

Erik Roman Ivins

Senior Research Scientist
Jet Propulsion Laboratory
California Institute of Technology, MS 300-233, Pasadena, CA
91109-8099
erik.r.ivins@jpl.nasa.gov
<http://science.jpl.nasa.gov/people/Ivins/>
tele: 818-354-4785 fax: 818-354-9476



Employment Graduate Research Assistant, UCLA, 1973
Member of Technical Staff: JPL 1973-2004
JPL Group Supervisor: Solid Earth (329A) 2005-2015
Principal and Senior Research Scientist: JPL 2005-present

Education

1995 PhD Earth Sciences, USC, Los Angeles
1976 MSc Geophysics & Planetary Physics, UCLA, Los Angeles
1972 BSc Physics, Calif. Polytechnic Univ. Pomona

Research Experience

- Numerical studies of the influence of solid Earth dynamics on coastal change processes
- Ice sheet interaction with solid Earth on decade to millennial time scales
- Satellite observation and interpretation of time-variable gravity
- Interdisciplinary study of transient and secular water mass in response to climate change
- Modeling of transient near-fault, crustal and mantle post-seismic deformation
- Modeling postglacial rebound as an interdisciplinary subfield of geodesy
- Loading-related earthquakes and seismicity pattern
- Material transport through convection in the Earth's interior

Recent Honors and NASA Research Awards

- Lead for NASA Group Achievement Award: "Ice Mass Balance Intercomparison Exercise Team" 2013.
- Cryosphere Program: "Antarctic Ice Sheet Mass Balance and the Correction for Glacial Isostatic Adjustment" (NRA NNH12ZDA) \$262 K, Erik Ivins PI.
- NASA Sea-level Rise: "*Ice Sheet Basal Conditions and Sea Level Rise: Interface with Earth Structure Models and GIA*" (ROSES2013 NRA NNH13ZDA001N-SLR) Amount: \$1,3890 M, Erik Ivins PI.
- GRACE Science Team: "*Geodetic Signature of Cryospheric Change and Interaction with the Lithosphere, Mantle and Ocean*", SENH Program (NRA01-OES-05) \$360 K, Erik Ivins PI.
- NASA Exceptional Service Medal (for "*Sustained contribution to understanding interactions of the Earth's surface, ice and mantle*") June 2010.

Memberships

- American Geophysical Union (1973-present)
- European Geosciences Union (2003-present)
- International Association of Geodesy (1992-present)

Committees and Community Service

- NASA Lead Scientist for "Ice Sheet Mass Balance Inter-comparison Exercise" (Joint with the European Space Agency) 2011-2012, 2015-2018.
- NASA Earth Surface and Interior Executive Committee for writing the Solid Earth Science Working Group Report 2016.
- Editorial Board: Pure and Applied Geophysics – Pageoph. (2015 –).
- Lecturer at GIA Modeling Training School, Gibraltar Is., Ohio, September, 2015.
- Member of the IAG study group Inter-Commission Committee on Theory (ICCT) IC-SG 28: Geophysical modelling of time variations in deformation and gravity (formed Jan. 2016).
- Member of the National Science Foundation Polar Networks Science Advisory Committee (2011-2014).
- Member of International Association of Geodesy study group for Future Gravity Missions for Cryospheric Sciences & Solid Earth Sciences (formed Feb. 27, 2013).
- Member of Global Geodetic Observing System (GGOS) Working Group on "Contributions to Earth System Modeling"
- Advisory Panel: "Upper Mantle Dynamics and Quaternary Climate in Cratonic Areas", International Lithosphere Program. (2008-2014).
- Coordinator for UNAVCO 30th Annual Celebration 2014 Science Workshop, Broomfield, CO, March 3-6, 2014.
- Visiting Scientist at the Technical University of Dresden, Germany, Sept. 27 – Nov. 2, 2006
- Editor's Citation for Excellence in Refereeing for JGR-Solid Earth 2000 & 2011
- Editor's Citation for Excellence in Refereeing for GRL 2007
- 2004 Spring Joint AGU-CGU Program Committee (Geodesy Section)
- Plenary Session Speaker at Scientific Committee for Antarctic Research (SCAR), Bremen, Germany, July 26-30, 2004.
- Co-convenor of the Joint UNAVCO-IRIS Workshop, June 9-11, 2005, Stevenson, WA.
- Keynote Speaker at 2nd International CHAMP Satellite Conference, Potsdam, Germany, Sept. 1-5, 2003.
- Member Executive Council, AGU (2003-2004)
- NASA Panel: Cryospheric Science 2003
- NASA IceBridge Review Panel (2013-2014)
- Session Organizer, 13 individual AGU and Joint with CGU and EGS-AGU-EUG Joint Assembly, Nice France, 06-11, April 2003.
- IERS Special Bureau for the Mantle (2005-2009)
- IAG Geodynamics Section: Member of Antarctic sub-Commission
- GRACE Science Team Member 2003-2015
- IAG ICCT Working Group: Dynamic Theories of Deformation and Gravity Fields
- International Polar Year (2006-2007) POLNET Lead co-investigator for Geodynamics
- Member of the 10th ISAES Editorial Team, 2007 "Antarctica a Keystone in a Changing World" (http://www.nap.edu/catalog.php?record_id=12168#orgs)

Selected Peer Reviewed Articles in 2010-2016:

- Richter, A., **E.R. Ivins**, H. Lange, L. Mendoza, L. Schröder, J.L. Hormaechea, G. Casassa, E. Marderwald, M. Fritsche, R. Perdomo, M. Horwath, and R. Dietrich, (2016), Crustal deformation across the Southern Patagonian Icefield observed by GNSS, *Earth Planet. Sci. Lett.*, 452, 206–215, doi: 10.1016/j.epsl.2016.07.042.
- Briggs, K. H., A. Shepherd, A. E. Hogg, **E.R. Ivins**, N. Schlegel, I. Joughin, B. Smith, G. Krinner, J. Fourier, G. Moyano, S. Nowicki, T. J. Payne, Eric Rignot I. Velicogna, T. Scambos, M. R. van den Broeke and P.L. Whitehouse, (2016), Charting ice sheet contributions to global sea level rise, *Eos*, 97, doi:10.1029/2016EO055719.
- Jones, C.E., K. An, R. G. Blom, J. D. Kent, **E.R. Ivins**, and D. Bekaert (2016), Anthropogenic and geologic influences on subsidence in the vicinity of New Orleans, Louisiana, *J. Geophys. Res. Solid Earth*, 121, doi:10.1002/2015JB012636.
- Adhikari, S. and **E.R. Ivins** (2016), Climate-driven polar motion: 2003–2015, *Science Advances*, 2, (4), e1501693 doi:10.1126/sciadv.1501693.
- Adhikari, S., **E.R. Ivins** and E. Larour (2016), ISSM-SESAW v1.0: mesh-based computation of gravitationally consistent sea level and geodetic signatures caused by cryosphere and climate driven mass change, *Geosci. Model Dev.*, 9, 9769–9816, doi:10.5194/gmd-9-1087-2016.
- Pail, R., R. Bingham, C. Braitenberg, H. Dobslaw, A. Eicker, A. Gunter, M. Horwath, **E.R. Ivins**, L. Longuevergne, I. Panet and B. Wouters, (2015), Science and user needs for observing global mass transport to understand global change and to benefit society, *Surveys Geophys.*, 36, 743–772, doi:10.1007/s10712-015-9348-9.
- Bouman, J., M. Fuchs, **E.R. Ivins**, W. van der Wal, E. Schrama, P. Visser, and M. Horwath (2014), Antarctic outlet glacier mass change resolved at basin scale from satellite gravity gradiometry, *Geophys. Res. Lett.*, 41, doi:10.1002/2014GL060637.
- Adhikari, S., **E.R. Ivins**, E. Larour, H. Seroussi, M. Morlighem and S. Nowicki, (2014) Future Antarctic bed topography and its implications for ice sheet dynamics, *Solid Earth*, 5, 569–584, doi: 10.5194/sed-6-191-2014.
- Lange, H., G. Casassa, **E. R. Ivins**, L. Schröder, M. Fritsche, A. Richter, A. Groh and R. Dietrich, (2014) Observed crustal uplift near the Southern Patagonian Icefield constrains improved viscoelastic Earth models, *Geophys. Res. Lett.*, 41, 805–812, doi:10.1002/2013GL058419.
- Sasgen, I., H. Konrad, **E.R. Ivins**, M van den Broeke, J. Bamber Z. Martinek and V. Klemann, (2013), Antarctic mass balance 2002 to 2011: regional re-analysis of GRACE satellite gravimetry measurements with improved estimate of glacial isostatic adjustment, *The Cryosphere*, 6, 3703–3732, doi:10.5194/tdc-6-3703-2012.

- Ivins, E.R.**, T.S. James, J. Wahr, E. J.O. Schrama, F.W. Landerer and K.M. Simon (2013) Antarctic contribution to sea-level rise observed by GRACE with improved GIA correction, *J. Geophys. Res., B.*, 118, 3126-3141, doi: 10.1002/jgrb.50208.
- Hanna, E., F. Navarro, F. Pattyn, C. M. Domingues, X. Fettweis, **E.R. Ivins**, R. J. Nicholls, C. Ritz, B. Smith, S.Tulaczyk, P.L. Whitehouse & H.J. Zwally, (2013) Ice sheet mass balance and climate change, *Nature*, 497, 51-59, doi:10.1038/nature12238.
- Shepherd, A., **E.R. Ivins** et al., (2012) A reconciled estimate of ice sheet mass balance, *Science*, 338, 1183-1189.
- Simms, A.R., **E.R. Ivins**, R. DeWitt, P. Kouremenos & L. Miller, (2012), Timing of the most recent Neoglacial advance and retreat in the South Shetland Islands, Antarctica Peninsula, Insights from raised beaches evidence and Holocene uplift rates, *Quaternary Sci. Rev.*, 47, 41-55.
- Vermeersen B. L. A., **E.R. Ivins** and M.A. King, (2011) Special section on observation and modeling of glacial isostatic adjustment, *Tectonophysics*, 511, 67-68, doi: 10.1016/j.tecto.2011.10.012.
- Ivins, E.R.**, M.M. Watkins, D-N. Yuan, R. Dietrich, G. Casassa & A. Rülke, (2011) On-land ice loss and glacial isostatic adjustment at the Drake Passage: 2003-2009, *J. Geophys. Res., B.*, 116, B02403, doi:10.1029/2010JB007607.
- Wu, X., M.B. Heflin, H. Schotman, B.L.A. Vermeersen, D. Dong, R.S. Gross, **E.R. Ivins**, A.W. Moore & S.E. Owen, (2010) Simultaneous estimation of global present-day water transport and glacial isostatic adjustment, *Nature Geosciences*, 3, 642-646, doi:10.1038/ngeo936.
- Dietrich, R., **E.R. Ivins**, G. Casassa, H. Lange, J. Wendt & M. Fritsche, (2010) Rapid crustal uplift in Patagonia due to enhanced ice loss, *Earth and Planetary Sci. Lett.*, 289.
- Simon, K.M., T.S. James & **E.R. Ivins**, (2010) Ocean loading effects on predictions of uplift and gravity change due to glacial isostatic adjustment in Antarctica, *J. Geodesy*, 84, 305-317.
- Poutanen, M. & **E.R. Ivins**, (2010) Upper mantle dynamics and Quaternary climate in cratonic areas (DynaQlim)-understanding the glacial isostatic adjustment, *J. Geodynamics*, 50, 2-7.

Other Peer Reviewed Articles Pertinent during 1995-2009:

- Ivins, E.R.**, Ice sheet stability and sea level, *Science*, 324, 888-889, doi:10.1126/science.1173958, 2009.
- Amalvict, M., P. Willis, G. Wöppelmann, **E.R. Ivins**, M-N. Bouin, L. Testut & J. Hinderer, Isostatic stability of the East Antarctic station Dumont d'Urville from long-term geodetic observations and geophysical models, *Polar Res.*, 28,(2) 193-202, doi: 10.1111/j.1751-8369.2008.00091.x. 2009.
- Wu, X., R.G. Blom, **E.R. Ivins**, F.A. Oyafuso & M. Zhong, Improved inverse and probabilistic

methods for geophysical applications of GRACE gravity data, *Geophys. J. Int.*, doi:10.1111/j.1365-246X.2009.04141.x, 2009.

Ivins, E.R. & D. Wolf, Glacial isostatic adjustment: New developments from advanced observing systems and modeling, *J. Geodynamics*, 46, 69-77, doi:10.1016/j.jog.2008.06.002, 2008.

Klemann, V., Z. Martinec & **E.R. Ivins**, Glacial-isostasy and plate motion, *J. Geodynamics*, 46, 95-103, 10.1016/j.jog.2008.04.005, 2008.

Chen, J.L., C.R. Wilson, B.D. Tapley, D.D. Blankenship & **E.R. Ivins**, Patagonian icefield melting observed by Gravity Recovery and Climate Experiment (GRACE), *Geophys. Res. Lett.*, 34, L22501, doi:10.1029/2007GL031871, 2007.

Ivins, E.R., R.K. Dokka & R.G. Blom, Post-glacial sediment load and subsidence in coastal Louisiana, *Geophys. Res. Lett.*, 34, L16303, doi:10.1029/2007GL030003, 2007.

Klemann, V., **E.R. Ivins**, Z. Martinec & D. Wolf, Models of active glacial isostasy roofing warm subduction: The case of the South Patagonian icefield, *J. Geophys. Res., B.*, B09405, doi:10.1029/2006JB004818, 2007.

Ramillien G., A. Lombard, A. Cazenave, **E.R. Ivins**, M. Llubes, F. Remy & R. Biancali, Interannual variations of the mass balance of the Antarctica and Greenland ice sheets from GRACE, *Global and Planetary Change*, 53, 198-208, 2006.

Wu, X., M.B. Heflin, **E.R. Ivins** & I. Fukumori, Seasonal and interannual global surface mass variations from geodetic data combinations, *J. Geophys. Res.*, 111, B09401 doi:10.1029/2005JB004100. 2006.

Ivins, E.R. & T.S. James, Antarctic glacial isostatic adjustment: A new assessment, *Antarctic Science*, 17(4), 541-553, 2005.

Larsen, C.F., R.J. Motyka, J.T. Fryemueller, K.A. Echelmeyer & **E.R. Ivins**, Rapid viscoelastic uplift in southern Alaska caused by post-Little Ice Age retreat, *Earth Planetary Sci. Lett.*, 237, 548-560, 2005.

Kaufmann, G., P. Wu & **E.R. Ivins**, Lateral viscosity variations beneath Antarctica and their implications on regional rebound motions and seismotectonics, *J. Geodynamics*, 39, 165-181, 2005.

Ivins, E. R. and T. S. James (2004), Bedrock response to Llanquihue Holocene and present-day glaciation in southernmost South America, *Geophys. Res. Lett.*, 31, L24613, doi:10.1029/2004GL021500.

Larsen, C.F., R.J. Motyka, J.T. Fryemueller, K.A. Echelmeyer, and **E.R. Ivins**, Rapid uplift of southern Alaska caused by recent ice loss, *Geophys. J. Int.*, 158, 1118-1133, 2004.

- Raymond, C.A., **E.R. Ivins**, M.B. Heflin and T.S. James, Quasi—continuous Global Positioning System measurements of glacial isostatic adjustment in the Northern Transantarctic Mountains, *Global and Planetary Change*, 42, 295-303, 2004.
- Wu, X., M.B. Heflin, **E.R. Ivins**, D.F. Argus and F.H. Webb, Large-scale global surface mass variations inferred from GPS measurements of load-induced deformation, *Geophys. Res. Lett.*, 30, doi:10.1029/2003GL0117546, 2003
- Ivins, E.R.** V. Klemann and T.S. James, Stress shadowing by the Antarctic ice sheet, *J. Geophys. Res.*, 108 (12) doi:10.1029/2002JB002182, 2003.
- Wu, X., M.M. Watkins, **E.R. Ivins**, R. Kwok, P. Wang and J.M. Wahr, Toward global inverse solutions for the determination of current and past ice mass variations: Contribution of secular satellite gravity and topography change measurements, *J. Geophys. Res., Solid Earth*, 107, doi:10.1029/201JB000543, 2002.
- Wu, X., D.F. Argus, M.B. Heflin, **E.R. Ivins** and F.H. Webb, Site distribution and aliasing effects in the inversion for load coefficients and geocenter motion from GPS data, *Geophys. Res. Lett.*, 29, doi:10.1029/2002GL016324, 2002.
- Ivins, E.R.**, C.A. Raymond and T.S. James, The influence of 5000 year-old and younger glacial mass variability on present-day crustal rebound in the Antarctic Peninsula, *Earth, Planets and Space*, 52, 1023-1029, 2000.
- Ivins, E.R.** and T.S. James, Simple models for late Holocene and present-day Patagonian glacier fluctuations and predictions of a geodetically detectable isostatic response, *Geophys. J. Int.*, 138, 601-624, 1999.
- James, T.S. and **Ivins, E.R.**, Predictions of Antarctic crustal motions driven by present-day ice sheet evolution and by isostatic memory of the Last Glacial Maximum, *J. Geophys. Res., B*, 103, 4993-5017, 1998.
- James, T.S. and **Ivins, E.R.**, Global geodetic signatures of the Antarctic ice sheet, *J. Geophys. Res., B*, 102, 605-633, 1997.
- Ivins, E.R.** and C.G. Sammis, Transient creep of a composite lower crust 1. Constitutive theory, *J. Geophys. Res.*, 101, 27,981-28,004, 1996.
- Ivins, E.R.**, Transient creep of a composite lower crust 2. A polymineralic basis for rapidly evolving postseismic deformations modes, *J. Geophys. Res.*, 101, 28,005-28,028, 1996.
- Ivins, E.R.** and C.G. Sammis, On lateral viscosity in the mantle and the rheology of low frequency geodynamics, *Geophysical J. Int.*, 123, 305-322, 1995.
- Ivins, E.R.** and C.G. Sammis, On lateral viscosity in the mantle and the rheology of low frequency geodynamics, *Geophysical J. Int.*, 123, 305-322, 1995.

Ivins, E.R., C.G. Sammis and C.F. Yoder, Deep mantle viscous structure with prior estimate and satellite constraint, *J. Geophys. Res.*, 98, 4579-4609, 1993.

James, T.S. and **Ivins, E.R.**, Antarctic mass balance and present-day crustal motion, *Geophysical Res. Lett.*, 22, 973-976, 1995.

Ivins, E.R., C.G. Sammis and C.F. Yoder, Deep mantle viscous structure with prior estimate and satellite constraint, *J. Geophys. Res.*, 98, 4579-4609, 1993.

Ivins, E.R., T.H. Dixon and M.P. Golombek, Extensional reactivation of an abandoned thrust: A bound on shallowing in the brittle regime, *J. Structural Geol.*, 12, 303-314, 1990.

Dixon, TH, **Ivins ER** and Franklin BJ, and volcanic asymmetry around the Red Sea – Constraints on rift models, *Tectonics* 8, 1193-1216, 1989.

Ivins, ER and GA Lyzenga, Stress patterns in an interplate shear zone – an effective anisotropic model and implications for the Transverse Ranges, California, *Phil. Trans. Roy. Soc., London, Ser. A.*, 318, 285-347, 1986.

Ivins, E.R. T. Unti and R.J. Phillips, Large Prandtl number finite-amplitude thermal convection with Maxwell viscoelasticity, *Geophys Astrophysical Fluid Dynamics*, 22, 103-132, 1982.

Phillips RJ and **Ivins, E.R.**, Geophysical observations pertaining to solid-state convection in the terrestrial planets, *Phys. Earth Planet. Interiors*, 19, 107-148, 1979.

Book Chapters

Ivins E.R., (2015) Glacial isostatic adjustment and Late Pleistocene true polar wander, Chapter in; *Earth Sciences Series. Encyclopedia of Geodesy*, Erik W. Grafarend (ed.), Springer International, ISBN 978-3-319-01868-3.

Ivins, E.R., Observed Solid Earth Mass Transport, In *Encyclopedia of Remote Sensing*, E.G. Njoku, (ed.), Springer, Dordrecht, doi:10.1007/978-0-387-36699-9, 2014.

Poutanen M., D. Dransch, S. Gregersen, S. Haubrock, **E.R. Ivins**, V. Klemann, E. Kozlovskaya, I. Kukkonen, B. Lund, J.-P. Lunkka, G. Milne, J. Müller, C. Pascal, B.R. Pettersen, H.-G. Scherneck, H. Steffen, B. Vermeersen, D. Wolf (2010): DynaQlim – Upper Mantle Dynamics and Quaternary Climate in Cratonic Areas. In *New Frontiers in Integrated Solid Earth Sciences* (Eds. S. Cloetingh and J. Negendank). Springer Verlag, p. 349-372, doi:10.1007/978-90-481-2737-5_10.

Mitrovica, J.X., M. E. Tamisiea, **E. R. Ivins**, L. L. A. Vermeersen, G. A. Milne and K. Lambeck, Surface Mass Loading on a Dynamic Earth: Complexity and contamination in the analysis of global sea level trends, In *Understanding Sea-level Rise and Variability*, Church, J.A., P.L. Woodworth, T. Aarup and W.S. Wilson (eds.), Wiley-Blackwell, 285-324, 2010.

Ivins, E.R., E. Rignot, X-P. Wu, T.S. James and G. Casassa, Ice mass balance and Antarctic gravity change: Satellite and terrestrial perspectives, In, *Earth Observation with CHAMP: Results with Three Years in Orbit*, Ch. Reigber, H. Luhr, P. Schwintzer and J. Wickert (eds.) Springer-Verlag, Heidelberg, pp. 3-12, 2005.

Scheinert, M., **E. Ivins**, Dietrich, R. and Rulke, A., Vertical crustal deformations in Dronning Maud land, Antarctica: Observations and model predictions, in Futterer, D., Damaske, Kleinschmidt, G., Miller, H. and Tessensohn, D., *Antarctica -- Contributions to Global Earth Sciences (Proc. of ISAES IX, Potsdam, September 8-12, 2003)* 355-358. Springer Berlin -- Heidelberg -- New York, 355-358, 2005.

Ivins, E.R., C.A. Raymond and T.S. James, Late-Pleistocene, Holocene and present-day ice load evolution in the Antarctic Peninsula: Models and predicted vertical crustal motion, in *Ice Sheets, Sea Level and the Dynamic Earth*, (ed. J.X. Mitrovica and B. Vermeersen), Geodynamics Ser. 29, 133-155, A.G.U., Washington, DC, 2002.

Ivins, E.R., X-P. Wu, C.A. Raymond, C.F. Yoder and T.S. James, Temporal geoid of a rebounding Antarctica and potential measurement by the GRACE and GOCE satellites, in *Gravity, Geoid and Geodynamics 2000, IAG Symp. Ser. Vol. 123*, (ed. M. Sideras) Springer-Verlag, Berlin, 361-366, 2001.

Ivins, E.R., New aspects of rotational dynamics within the North American-Pacific ductile shear zone, in *Deep Structure and Past Kinematics of Accreted Terranes*, (ed. J.W. Hillhouse) *Geophysical Monograph*, 50, A.G.U. Washington, DC, 179-201, 1989.

Yoder, C.F. and **Ivins, E.R.**, On the ellipticity of the core-mantle boundary from Earth nutations and gravity, in *The Earth's Rotation and Reference Frames for Geodesy and Geodynamics, IAU Symposia*, 128, (eds., A. Babcock and G.A. Wilkins) Kluwer, Netherlands, Dordrecht, pp. 317-322, 1988.

Yoder, C.F. and **Ivins, E.R.**, Improved analytic nutation model, in *The impact of VLBI on Astrophysics and Geophysics, IAU*, 129, (eds., Reid, M.J. & Moran, J.M.) Kluwer, Dordrecht, Netherlands, pp. 181-199, 1988.