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Interactive comment on "Future accreted terranes: a compilation of island arcs, oceanic plateaus, submarine ridges, seamounts, and continental fragments" *by* J. L. Tetreault and S. J. H. Buiter

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Abstract. I would have added backarc basins to this collection of accreted materials. OK, some of this will subduct or obduct to form ophiolites, but commonly the overlying sedimentary pile is not included in this menagerie, but it might be the most abundant material to accrete, because it is usually too buoyant to subduct.

P 1457 ln 17: Interesting that the reference for an explanation of "flake tectonics" is Oxburgh 1972. Personally, I think it is almost mechanically impossible. What is a "strong wedge" anyway? Accretion of Quesnellia, Stikinia, and Cache Creek terranes in the Canadian cordillera are better explained by backarc closure following slab flipping

(eg Colpron & Nelson, 2007 GSA Today 17).

P 1473 ln 15: I would suggest that the most common way to form microcontinental ribbons, at least for the SW Pacific, is by extension and rifting from the active continental margin during subduction retreat (read Schellart papers). This is the way most backarc basins form, with the retreating arc and forearc becoming isolated as the continental ribbon. However, this process does not explain the continental fragments embedded in the Atlantic Ocean floor, and other processes such as heterogeneous hyper-extension of passive margins along pre-existing structural discontinuities, are required to form them.

P 1476. Ln 1: It is stated that "FATs will combine before accreting onto a continent". Note that the microcontinental ribbons in the SW Pacific are on the upper plate, inboard from the active subduction zone, with the Pacific plate as the primary subduction driver. I would argue that FAT combination is a necessary condition for accretion, such as in the SW Pacific. If the oceanic plateau is on the primary subducting plate, the delay in its conversion to eclogite is the reason why it remains buoyant and thus "collides" with the continental ribbon. Both can then be accreted onto the continent as a composite terrane.

P 1478 ln 18: The statement: "The ability of continental crust to subduct has been documented in the coesite found in exhumed ultrahigh pressure terranes" might be correct, but it is a corollary that these units came back to the Earth's surface. Hyper-extended crustal fragments in subducting oceanic crust will obviously be dragged into the mantle, but then it becomes an issue of fragment size if it returns, when buoyancy contrast becomes sufficient to induce slab breakoff. Clearly, breakoff is required to get such fragments back to the surface, largely by a process of isostatic rebound.

P 1480 ln 13: To understand the fate of lower crustal material along active plate margins, one needs to go no further than the study by Hyndman et al 2005. GSA Today 15. They provide compelling evidence that the wide backarc (orogenic) regions are in-

variably hot because of shallow asthenosphere convection, facilitated by water derived by dehydration of the underlying subducting slab. See their subsequent papers as well. Thus, delamination is not nearly as important as convective removal of arc-type lower crust, which is a simple consequence of subduction and an elegant explanation for modern high heat flow around the circum-Pacific. Inferences made from seismic or crystal fractionation modelling are largely unnecessary if this global-scale phenomenon is considered.

P 1481 ln 5: I disagree with the comment that “The nature of the accretionary prism region can be either erosive or accretionary depending on the sedimentary and erosive fluxes (Clift and Vannucchi, 2004; Scholl and von Huene, 2010). It is much more likely to relate to the tectonic driving forces associated with subduction. Ultimately, whether a mountain range like the Andes exists to supply sediment via erosion, or whether it is an island arc with no erosive or sedimentation capacity, is not determined by sedimentary and erosive fluxes, but by the fundamental drivers of plate tectonics themselves.

Interactive comment on Solid Earth Discuss., 6, 1451, 2014.