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Sedimentation, lithostratigraphic differentiation of Kauriyala Formation and delineation of limestone bands, Inner Krol Belt, Himachal Himalayas, India

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The Late Proterozoic Krol Group is exposed in Outer and Inner Krol Belts. The Krol carbonate sequence in Inner Krol Belt is exposed in regional Korgai and Nigalidhar synclines, Sirmaur district, Himachal Pradesh. The Krol Group is divisible into Mahi, Jarashi and Kauriyala Formation (Upper Krol Formation). The Mahi, Jarashi formations form the subordinate calc-argillite suite. The work in the Krol Belt was carried out by J.B. Auden [1] and the Kauriyala Formation was differentiated in Lower (Krol 'C'), Middle (Krol 'D') and Upper (Krol 'E') members in Outer Krol Belt, but the Kauriyala Formation of the Inner Krol Belt remained undifferentiated.

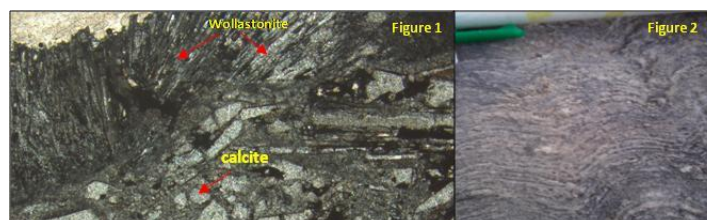
The work has led to differentiation of Kauriyala Formation in Lower, Middle and Upper members in Korgai and Nigalidhar synclines in Inner Krol Belt. This classification has provided an insight into the sedimentation history and also provides a veritable tool in economic exploration and utilisation of these limestone and dolomite bands. The characteristics of the carbonate suite i.e. Lower, Middle and Upper members of Kauriyala Formation, Inner Krol Belt are as follows:

The Lower Member is mainly constituted of thinly bedded limestone in basal part followed by massive to cavernous/pitted thickly bedded crystalline, pyritous slightly calcitic dolomite to slightly dolomitic limestone with birds eye texture and thickness varying from 18m to 90m. Wollastonite, a diagnostic mineral of dynamo-thermal metamorphism, associated with thrust has been reported for the first time. In microfacies study, it is categorised as Grainstone-packstone-mudstone. Four limestone zones (Flux grade for Iron industry) have been delineated in Korgai and Nigalidhar synclines. In Korgai syncline, CaO varies from 45.41% to 46.98%, MgO varies from 2.28% to 4.95 %, with thickness 24m and 17m. In Nigalidhar syncline, CaO varies from 48.31% to 51%, MgO 4.89 % to 5.07% and thickness 89 m.

The Middle Member is mainly constituted of dolomite alternating with subordinate black chert, interbedded shale bands with thickness varying from 87m to 210m. Gypsum, a mineral of evaporite facies, has been found as pockets, veins and along joint planes. The gypsum lenses in dolomite suggest its direct chemical precipitation as primary dolomite.

The Upper Member is massive stromatolitic calcitic dolomite with subordinate shale. Stromatolites have been reported for the first time and are of Stratifera species. Stromatolites are non-columnar, with undulatory lamination and are laterally linked. It has formed by bio-chemical precipitation. The evidences of diagenesis are i.e. algal layers are filled with secondary dolomite and peloidal packstone with stylolites. CaO varies from 27.3% to 33.29%, MgO varies from 11.11% to 22.11%. Stromatolites of

Stratifera species from Upper Member of Kauriyala Formation are of Middle to Late



Riphean age and can be correlated with those in Mussorie syncline, Uttarakhand Himalayas.

Figure 1: Wackestone with wollastonite in Lower Member; Figure 2: Stromatolite in Upper Member

References:

[1] Auden JB (1934) Rec Geol Surv India 67(4):357-451

