earthquakes, volcanic eruptions and landslides. The use of both conventional as well as new innovative techniques such as Interferometric SAR (Synthetic Aperture Radar) has been stressed.

Advances have been made in several of the services. During the last term, the IERS has improved significantly the accuracy of both the International Terrestrial and Celestial Reference Frames (ITRF and ICRF), and has incorporated the GPS technique in polar motion and reference frame determination (in cooperation with International GPS Service (IGS)). In addition, the IERS is looking forward to the next millennium, reevaluating its mission and goals. Special campaigns (such as SEARCH'92 and CONI'94), coordinated by the IERS and advocated by SSG 5-143, have provided highly accurate subdaily measurements enabling new insights into solid Earth-atmosphere-ocean interactions. TOPEX sea level determinations are augmenting conventional tide gauge measurements of sea level (see Woolworth, this volume).

Section V also examined mechanisms to improve its services. A Review Board (see introduction) recommended that the establishment of a Crustal Deformation Bureau be considered; this bureau would restructure and enlarge the services that are currently available through the International Center of Recent Crustal Movement. An Ad Hoc Planning Group on Crustal Deformation, formed at Boulder under the leadership of W.H. Prescott, **will consider the formation and structure of** this bureau as well as the modernization of the Recent Crustal Movement Commission.

ACKNOWLEDGMENTS

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