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ENSO modulates the variability of ice core δ18O in the central Tibetan Plateau

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The El Nino-Southern Oscillation (ENSO) drives interannual variability of rainfall, ecosystems and floods in many parts of the world. Climates in the Tibetan Plateau (TP) called as the “water tower” may be impacted by ENSO, but the character of ENSO impact and its mechanism are still not well understood. Here we present the isotopic profiles ($\delta^{18}O$) from a new Zangsegangri (ZSGR) ice core drilled in 2013 in the central TP covering 200 years to understand the ENSO impact on the TP climate. The imprint of ENSO is evidenced at annual scale as recorded in ice core. This ice core $\delta^{18}O$ record also reveal contributions of south/north moisture sources change with the transition of El nino/La nina events which are triggered by the tropical sea surface temperature, associated with the change of convections along the moisture transport paths. These rapid changes lead to the variation of ZSGR ice core $\delta^{18}O$, namely El Nino events result in lower $\delta^{18}O$ in the ZSGR ice core record. The mechanism of ENSO impact on the ZSGR ice core $\delta^{18}O$ are quantified with LMDZiso model. The significant impact of ENSO activity on the Tibetan ice core record during the past centuries implies the importance of ENSO in land surface processes in the TP.