

400,000 YEARS OF RAINFALL VARIABILITY IN SUBTROPICAL BRAZIL INFERRED FROM STALAGMITE $\delta^{18}\text{O}$ RECORD

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$\delta^{18}\text{O}$ values of carbonate in stalagmites constitute one of the best established proxies for reconstructions of paleo-rainfall variability in tropical and subtropical areas. Here we present a new paleo-rainfall record spanning the last 400,000 years based on a stalagmite $\delta^{18}\text{O}$ profile from Tapagem Cave (located at about 280 km SE from the city of São Paulo, Brazil). Long-term $\delta^{18}\text{O}$ oscillation ranges between -6 and -2 per mil (PDB). Both the amplitude and the periodicity of $\delta^{18}\text{O}$ oscillation show significant anticorrelation with summer insolation curve calculated for 30 degrees of latitude South. This reinforces the argument that solar irradiance is the main driver of long term rainfall variability in subtropical South America. In the light of present day seasonal variation of $\delta^{18}\text{O}$ values of regional precipitation, the observed correspondence between lower $\delta^{18}\text{O}$ and higher insolation values can be interpreted in terms of a dominant ^{18}O -depleted vapor source during periods of high insolation, and vice-versa. This suggests that the causal link between solar irradiance and the activity of South American Monsoon, extensively documented for the last glacial cycle, can be extended far back into the Pleistocene.