Is the Argentinean Loess a primary dust source in the Southern Hemisphere?

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Loess is considered an aeolian deposit formed by wind-blow mineral dust. Dust particles can be transported long-range in suspension in the troposphere at different altitutes and their deposits can be found far away from their sources. Dust becomes then a key element for micronutrients, especially in the HNLC zones. Furthermore, when dust is identified and characterized in different paleo-climatic archives (i.e., ice cores, loess, marine sediment cores, etc) it constitutes an excellent proxy indicator of past atmospheric circulation. Many studies have presented unequivocal evidence demonstrating that the dust trapped in Antarctic ice originates mainly from southern South America (SSA). In detail, dust source regions include Patagonia, the southern part of Central Western Argentina, southern Puna, southern Altiplano and a possible contribution from the Pampean region during glacial/interglacial periods. The Argentinean Pampean region is a large area (~10^6 km^2) covered with a 20-50 m thick loess cover. Its origin and impact is still controversial since there is no agreement if it represents a primary or a secondary source of dust in the Southern Hemisphere. We here address that question and present a comprehensive study of the rare earth element (REE) and Sr–Nd isotopes of loess samples collected in a NW-SE transect along the Pampean Region. Our first results indicate aeolian material in this region is mainly affected by re-suspension close to the sources. Moroever, only some sub-areas within this extensive region, could represent active dust sources during the last climatic cycles, where the loess can cross the atmospheric boundary layer and be transported far away to surrounding environments such as the Southern Ocean or Antarctica.