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The Archaean Singertat carbonatites from South-East Greenland indicate constant carbon isotopic composition of the mantle over geological time

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We report the first light carbon isotope composition of Archaean carbonatites from South East Greenland. Samples were collected from the nephelinitic-carbonatitic Singertat Complex which is 2.664 +4/-2 bilion years old (Blichert-Toft et al., 1995). We extracted samples both from carbonatite matrix, and from syenitic pegmatites in ijolite and carbonatitc breccias. We measured carbon isotope compositions in both hand picked calcite separates and whole rock using Cavity Ring-Down Spectrometer at the Natural History Museum of Denmark. Carbonatites show δ^{13}C values ranging from -5.64 to -4.66‰The Archaean Singertat carbonatites have carbon isotope values similar to Neoproterozoic carbonatites, kimberlites and aillikites from West Greenland and Aillik Bay in Labrador (Tappe et al., 2006; Tappe et al., 2011). Morover, the narrow range in δ^{13}C values around a mean value of -5.08‰ fits well into the picture emerged from the studies of peridotitic diamonds from worldwide sources (Cartigny, 2005) and it is consistent with inferred isotopic composition of mantle carbon of δ^{13}C = -5‰ (Deines, 2002). Therefore we provide a robust evidence for a carbon isotopic composition of the mantle source of carbonatites and kimberlites that has been constant over geological time from Archaean until today. Furthermore, according to the iron meteorites that represent the isotopic composition of the bulk Earth with the δ^{13}C mode between -5 and -6‰ (Deines and Wickman, 1975), we suggest that the mantle has been unchanged since the homogenization of the Earth.