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Mesoproterozoic Orogeny along Eastern Boundary of Aravalli Craton, Northwestern India: a Tectonostratigraphic and Geochronological Study

Sengupta, S.¹ and Basak, K.²

¹Geological Survey of India, 15 Kyd Street, Kolkata, India 700016 and senguptasiladitya@gmail.com

²Geological Survey of India, 15 Kyd Street, Kolkata, India 700016

Polyphase deformation in the low grade supracrustals consisting of two linear NE-SW trending belts of platformal orthoquartzite-carbonate sequence, namely the East Jahazpur Belt (EJB) and the West Jahazpur Belt (WJB), within a vast tract of meta-turbidite sequence of slate-argillite-metagreywacke with subordinate metavolcanics of Hindoli Group (HG) represents a major orogenic event along the eastern boundary of the Archaean Aravalli Craton of Northwestern India.

A linear body of intensely deformed and mylonitised granitoid, known as 'Jahazpur granite' (JG), occupies the core of an eastward verging D1-antiformal nappe in the EJB. The D1 nappe structure is manifested by stacking of early recumbent folds in the carbonate and quartzite units, mylonitised granitoid and a prominent zone of brecciation and ferruginisation all along the eastern margin of EJB, separating EJB carbonates from Hindoli meta-turbidites. In the WJB, D1 is represented by large scale isoclinal reclined folding. S1- fabric, present as a prominent schistosity, varies in orientation due to superposition by later deformation. D2 deformation phase, variably superposed over the D1 structures and controlling the NE-SW disposition of Hindoli and Jahazpur rocks, is represented by consistent easterly verging minor and major F2 folds with a penetrative, moderate to steep northwesterly dipping cleavage (S2). A NE-SW trending crustal scale transpressive shear separates the WJB rocks from the older Mangalwar Complex (MC) to the west.

The basement status of the JG is evident from the presence of a basal unit of oligomict conglomerate consistently overlying the granite at the base of EJB. EJB and WJB have contrasting stratigraphic relationship with the HG rocks. Metasediments of HG tectonically underlie the EJB rocks in the east

W

E

but
stratigraphically overlie
them

without any tectonic discontinuity

JG

in the west. On the other hand,

D₁ Phase

the
WJB rocks
stratigraphically

(a)

overlie
the
HG
metasediments

with
a
polymict

conglomerate/quartzite unit at its

JG

base.
This
indicates
non-

D₂ Phase

contemporaneity of EJB and WJB

rocks in spite of having similar

litho-package. The basement JG is

JG Jahazpur Granite

Conglomerate

MC

overlain sequentially by

rocks of

Impure Dolomite

Quartzite

EJB, Hindoli Group (HG) and WJB

Slate, argillite,
S1 schistosity

Metareywacke

in succession.

S2 CleavageMC

Mangalwar Complex

Ferruginised, breccated Fault Zone/Shaer Zone

(b)

The depositional age of the Hindoli

Present topography
Direction of younging

volcanics is ~1.8 Ga based on

Fig.1 Schematic cross section of (a) East Jahazpur Belt showing zircon U-Pb dating (Deb et al

D1 nappe and D2 overturned folding and (b) West Jahazpur 2000).

Two

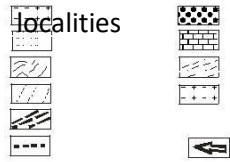
suites
of
the

Belt showing D2 overturned syncline and crustal-scale shear
mylonitised

Jahazpur
Granite

between older Mangalwar Complex and Hindoli-Jahazpur rocks
from

two
different
localities



namely
Itunda
(25°37'58''
and

75°23'53.7'') and Biramata (25°34'15'' and 75°19'52.2'') were dated by whole rock Rb-Sr systematics in Sector 54 TIMS. The ages of 1423 ± 52 Ma and 1393 ± 33 Ma, obtained from the suites, represent age of resetting of whole-rock Rb-Sr systems by intense ductile deformation of the granite during the major tectonic event. The tectonism that resulted in folding, shearing and nappe structure involving basement JG and overlying Palaeoproterozoic supracrustals represents a major Mesoproterozoic (~ 1.4 Ga) orogenic event along the eastern margin of the Aravalli craton.

References: [1] Deb M et al. (2002) Gondwana Research, V.5 no. 4; pp. 879-883.

