

Alessandro Capra
Reinhard Dietrich
(Eds.)

Geodetic and Geo- physical Observations in Antarctica

An Overview in the IPY Perspective

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Alessandro Capra · Reinhard Dietrich (Eds.)

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To Oto and Otino
To my mother and my family
Alessandro

Preface

The polar regions with their unique geophysical and geodynamic environment are characterized by close interactions between solid earth, cryosphere, hydrosphere and atmosphere. They are directly linked to the global climate system. Geodetic and geophysical observations play an essential role in the scientific investigation of the polar regions, especially with regard to permanent and temporary observatories.

For several years geodetic observatories have been realized in Antarctica by continuous or periodic data acquisitions.

The observation techniques include: Global Navigation Satellite Systems (GNSS, in particular GPS and GLONASS, in future also GALILEO); further geodetic space techniques (DORIS, VLBI); tide gauges observations; absolute, tidal and relative gravimetry; seismology; geomagnetometry; meteorology.

Within the Scientific Committee on Antarctic Research (SCAR) the SCAR group of experts on Geodetic Infrastructure of Antarctica (GIANT) spent great effort to coordinate the international activities and to enhance the development of geodetic and geophysical observatories.

In order to gain a better understanding of the polar environment long time series as recorded by permanent observatories should be integrated together with data acquired by field surveys like geological and glaciological sampling, geophysical investigations, and with satellite data (remote sensing, satellite gravimetry).

Focussed on the geodetic-geodynamic aspects of the IPY project “Polar Earth Observing Network” (POLENET, IPY full proposal no. 185) special attention should be given to regional and global model generation and validation (regional geodynamics, plate tectonics, postglacial rebound, global climate system, global change).

Special sessions at international symposia have been dedicated to Antarctic geodetic and geophysical observations and data analysis; among others we would like to mention Session G10 “Short and long-term observations in polar region” - EGU06, Vienna, April 2006; and the International Workshop “GPS in the IPY: The POLENET Project” - Dresden, Germany, October 4-6, 2006. relevant contributions have been presented at the ISAES X (X. International Symposium on Antarctic Earth Science), Santa Barbara, California, USA, August 2007.

The book is intended to give an overview on all aspects of the scientific utilization of geodetic-geophysical observations in Antarctica, of data analysis and geodynamic interpretation as well as of the various technological aspects in setting up autonomous observatories in Antarctica.

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