Flute casts in the banded iron formation of the Chitradurga schist belt in the vicinity of Palvanahalli village, north of C.S. Halli are reported in this note.

Signatures of near-shore and shallow basin conditions of deposition which are noticed in the BIF of the Chitradurga Schist Belt north of C.S. Halli in the form of flute casts are reported. Tectonic structures like, folding, faulting, disaggregation and rotation, brecciation and shearing are also prominent in the BIF (Hussain et al. 2002). The schist belt is made up of different volcano-sedimentary lithounits with distinct litho-tectonic characters reflecting near shore, shallow to deep water sedimentation and sub-aqueous volcanic activity including BIFs of oxide, carbonate, silicate/shaly and sulphide facies (Radhakrishna and Vaidyanadhan, 1994). Many bands of BIF 10-30 m wide each and up to 35 km long, occur in the central and eastern part of the belt. These are underlain by pillowed and variolitic metavolcanic rocks and are highly deformed, sheared and metamorphosed from upper greenschist to lower amphibolite facies (Naqvi, 1985). The BIF shows well developed banding with a general NNW strike and dip of 50 to 70°E. Gold occurs in the sheared portions of the sulphide facies BIF bands at many places which ranges from 0.2 to 3.5 g/t (Sawkar et al. 1995). During the investigation taken up to find new bands of sulphidic BIF for probable gold occurrence, flute casts and turbidites were noticed. In the BIF flute casts were noticed at 1 km north of Palvanahalli village (latitude: 14°10'N and longitude: 76°30'E) on an outcrop spreading over an area of 50x100 m. Flute casts were studied in detail from this area only.

Flute casts, which are indicators of palaeocurrent direction and 'way up', are well preserved in the BIF. The schist belt is an established basin with shallow water structures like current bedded quartzites, ripple marks and occurrence of stromatolites (Gnaneswar and Naqvi 1995; Srinivasan et al. 1990). The surface of the BIF outcrop in which they occur is brownish red with uneven surface, fine to medium grained and consists mostly of quartz and haematite. Layering and compositional banding of fine grained magnetite, haematite with chert (Fig. 1) and red jasper at some places is common and well preserved. Individual flutes are of variable size.
and are characterized by rounded and sometimes tightly curved 'nose' at one end. The flutes are similar to those described by Collinson and Thompson (1989). The width of the flutes ranges from 6 to 10 cm and the depth from 2 to 2.5 cm. These flutes might have formed during or shortly after sedimentation in nearshore conditions due to high velocity currents. The alignment direction of the noses indicates easterly current (Figs. 2 and 3). This seems to be a local phenomenon. The BIFs which occur adjacent and in continuation to these are associated with iron phyllites/shales and all these are traversed by many syn- and post-tectonic quartz veins and veinlets (Hussain et al. 2002; Sunder Raju, 2004). Stromatolites have been reported to occur in this belt are indicative of widespread oxidizing environment during that period (Srinivasan et al. 1990). Some of the bands of adjacent BIF show Ce anomalies indicative of oxidising environment at the time of deposition.

The chemical composition of the flute cast bearing BIF is given below (oxides in wt%; REE in ppm):

<table>
<thead>
<tr>
<th></th>
<th>SiO₂</th>
<th>TiO₂</th>
<th>Al₂O₃</th>
<th>Fe₂O₃</th>
<th>MgO</th>
<th>CaO</th>
<th>Na₂O</th>
<th>K₂O</th>
<th>MnO</th>
<th>P₂O₅</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>49.57</td>
<td>0.17</td>
<td>5.05</td>
<td>39.05</td>
<td>1.94</td>
<td>2.24</td>
<td>0.45</td>
<td>1.36</td>
<td>0.10</td>
<td>0.26</td>
</tr>
</tbody>
</table>

La: Cr: Nd: Sm: Eu: Gd: Dy: Er: Yb: Lu
15.03: 24.12: 10.33: 2.44: 1.22: 2.24: 2.11: 1.04: 1.27: 0.20

Acknowledgements: We are grateful to Director, NGRI for permission to publish this short note.

References


(Received: 8 April 2004; Revised form accepted: 5 January 2005)