Committee on Earth Observation Satellites

The Global Geodetic Observing System

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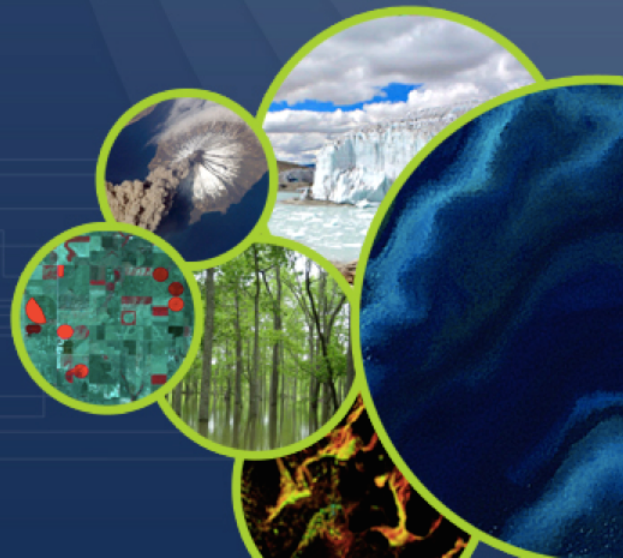
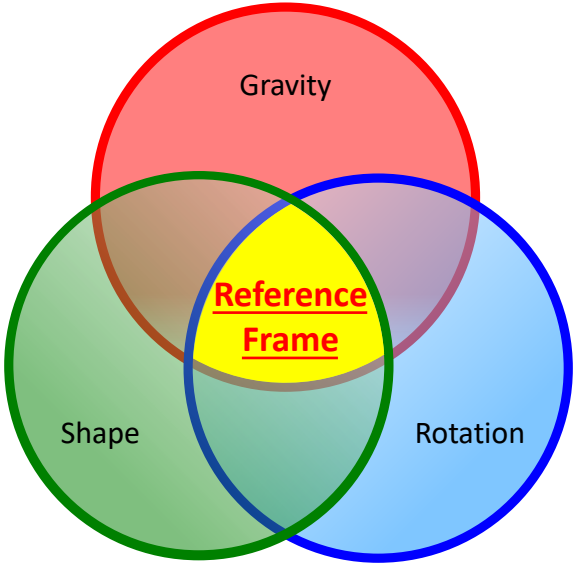


Geodesy

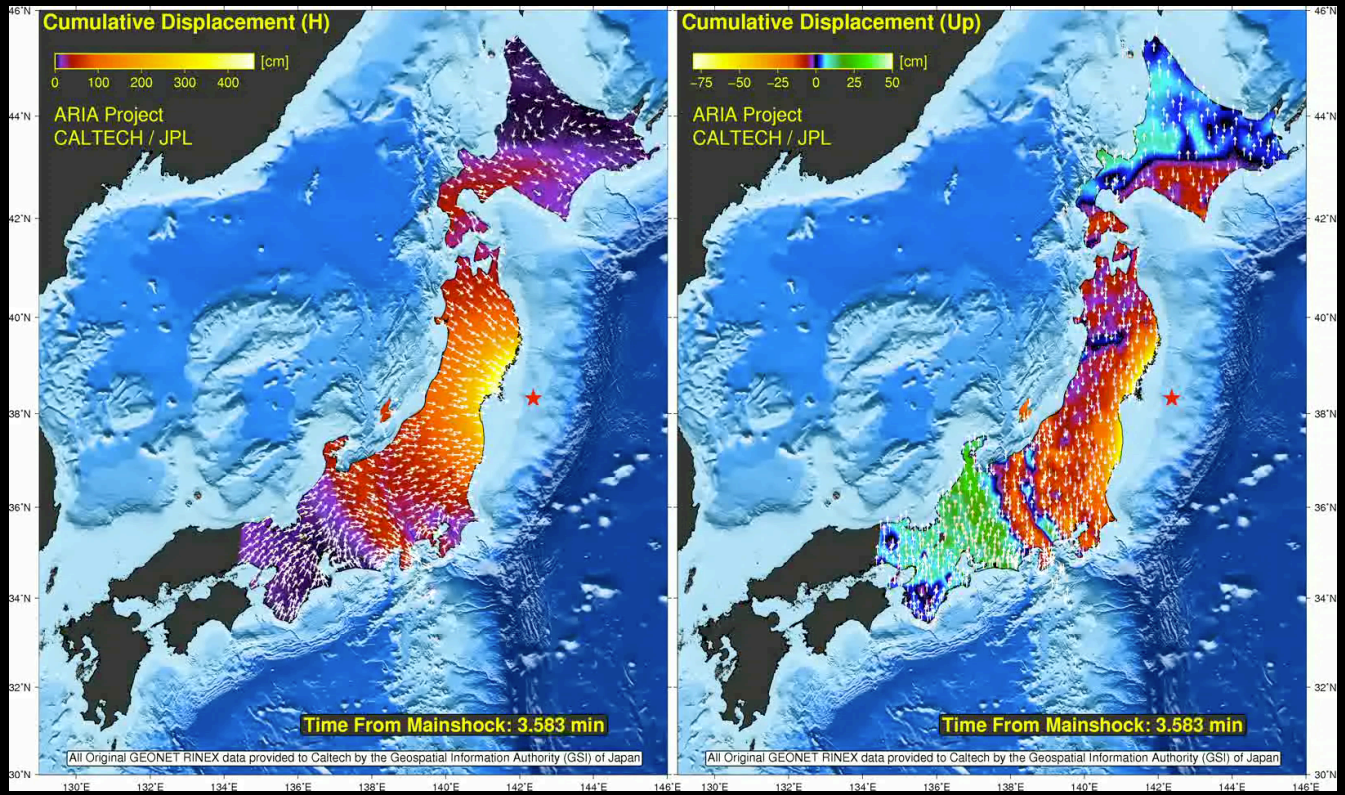
Geodesy is the science of accurately measuring and understanding three fundamental properties of the Earth and their changes in time

- Geometric shape
- Rotation and orientation in space
- Gravity field



Establishing and disseminating the Terrestrial Reference Frame is central to Geodesy

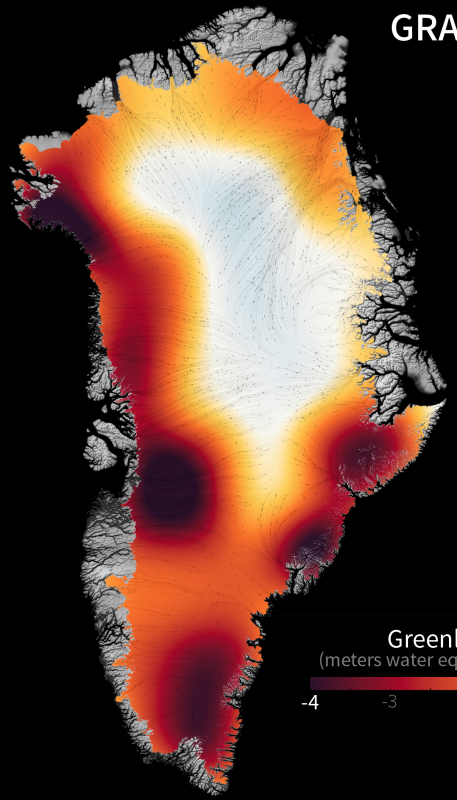
Shape

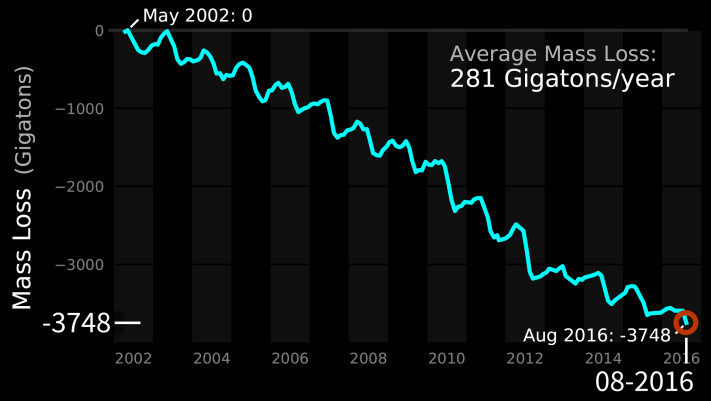


http://tectonics.caltech.edu/slip_history/2011_taiheiyo-oki/Displacement/

Gravity

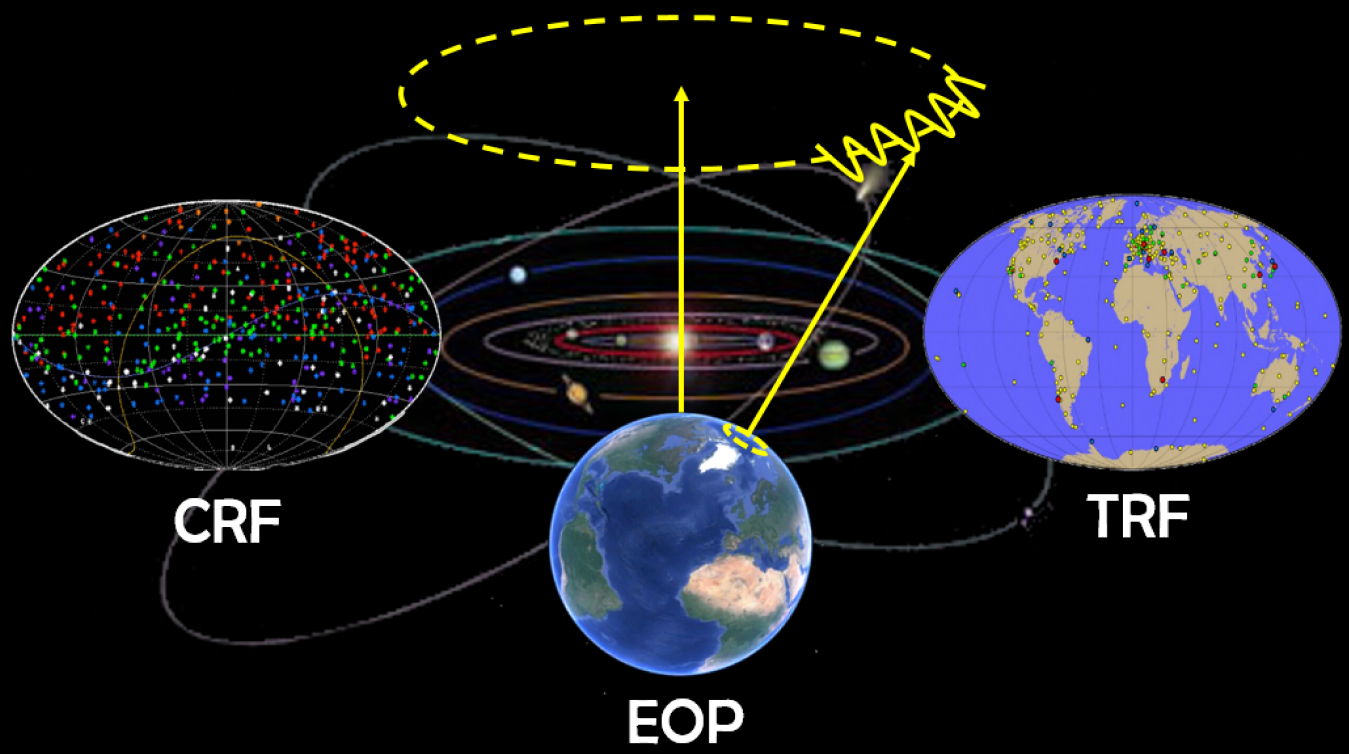
GRACE Observations of Greenland Ice Mass Changes





Source: NASA'S Goddard Space Flight Center

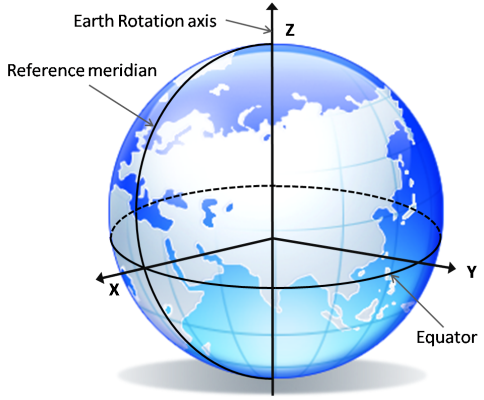
Rotation



Source: A. Escapa, University of Alicante

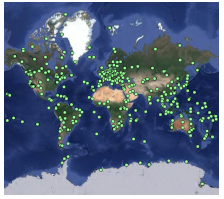
Terrestrial Reference Frame

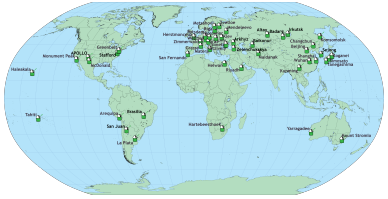
- **Definition**
  - The TRF is an accurate, stable set of positions and velocities of reference points on Earth's surface
  - The TRF provides the stable coordinate system that allows us to link measurements over space and time for numerous scientific and societal applications including critical climate and sea level change studies



Terrestrial Reference Frame

- **Determination**
  - The GNSS, VLBI, SLR, & DORIS geodetic networks, along with ground surveys of stations at co-located sites to tie the networks together, provide the data for determining the TRF as well as for direct science investigations

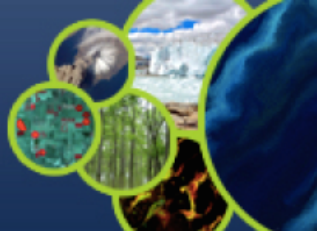

GNSS


SLR


VLBI


DORIS

CEOS and GGOS



- Challenges for GGOS
  - Continue to provide Terrestrial Reference Frame
    - Of improved accuracy and stability in a sustainable manner
- CEOS support of GGOS
  - Open data policy
    - Essential for obtaining data needed to determine TRF
  - Advocate for satellite Earth observations
    - And by extension, the TRF needed to analyse the observations
  - Satellite Earth obs. for Sustainable Development Goals
    - Importance of geodetic data and products