

Transition from gneiss to migmatite and the relationship of leucosome to peraluminous granodiorite, Cooma Complex

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Abstract: In the Cooma Complex, SE Australia, leucosomes first appear as small patches and veinlets in high-grade, muscovite-free gneisses containing cordierite, andalusite and K-feldspar. Simultaneously, fibrous sillimanite appears in discontinuous folia. The leucosomes consist of quartz, microperthitic K-feldspar and cordierite, rarely with minor andalusite or biotite. Plagioclase is absent, apart from exsolution lamellae in the K-feldspar. Breakdown of biotite probably produced the leucosomes. The leucosomes are largely confined to the metapelitic beds, which are plagioclase-poor; this explains the calcium-poor composition of the leucosomes. Most of the melting occurred during D_3 , which is responsible for most of the macroscopic folding in the area, though some leucosomes may predate D_3 . The metapelite leucosome is compositionally unsuitable as a source of the Cooma Granodiorite magma. Leucosome rich in plagioclase, which could be a source for the Cooma Granodiorite magma, was produced later (probably early during D_5) by partial melting of quartzofeldspathic metapsammitic rocks. It intrudes and disaggregates the metapelitic leucosomes, confirming that melting of the local metapelites did not produce the Cooma Granodiorite.

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