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Miocene to recent chemical weathering in the Himalaya inferred from the stable Li-isotopes

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Miocene to recent chemical weathering in the Himalaya inferred from the stable Li-isotopes

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The interplay between tectonic exhumation, climate, atmospheric CO_2 and continental erosion and weathering is crucial to understand the mechanism that forced Cenozoic global cooling. However, long-term silicate weathering records are poorly constrained in the Himalayan belts during Late Cenozoic period. We present radiogenic Sr, Nd and stable Li isotope compositions measured on Himalayan foreland basin clays to delineate the sources of the clays and silicate weathering history over the past 20 Myr. Our Sr-Nd isotope records show that the foreland clays were mainly supplied from the Higher Himalayas between 20 and 9 Myr ago. Thereafter the source shifted to Lesser Himalayan sources to switch back to High Himalayan dominance 5 Myr ago. Our clay mineral assemblages and Li isotope results show a strong positive excursion between 14 and 8 Ma ago, suggesting weak chemical weathering possibly linked with reduced atmospheric CO_2 and global cooling with the development of dry climate during the Middle Miocene Climate Transition (MMCT). On the other hand, a high Kaolinite/illite+chlorite and negative Li isotope excursion indicate strong chemical weathering ~8 Myr coincide with the Late Miocene global cooling and stronger seasonality.