The northern part of South America has undergone several major changes in its tectonic setting since the Triassic, evolving from oceanic rifting to the development of a retroarc-foreland basin on its Andean margin, leading to margin extension and continental uplift following the breakup between Africa and South America. So far, it is unclear when and how these geodynamic events affected the paleo Amazonian drainage. In this study, we investigate the provenance of Meso-Cenozoic sedimentary rocks deposited in the Huallaga and Madre de dios basins basins (Peru) and Acre basin (Brazil), based on their Sr-Nd isotopic compositions and U-Pb zircon dating. The Triassic–Jurassic samples from the Huallaga basin have εNd (0) values ranging from -7.9 to -10.0 and main U-Pb zircon peaks at 0.9–1.3 Ga (31-33%) and 0.5-0.7 Ga (21-28%) that suggest a mixed clastic supply from the Western and Eastern Cordillera within a back-arc setting. Samples from the Albian–Maastrichtian interval yield much lower εNd (0) values (-16.8 to -18.6) and a dominance of zircon grains derived from terranes in the easternmost Brazilian shield (Ventuari-Tapajos (2.0–1.82 Ga), Rio Negro-Jurena (1.82–1.54 Ga) and Rondonia San Ignacio (1.54–1.3 Ga), thus indicating a cratonic source for these sedimentary rocks. In the Madre de Dios basin, Early Maastrichtian sedimentary rocks have also low εNd(0) values (-15 to -16) and they are characterized by Precambrian-inherited zircon grains. The late Cretaceous sedimentary rocks of the Acre basin (Serra do Divisor) yield low εNd (0) values (between -4.3 and -7.5) and a greater proportion of zircon grains ages younger than 120 Ma which suggest that they are sourced from the Andes. In addition, one sample (AC 61) yield 7 zircons age between 5 +- 0.38 Ma and 7+- 0.08 Ma. These later data indicate a source located in the Peruvian Altiplano (Barroso group, Puno area) and give a minimum age for the uplift of the Fitzcarrald Arch at ca 5 Ma. Hence together with previously published studies, this indicate that the modern Amazon drainage system is no younger than the Pliocene.