

Interactive comment on “First magmatism in the New England Orogen, Australia: Forearc and arc-backarc components in the Bakers Creek Suite gabbros” by Seann J. McKibbin et al.

Anonymous Referee #1

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This paper presents new petrological, geochemical and geochronological data, which are helpful for understanding the late Paleozoic tectonic evolution along the eastern Australian margin. The data quality is good, and the interpretation is reasonable. Here I provide some suggestion for authors to further improve the manuscript.

(1) A schematic diagram is required to show the major tectonic element of the NEO. This is particularly important for the regional geology section. Otherwise, it is difficult for readers to follow when seeing some terms (the Tamworth Belt, the Tablelands Complex and so on). Authors may be able to refer to Fig 1 in Li et al (2015) or Fig 1 in Glen and Roberts (2012).

(2) Section 7.3 for tectonic implication is kind of weak. Actually, there are a large
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number of structural, metamorphic, sedimentary, magmatic data to support authors' interpretation. The discussion will be significantly strengthened if these data can be incorporated. Authors may also think about discussing a bit how the Permian tectonic units in New Zealand and New Caledonia, and the Permian Gympie terrane are linked with the tectonic transition mentioned in the manuscript.

(3) Section 7.2 refers to a large number of intrusion names. These names should be somehow demonstrated in a figure. Otherwise, it will be difficult for readers to find out where are these rocks.

Additional minor comments:

Page 2_Line 27: Using “eastward” to replace “outboard”

Page 3_line 3: Actually, only that part of the Hillgrove Suite close to the shear/fault zone is foliated. As far as I know, some parts of the Hillgrove Suite are non-foliated.

Page 10_Line 18: Li et al. (2014) also dated the basalt of the Alum Mt Volcanics, which yielded an eruption age at around 272 Ma. This age is similar as the SHRIMP zircon age from the felsic part. Such information should be provided.

Page 10_Line 23: This statement for the Lachlan Orogen is confused. The orogenesis for the New England Orogen had already initiated in the Late Devonian.

Page 10_Line 34: melting of the Tablelands accretionary complex

References: Glen, R.A., Roberts, J., 2012. Formation of oroclines in the New England Orogen, Eastern Australia. *J. Virtual Explor.* 43, Paper 3. Li, P., Rosenbaum, G., Vasconcelos, P., 2014. Chronological constraints on the Permian geodynamic evolution of eastern Australia. *Tectonophysics* 617, 20-30. Li, P., Rosenbaum, G., Yang, J.-H., Hoy, D., 2015. Australian-derived detrital zircons in the Permian-Triassic Gympie terrane (eastern Australia): evidence for an autochthonous origin. *Tectonics* 34, 2015TC003829, doi: 10.1002/2015TC003829.

