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PROGRADE CHARNOCKITIZATION AND RETROGRADE DE-CHARNOCKITIZATION IN THE KURUNEGALA AREA: IMPLICATION FOR CONTRASTING CHANNELISED FLUID FLOW

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The Wanni Complex around Kurunegala area consists of charnockitic gneisses, hornblende-biotite gneisses, granitic gneisses and minor quartzites and pelitic gneisses and they have been folded into km-scale synforms and antiforms. The hornblende-biotite gneisses and the charnockitic gneisses respectively display spectacular exposures of prograde charnockitisation and de-charnockitisation phenomena which are characteristically associated with late, small-scale ductile shear zones.

The prograde charnockitic rocks characteristically occur in the form of patches and bands and layers. The dominant oval shaped patches characteristically over-print the penetrative fabric in the host gneiss and are commonly oriented oblique to the foliation and they are related to the NNW-SSE trending, meter scale ductile shear zones. The bands and layers lie parallel to the foliation, trending NW-SE. Though several models have been suggested for the formation of prograde charnockitic rocks, field relations favour the model involving influx of chanellized CO_2.

Striking exposures displaying retrograde de-charnockitisation phenomenon and related K-metasomatism occur in the Pellandeniya, Ihala Madawala and Uhumiya quarries where dark coloured, enderbitic charnockitic rocks have been down graded and metasomatised to pale pink coloured syenitic rocks involving two stages. The first stage involves down grading of the enderbitic rocks to pale coloured charnoenderbitic rocks with the influx of hydrous fluids via the N-S trending meter to ten's of meter scale ductile shear zones and laterally through the foliation. The second stage involves the influx of metasomatising fluids again through the same shear zones and the formation of the syenitic rocks which are confined to the shear zones and the adjoining areas. Consequently the unaltered and partly altered host enderbitic charnockitic rocks occur as meter to ten's of meter scale patches within the light coloured retrograded and metasomatised rocks and these relict host rock patches resemble the prograde charnockitic patches. The mineralogical changes associated with retrogression and metasomatism includes gradual decrease of mafic minerals with partial and or complete replacement of orthopyroxene by biotite, replacement of plagioclase by microcline and increase in modal myrmekite.

The source of the CO_2 believed to have caused the prograde charnockitisation has been not constraint in the present study but the source of hydrous fluids may have been the fluids released from the crystallising pegmatites and further supplemented by the metasomatic fluids derived from deep seated granitic bodies. The field and petrography data suggest that the non-hydrous and metasomatising hydrous fluids have been channellised separately through different lithologies in the area, which had initiated retrograde de-charnockitisation before prograde charnockitisation.