



Short-term Variability of Indian Summer Monsoon Rainfall $\delta^{18}\text{O}$

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We present the first ever dataset of rainfall stable isotopologues ($\delta^{18}\text{O}$ and δD) of Indian Summer Monsoon with a high spatio-temporal resolution. ~ 260 daily rain samples were collected from six different locations over Central and Northern India during June to September (monsoon season), 2013. On a daily scale, significant linear negative correlations between rainfall amount and its $\delta^{18}\text{O}$ ("amount effect") are observed at five out of six locations, however the amount explains only $\sim 7-23\%$ of total observed variability of daily rainfall $\delta^{18}\text{O}$. There are two different moisture transport pathways to Central and Northern India during the summer monsoon; the Arabian Sea and the Bay of Bengal Branches. HYSPLIT back trajectory analysis suggests that the Arabian Sea component is stronger during relatively enriched $\delta^{18}\text{O}$ rain events compared $\delta^{18}\text{O}$ depleted rain events. A significant negative temporal trend in rainfall $\delta^{18}\text{O}$ is observed at four stations during the season. This is likely due to the shift in moisture transport pathway from the Arabian Sea branch to the Bay of Bengal branch during the later period of the season. These results suggest that $\delta^{18}\text{O}$ of Indian Summer Monsoon rainfall is highly sensitive to the circulation pattern. The new dataset will be useful to validating isotope enabled General Circulation Models over Indian Monsoon region.