Discussion

Reply to Dallmeyer*

S. G. BERGH & A. ANDRESEN

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S. G. Bergh, Department of Geology, University of Tromsø, IBG, P.O. Box 3085, N–9001 Tromsø, Norway; A. Andresen, Department of Geology, University of Oslo, P.O. Box 1047 Blindern, N–0316, Oslo 3, Norway.

In a recent publication* we presented geochemical analyses from polydeformed metadolerites in the Senja Nappe, Troms, North Norway. Based on the geochemical character of the metadolerites and the nature of the country-rock into which the dolerites were emplaced, we suggested that the Senja Nappe on Senja should be correlated with the dike intruded Upper Ordovician–Lower Silurian Balsfjord Group of the Lyngen Nappe. In a discussion to this paper, Dallmeyer claims that 'published descriptions of the field, petrologic and geochronological characteristics of the Senja Nappe are markedly inconsistent with this correlation'. Instead, Dallmeyer prefers a correlation of the Senja Nappe with the Middle Allochthon (Roberts & Gee 1985). To support this correlation two lines of evidence are presented: (1) $^{40}Ar/^{39}Ar$ age spectra from the structurally underlying Proterozoic basement rocks as well as the Senja Nappe; and (2) the similarities between Senja Nappe lithologies and the Middle Allochthon in the Finnmark Caledonides.

Before responding to this criticism we would like to point out that all the 'published descriptions' referred to by Dallmeyer (Cumbest et al. 1983, 1984; Williams et al. 1985; Clark et al. 1985) are abstracts. As one of us (A.A.) is a co-author on some of these abstracts we were of course aware of their existence. So long as there have been no published maps, sample localities or detailed analytical data available when we wrote our paper, their importance in support of an alternative correlation is therefore limited. However, we are looking forward very much to the publication of these data, some of which will be of the greatest importance for lithostratigraphic/tectonostratigraphic correlations in an area with very little palaeontological control.

Among the geochronological data discussed by Dallmeyer, only the $^{40}Ar/^{39}Ar$ age spectra from recrystallized hornblende in the cover rocks (Senja Nappe) would appear to be pertinent to the age and correlation of the Senja Nappe. Dallmeyer interprets the internally discordant $^{40}Ar/^{39}Ar$ hornblende spectra from Senja as dating the initial post-metamorphic cooling to around 475–500 Ma as well as recording variable effects of a 380–390 Ma thermal recrystallization. Without having access to the analytical data and exact sample location, it is impossible for us to evaluate this interpretation. We do, however, want to point out that excess argon has represented a problem in several $^{40}Ar/^{39}Ar$ studies on Senja and nearby areas (Dallmeyer & Andresen 1984) as well as elsewhere within the Scandinavian Caledonides (Dallmeyer & Gee 1986).

Furthermore, the portion of the Senja Nappe studied by us is clearly located at a structurally higher level than the cover rocks studied by Dallmeyer and co-workers, the latter being located next to the basement rocks. One possibility is therefore that the internally discordant $^{40}Ar/^{39}Ar$ age spectra referred to by Dallmeyer are from a tectonostratigraphic level lower than the Lyngen Nappe. Further east, in the Lyngen area, one finds in descending order the Normannvik Nappe, the Vaddas Nappe and the entire

* A reply to R. D. Dallmeyer's comments in the previous issue on our article 'Geochemical evidence for a rift-related origin of metadolerites within the Senja Nappe, Troms, North Norwegian Caledonides', published in NGT, Vol. 68, pp. 25–37.

Middle and Lower Allochthons below the Lyngen Nappe. From previous work it is well documented that the Kalak Nappe Complex (Middle Allochthon) has been through a Late Cambrian–Early Ordovician tectonothermal event (Sturt et al. 1978). An Early Ordovician tectonothermal event has also recently been recognized in the Nordmannvik Nappe (Elvevold 1988). The rocks dated by Dallmeyer and co-workers could therefore very well represent a westerly continuation of these lower nappes. However, with abstracts as the only available documentation one can only speculate on the apparent discrepancy between Dallmeyer's data and ours.

Dallmeyer further claims that our suggestion that carbonates are not typical of the Kalak Nappe Complex is not supported by the descriptions of Roberts (1968) and Zwaan & Roberts (1978). Although marbles exist within the Kalak Nappe Complex (Falkenes Marble) in Finnmark, they are not very voluminous. In most papers dealing with metasediments of the Middle Allochthon in central and northern Scandinavia (Roberts & Gee 1985; Ramsay et al. 1985) psammites appear to be the dominant lithology. We therefore maintain that carbonates are more typical of the outboard terranes than of the Baltoscandian miogeoclinal terranes, and that the Senja Nappe, based on lithostratigraphic similarities, could be correlated with the Balsfjord Group. This conclusion is further strengthened by new field observations and petrographic data from the structurally overlying Dyrøy Nappe. These data point towards a correlation of the Dyrøy Nappe with the Tromsø Nappe Complex rather than with the Normannvik Nappe.

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