

NOTES

IS SON-NARMADA NORTH FAULT GETTING ACTIVE?

The Son-Narmada rift valley near Jabalpur is bounded by two ENE-WSW trending deep major fault systems. These are called Son-Narmada North Fault (SNNF) and Son-Narmada South Fault (SNSF) respectively. In addition, several transverse faults mostly along NNE-SSW direction, also traverse the area. These two faults are believed to have been active during the past geological time, as evidenced by the distribution of Mahakoshal Group, Vindhyan Supergroup and Gondwana Supergroup. The SNSF system was also active during Deccan Trap volcanic activity (Acharyya et al. 1998). The recent increase in seismic activity in and around Jabalpur (Khanna, 2000) is due to reactivation of SNSF. In addition to the Jabalpur earthquakes of 1997 (6.0 M) and 2000 (5.2 M), the Rewa earthquake of 1927 (6.5 M) and the Satpura earthquake of 1938 (6.3 M) were due to the reactivation of SNSF. Further the activation of Govilgarh fault is responsible for low magnitude earthquakes in the neighbouring districts of Chhindwara and Mandla in the recent years.

Around Jabalpur, the activities due to SNSF have been very limited. Two important examples are the Sagar earthquake of 17 May 1846 (5.0 M) and Damoh earthquake of 18 April 1987 (4.1 M). The epicentre of Jabalpur earthquake of 3.5 M on 23rd January, 2001 (23.20 N - 79.80 E) is north of the South Narmada Fault zone and is very close to the SNNF. A number of low magnitude earthquakes have also occurred around Hoshangabad, about 250 km west of Jabalpur. These are the earthquakes of 10-1-1996 (4.4 M), 15-1-1996 (2.7 M), 15-7-1997 (2.8 M) and 9-3-1998 (4.1 M) that are due to activation of SNNF.

The Son-Narmada North Fault system marks the boundary between the Mahakoshal Group and Vindhyan Supergroup and has not been very active in the recent past. The upper limit of the activation could be fixed by Jabalpur Beds (Upper Jurassic) east of Katni, where along a narrow zone they overlap and conceal the fault trace and transgress the Vindhyan (Jain et al. 1995). However, a limited amount of seismic activity due to SNNF in Bharwani and Broach areas, though far away from Jabalpur, is evidenced from Table 1 (Bansal and Gupta, 1998).

Acharyya and Roy (2000) have remarked that while the SNSF continues to serve as potential seismogenic zone, the SNNF had remained more or less inactive in the contemporary regime. According to them, this could be due

Table 1

Date	Lat. and Long.	Magnitude	Place
18-11-1863	21.80 N - 75.30 E	5.7	Barwani
23-03-1970	21.70 N - 73.00 E	5.4	Broach
23-03-1970	21.70 N - 73.00 E	3.8	Broach
09-08-1970	21.70 N - 73.00 E	3.5	Broach
30-08-1970	21.60 N - 72.70 E	4.1	Broach
10-09-1970	21.60 N - 72.70 E	3.4	Broach
18-06-1971	21.70 N - 73.00 E	3.4	Broach
31-12-1993	21.117 N - 72.74 E	3.8	Broach

to sealing of this fault and/or the geometry of the fault system. They further point out that the SNNF is subvertical to steeply dipping to the north, while SNSF has steep dip to the south. They further point out that in the north-directed (unipolar) stress will be difficult to reactivate both the oppositely dipping faults simultaneously.

The recent seismic activities in Hoshangabad and the 23rd January 2001 earthquake of Jabalpur, however, point out that the stress developed at crust-mantle boundary in Jabalpur and adjacent areas are capable of reactivating both SNSF and SNNF simultaneously, although the reactivation of SNNF is limited.

Department of Geology,
Govt. Autonomous Science College,
Jabalpur-482 001

V.K. KHANNA

No.1, M.I.G., Shiv Nagar,
Jabalpur 482 002

A.P. AGRAWAL

References

- ACHARYYA, S.K. and ROY, A. (2000) Tectonothermal history of the Central Indian Tectonic Zone and reactivation of major faults/shear zones. *Jour. Geol. Soc. India*, v.55, pp.239-256.
- ACHARYYA, S.K., KAYAL, J.R., ROY, A. and CHATURVEDI, R.K. (1998) Jabalpur earthquake of May 22, 1997: Constraint from aftershock study. *Jour. Geol. Soc. India*, v.51, pp.295-304.
- BANSAL, B.K. and GUPTA, S. (1998) A glance through the seismicity of Peninsular India. *Jour. Geol. Soc. India*, v.52, pp.67-80.
- JAIN, S.C., NAIR, K.K.K. and YEDEKAR, D.B. (1995) Geology of the Son-Narmada-Tapti lineament zone in Central India. *In: Geoscientific Studies of the Son-Narmada-Tapti Lineament Zone: Project Crumansonata. Geol. Surv. India Spec. Publ. no.10*, pp.1-154.
- KHANNA, V.K. (2000) Jabalpur Earthquake of 17 October, 2000. *Jour. Geol. Soc. India*, v.57, p.84.