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For decades, communities across much of sub-Saharan Africa have overcome intermittent and sustained water scarcity by withdrawing groundwater from weathered crystalline rocks. Intensification of the global hydrological system brought about by climate change is projected to accentuate current inequities in the distribution of precipitation over the next century. Substantial uncertainty, primarily associated with the choice of GCM and estimation of evapotranspiration, severely constrains understanding of climate change impacts on terrestrial hydrology. Fewer but more intense rainfall events associated with a warming atmosphere heighten temporal variability in surface water resources and reduce soil moisture storage. Both of these projected impacts pose serious threats to regional food security let alone access to safe drinking water. Increased spatial and temporal variability in precipitation is expected to substantially increase reliance upon groundwater to meet domestic, agricultural and industrial water demands over the next few decades in sub-Saharan Africa. Recent evidence from ground-based observations including borehole hydrographs and river discharge records and satellite data (GRACE) reveal: (1) the dependence of direct recharge fluxes on heavy rainfall events exceeding 10 mm/day, (2) the localised extent of saprolite-saprock aquifer systems in their response to recharge and abstraction, and (3) substantial spatial variability in trends in total water storage (soil moisture, groundwater, lakes). These results highlight the role that groundwater can play in enabling communities to adapt to (1) more variable soil moisture and its associated impacts on food production, and (2) more variable surface water flows and their impacts on water supplies. The localised nature of saprolite and saprock aquifers underlying nearly half of sub-Saharan Africa compels small-scale groundwater-based adaptations to climate change. Apart from substantial uncertainty in groundwater resources at the local scale, technical and economic barriers continue to inhibit the widespread adoption of groundwater-based solutions for development and climate change adaptation.

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