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Interactive comment on “Extreme extension across Seram and Ambon, eastern Indonesia: Evidence for Banda slab rollback” by J. M. Pownall et al.

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It is with great pleasure and keen interest I have read the submitted manuscript on Extreme extension across Seram and Ambon of eastern Indonesia. In this manuscript, Pownall, Hall and Watkinson have presented a whole new tectonic model to explain the abundant presence of mantle peridotites and their connection to the regional ultra high temperature metamorphic (UHT) complex found in a large area on the junglecoved islands of the north Banda Arc. They explain the presence of the exposed mantle rocks and the relatively unusual and large UHT complex to have formed by rapid (and young) extension of the crust accompanied by upwelling of mantle lithosphere in the foot-

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wall of large-scale extensional detachments. Juxtaposition of hot mantle lithosphere with the crust resulted in the UHT metamorphism and abundant partial melting. The geodynamic mechanism for the hyperextension is connected to eastward subduction roll-back in the Banda Arc.

As expressed in the manuscript (page 20, lines 1035-1040), their model and documentation still lack some critical data, particularly modern age constraints. However, the working hypotheses and conceptual model as presented become increasingly convincing as the geological and petrographic descriptions are presented in the manuscript. The extension, rather than obduction model for explaining many exhumed mantle peridotites has become quite common during the last decade. The extension model has largely taken over for the “fragmented ophiolite” model to explain solitary mantle peridotites.

Indeed some of the world's most famous and largest exhumed mantle peridotites in both ancient orogenic belts (Alps, Pyrenees, Caledonides and other) as well as passive continental margins (Iberia, Brazil and other) are now commonly interpreted to have formed by hyperextension and partial to complete removal of crust by large magnitude extension. In some areas, such as the Pyrenees the mantle exhumation was apparently also associated with a regional low-pressure and high-temperature metamorphism. The regional metamorphic part of the story as presented in this manuscript is, however, less commonly seen and also less extreme in other areas where hyperextension has been documented. There are some obvious points of possible additions and improvement concerning various aspects of the UHT metamorphism that could have been added in the discussion.

My review conclusion is, however, that this paper represents such an important novel contribution to the understanding of these unusual rocks and their relationship to the unusual subduction zone geometry of the Banda Arc that it should be published as it is.

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The authors should be congratulated with their fieldwork efforts and not least for putting the their descriptions and observations into a logical and comprehensive working model that undoubtedly will stimulate discussion and new research in this very interesting area.

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