

## Table of Contents

<b>I</b>	<b>Orbit and Earth Gravity Field</b>	<b>1</b>
	Ice mass balance and Antarctic gravity change: Satellite and terrestrial perspectives <i>Erik R. Ivins, Eric Rignot, Xiaoping Wu, Thomas S. James, Gino Casassa</i>	3
	Gravity model TUM-2Sp based on the energy balance approach and kinematic CHAMP orbits <i>Lóránt Földváry, Dražen Švehla, Christian Gerlach, Martin Wermuth, Thomas Gruber, Reiner Rummel, Markus Rothacher, Björn Frommknecht, Thomas Peters, Peter Steigenberger</i>	13
	On the contribution of CHAMP to temporal gravity field variation studies <i>Zhang Qiang and Philip Moore</i>	19
	Earth gravity field and seasonal variability from CHAMP <i>Christoph Reigber, Horst Jochmann, Johann Wunsch, Svetozar Petrovic, Peter Schwintzer, Franz Barthelmes, Karl-Hans Neumayer, Rolf König, Christoph Förste, Georges Balmino, Richard Biancale, Jean-Michel Lemoine, Sylvain Loyer, Felix Perosanz</i>	25
	Comparison of superconducting gravimeter and CHAMP satellite derived temporal gravity variations <i>Jürgen Neumeyer, Peter Schwintzer, Franz Barthelmes, Olaf Dierks, Yuichi Imanishi, Corinna Kroner, Bruno Meurers, He-Ping Sun, Heikki Virtanen</i>	31
	Improvements in Arctic gravity and geoid from CHAMP and GRACE: An evaluation <i>David McAdoo, Carl Wagner, Seymour Laxon</i>	37
	Evaluation of gravity data by EIGEN-2 (CHAMP-only) model in China <i>Yang Lu and Hongling Shi</i>	47
	Energy balance relations for validation of gravity field models and orbit determinations applied to the CHAMP mission <i>Anno Löcher and Karl Heinz Ilk</i>	53
	Evaluation of terrestrial gravity data by independent global gravity field models <i>Markus Roland and Heiner Denker</i>	59

## VIII

Recent developments in CHAMP orbit determination at GFZ <i>Rolf König, Grzegorz Michalak, Karl Hans Neumayer, Roland Schmidt, Sheng Yuan Zhu, Heribert Meixner, Christoph Reigber</i>	65
On calibrating the CHAMP on-board accelerometer and attitude quaternion processing <i>Karl Hans Neumayer, Grzegorz Michalak, Rolf König</i>	71
Evaluation of the CHAMP accelerometer on two years of mission <i>Félix Perosanz, Richard Biancale, Jean Michel Lemoine, Nicole Vales, Sylvain Loyer, Sean Bruinsma</i>	77
A new method to detect and estimate CHAMP clock bias change and cycle slip <i>Bibo Peng, Bin Wu, Jun Li, Houze Hsu</i>	83
Comparison of different stochastic orbit modeling techniques <i>Adrian Jäggi, Heike Bock, Urs Hugentobler, Gerhard Beutler</i>	89
Determination of non-conservative accelerations from orbit analysis <i>Jose van den Ijssel, Pieter Visser, Roger Haagsmans</i>	95
CHAMP and resonances <i>Robert H. Gooding, Carl A. Wagner, Jaroslav Klokočník, Jan Kostelecký, Christoph Reigber</i>	101
CHAMP gravity field solutions and geophysical constraint studies <i>Shin-Chan Han, C.K. Shum, Christopher Jekeli, Alexander Braun, Yiqun Chen, and Chung-Yen Kuo</i>	108
Application of Eigenvalue decomposition in the parallel computation of a CHAMP 100x100 gravity field <i>Mark B. Hinga, Steve R. Poole, Byron D. Tapley</i>	115
Time-variable gravity seen by satellite missions: On its sampling and its pa- rametrization <i>Martin Wiehl and Reinhard Dietrich</i>	121
Gravity field recovery by analysis of short arcs of CHAMP <i>Karl Heinz Ilk, Torsten Mayer-Gürr, Martin Feuchtinger</i>	127
Statistical assessment of CHAMP data and models using the energy balance ap- proach <i>Jürgen Kusche and Jasper van Loon</i>	133

Multiscale geopotential solutions from CHAMP orbits and accelerometry <i>Martin J. Fengler, Willi Freedен, Jürgen Kusche</i>	139
Multiscale modeling from EIGEN-1S, EIGEN-2, EIGEN-GRACE01S, UCPH2002_0.5, EGM96 <i>Martin J. Fengler, Willi Freedен, Martin Gutting</i>	145
A comparison of various procedures for global gravity field recovery from CHAMP orbits <i>Torsten Mayer-Gürr, Martin Feuchtinger, Jürgen Kusche</i>	151
Precise orbit determination for CHAMP using an efficient kinematic and re- duced-dynamic procedure <i>Heike Bock, Urs Hugentobler, Adrian Jäggi, Gerhard Beutler</i>	157
On bias and scale and thrust factors for CHAMP accelerometry <i>Zhang Qiang and Philip Moore</i>	163
CHAMP accelerometer preprocessing at GeoForschungsZentrum Potsdam <i>Christoph Förste and Sunchan Choi</i>	169
CHAMP clock characterization revisited <i>Rolf König, Grzegorz Michalak, Ludwig Grunwaldt, Christoph Reigber</i>	175
How Baltic Sea water mass variations mask the postglacial rebound signal in CHAMP and GRACE gravity field solutions <i>Martin Wiehl, Reinhard Dietrich, Andreas Lehmann</i>	181
The impact of the new CHAMP and GRACE gravity models on the measurement of the general relativistic Lense-Thirring effect <i>Lorenzo Iorio</i>	187
Recovery of isostatic topography over North America from topographic and CHAMP gravity correlations <i>Laramie V. Potts, C.K. Shum, Ralph von Frese, Shin-Chan Han, Rainer Mautz</i>	193
Dynamic topography as reflected in the global gravity field <i>Mikhail K. Kaban, Peter Schwintzer, Christoph Reigber</i>	199
Impact of the CHAMP mission on estimating the mean sea surface <i>Verena Seufer, Jens Schröter, Manfred Wenzel, Wolfgang Keller</i>	205

## X

Improved estimates of the oceanic circulation using the CHAMP geoid <i>Gennady Kivman, Sergey Danilov, Bernadette Fritzsich, Sven Harig, Christian Reick, Jens Schröter, Verena Seuffer, Dmitry Sidorenko, Joanna Staneva, Manfred Wenzel</i>	211
Contemporary changes in the geoid about Greenland: Predictions relevant to gravity space missions <i>Kevin Fleming, Zdeněk Martinec, Jan Hagedoorn, Detlef Wolf</i>	217
Mantle viscosity and S-wave to density conversion profiles using CHAMP geoid data <i>Gabriele Marquart and Radboud Koop</i>	223
Regional geoid undulations from CHAMP, represented by locally supported ba- sis functions <i>Rainer Mautz, Burkhard Schaffrin, C. K. Shum, Shin-Chan Han</i>	230
<b>II      Earth Magnetic Field</b>	<b>237</b>
Ionospheric plasma effects for geomagnetic LEO missions at mid- and low- latitudes <i>Matthias Förster, Martin Rother, Hermann Lühr</i>	239
Interpretation of CHAMP crustal field anomaly maps using Geographical Infor- mation System (GIS) technique <i>Kumar Hemant, Stefan Maus, Volker Haak</i>	249
Magnetic crustal thickness in Greenland from CHAMP and Ørsted data <i>Cathrine Fox Maule, Michael E. Purucker, Nils Olsen</i>	255
CHAMP magnetic anomalies of the Antarctic crust <i>Hyung Rae Kim, Luis R. Gaya-Piqué, Ralph R. B. von Frese, Patrick T. Taylor, Jeong Woo Kim</i>	261
Magnetic petrology database for interpretation satellite magnetic anomalies <i>Katherine A. Nazarova</i>	267
Balloon geomagnetic survey at stratospheric altitudes <i>Katherine A. Nazarova, Yuri Tsvetkov, James Heirtzler, Terence Sabaka</i>	273
Effect of varying crustal thickness on CHAMP geopotential data <i>Patrick T. Taylor, Károly I. Kis, Ralph R. B. von Frese, Juha V. Korhonen, Géza Wittmann, Hyung Rae Kim, Laramie V. Potts</i>	279

Reliability of CHAMP anomaly continuations	287
<i>Ralph R.B. von Frese, Hyung Rae Kim, Patrick T. Taylor, Mohammad F. Asgharzadeh</i>	
Introducing POMME, the POtsdam Magnetic Model of the Earth	293
<i>Stefan Maus, Hermann Lühr, Georgios Balasis, Martin Rother, Mioara Manda</i>	
Alternative parameterisations of the external magnetic field and its induced counterpart for 2001 and 2002 using Ørsted, Champ and observatory data	299
<i>Vincent Lesur, Susan Macmillan, Alan Thomson</i>	
New insight into secular variation between MAGSAT and CHAMP/ØRSTED	305
<i>Ingo Wardinski and Richard Holme</i>	
Time structure of the 1991 magnetic jerk in the core-mantle boundary zone by inverting global magnetic data supported by satellite measurements	311
<i>Ludwig Ballani, Ingo Wardinski, Dietrich Stromeyer, Hans Greiner-Mai</i>	
Use of CHAMP magnetic data to improve the Antarctic geomagnetic reference model	317
<i>Luis R. Gaya-Piqué, Angelo De Santis, Joan Miquel Torta</i>	
Secular variation of the geomagnetic field from satellite data	323
<i>Vadim P. Golovkov, Tatiana I. Zvereva, Tatiana A. Chernova</i>	
The spectrum of the magnetic secular variation	329
<i>Richard Holme and Nils Olsen</i>	
Geomagnetic induction modeling based on CHAMP magnetic vector data	335
<i>Heather McCreadie and Zdeněk Martinec</i>	
Electromagnetic induction by <i>S<sub>q</sub></i> ionospheric currents in a heterogeneous Earth: Modeling using ground-based and satellite measurements	341
<i>Jakub Velínský and Mark E. Everett</i>	
Wavelet analysis of CHAMP flux gate magnetometer data	347
<i>Georgios Balasis, Stefan Maus, Hermann Lühr, Martin Rother</i>	
Modelling the ocean effect of geomagnetic storms at ground and satellite altitude	353
<i>Alexei Kuvshinov, Nils Olsen</i>	
3-D modelling of the magnetic fields due to ocean tidal flow	359
<i>Alexei Kuvshinov, Nils Olsen</i>	

## XII

The enhancement of the thermospheric density during the Sept. 25-26, 2001 magnetic storm <i>Huixin Liu, Hermann Lühr, Wolfgang Köhler</i>	366
On the modelling of field-aligned currents from magnetic observations by polar orbiting satellites <i>Peter Stauning, Freddy Christiansen, Jürgen Watermann</i>	371
The low-altitude cusp: Multi-point observations during the February 2002 SIRCUS campaign <i>Jürgen Watermann, Hermann Lühr, Kristian Schlegel, Peter Stauning, Jeffrey P. Thayer, Freddy Christiansen, Patrick T. Newell</i>	375
Detection of intense fine-scale field-aligned current structures in the Cusp region <i>Peter Stauning, Freddy Christiansen, Jürgen Watermann</i>	381
A comparative study of geomagnetic Pi2 pulsations observed by CHAMP and on the ground <i>Peter R Sutcliffe and Hermann Lühr</i>	389
ULF wave magnetic measurements by CHAMP satellite and SEGMA ground magnetometer array: Case study of July 6, 2002 <i>Massimo Vellante, Hermann Lühr, Tielong Zhang, Viktor Wertzgerom, Umberto Villante, Marcello De Lauretis, Andrea Piancatelli, Martin Rother, Konrad Schwingenschuh, Wolfgang Koren, Werner Magnes</i>	395
Classes of the equatorial electrojet <i>Heather McCreddie</i>	401
The ESPERIA project: A mission to investigate the near-Earth space <i>Vittorio Sgrigna, Rodolfo Console, Livio Conti, Arkady Moiseev Galper, Valeria Malvezzi, Michel Parrot, Piergiorgio Picozza, Renato Scrimaglio, Piero Spillantini, David Zilpimiani</i>	407
Status of the CHAMP ME data processing <i>Martin Rother, Sungchan Choi, Wolfgang Mai, Hermann Lühr, David Cooke</i>	413
<b>III Neutral Atmosphere and Ionosphere</b>	<b>419</b>
Atmospheric and ocean sensing with GNSS <i>Thomas P. Yunck and George A. Hajj</i>	421

Amplitude variations in CHAMP radio occultation signal as an indicator of the ionospheric activity	431
<i>Alexander Pavelyev, Jens Wickert, Christoph Reigber, Torsten Schmidt, Yuei-An Liou, Chen-Young Huang, Stanislav Matyugov, Dmitrii Pavelyev</i>	
About the potential of GPS radio occultation measurements for exploring the ionosphere	441
<i>Norbert Jakowski, Konstantin Tsybulya, Stanimir M. Stankov, Andreas Wehrenpfennig</i>	
Validation of GPS ionospheric radio occultation results onboard CHAMP by vertical sounding observations in Europe	447
<i>Norbert Jakowski, Konstantin Tsybulya, Jens Mielich, Anna Belehaki, David Altadill, Jean-Claude Jodogne, and Bruno Zolesi</i>	
Ionospheric tomography with GPS data from CHAMP and SAC-C	453
<i>Miquel García-Fernández, Angela Aragón, Manuel Hernandez-Pajares, Jose Miguel Juan, Jaume Sanz, Victor Rios</i>	
Topside plasma scale height modelling based on CHAMP measurements: First results	459
<i>Stanimir M. Stankov and Norbert Jakowski</i>	
Differential code bias of GPS receivers in low Earth orbit: An assessment for CHAMP and SAC-C	465
<i>Stefan Heise, Claudia Stolle, Stefan Schlüter, Norbert Jakowski</i>	
Ionosphere/plasmasphere imaging based on GPS navigation measurements from CHAMP and SAC-C	471
<i>Stefan Heise, Norbert Jakowski, David Cooke</i>	
Three-dimensional monitoring of the polar ionosphere with ground- and space-based GPS	477
<i>Claudia Stolle, Stefan Schlüter, Christoph Jacobi, Norbert Jakowski, Stefan Heise, Armin Raabe</i>	
Comparison of electron density profiles from CHAMP data with NeQuick model	483
<i>Norbert Jakowski, Konstantin Tsybulya, Sandro M. Radicella, Marta Cueto, Miguel Herraiz</i>	
Model for short-term atmospheric density variations	489
<i>Mark Zijlstra, Stephan Theil, Silvia Scheithauer</i>	

XIV

Atmospheric profiling with CHAMP: Status of the operational data analysis, validation of the recent data products and future prospects <i>Jens Wickert, Torsten Schmidt, Georg Beyerle, Grzegorz Michalak, Rolf König, Julia Kaschenz, Christoph Reigber</i>	495
Simulated temperature and water vapor retrieval from bending angles and refractivity measurements using an optimal estimation approach <i>Axel von Engel and Gerald Nedoluha</i>	501
An analysis of the lower tropospheric refractivity bias by heuristic sliding spectral methods <i>Georg Beyerle, Jens Wickert, Torsten Schmidt, Rolf König, Christoph Reigber</i>	507
Diffractive integrals for bistatic remote sensing using GPS signals <i>Alexander Pavelyev, Jens Wickert, Yuei-An Liou</i>	513
Canonical transform methods for analysis of radio occultations <i>Michael E. Gorbunov and Kent B. Lauritsen</i>	519
GPS radio occultation with CHAMP: Comparison of atmospheric profiles from GFZ Potsdam and IGAM Graz <i>Jens Wickert, Andreas Gobiet, Georg Beyerle, Andrea K. Steiner, Gottfried Kirchengast, Ulrich Foelsche, Torsten Schmidt</i>	525
Evaluation of stratospheric radio occultation retrieval using data from CHAMP, MIPAS, GOMOS, and ECMWF analysis fields <i>Andreas Gobiet, Gottfried Kirchengast, Jens Wickert, Christian Retscher, Ding-Yi Wang, Alain Hauchecorne</i>	531
Derivation of the water vapor content from the GNSS radio occultation observations <i>Francesco Vespe, Jens Wickert, Catia Benedetto, Rosa Pacione</i>	537
Processing of CHAMP radio occultation data using GRAS SAF software <i>Georg Bergeton Larsen, Kent Bækgaard Lauritsen, Frans Rubek, Martin Bjært Sørensen</i>	543
Gravity wave "portrait" reconstructed by radio holographic analysis of the amplitude of GPS radio occultation signals <i>Yuei-An Liou, Jens Wickert, Alexander Pavelyev, Christoph Reigber, Torsten Schmidt, Chen-Young Huang, Shen Yan</i>	549



Global analysis of stratospheric gravity wave activity using CHAMP radio occultation temperatures	555
<i>Christoph Jacobi, Madineni Venkat Ratnam, Gerd Tetzlaff</i>	
Tropical tropopause characteristics from CHAMP	561
<i>Torsten Schmidt, Jens Wickert, Georg Beyerle, Christoph Reigber</i>	
Comparisons of MIPAS/ENVISAT and GPS-RO/CHAMP temperatures	567
<i>Ding-Yi Wang, Jens Wickert, Gabriele P. Stiller, Thomas von Clarmann, Georg Beyerle, Torsten Schmidt, Manuel López-Puertas, Bernd Funke, Sergio Gil-López, Norbert Glatthor, Udo Grabowski, Michael Höpfner, Sylvia Kellmann, Michael Kiefer, Andrea Linden, Gizaw Mengistu Tsidu, Mathias Milz, Tilman Steck, Herbert Fischer</i>	
Comparison of GPS/SAC-C and MIPAS/ENVISAT temperature profiles and its possible implementation for EOS MLS observations	573
<i>Jonathan H. Jiang, Ding-Yi Wang, Larry L. Roman, Chi O. Ao, Michael J. Schwartz, Gabriele P. Stiller, Thomas von Clarmann, Manuel López-Puertas, Bernd Funke, Sergio Gil-López, Norbert Glatthor, Udo Grabowski, Michael Höpfner, Sylvia Kellmann, Michael Kiefer, Andrea Linden, Gizaw Mengistu Tsidu, Mathias Milz, Tilman Steck, Herbert Fischer</i>	
Structure and variability of the tropopause obtained from CHAMP radio occultation temperature profiles	579
<i>Madineni Venkat Ratnam, Gerd Tetzlaff, Christoph Jacobi</i>	
An assessment of an ionospheric GPS data assimilation process	585
<i>Matthew Angling</i>	
The Continuous Wavelet Transform, a valuable analysis tool to detect atmospheric and ionospheric signatures in GPS radio occultation phase delay data	591
<i>Achim Helm, Georg Beyerle, Stefan Heise, Torsten Schmidt, Jens Wickert</i>	
The CHAMP atmospheric processing system for radio occultation measurements	597
<i>Torsten Schmidt, Jens Wickert, Georg Beyerle, Rolf König, Roman Galas, Christoph Reigber</i>	
Potential contribution of CHAMP occultation to pressure field improvement for gravity recovery	603
<i>Shengjie Ge and C. K. Shum</i>	

Analysis of gravity wave variability from SAC-C and CHAMP occultation profiles between June 2001 and March 2003 <i>Alejandro de la Torre, Toshitaka Tsuda, Ho Fang Tsai, George Hajj, Jens Wickert</i>	609
The CHAMPCLIM project: An overview <i>Ulrich Foelsche, Andreas Gobiet, Armin Löscher, Gottfried Kirchengast, Andrea K. Steiner, Jens Wickert, and Torsten Schmidt</i>	615
<b>Author Index</b>	<b>621</b>
<b>Keyword Index</b>	<b>625</b>



<http://www.springer.com/978-3-540-22804-2>

Earth Observation with CHAMP

Results from Three Years in Orbit

Reigber, C.; Lühr, H.; Schwintzer, P.; Wickert, J. (Eds.)

2005, XVI, 628 p., Hardcover

ISBN: 978-3-540-22804-2