



Progress in understanding water balance, transmission loss, and groundwater recharge dynamics in drylands

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Water resources of sufficient quality for human and ecosystem use are by definition limited within dryland environments. A critical determination of surface water resource availability in drylands is the loss of water as flow is transmitted downstream. These losses can occur via infiltration, evaporation, and terminal ponding, and provide the pathways for groundwater recharge. However, improving our understanding of these dynamics is hampered by the lack of monitoring data and high degree of hydrological variability, which in combination impacts our ability to create calibrated models or indeed validate their results. A summary of progress in understanding transmission losses is presented, which highlights the main limitations and pathways forward. In addition, new research using novel analysis of groundwater hydrographs for recharge estimation, storage – discharge analysis for recharge estimation, geochemical tracers, remote sensing for the calibration of flow hydraulic models, and ecohydrology feedbacks will be presented that in combination pave the way for a greater understanding of how the water budget is partitioned in dryland areas and the sensitivity of this partitioning to change.