

Monitoring groundwater variability from space: the GRACE satellite gravity mission

JOHN WAHR¹, VIRENDRA M. TIWARI² & SEAN SWENSON³

1 *Department of Physics and CIRES, University of Colorado, Boulder, Colorado, USA*
wahr@lemond.colorado.edu

2 *National Geophysical Research Institute, Hyderabad (CSIR), 500 007 India*

3 *Advanced Study Program, NCAR, Boulder, Colorado, USA*

Abstract NASA and the German Space Agency (DLR) launched the GRACE satellite mission in 2002. GRACE provides accurate monthly solutions for Earth's global gravity field. Differences between solutions provide information about monthly variations in Earth's mass distribution. The results can be used to monitor changes in the total volume of water stored in regions with scales of a few hundred kilometres and larger. Total water volume includes contributions from groundwater, soil moisture, surface water, and snow. If soil moisture and surface water+snow contributions are subtracted, using observations or model output, the residuals provide groundwater variability.

Key words groundwater monitoring; water storage; soil moisture; GRACE satellite; remote sensing; time-variable gravity