東南極セール・ロンダーネ山地，原生代マグマ過程とリソスフェアの進化

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Proterozoic magma processes and evolution of continetal lithosphere in the Sør Rondane Mountains, East Antarctica

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The Sør Rondane Mountains is situated within the continental collision zone between the West and East Gondawana and the timing of collition is regarded as the late Proterozoic to the early Paleozoic (650 to 530 Ma) (Asami et al., 2005, Shiraishi et al., 2008). The metamorphosed tonalite complex is exposed in the southern part of the mountains and its magmatic age is of the middle Proterozoic (950-920 Ma; Takahashi et al., 1990, Shiraishi et al., 2008). Large amouts of microgabbro occure as mafic magmatic enclaves and syn-plutonic dikes in the tonalite complex. Unmetamorphosed dolerite and lamprophyre dikes intrude the tonalite complex and gneisses during the late- to post-collisional stages (560-480Ma; Takigami and Funaki, 1991, Owada et al., 2010). The magma processes of the tonalite complex together with the unmetamorphosed dikes, therefore, provide us useful information of the evolution of continental lithosphere during the formation of Gondwana supercontinent related to closure of the ocean; i.e., the Mozanbieque Ocean (Shiraishi et al., 1994). Here, we address the geochemical features of the microgabbro and the unmetamorphosed dikes, and discuss the evolution of the continental lithosphere.

The microgabbro is geochemically classified into Low-Ti group and High-Ti group. The micorgabbro represents the low-K and tholeiitic series. The microgabbro of the Low-Ti and High-Ti groups shows geochemical signature similar to the Oceanic Arc Basalts and Back-Arc Basin Basalts, respectively. The middle Proterozoic magma processes would, therefore, proceed at a subduction zone with back arc spreading in an oceanic arc environment. The unmetamorphosed dikes are plotted in the within-plate field and a part of the island arc field that is close to the within-plate field on some discrimination diagrams. Considering the geochemical features, the unmetamorphosed dikes have been formed in a within-plate tectonic setting by the mixing of subduction-related materials.

The geochemical studies including Sr-Nd compositions reveal that the microgabbro has been originated from a depleted source, whereas chemical compositions of the unmetamorphosed dikes are more enrichment rather than those of the microgabbros. Consequently, the magma processes in the Sør Rondane Mountains reflect the evolution of lithosphere from the middle Proterozoic to the early Paleozoic; the depleted mantle at the initial subduction stage then changing to the enriched mantle at the continental collision stage. This lithospheric evolution can be explained by interaction between the depleted mantle and the enriched materials (*e.g.*, slab-derived fluids, melting product of subducted crustal rocks, or reaction with fossil wedge mantle) during closure of the Mozanbique Ocean.

東南極セール・ロンダーネ山地は，原生代末～古生代初頭（650–530 Ma）におきたゴンドワナ大陸形成時の衝突帯に位置する．山地南西部に分布する変成トーナル岩複合岩体（火成年代：950-920 Ma）には，細粒斑れい岩が苦鉄質包有物や同時性岩脈として産する．細粒斑れい岩は低 Ti と高 Ti グループに区分され，各グループの化学的特徴は，海洋島弧玄武岩と背弧海盆玄武岩にそれぞれ類似する．したがって，中期原生代の火成活動は，背弧海盆を伴う沈み込み帯で起きた可能性が高い．一方この地域には，変成トーナル岩複合岩体を貫く非変成岩脈（ドレライト・ランプロファイアー，貫入年代：560-480 Ma）が産する．これら岩脈は大陸内玄武岩と沈み込み帯玄武岩の両方の化学的特徴をもち，細粒斑れい岩に比べてより肥沃なマントルに由来する同位体比組成を示す．すなわち，中期原生代～初期古生代のマグマ過程の変遷は，枯渇マントルに由来する海洋島弧から大陸衝突をへて肥沃

化したマントル起源の大陸内火成活動へと移り変わったことを示す．肥沃化の原因は，沈み込むスラブ由来の流体あるいは大陸起源のメルトの付加によると推察される．

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