ABSTRACT

The garnet clinopyroxenite xenoliths found in the Kakanui Mineral Breccia (Kakanui, South Island, New Zealand) are thought to have originated from a mantle cumulate at a depth of some 60 to 70 km. It is most likely that the garnet-clinopyroxene assemblage seen in these rocks is the original mineralogy, unlike similar xenoliths found in Australia, Hawaii, and Israel (for example), which are presumed to have exsolved from a high pressure clinopyroxene cumulate.

The clinopyroxene in some of the garnet clinopyroxenites has been partially replaced by a kaersutitic amphibole. Some of this replacement is due to direct precipitation of oikocrysts from an amphibolite (= basaltic) liquid, and some to hydration of the pyroxene by metasomatism, probably associated with the amphibolite liquid.

The garnet clinopyroxenites are accidental inclusions within the breccia, bearing no relation to the host melanephelinite. They were entrained within the melanephelinite and erupted shortly thereafter, around 34 million years ago. The rapid ascent to the surface caused decompression melting in some of the garnet pyroxenites.

Rare orthopyroxene has been found for the first time in these nodules.

As the pyroxene in the garnet pyroxenites is an Fe-Al- Na- augite, the name "eclogite" cannot be given to them as it has previously.