D-23: Phenomenon of incipient charnockitization in the Kalutara District

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Incipient charnockitic patches were observed in several quarries located in the villages of Mihikata, Pelpola and Uggalboda of Kalutara District. Light coloured and highly sheared garnetiferous biotite gneiss (para-gneiss) was invaded by dark green orthopyroxene-bearing charnockitic patches, pods and lenses. At Danhoff-quarry near Mihikata, newly-formed charnockitic lenses clearly cross-cut the axial planes (S_5) of late open folds (D_5). Similar observations had been made in the districts of Kurunegala and Anuradhapura and this younger event which led to the process of charnockitization postdates the juxtaposition of Highland and Vijayan Complexes. It seems that the distribution of charnockitc patches in this quarry was controlled by a deformed (layer-paralled) basic dyke, and if this was correct, involvement of a fluid phase (most probably channellized) during arrested charnockitization can be inferred. In the village of Pelpola, garnetiferous biotite gneiss was charnockitized along the foliation plane (S_2) as well. Here, incipient charnockites spread along 2 planes (along S_2 and plane which cross-cuts S_5) and at some places, they formed a network. In this quarry (Pelpola), there was a set of thin felsic dykes which postdate all the ductile structures. The colour of these dykes was obscured when charnockitic patches spread over them but biotite grains in the dykes were not altered in orthopyroxene. Therefore, their temporal relationship was not clear.

In the charnockitized portions, there was a slight coarsening of grain size. Orthopyroxene was mainly produced by a reaction between biotite and quartz although garnet was involved occasionally. Low density CO_2-rich fluid inclusions were abundant in the investigated charnockite sample. Probably CO_2-rich fluids triggered the dehydration of biotite but at present, the source of these fluids was not clear. Their densities corresponded to about 4 kb while mineralogical barometry yields pressures between 4 and 5 kb as the condition of charnockitization.