tectonic scenario that exists at the collision zone of oceanic-continental plates and oceanic-oceanic plates (Trubitsyn et al 2006) and the formation of Makran accretionary wedge by subduction of the oceanic crust of Arabian plate under the Eurasian plate (Schluter et al 2002) are entirely different to that of the NSL zone No such explanation is valid to this zone, where the latest tectonic activity is intracontinental extension rather than compression at the inter-continental plate boundary The seismic structure here is attributed to the major activity of mantle plume rather than subduction / collision at the plate boundary regions Though the Mesozoic sea intruded into the present study area, no plate boundary activities of subduction, juxtaposition and over-riding of continental / oceanic plates have yet been reported in the region after the formation of Narmada basin A large number of dykes of ~66 Ma age, contemporaneous with the Deccan volcanism, observed all along the NSL and west coast of India, indicate a close relationship between dykes and Deccan basalts and to the crust-mantle interaction process leading to underplating

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Three-Phased Temporal Evolution of the Jhirgadandi Granite Complex, Sonbhadra District, Uttar Pradesh by D Bhattacharya, Madhuparna Roy and G B Joshi Jour Geol Soc India, v 70, 2006, pp 730-744

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1 In the caption for Fig 2, Modal mineralogical classification for rocks of the Jhirgadandi granite" (p 737), a filled square is shown as the symbol for the "first phase melanocratic rock" However, no melanocratic rock has been plotted on this diagram In "Table 1 Modal data for leucocratic, mesocratic and melanocratic rocks from Jhirgadandi (p 732), the modes of nine mesocratic rocks are given However, only eight samples have been plotted on the QAP diagram (Fig 2, p 737) The reason for this not clear

2 What analytical technique was used for obtaining the major element and trace element data given in Tables 1 (p 734), 2 (p 735) and 3 (p 736)? What are the accuracy and precision of these analytical data?

3 In "Fig 4, K_2O vs Na_2O, K_2O-CaO and CaO-Na_2O-K_2O diagrams of samples from Jhirgadandi" (p 738), the "fields" are stated to be after Harpum (1963) and Barker and Arth (1976) Which of the "fields" in the three diagrams (Fig 4a, b, and C) are from Harpum (1963) and which are from Barker and Arth (1976)? In the section, 'Discussion', paragraph 1 (p 739), the Figure numbers for the CaO-K_2O and K_2O-Na_2O diagrams should have been 4b and 4a and not 4a and 4b as stated

4 In Table 2 (p 734), 3 (p 735) and 4 (p 736), *the values for the K/Rb ratios of* the samples of the leucocratic, mesocratic and melanocratic rocks from Jhirgadandi are given to the second decimal point This is improper The ratio of a major element, as the numerator, to a trace element, as the denominator, should be given only in whole numbers Some other examples of such ratios used in geochemical studies of granitic rocks are K/Sr, K/Ba, K/Pb, K/U, K/Th, Ca/Sr, Ca/Ba and Ca/Pb

5 In "Table 4 Chemical and normative data of melanocratic rocks from Jhirgadandi" (p 736), the "Average" of the Ba content is stated to be for "(n=4)", although the "Range" covers the Ba contents of the five samples listed The reasons for this is not clear

6 In the 'Abstract' (p 730), the authors have stated that "Geochemical data suggests that the granitic rocks of the three phases are comagmatic" Under 'Discussion', paragraph 1, (p 740), they state that "fractionation and differentiation process may have played a major role in the evolution of this suite" For such an interpretation to hold true, the K/Rb ratios should have progressively decreased in the sequence melanocratic phase to mesocratic phase to leucocratic phase However, the average K/Rb ratio is lowest in the melanocratic phase (192, see Table 4 on p 736) and is the highest in the mesocratic phase (240, see Table 3 on page 735) The average K/Rb ratio of 216 for the leucocratic phase (see Table 2 on p 734) is between the value of 192 for the melanocratic phase and of 240 for the mesocratic phase

7 Citing the initial Sr^{87}/Sr^{86} ratio of 0 7038±0 0038 for the mesocratic phase of the Jhirgadandi suite reported by Pande et al (1996), the authors have stated that "the granitic magma might have been formed by the partial melting of the lower crust or upper mantle and got gradually fractionated from mafic to intermediate source" (see 'Conclusions', para 3, pp 742-743) If this inference is to be correct, the average K/Rb ratios of the melanocratic phase and the mesocratic phase, 192 and 240, respectively,

should have been higher Invoking crustal contamination to explain the observed K/Rb ratios will only raise other problems

8 The section, 'Conclusions' (pp 742-743), is more like a brief review of the processes of magma generation at lower crustal and mantle depths and of magma emplacement in diverse tectonic settings, giving the views expressed by 20 authors in as many as 11 references This main conclusions of the present authors are given only in a short, last paragraph and in some scattered sentence in the penultimate paragraph

9 Under the list of 'References' on p 744, the name of one of the Editors of the volume 'Migmatite, melting and metamorphism' is given as "M P Arthurton" The name should be 'M P Atherton'

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At the onset, we would like to express our deepest appreciation to Dr S Viswanathan, a scholar of international repute, for sparing his valuable time, interest and knowledge, in reading our paper critically and expressing his opinions The answers to his critical queries are as follows

1 As regards Fig 2 and Table 1, the QAP diagram is not applicable for the melanocratic phase, since quartz and alkali feldspar are not present A generalized legend for symbols was given separately for all figures However, during final setting, it was included in this particular diagram by mistake The plot of the ninth mesocratic phase has been inadvertently omitted The omission is regretted

2 Analytical data is given in Table 2,3,4 and not Table 1 The method is as follows Phillips X'Unique-11 XRF wavelength dispersive spectrometer was used for the major, minor and trace elemental analysis of rocks Major elements were analysed on a pressed pellets at 40 kV and 60 mA and trace elements on 80 kV and 20 mA tube-operating conditions Matrix effects were corrected using theoretical alpha factor and measured line overlap factors to the raw intensities measured Ka lines of the elements were chosen for quantification In all, a total of 22 international rock standards were used to construct the calibration graphs The accuracy of major element analysis is ±5% while the accuracy for trace elements is ± 10% The data is reproducible U in the rock was determined using pellet flurometry The accuracy for uranium is ±10% Thorium is determined by radio-metric assay, the accuracy for it is ±10% The data is reproducible

3 Fig 4a is after Harpum (1963) and Fig 4c after Barker and Arth (1976) The comment on 'Discussion' regarding the Figs 4b, a is correct The mistake is accepted

4 The authors tried to be more near to the accurate value However this suggestion will be followed in future

5 The average value of Ba should have been 786 (n=5) The mistake is regretted

6 The authors hold that the suite of rocks in the study area formed from the same initial parent magma (comagmatic) by fractionation and differentiation Though, there is a difference in the expected pattern of K/Rb ratio in these rocks, this ratio is not the only parameter for concluding the above process In fact, we have used a combination of petrography and geochemical ratios like K/Rb, Rb/Sr, Rb/Ba and Y/Nb and indices like felsic index, Larsen's index for arriving at the conclusion It is observed that Rb/Sr, Rb/Ba, felsic index and Larsen's index increases with differentiation and fractionation It should also be noted that the melanocratic phase is affected by metamorphism (p 732, line 8) and both meso- and leucocratic phases are affected by some degree of alteration of hornblende and albite (p 732, last few lines) These secondary processes might have disturbed the K/Rb ratio

7 The initial Sr^{87}/Sr^{86} ratio of 0 7038±0 0038 (Pandey et al 1996) clearly indicates lower crust-upper mantle tendency The upper mantle is marked by long-term heterogeneity with respect to alkali elements This is a consequence of element extraction during multistage melting events over geological time Granites originating from the depleted mantle asthenosphere or mantle lithosphere are depleted in incompatible trace elements (LILE) in comparison to primodial mantle This is also the characteristic of granite derived from lower crust The reconstruction of magmatic events in the area on the basis of available geochronological data indicated prolonged mantle/plume activity at the same time of the emplacement of Jhirgadandi granite (Para 1 of conclusion) Isotopic study of the Jungel lamprophyres, gabbro and dolerites from the adjacent area, which were emplaced at the same time, as Jhirgadandi granite indicated depleted mantle source Thus, in the background of this and also because K and Rb are elements which are susceptible to secondary changes, K/Rb ratio cannot be the sole criteria for inferring the source of the magma

8 The point is noted for improvement in future

9 The error is regretted

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