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Petrograpgy and Major Elements Chemistry of Granitic rocks of the Nagar Parkar Igneous Complex, Tharparkar, Sindh

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Abstract : The Nagar Parkar area in southeastern Sindh is a part of the Thar Desert adjacent to the Runn of Kutchh, and covers 480 km2. It contains exposures of a variety of igneous rocks referred to as the Nagar Parkar Igneous Complex. The complex comprises rocks belonging to at least six phases of magmatism, from oldest to youngest: 1) amphibolitic basement rocks, 2) riebeckite-aegirine grey granite, 3) biotite-hornblende pink granite, 4) acid dykes, 5) rhyolite “plugs”, and basic dykes (Jan et al., 1997). The last three of these are not significant in volume. Radiometric dates are lacking but the grey and pink granites are petrographically comparable to the Siwana and Jalore plutons, respectively, emplaced in the Malani volcanic series. Based on these similarities and proximity, the phase 2 to 6 bodies in the Nagar Parkar may belong to the Late Proterozoic (720–745 Ma) Malani magmatism that covers large areas in western Rajasthan. Khan et al. (2007) have reported a 745 ±30 – 755 ±22 Ma U-Th-Pb age on monazite from the pink granite. The grey granite is essentially composed of perthitic feldspar (microperthite, mesoperthite), quartz, small amount of plagioclase and, characteristically, sodic minerals such as riebeckite and aegirine. A few samples lack aegirine. Fe-Ti oxide and minute, well-developed crystals of zircon occur in almost all the studied samples. Tourmaline, fluorite, apatite and rutile occur in only some samples and astrophyllite is rare. Allanite, sphene and leucoxene occur as minor accessories along with local epidote. The pink granite is mostly leucocratic, but locally rich in biotite (up to 7 %). It is essentially made up of microperthite and quartz, with local microcline, and minor plagioclase (albite-oligoclase). Some rocks contain sufficient oligoclase and can be called adamellite or quartz mozonite. Biotite and hornblende are main accessory minerals along with iron oxide, but in a few samples are without hornblende. Fayalitic olivine, zircon, sphene, apatite, tourmaline, fluorite, allanite and cassiterite occur as sporadic accessory minerals. Epidote, carbonate, sericite and muscovite are produced due to the alteration of feldspar. This work concerns the major element geochemistry and comparison of the principal granitic rocks of Nagar Parkar. According to the scheme of De La Roche et al. (1980), majority of the grey and pink granites classify as alkali granite, 20 % as granite and 10 % as granodiorite. When evaluated on the basis of Shand's indices (after Maniar and Piccoli, 1989), the grey and pink granites span all three fields (peralkaline, metaluminous and peraluminous). Of the analysed grey granites, 67 % classify as peralkaline, 20 % as peraluminous and 10 % as metaluminous, while 50 % of pink granites classify as peralkaline, 30 % metaluminous and 20 % peraluminous.

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