

Petrogenesis of the Neoproterozoic granitoids from NW India: Regional correlation of Rodinia paleogeography

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Neoproterozoic igneous rocks are widespread in the Aravalli-Delhi Fold Belt (ADFB) of the NW India. Three typical felsic intrusions record the secular evolution of the ADFB during the Neoproterozoic. The 976 Ma Moras calc-alkalic I-type granites show variable SiO₂ (67.15-75.87 wt.%) and CaO (1.10-3.24 wt.%), and display arc-like trace element characters. They show positive whole rock ϵ Nd (+0.41 to +1.40) and zircon ϵ Hf (+2.34 to +9.35) and high zircon $\delta^{18}\text{O}$ values (6.48‰ to 7.58‰). These features suggest that the Moras granites were produced by melting of the juvenile mafic crust in an arc setting. However, the 811-Ma Pali and 780-Ma Mirpur A-type granites have high SiO₂ (74.42-78.63 wt.%) and K₂O+Na₂O (7.74-8.95 wt.%) and low Al₂O₃ (11.41-12.54 wt%). They have lower whole rock ϵ Nd (-2.28 to +0.84) and zircon ϵ Hf values (-2.31 to +8.62) than, but similar zircon $\delta^{18}\text{O}$ (5.77 ‰ to 7.01 ‰) to those of the Moras granites, suggesting that the rocks were derived from partial melts of the dehydrated mafic crust in a rift setting after formation of the Delhi Fold Belt. The Neoproterozoic igneous and sedimentary rocks from the ADFB are well correlated with those in South China, suggesting a possible linkage between South China and Northwestern India in the configuration of Rodinia supercontinent.