

THE KOVDOR CARBONATITIC AND ALKALINE COMPLEX (KOLA PENINSULA, RUSSIA): EVIDENCE FOR MULTI-SOURCE EVOLUTION.

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The 380Ma Kovdor intrusion belongs to the famous Kola carbonatite province (NW Russia). It displays a complete sequence of rocks. Ultramafic rocks (dunites and clinopyroxenites) and melilitolites are cumulates. Rocks of the melteigite-ijolite series are heterogeneous (variations in grain size, mineralogy and modal proportions) and show disequilibrium textures (core resorption and complex zoning of clinopyroxene). Several generations of phoscorites and carbonatites are observed. Geochemical (major and trace elements) and isotopic (Sr-Nd) data have been obtained for the different units. The main conclusions of this study are :1) the carbonatites and the melteigite-ijolite series do not correspond to conjugate immiscible liquids; 2) carbonatites and melilitolites are derived from a common Sr- and LREE-rich liquid quite comparable to the Kola melilitites and lamprophyres; 3) initial isotopic compositions of the clinopyroxenite, the melilitolites and the carbonatites ($^{87}\text{Sr}/^{86}\text{Sr}$: 0.70320 to 0.70392; positive epsilon Nd values: +0.6 to +5.2) plot close to the mantle array at 380Ma, in the depleted quadrant of the Sr-Nd diagram. The quite large dispersion of data suggests either that several magma batches were derived from an isotopically heterogeneous mantle source or that two mantle components (the depleted mantle and a plume-type component) were mixed in various proportions; 4) the isotopic composition of the melteigites-ijolites (both positive and negative epsilon Nd values) requires an enriched component that could correspond to the source of the contemporaneous ultramafic lamprophyres and kimberlites or could result from the contamination by lower crustal material.