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# Terrestrial storage changes and long-term climate variations in the Colorado basin

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The Colorado River basin covers about 637 000 km2 and spreads over the southwestern United States and a small portion of Mexico. Much of the basin is arid, and runoff derives from the high elevation snow pack over the Rocky Mountains, which contributes about 70% of the annual runoff. The Colorado River system is one of the most heavily regulated for providing water supply, irrigation, flood control, and hydropower to a large area of the U.S. Southwest. Estimating intra- and inter-annual variability of water storage in the basin is important for sustainable water management.

Different methods exist to estimate basin scale water storage changes. The Basin-Scale Water Balance method (BSWB; see http://iacweb.ethz.ch/data/water_balance/ ) estimates monthly terrestrial and atmospheric storage change from water vapor flux convergence, river runoff and water vapor content. The first two quantities are derived from two different re-analysis datasets: ECMWF re-analysis (ERA40) and North-American Regional Re-analysis (NARR). Both estimates will be compared to storage change estimates from the Variable Infiltration Capacity (VIC) model, which is applied in the Colorado basin, forced with observations spanning the period between 1950 and 2000 and compiled by Maurer et al. (2002). Derived storage change estimates show similar dynamics but amplitudes are different. Besides a strong annual cycle storage change estimates show a weaker decadal cycle. Correlations of this decadal cycle with climate variability indices such as the Pacific Decadal Oscillation (PDO) and Atlantic Multi-decadal Oscillation (AMO) are investigated.