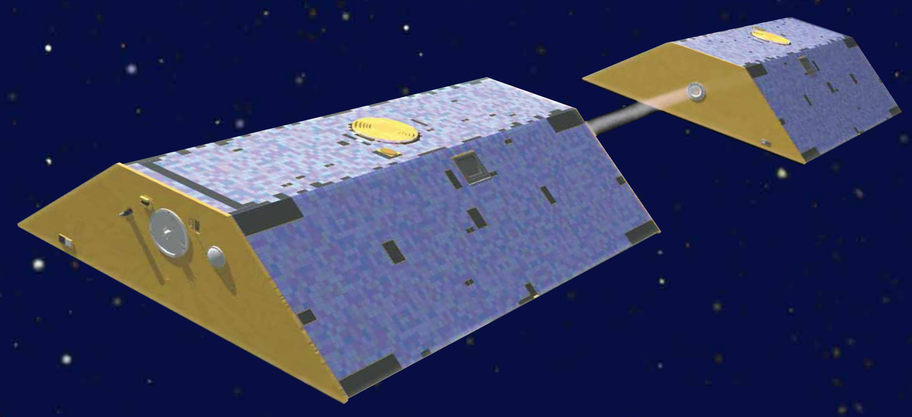
Mission Applications Support at NASA: GRACE, GRACE-FO, GRACE II

National Aeronautics and Space Administration

Margaret Srinivasan
margaret.srinivasan@jpl.nasa.gov
Erik Ivins
erik.r.ivins@jpl.nasa.gov
NASA's Jet Propulsion Laboratory

John Bolten
john.bolten@nasa.gov
Goddard Space Flight Center

Bradley Doorn
bradley.doorn@nasa.gov
NASA



Abstract

The NASA Applied Sciences Program is actively supporting an agency-wide effort to formalize a mission-level data applications approach. The program objective is to engage early-phase NASA Earth satellite mission project teams, including GRACE Follow On, with applied science representation in the flight mission planning process. The end goal is to "to engage applications-oriented users and organizations early in the satellite mission lifecycle to integrate end-user needs into satellite mission planning as a way to increase the benefits to the nation."

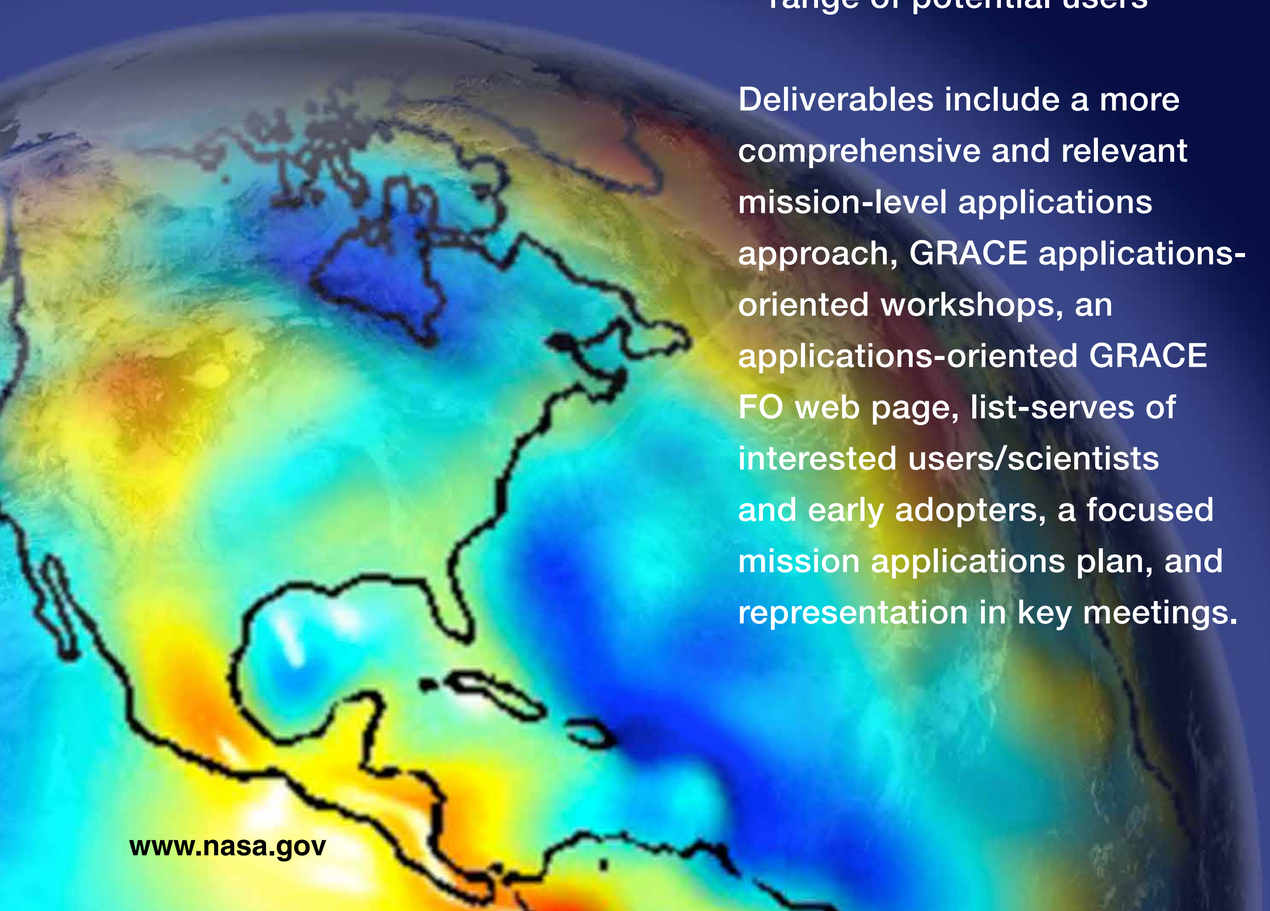
GRACE FO will be a key element of the continued observations of global water mass variations. It will provide critical support for improved global water management, further our understanding of many biological aspects of ongoing climate variations, and enable both researchers and decision-making institutions to better characterize, understand, and predict potential ground-water crises and other climatological hazards.

In leveraging the success of GRACE, the GRACE FO mission applications support is now tasked with identifying and organizing relevant user communities. This effort is promoting existing applications in order to enhance the value of GRACE FO to society.

Improved strategies to enhance science and practical applications of GRACE-FO data streams are envisaged. The GRACE-FO mission applications support team is engaging representatives in the relevant science, societal applications, and mission planning communities. Some of the elements of this program include identifying;

- Early adopters
- Applications Working Group including project and science leads
- Mission data products that effectively incorporate a wide range of potential users

Deliverables include a more comprehensive and relevant mission-level applications approach, GRACE applications-oriented workshops, an applications-oriented GRACE FO web page, list-serves of interested users/scientists and early adopters, a focused mission applications plan, and representation in key meetings.



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Mission objectives

- Maintain data continuity from GRACE
- Minimize data gap after GRACE
- Maintain maximum heritage from GRACE to optimize project schedule, technical & cost risks

Key GRACE Mission Applications

- Operational Drought and Flood Modeling, large-scale hydrology, water resources, climate
- Cryosphere
- Ocean circulation
- Solid Earth mass variations

Feb. 3, 2009 view of Lake Oroville northeast of Sacramento, California, in the Sierra Nevada foothills. Image: CA Dept. of Water Resources.

NASA Earth Science Directorate, Applied Sciences Program

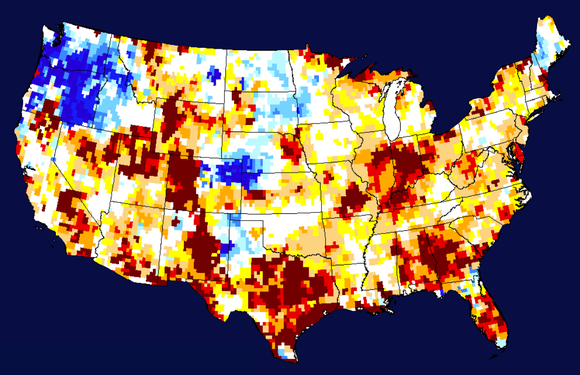
NASA supports applications activities for early phase missions based on the 2007 NRC Decadal Survey objectives to "enhance economic competitiveness, protect life and property, and assist in the stewardship of the planet for this and future generations."

- GRACE-FO – a gap-filling mission to GRACE-II
- GRACE-II – Tier 2 Decadal Survey mission
- ESD Applied Science Deputy Program Applications Leads identified for GRACE at JPL and GSFC
- Implement Decadal Survey & 'NASA Climate-Centric Architecture' goals related to applications
- Goal: ensure a sustained interaction with mission project leads, scientists, users to maximize impact of NASA Earth science investments
- GRACE, GRACE-FO, GRACE II missions are implementing an applications approach at the project level, supported by NASA HQ and science leads

Support of NASA Earth Science Focus Areas

GRACE-FO will support the Earth Science Focus Areas with continued uniquely determined or enabled measurements from GRACE

- Mass changes in polar ice sheets
- Mass contribution to sea level rise; heat content vs. surface water contributions
- Global monitoring of the hydrological cycle and of continental water resources, seasonal/interannual river basin water storage changes, large-scale evapotranspiration, land-ocean mass exchange, and continental aquifer changes
- Deep ocean currents and ocean mass & energy transport
- Large-scale post-glacial rebound
- Mass displacements from large earthquakes



Improving Drought Prediction Models

This map is a regularly issued drought monitoring product from the National Drought Mitigation Center that now includes GRACE data as one of its data sources. Blue colors indicate wetter-than-normal conditions, while yellow and red colors show drier-than-normal conditions. Image: NASA/National Drought Mitigation Center

GRACE-FO Deputy Program Applications Approach

- Identify Community of Practice (operational users) beginning with key GST members
- Support mission studies that enhance or enable applications and operational uses
- Develop GRACE-FO Applications web site
- Communicate established GRACE-FO data product plans for the benefit of level-2 data product end-user community
- Resources; applications brochure, poster, exhibit elements for recruiting data users, exhibiting in mission environments (project areas at HQ, JPL, GSFC)
- Maintain awareness of GRACE 2 development and plan for improved data quality

For more information:

grace.jpl.nasa.gov
www.csr.utexas.edu/grace/
www.gfz-potsdam.de/portal/gfz/Struktur/Departments/Department+1

GRACE Science Team Meeting, Potsdam, Germany
17-19 September 2012