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Integrated mapping of groundwater drought risk in the Southern African Development Community (SADC) region

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Abstract

Groundwater drought denotes the condition and hazard during a prolonged meteorological drought when groundwater resources decline and become unavailable or inaccessible for human use. Groundwater drought risk refers to the combined physical risk and human vulnerability associated with diminished groundwater availability and access during drought. An integrated management support tool, GRiMMS, is presented, for the mapping and assessment of relative groundwater drought risk in the Southern African Development Community (SADC) region. Based on composite mapping analysis of regionwide gridded relative indices of meteorological drought risk, hydrogeological drought proneness and human groundwater drought vulnerability, the mapping results highlight consistent areas across the region with highest groundwater drought risk and populations in the order of 39 million at risk of groundwater drought at present. Projective climate-model results suggest a potentially significant negative impact of climate change on groundwater drought risk. The tool provides a means for further attention to the key, but neglected, role of groundwater in drought management in Africa.