David D. Rowlands

Planetary Geodynamics Laboratory
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CURRENT POSITION

Geophysicist and Head of the Space Geodesy Group in the Planetary Geodynamics Laboratory, NASA/Goddard Space Flight Center

RESEAECH INTERESTS:

Satellite tracking data analysis for precision orbit determination and geophysical parameter estimation. Measurement modeling and force modeling for tracking data analysis. Design of constraint equations and alternative parameterizations for geophysical parameter recovery.

CURRENT ACTIVITIES:

Dave Rowlands' research is centered on satellite tracking observations. He is active in Earth orbiting and planetary missions using a wide variety of tracking types including: GPS, satellite laser ranging (SLR). DSN (planetary orbiters), altimetry (both laser and radar) and the precise K-band intersatellite tracking from GRACE. His interests include parameter estimation from the data as well as modeling of the data (models for satellite forces and for observations) and he is the lead for the GEODYN orbit determination and geodetic parameter estimation software. Most recently his work has focused on the ICESat and GRACE missions and two lunar missions: SELENE and Lunar Reconnaissance Orbiter (LRO). For GRACE he developed a short arc analysis technique for recovery of regional mass concentration parameters (MASCONs). He is the PI of a NASA ACCESS investigation to make continental mass flux estimates available on a 4°x4° grid every 10 days (see **http://grace.sgt-inc.com**). For SELENE he has developed and implemented into GEODYN models for the observation types unique to those missions (4-way planetary Doppler, planetary satellite VLBI, planetary 1-way laser ranging and multi-beam laser altimetry). In addition to being PI of the GRACE ACCESS investigation he is a Co-I on various funded investigations in Code 698 including: an ICESat Science Team investigation (Scott Luthcke PI), a GRACE Science Team investigation for gravity (Frank

Lemoine PI), a GRACE Science Team Investigation for tides and a Mean Sea Level investigation (Richard Ray PI).

EDUCATION:

1975 - BS (Mathematics), The Ohio State University, Columbus, OH

1979 – MS (Mathematics), The Ohio State University, Columbus, OH

1982 - MS (Geodetic Science,) The Ohio State University, Columbus, OH

PREVIOUS POSITIONS:

1982-1989 Analyst, EGG WASC, Lanham ,MD

1989-1992 Analyst ,Van Martin Systems and Consulting, Rockville, MD

REFEREED PUBLICATIONS

Han, S.-C., D.D. Rowlands, S.B. Luthcke, F.G. Lemoine, Localized analysis of satellite tracking data for studying time-variable Earth's gravity fields, Journal of Geophysical Research,. In Press 2007

Luthcke, S.B., D.D. Rowlands, F.G. Lemoine, S.M. Klosko, D. Chinn and J.J. McCarthy, "Monthly spherical harmonic gravity field solutions determined from GRACE inter-satellite range-rate data alone" Geophys. Res. Lett., Vol. 33, L02402, doi:10.1029/2005GL024846, 2006.

Luthcke, S.B., H.J. Zwally, W. Abdalati, D.D. Rowlands, R.D. Ray, R.S. Nerem, F.G. Lemoine, J.J. McCarthy and D.S. Chinn, "Recent Greenland Ice Mass Loss by Drainage System from Satellite Gravity Observations," Science 314, 1286 (2006) (10.1126/science.1130776).

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Luthcke, S.B., D.D. Rowlands, T.A. Williams, M. Sirota,"Calibration and reduction of ICESat geolocation errors and the impact on ice sheet elevation change detection," *Geophys. Res. Lett.*, Vol. 32, L21S05, doi:10.1029/2005GL023689, 2005.

Luthcke, S.B., N.P. Zelensky, D.D. Rowlands, F.G. Lemoine and T.A. Williams, "The 1-centimeter Orbit: Jason-1 Precision Orbit Determination Using GPS, SLR, DORIS and Altimeter data," *Marine Geodesy*, Special Issue on Jason-1 Calibration/Validation, Part 1, Vol. 26, No. 3-4, 2003, pp. 399-421.

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Rubincam DP, Rowlands DD, Ray RD, Is asteroid 951 Gaspra in a resonant obliquity state with its spin increasing due to YORP?, JOURNAL OF GEOPHYSICAL RESEARCH-PLANETS 107 (E9): Art. No. 5065 SEP 2002

Luthcke, S.B., Carabajal, C.C and D.D. Rowlands, "Enhanced Geolocation of Spaceborne Laser Altimeter Surface Returns: Parameter Calibration from the Simultaneious Reduction of Altimeter Range and Navigation Tracking data," *Journal of Geodynamics*, Vol. 34, No. 3-4, October/November 2002, pp. 447-475.

Lemoine F. G., D. E. Smith, D. D. Rowlands**,** M. T. Zuber, G.A. Neumann, D.S. Chinn and D.E. Pavlis, "An improved solution of the gravity field of Mars (GMM-2B) from Mars Global Surveyor," *Journal of Geophysical Research, 106,* 23539-23376., 2001.

Luthcke, S. B., C. C. Carabajal, D. D. Rowlands**,** D. E. Pavlis, "Improvements in spaceborne laser altimeter data geolocation," *Surveys in Geophysics, 22,* 549-559.

Smith, D. E., M. T. Zuber, H. V. Frey, J. B. Garvin, J. W. Head, D. O. Muhleman, G.H. Pettengill, R.J. Phillips, S.C. Solomon, H.J. Zwally, W.B. Banerdt, T.C. Duxbury, M.P. Golombek, F. G. Lemoine, G. A. Neumann, D. D. Rowlands**,** O. Aharonson, P.G. Ford, A.B. Ivanov, C.L. Johnson, P.J. McGovern, J.B. Abshire, R.S. Afzal and X. Sun, "Mars Orbiter Laser Altimeter: Experiment summary after the first year of global mapping of Mars," *Journal of Geophysical Research, 106,* 23689-23722, 2001.

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Zuber, M. T., D. E. Smith, A.F. Cheng, J.B. Garvin, O. Aharonson, T.D. Cole, P.J. Dunn, Y.Guo, F.G. Lemoine, G.A. Neumann, D. D. Rowlands and M. H. Torrence, "The shape of 433 Eros from the NEAR-Shoemaker laser rangefinder", *Science, 289,* 2097-2101, 2000.

Zuber, M. T., S. Solomon, R. Phillips, D. Smith, G. Tyler, G. Balmino, W. Barnedt, J. Head, C. Johnson, F. Lemoine, G. Neumann, D. Rowlands and S. Zhong, " Internal structure and early thermal evolution of Mars from MGS topography and gravity", Science, 287, 1788-1793, 2000.

Rowlands, D. D., D, Pavlis, F. Lemoine, G. Neumann and S. Luthcke, "The use of laser altimetry in the orbit and attitude determination of Mars Global Surveyor, Geophysical Research Letters, 26, 1191-1194, 1999"

Matsumoto, K., K. Heki, D. Rowlands, "Impact of far-side satellite tracking on gravity estimation in the SELENE project," Advances in Space Research, 23, 1809-1812, 1999.

Smith DE, M.T. Zuber, R.M. Haberle, D.D. Rowlands and J.R. Murphy, The Mars seasonal CO2 cycle and the time variation of the gravity field: A general circulation model simulation,

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Rowlands, D. D., S. Luthcke, A. Marshall, C. Cox, R. Williamson and S. Rowton, "Space shuttle orbit determination in support of SLA-1 using TDRSS and GPS tracking", Journal of the Astronuatical Science, 45, 113-129, 1997.

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AWARDS

Group Achievement Awards:

JGM –1 Gravity Team
TOPEX Precision Orbit Determination Team
DSPSE (Clementine) Lunar Orbit Ops Support Team
EGM96 Gravity Development Team
NEAR Shoemaker Mission Team
Meteor 3M / SAGE III Team

Performance Awards:

1993, 1994, 1996, 1997, 2001, 2002, 2003, 2005, 2006,2007