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Trends and Interannual Variability in Terrestrial Water Storage and Atmospheric Water Vapor Transport from GRACE and Multiple Atmospheric Reanalysis Datasets

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The global hydrological cycle plays an important role in the Earth's climate system. Understanding the variability of global hydrological cycle and the water storage of the ocean, land, and atmosphere is essential work for climate prediction and water management. The global hydrological cycle may intensify under global warming; some consequences include increasing in precipitation, evaporation, river freshwater discharge, and atmospheric water vapor transport. In this study, we use several atmosphere reanalysis datasets to estimate the atmospheric water transport from ocean to land. The terrestrial water storage variations are estimated from the Gravity Recovery and Climate Experiment (GRACE). Global freshwater discharge is computed using an atmosphere-land water balance equation. Our preliminary results show that the interannual variability of water vapor transport has a significant connection with climate change, especially the El Niño Southern Oscillation. Also, the enhanced water vapor transport from land to ocean play a major contribution to the increasing of seasonal cycle in terrestrial water storage.