



Long distance transport of eclogite and blueschist during early Pacific Ocean subduction rollback

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The Tasmanides in eastern Australia represent a period of continental crustal growth on the western margin of the Pacific Ocean associated with slab rollback from the Cambrian until the Triassic. During rollback numerical models predict that subduction products can become trapped in the forearc (Geyra et al., 2002), and can migrate with the trench as it retreats. In a long-lived subduction controlled regime such as the Tasmanides, this should result in an accumulation of subduction products with protracted geochronological and metamorphic histories. U–Pb, Lu–Hf, Sm–Nd and Ar–Ar geochronology and phase equilibria modelling of lawsonite-eclogite and garnet blueschist in the Southern New England Fold Belt in Australia demonstrate that high-P low-T rocks remained within a subduction setting for c. 40 Ma, from c. 500 to 460 Ma. High-P metamorphic rocks initially formed close to the Australian cratonic margin during the late Cambrian, and were subsequently transported over 1500 Ma oceanward, during which time subducted material continued to accumulate, resulting in the development of complex mélangé which records eclogite and blueschist metamorphism and partial exhumation over ~40 Ma. The duration of refrigerated metamorphism approximates the extensional evolution of the upper plate which culminated in the development of the Lachlan Fold Belt. The protracted record of eclogite and blueschist metamorphism indicates that rapid exhumation is not necessarily required for preservation of high-pressure metamorphic rocks from subduction systems.

Reference:

Geyra, T. V., Stockhert, B., & Perchuk, A. L. (2002). Exhumation of high-pressure metamorphic rocks in a subduction channel: A numerical simulation. *Tectonics*, 21(6), 6-1-6-19. doi:10.1029/2002tc001406