

17. New Field Data from Surgeon Island, North Victoria Land, Antarctica

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Surgeon Island is located in the Yule Bay at the Pennell Coast of North Victoria Land. This small island (about 3.5 x 1 km in size) is built up by granitic rocks which, because of their S-type characteristics (VETTER et al. 1983) and their late Precambrian origin as inferred from a Rb-Sr WR-isochron age of 599 ± 20 Ma (VETTER et al. 1984), contrast with the igneous rocks of the Yule pluton. The latter one forms part of the Devonian-Carboniferous Admiralty Intrusives which are generally I-type granitoids (VETTER et al. 1983, HENJES-KUNST this vol.).

Furthermore, the Surgeon Island granitoid can be clearly distinguished from rocks of the Yule pluton in the field because it exhibits a pronounced foliation. Foliation has never been observed in the Admiralty Intrusives suite of North Victoria Land. Surgeon Island had already been visited in the course of GANOVEX I and GANOVEX III in 1979/80 and in 1982/83, respectively and was revisited during GANOVEX VI in the austral summer 1990/91. This was done in order to collect structural data on the foliated granitoid and to sample large rock specimens for dating purposes (HENJES-KUNST this vol.).

The foliated Surgeon Island granitoid consists of quartz mainly of blue colour, two feldspars, primary igneous biotite showing kink bands and secondary muscovite (sericite) which is lined up in the foliation plane. Foliation is also seen in abundant melanocratic xenoliths which are of sub-elliptical shape. Rb-Sr dating of muscovite separates from the Surgeon Island granitoid yielded apparent ages of about 480 Ma (VETTER et al. 1984). These dates suggest that the deformation of the Surgeon Island granitoid can be related to the Ross Orogeny. Rb-Sr dates of about 360 Ma on igneous biotites (VETTER et al. 1984) may then indicate a still later thermal disturbance of the Surgeon Island granitoid in the course of the Devonian-Carboniferous Admiralty Intrusives magmatism. The foliated Surgeon Island granitoid is intruded at the northern coast line by a newly discovered small leucogranite. This unfoliated granite is medium grained and consists of quartz of white colour, two feldspars and subordinate amounts of biotite and is tentatively related to the Admiralty Intrusives phase of magmatism.

The foliation of the major Surgeon Island granitoid is a weakly anastomosing schistosity. From a structural point of view, this rock, therefore, is a gneiss. The schistosity varies between 210/85 (dip direction: CLAR compass) and 220/50 with a mean value of 210/60. This value compares well to the NW-SE trend found by C. WILSON (in VETTER et al. 1983) but contradicts the W-E and N-S trends given by WYBORN (1981). The schistosity plane generally does not show either stretching or intersection lineations. Strain measurements were also carried out on the cm- to dm-sized xenoliths. Sections parallel to the schistosity are more or less round ($R_s = 1$) whereas the ellipticity R_s perpendicular to the foliation has a value of about 3. These values fit to the observation that the schistosity plane of the Surgeon Island granitoid does not show stretching lineation. Thus we have to conclude that the schistosity of both rock groups, the granitoids and the xenoliths is due to flattening. Only as an exception, a stretching lineation (155/70) due to secondary simple shear is formed.

There are three sets of joints in the foliated granitoid: (i) 160/75, (ii) 235/03, and (iii) 275/75. The first and the third set may contain quartz veins with a thickness of about 1 cm. The first set is the most important one with a spacing of 5 to 20 cm. These joints are used during a later stage by normal faulting as indicated by slickensides

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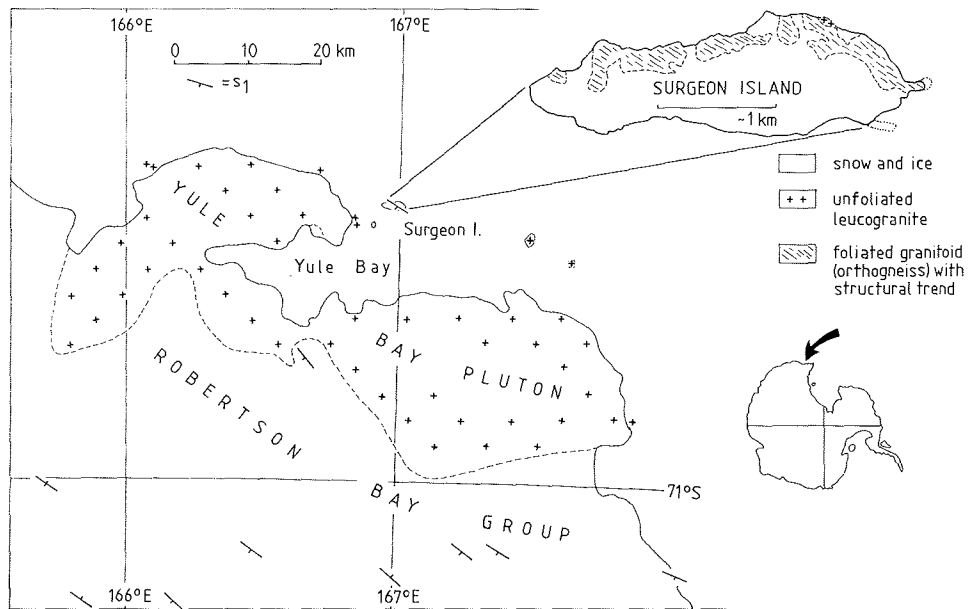


Fig. 1: Sketch of Surgeon Island and its position in the Yule Bay Pluton of North Victoria Land.

Abb. 1: Geologische Kartenskizze der Surgeon-Insel und ihre Lage im Yule-Bay-Pluton, Nord-Victoria-Land.

and slickenside lineation (155/80). Jointing is set off by shear planes (195/35) indicating a tectonic transport top to north. The jointing system of the unfoliated granitoid differs only slightly from that of the foliated rocks: (i) 345/80 and (ii) 255/50.

Specimens were collected from the foliated rocks in order to determine the temperature conditions during formation of the shear planes and from both, the foliated and unfoliated rocks for petrographical investigation, geochemical analysis and isotopic dating. Furthermore, boulders of basalts and serpentines were sampled from the top of the flat island. This was done in order to work out the origin of these erratics which were already mentioned by DUPHORN (1984).

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