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Hydrological response and impact pathways of the 2015/16 El Niño in eastern and southern Africa

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The 2015/16 El Niño has been classified as one of the three most severe on record. El Niño teleconnections are commonly associated with droughts in southern Africa and high precipitation in eastern Africa. No two El Niño's are the same, however, and despite their relatively frequent occurrence, evidence for their hydrological effects is limited. We present an analysis of the hydrological response and impact pathways of the 2015/16 El Niño in eastern and southern Africa, focusing on Botswana, Kenya and Zambia. We use in-situ and remotely sensed time-series of precipitation, river flow and lake levels complemented by qualitative insights from interviews with key organisations in each country about awareness, impacts and responses. Our results show that drought conditions prevailed in large parts of southern Africa, reducing runoff and leading to historically low lake levels in Botswana and Zambia. Key informants characterised this El Niño through record high temperatures and water supply disruption in Botswana and through hydroelectric load shedding in Zambia. Extreme precipitation was far less widespread in Kenya than associated with 1997/98's El Niño. Warnings of flood risk were consequently high but the 2015/16 El Niño did not materialise as expected. The severity of hydrological impacts of 2015's El Niño in southern Africa was strongly exacerbated by dry antecedent conditions, in combination with increasing demand and management factors. Improved understanding of hydrological response and dynamic impact pathways can support design of resilience building strategies.