

SUMMARY

Carbonatites are intrusive and extrusive rocks with content of carbonate minerals > 50% predominantly derived from upper mantle. They represent a potential economical source for platinum-group elements as can be seen on actively mined sites like Phalaborwa in South Africa or Ipanema in Brazil. The first complete dataset for highly siderophile element (HSE) abundances along with their $^{187}\text{Os}/^{188}\text{Os}$ compositions for carbonatites, silicocarbonatites and associated alkaline rocks (pyroxenite, syenite, monzogabbro and tonalite) from two Neoproterozoic (~ 800 Ma) suites from Samalpatti and Sevattur, Tamil Nadu region in south India is presented. The data were obtained by a standard methods in involving decomposition of samples in *Carius Tubes*, Os separation by CHCl_3 following microdistillation and Ir, Ru, Pt, Pd isolation by anion exchange chromatography. The data show that carbonatites from Samalpatti and Sevattur are characterized by very low HSE contents, lower than other mantle-derived mafic melts such as basalts or komatiites. Suprachondritic $\text{Os}_\text{N}/\text{Ir}_\text{N}$ ratios might suggest that carbonatites are able to concentrate not negligible amount of Os. Due to high, non-uniform $^{187}\text{Os}/^{188}\text{Os}$ ratios, we suggest that the source of carbonatitic melts was largely heterogeneous with high contribution of crustal material like eclogite. Some Sevattur carbonatites are considerably enriched in Cu and it seems that this feature is connected with high contents of P_2O_5 and FeO_tot associated with high proportions of apatite and magnetite. Analysed Mg-Cr-rich silicocarbonatites have much higher contents of HSE than other examined samples. Flat I-PGE patterns resemble that typical for pyroxenes and convex-upward distribution of P-PGE-Re may indicate that the Mg-Cr-rich silicocarbonatites undergone through some post-processes like metasomatism or late alteration. Due to their high contents of Os, Ir, Ru and their petrography, we believe that these silicocarbonatites originated in a close association with a fenitized pyroxenite and represent mixed primary mantle-derived alkali- CO_2 -rich melts and the host rock. The alkaline rocks from Samalpatti widely vary in their HSE contents, which are predominantly related to their sulphur concentrations. Within this suite, late-stage pyrite mineralization found in some pyroxenites caused high perturbation of Re-Os isotopic system. For those samples, where it is possible to calculate initial $^{187}\text{Os}/^{188}\text{Os}$ ratios, we suggest that their origin is a result of derivation from crustal lithologies. Patterns for monzogabbros and syenites and their highly radiogenic $^{187}\text{Os}/^{188}\text{Os}$ compositions correspond to continental crust. Alkaline rocks from Sevattur are very low in HSE contents and their $^{187}\text{Os}/^{188}\text{Os}$ ratios also imply that these rocks have a crustal origin.