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Geological mapping and U-Pb and Sm-Nd chronology of the Rauer Group Islands (East Antarctica)

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The Rauer Group are a series of ice free islands and peninsulas located adjacent to the Archaean block of the Vestfold Hills. Commonly, they interpreted to consist of mainly high-temperature orthogneiss with minor sediments incorporated into Mather and Filla series. Geological mapping of northern part of Rauer Group accompanied with U-Pb zircon and Sm-Nd whole-rock-garnet dating provide a new insight on geology and chronology of the Rauer Group.

On Efremova Island the garnet- biotite (\pm orthopyroxene) orthogneiss were found to intrude the layered orthopyroxene-bearing gneisses. Orthogneisses contains igneous zircons given an age of about 1400 Ma that thought to date a time of their igneous protolith crystallization. A sample of garnet-spinel bearing metasediments from Mather series contains detrital zircons given an age of about 2435 ± 99 Ma. That is interpreted to date a maximum time of sedimentation. A model $T_{(DM)}Nd = 3.23$ Ga and presence of detrital zircons of c. 3.21 Ga and c. 2.8 Ga suggests that protolith of these rocks were formed mainly on expense of Archaean material.

The Filla series is thought to incorporate the three sequences. Sequence I involves mainly two- pyroxene bearing mafic gneisses of apparently volcanic (basalts) origin. They were deposited within a time interval of 1342 ± 19 Ma - 1156 ± 21 Ma. Sequence II consists mainly of garnet-biotite (\pm orthopyroxene) metasediments with rare mafic and intermediate gneisses. A lens of clinopyroxene bearing leucocratic schist within this sequence contains detrital zircon with an age of 1748 ± 24 Ma dating a maximum time of sedimentation. Sequence III involves mainly sillimanite-garnet bearing gneisses and quartzite-like rocks. Detrital zircons given an age of 1630 ± 74 provide a maximum limit of sediments deposition. Model $T_{(DM)}Nd = 3.4$ Ga and detrital zircon with an age of c. 3.2 Ga suggest mainly Archaean age of their protolith. Because both c. 2.8 Ga and c. 3.2 Ga orthogneisses are widespread at the Rauer Islands [1] we may suggest that they were a main source of Mather and Filla sediments protolith.

An Archaean rocks at Scherbinina Island were intruded by series of two pyroxene-hornblende bearing mafic dykes. They contain igneous zircon given an age of c. 1.7 Ga that is interpreted to date a maximum time of the dyke injection.

A major impulse of igneous and probably tectonic activity of the region occurred between c. 1156 Ma and c. 960 Ma. This has led to emplacement of series intrusions and development of ductile shear zones. Intrusive rocks were incorporated in two association: an older diorite-tonalite-plagiogranite association emplaced between c. 1156-1143 Ma and younger gabbro-diorite association injected between c. 1143- 960 Ma ago. Both association contain pods of deformed Filla series rocks and were deformed by E-W trending ductile shear zones. On Filla and Efremova Islands the rocks a intruded by numerous mafic dykes injected after c. 1400 and c. 1143 Ma. Sm-Nd whole rock-garnet dating provides a limit for high-temperature thermal event which is within 523.7 ± 2.8 Ma- 511.6 ± 2.8 Ma time space.

[1] Kinny P.D. et al. (1993) *Antarctic Science* 5 (2): 193-206.

