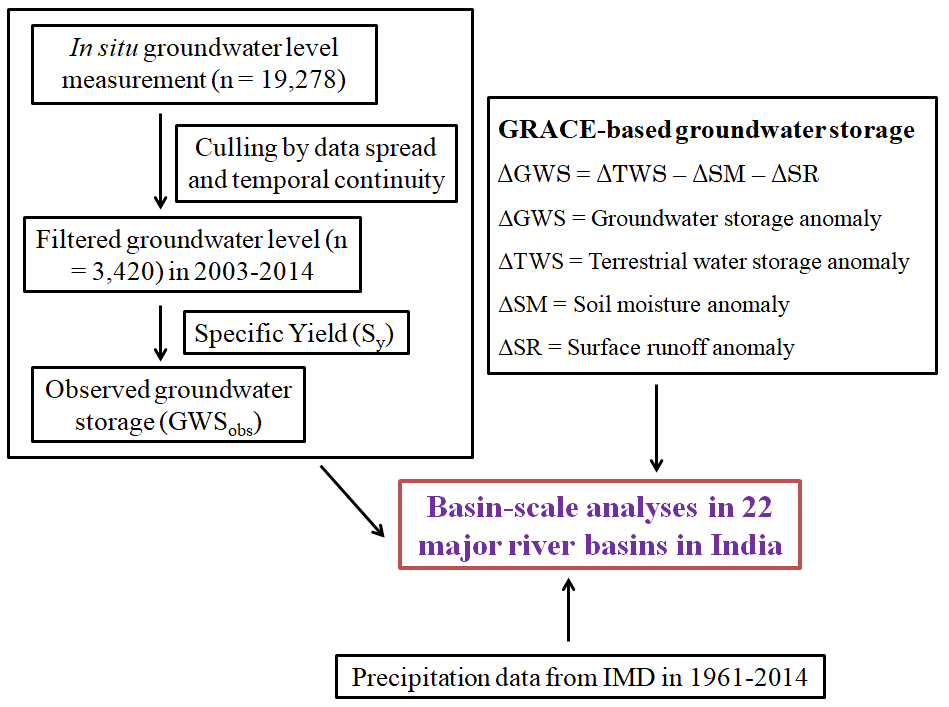
Supplementary material

Groundwater storage change from *in situ* and GRACE-based estimates in major river basins across India

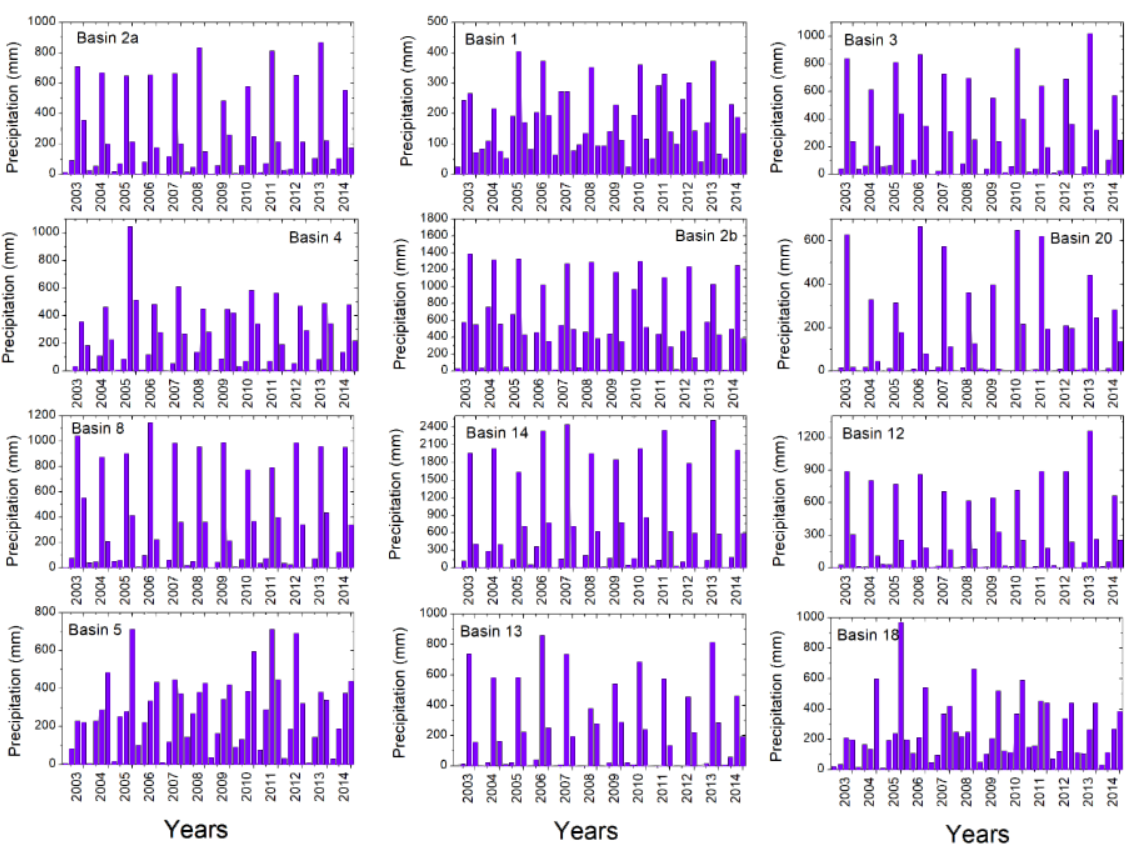
Soumendra N. Bhanja1†, Abhijit Mukherjee1,2, Matthew Rodell3

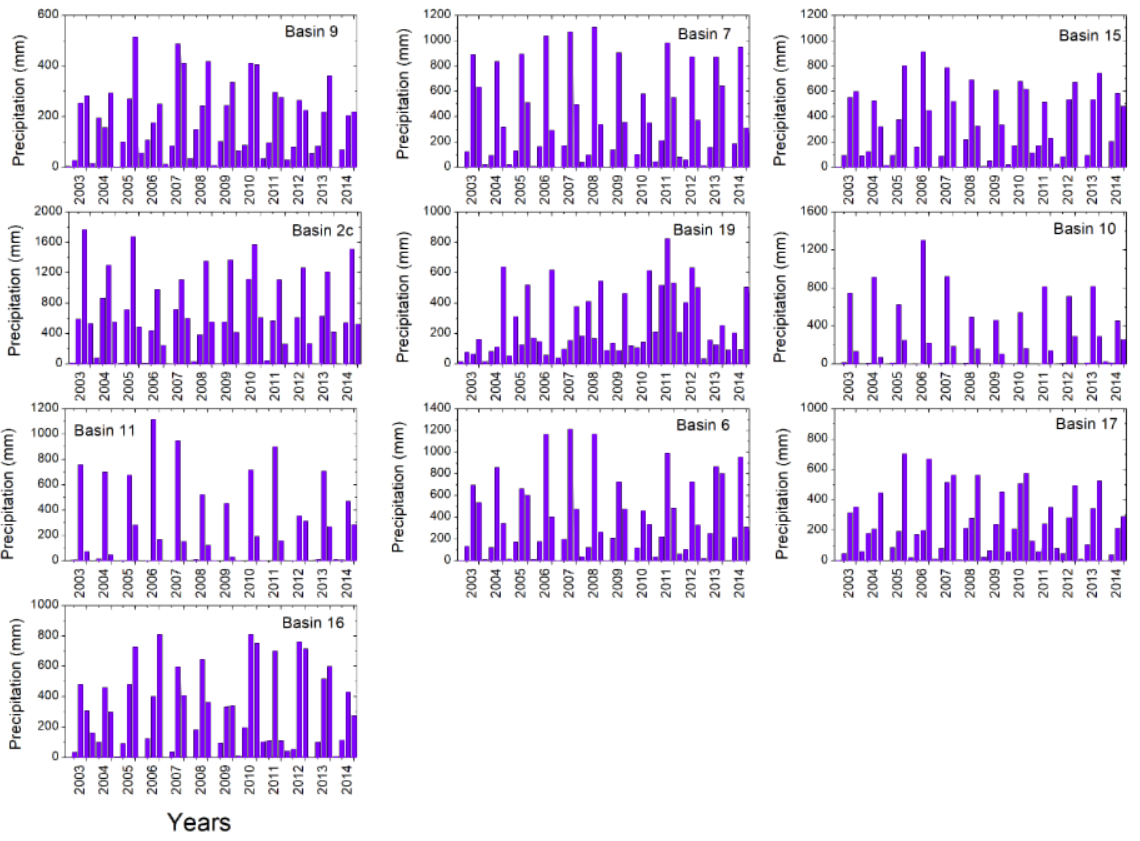
**Table S1.** Datasets used in the study.

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Data source | Spatial resolution | Temporal resolution |
| Precipitation | India Meteorological Department (IMD) precipitation data (IMD4) | Gridded (0.25º × 0.25º) | Daily |
| Groundwater level | Central Groundwater Board (CGWB), India | Point | Quarterly |
| Terrestrial water storage (TWS) | GRACE, Spherical harmonics solution from NASA JPL | Gridded (1º × 1º) | Monthly |
| Terrestrial water storage (TWS) | GRACE, Mascon solution from NASA JPL | Gridded (1º × 1º) | Monthly |
| Soil moisture | GLDAS (CLM, Noah, VIC) from NASA | Gridded (1º × 1º) | Monthly |
| Surface runoff | GLDAS (CLM, Noah, VIC) from NASA | Gridded (1º × 1º) | Monthly |

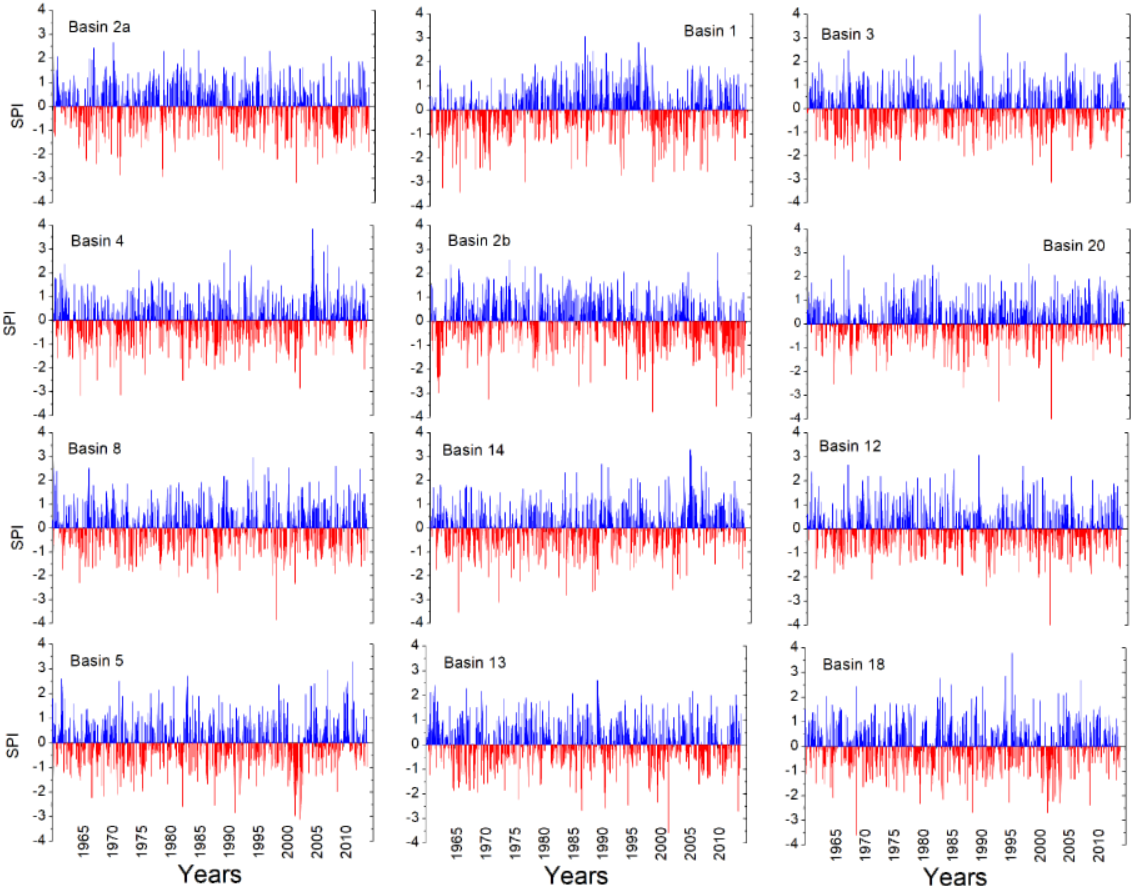


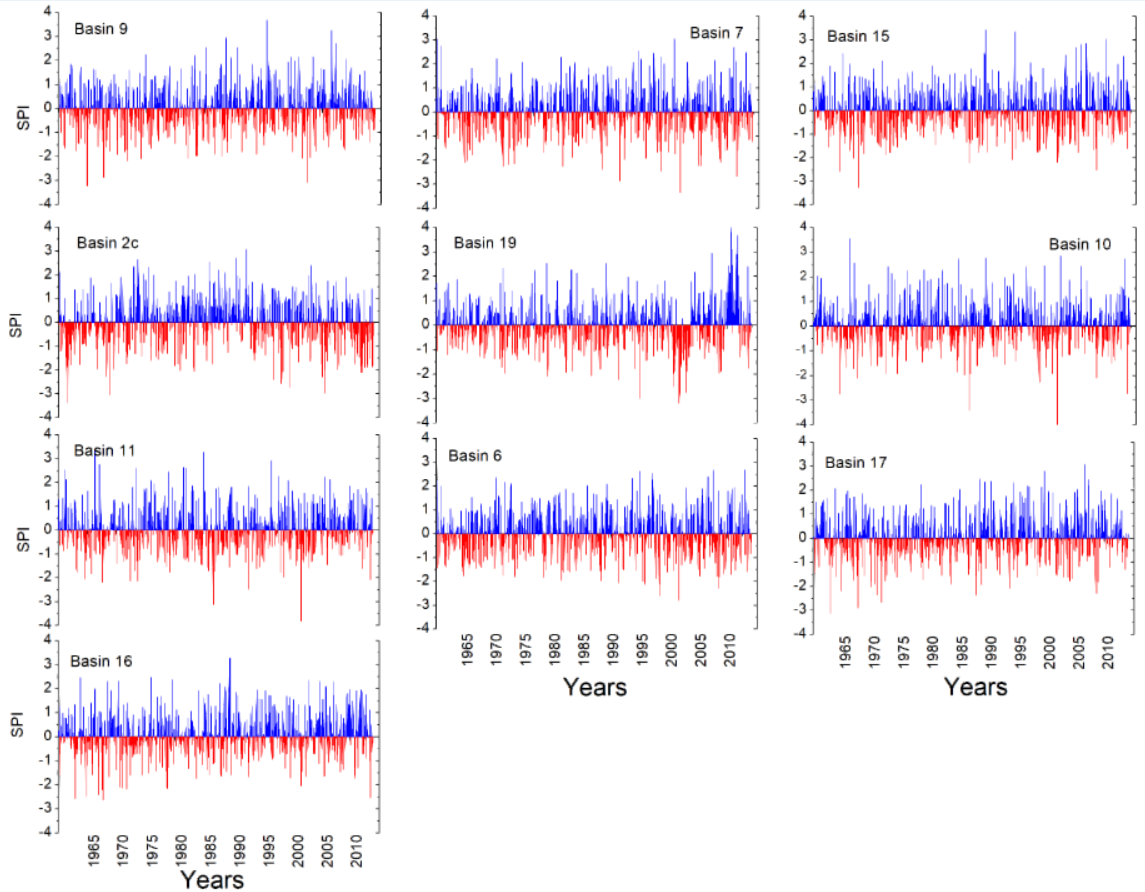
**Figure S1.** Flowchart showing the methodology adopted in the study.



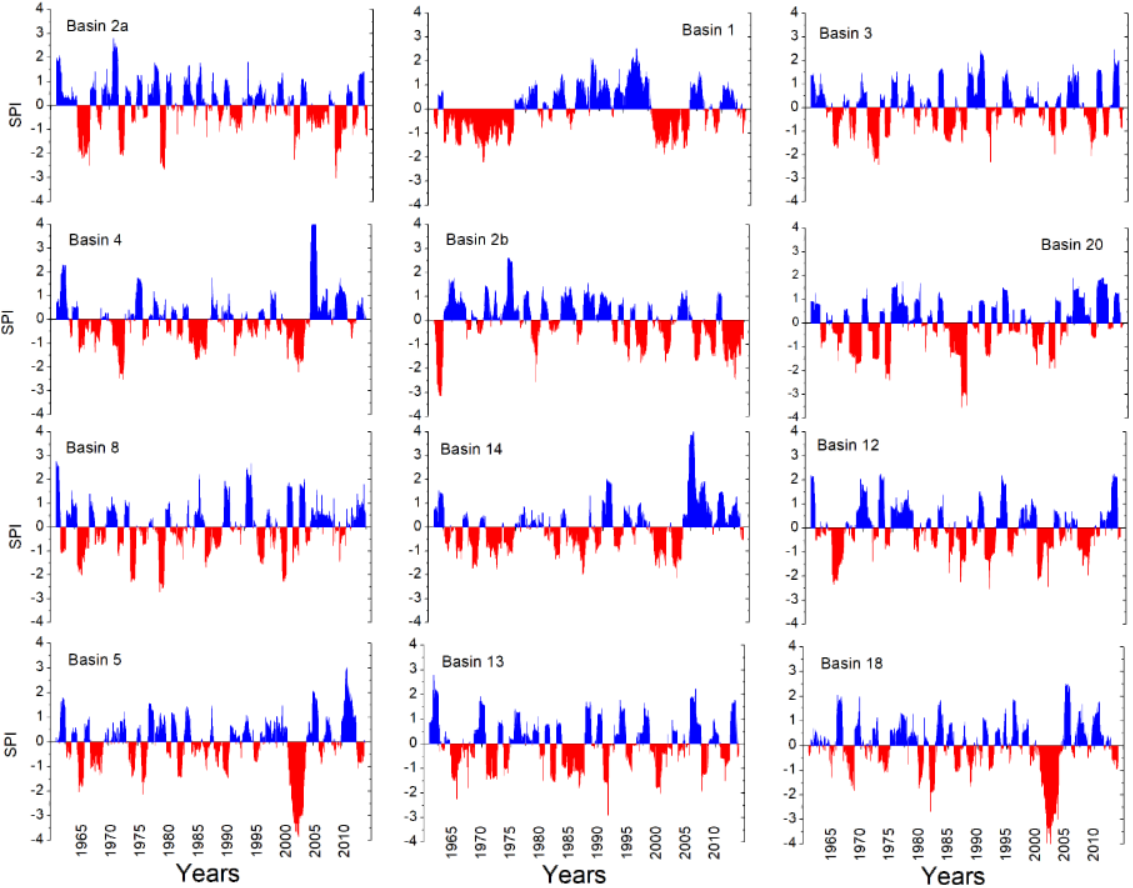


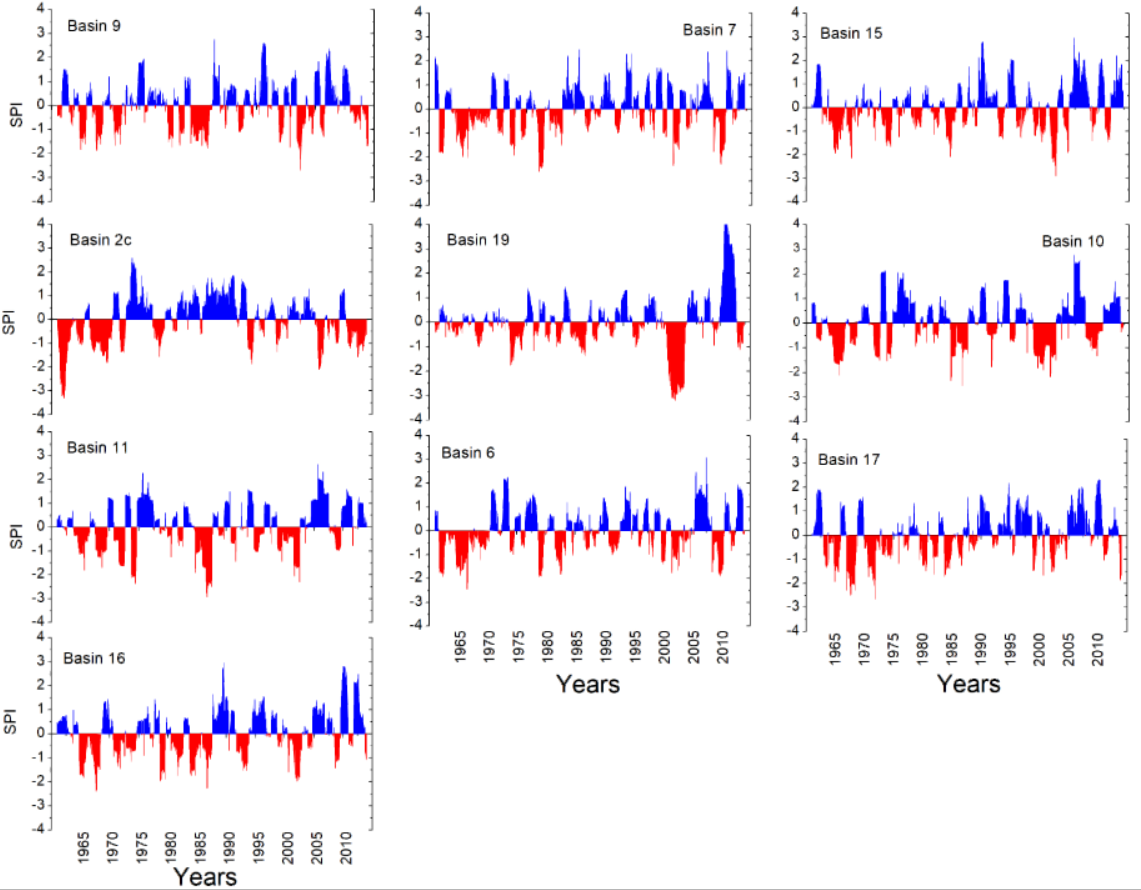
**Figure S2.** Basin-wise seasonal precipitation (mm). *x*-axis: seasons in 2003–2014 (four for each year). Basins are shown based on descending geographical area (N–S).

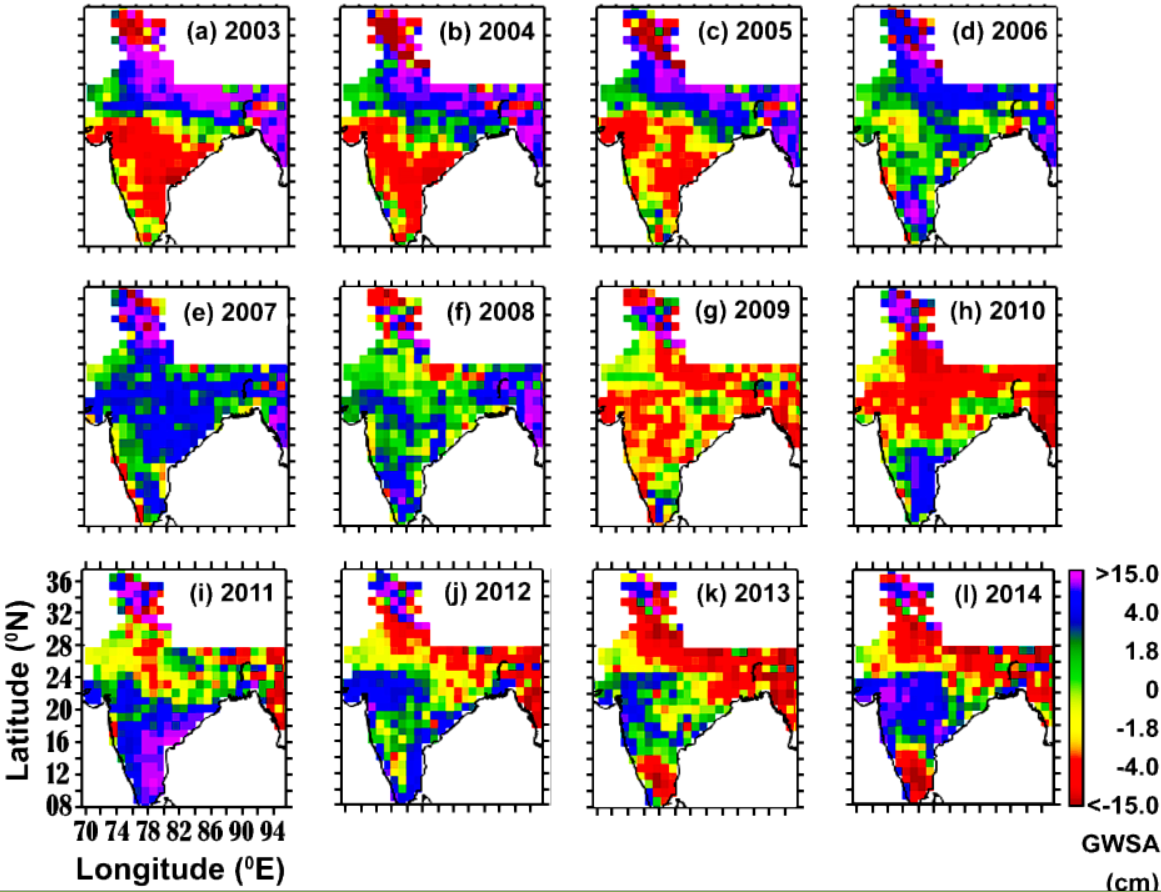




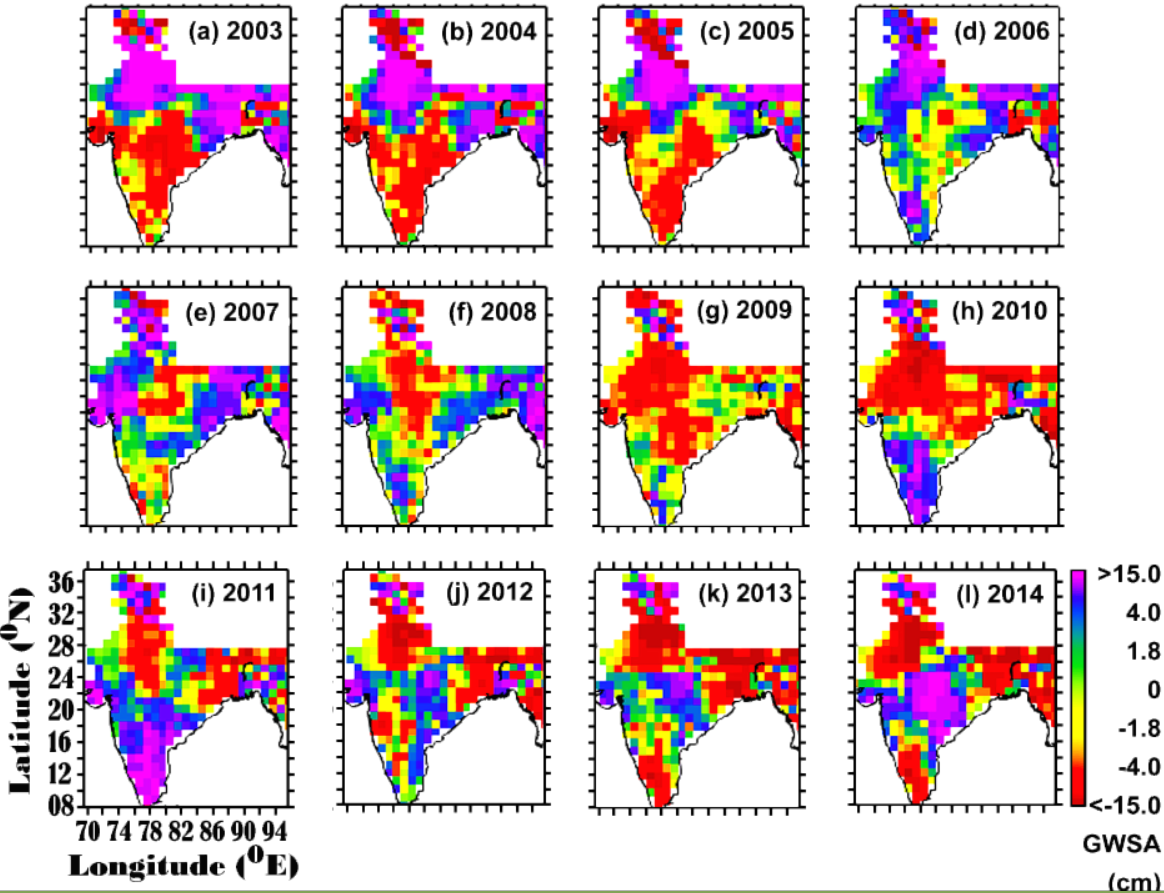
**Figure S3.** Basin-wise long-term (1961–2014) monthly SPI-1 values. Basins are shown based on descending geographical area.



**Figure S4.** Basin-wise long-term (1961–2014) monthly SPI-12 values. Basins are shown based on descending geographical area.



**Figure S5.** Annual satellite-based GWS anomalies (cm) using GRACE-SH data.



**Figure S6.** Annual satellite-based GWS anomalies (cm) using GRACE-MS data.