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Cenozoic climate evolution in Asian region and its influence on isotopic composition of precipitation

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The evolution of Asian climate during the Cenozoic as well as the onset of monsoon systems in this area is highly debated. Factors that control climate include the geographical position of continents, the land-sea distribution and altitude of orogens. In tern, several climatic parameters such as air temperature, precipitation amount and isotopic fractionation through mass-dependent processes impact precipitation δ^{18}O lapse rate. Stable oxygen paleoaltimetry is considered to be a very efficient and widely applied technique, but the link between stable oxygen composition of precipitation and climate is not well established. To quantify the influence of paleogeography changes on climate and precipitation δ^{18}O over Asia, the atmospheric general circulation model LMDZ-iso, with embedded stable oxygen isotopes, was used. For more realistic experiments, sea surface temperatures were calculated with the fully coupled model FOAM. Various scenarios of TP growth have been applied together with Paleocene, Eocene, Oligocene and Miocene boundary conditions. The results of our numerical modelling show a significant influence of paleogeography changes on the Asian climate. The retreat of the Paratethys ocean, the changes in latitudinal position of India, and the height of the Tibetan Plateau most likely control precipitation patterns over Asia and cause spatial and temporal isotopic variations linked with the amount effect. Indian Ocean currents restructuring during the Eocene induces a substantial warming over Asian continent. The adiabatic and non-adiabatic temperature effects explain some of δ^{18}O signal variations. We highlight the importance of these multiple factor on paleoelevations estimates derived using oxygen stable isotopes.