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Southern African hydroclimate during the Late Quaternary: integrating source to sink and multi-archive studies

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Southern Africa is located at the interface of sub-tropical and temperate climate zones as well as between two major warm and cold ocean current systems (Agulhas and Benguela), respectively. This makes it a key region for understanding global climate dynamics and highly sensitive to future climatic change. A growing number of paleo-archives have revealed small-scale climatic dipoles in this region and the driving mechanisms of the complex climatic variability often in this region remain unclear. Several regional studies have suggested a synchronicity with the southern hemisphere and thus inferred a direct insolation forcing while others have observed a synchronicity with northern hemispheric climate and associated this with a teleconnection mechanism. In order to decipher the complex climatic processes affecting this region it is necessary to integrate on- and offshore paleo-archives as well as various paleo-environmental indicators (proxies). For the correct interpretation of the various proxies a source to sink approach is necessary determining the origin of the different terrestrial sedimentary components and their potential alterations during transport and deposition. With a focus on marine and lacustrine sedimentary archives along the west, south, and east coast of southern Africa we are now able to reconstruct Late Quaternary climate variability on regional scales. We propose a new conceptual model describing latitudinal shifts of rainfall zones as tropical and temperate climate systems shift over glacial and interglacial cycles. New insights allow us to resolve some of the apparent contradictions between paleoclimate records from the region.