Objective: “See” where the water is, by looking at how it “moves” through the water cycle over the past 20 years (2000-2020)

Hydrological Cycle: The vertical and horizontal movement of water as liquid, vapor, or solids between the Earth’s surface, subsurface, atmosphere and oceans

Analyze: Inflow – Outflow = Change in Water Storage

Datasets:
- Precipitation Products: IMERG, PERSIANN
- Soil Moisture: SMOPS, SMAP
- Evaporation: GLEAM
- Runoff: ERA5, G-RUN
Components of the Global Hydrological Cycle

- NCSMOPScdr (Soil Moist)
- SMAP (Soil Moist)
- GLEAM (Evap)
- SMOPS (Soil Moist)
- ERA5 (Runoff)
- IMERG (Precip)
- PERSIANN (Precip)
- G-RUN (Runoff)

Mississippi River Basin
Precipitation (June 2017)

Global Evaporation — land (Jan-Apr 2003)

* NCS-MOPScdr: courtesy of Dr. Jin
RESULTS

Global Annual Cycle

Mississippi River Basin Annual Cycle

Components of the Global Hydrological Cycle (Annual)

Components of the Global Hydrological Cycle Mississippi River Basin (Annual)

- **Water storage** variations can be attributed to snow, ice, and groundwater, which were not explored in this project so far.
- Presented results suggest the variability and uncertainty in each of the water cycle components. Even though the datasets are derived by combining numerous sensors (both satellite- and ground-based) and models, there are still noticeable variations between the products measuring the same parameter.

**Inflow (precipitation) – Outflow (runoff, evaporation, soil moisture) = Change in Water Storage**