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NASA's First Gravity Mission Image Depicts a Bumpy Ride December 6, 2002

The first image released from the Gravity Recovery and Climate Experiment (Grace), a joint NASA-German Aerospace Center mission, graphically illustrates the sensitivity of the mission's twin spacecraft to changes in Earth's gravity.

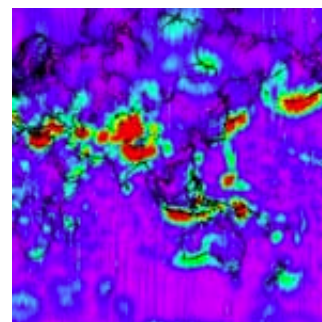
The image is available at http://www.jpl.nasa.gov/proto/earth_images.html

Color gradations in the image measure changes in the distance between the Grace spacecraft as they orbit overhead approximately 220 kilometers (137 miles) apart. Such variations are caused as the spacecraft fly over Earth's uneven gravity field, for example, when Grace travels over mountain ranges or undersea trenches. Earth's largest spatial features (those covering the largest areas of Earth) have been removed from this image so that such smaller features can be highlighted. Grace's extremely sensitive microwave ranging instrumentation is capable of measuring variations at the micron, or millionth of a meter, level.

Data from this and similar images will be processed by the Grace science team to produce precise maps of Earth's gravity field. Preliminary maps of Earth's geoid, or mean gravity field, are expected to be available to researchers in the spring of 2003.

Dr. Byron Tapley, Grace principal investigator from the Center for Space Research at the University of Texas in Austin, said Grace is already dramatically improving our knowledge of the geoid. "Errors in previous gravity field models were due to the effects of using data from multiple sources with uneven quality and incomplete geographic coverage," he said. "In 30 days, Grace has exceeded the information gained in over 30 years of previous study."

Launched March 17, 2002, Grace senses minute variations in Earth's surface mass and corresponding variations in Earth's gravitational



Earth, illustrating distance between Grace spacecraft

Related links

- [High resolution JPEG \(3,720 KB\)](#)
- [Grace home page](#)

pull. It will map these variations over time. The monthly gravity maps generated by Grace will be up to 1,000 times more accurate than current maps, substantially improving the accuracy of many techniques used by oceanographers, hydrologists, glaciologists, geologists and other scientists to study phenomena that influence climate. The mission is currently in its commissioning phase and the satellites are collecting science data.

Grace is a joint partnership between NASA and the German Aerospace Center (Deutsches Zentrum fuer Luft und Raumfahrt, or DLR). The University of Texas' Center for Space Research has overall mission responsibility. GeoForschungsZentrum Potsdam is responsible for the German mission elements. The Jet Propulsion Laboratory, Pasadena, Calif., manages the U.S. portion of the project for NASA's Office of Earth Science, Washington, D.C. Science data processing, distribution, archiving and product verification are managed under a cooperative arrangement between JPL, the University of Texas' Center for Space Research and the Geo-Research Center in Germany.

For more information on Grace, see:

<http://www.csr.utexas.edu/grace>, or
<http://www.gfz-potsdam.de/grace>.

Dr. Tapley, along with Dr. Michael Watkins, Grace project scientist at JPL, and Dr. John Wahr, Grace science team member from the University of Colorado, will report on Grace mission results to date during a press conference at the fall meeting of the American Geophysical Union on Saturday, December 7, at 2 p.m. Pacific Time. The press conference, "New Results from the Grace Mission," will be held in Room 112 of the Moscone Convention Center, 747 Howard Street, San Francisco, Calif. On or off-site interviews may be arranged through Alan Buis and Margaret Baguio at the phone numbers listed above.

The California Institute of Technology in Pasadena manages JPL for NASA.

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