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Granulite facies rocks from the Ross orogenic belt, Northern-Victoria-Land, Antarctica

The Ross orogenic belt in Northern-Victoria-Land is subdivided into three different, NW-SE trending lithotectonic units, the southwestern most of which - called **Wilson Terrane** - played the role of an active continental margin during Ross orogeny about 500 Ma ago, and thus forming a transition zone between the Ross belt and the old antarctic craton. High-grade metamorphic rocks from the two opposite ends of the Wilson Terrane, the Terra Nova Bay area at the Ross Sea coast in the SE and the Oates Coast area at the Pacific border in the NW, are under investigation:

Terra Nova Bay: The metamorphic rocks consist of monotonous clastic metasedimentary series, with calc-silicate intercalations and sometimes lenses of ultramafic rocks. In respect to metamorphism, an interfingering of metasediments in different metamorphic grade was observed, leading from a biotite zone through an andalusite-muscovite zone, a sillimanite-muscovite zone and a sillimanite-K-feldspar zone to a garnet-cordierite zone, with Bt+Sill+Qtz --> Ga+Crd+Kfsp+V and Bt+Sill+Qtz --> Crd+Kfsp+Herc+V as prograde reactions in the highest-grade migmatites (Talarico, Ricci et al. in prep; Schubert & Olesch 1989). This metamorphic sequence resembles a prograde low-pressure/high-temperature regional metamorphism with P-T conditions ranging up to 4.5 Kbar/750°C (Palmeri et al. in press).

Oates Coast: From their lithology, the metamorphic rocks of the Oates Coast area are quite similar to that of the Terra Nova Bay. All rocks were affected by high-grade metamorphism, with Bt+Sill+Qtz --> Crd+Kfsp±Herc+V as typical prograde reaction. An exception are the low-grade metasediments from the westernmost outcrops of the Oates Coast (Berg Mts.), the transition between high-grade and low-grade metamorphics, however, is covered by ice and could not be mapped.

Granulitic Rocks: In both areas mentioned above, orthopyroxene-bearing granulitic rocks occur within the highest-grade metasedimentary sequences. In the Terra Nova Bay area, several outcrops were found along the western side of the Campbell Glacier (Deep Freeze Range) and Kay Island. At Oates Coast, two outcrops of comparable granulitic rocks in the western Wilson Hills close to the Matusevich Glacier were recently discovered. Several petrographic types of granulite facies rocks can be distinguished, usually, however, with a typical paragenesis Opx+Plag+Qtz+Bt and, in several outcrops, additional Ga, Crd and Kfsp in variable amounts. Special types are Qtz+Plag+Opx±Cpx-enderbitic rocks and two-pyroxene mafic granulites. Orthopyroxene occurs unaltered or was partly or totally replaced by cummingtonite. A reaction between this cummingtonite and biotite leads to biotite-quartz-symplectites typical for granulitic, but also migmatitic rocks of the Wilson Terrane. Petrological investigations on the Campbell granulites indicate a polyphase granulite facies evolution, with an early stage at 7-8.7 Kbar/800-830°C and a subsequent stage at 4-5.3 Kbar/725-875°C (Talarico et al. 1987; Talarico & Lombardo in prep.). The occurrence of similar granulitic rocks and similar country rocks in both, the Terra Nova Bay and the Oates Coast area indicates, that both areas belong to the same metamorphic belt at the southwestern border of the Ross orogeny, although the distance between both areas is about 600 km - again an example for the rather simple and largescaled architecture of the Ross belt. Uncertainties still exist about the time of the granulite facies event. At Terra Nova Bay, some granulitic occurrences preserved a relict structural setting which is strongly discordant to the NNW-SSE regional "Ross"-trend. This points to old granulitic crust from the antarctic craton involved into the Ross belt. Granulites from other outcrops, however, may be derived from granulite facies conditions during Ross orogeny.

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