

Three main events: deposition of Mesopaleozoic









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Note there is a major unconformity in Grand Canyon and Pahrump groups with bottom ending at ~1080 Ma, then resuming ~780Ma (e.g., Mahon et al., 2014). Some stuff still not on here: Doe et al.'s (2013) pC qtzts near Four Corners. Uncompany Frm in CO.













Red thick bar is hiatus in NAm igneous and thin is Archean-Proterozoic bdry. Paper says these ages abundant in Australia and Baltica (another paper points out they are found in Amazonia, too). Note the small number of zircons compared to later work.



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This seems to support an Australian source to the west of the WUS c. 1550 Ma (though AZ sediments are dominantly juvenile). —same time as constraints used to put Siberia there! This is from newly recognized 1.48 Ga quartzites in NE AZ. Absence of these zircons later thought to mean that these terranes moved during shift from Nuna/Columbia supercontinent to Rodinia. Fig. 7. A) Initial [2]Hf values for 1.62–1.48 Ga detrital zircon from the Defiance uplift and Blackjack Formation, Arizona, plotted with the range of [2]Hf values for 1.62–1.48 Ga detrital zircon from the Defiance uplift and Blackjack Formation, Arizona, plotted with the range of [2]Hf values for 1.62–1.48 Ga detrital zircon from the Gawler craton (Belousova et al., 2009) and Mt. Isa region (Griffin et al., 2006). The lower black dashed line represents a 2.1 Ga peak in TDM ages of the Gawler data (Belousova et al., 2009). B) Generalized reconstruction of Australia (Gies et al., 2004); Cavood and Korsch, 2008) and East Antericea (Payne et al., 2009) during the Proterozoic showing the distribution of potential 1.6–1.5 Ga igenesitia craton; C—Core region; GI—Mt. Isa region; CII—Mt. Isa region; CII—Mt. Isa region; CP/BH—Curnamona province and Brorice (Belousova et al., 2009), a 1590 ± 40Ma age populations of 1.60–1.54 Ga afor the Mt. Isa region (Griffin et al., 2006), a 1590 ± 40Ma age population of from the Gawler craton; TA—Tera dedie; SAC—South Australia craton; NAC—Methage ages from the Isalckjack Formation and Defiance uplift.



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While an interesting idea, seems to run into issues with plutonism being all to SE...



Columbia = Nuna in other papers







Two notes: No c. 1400 Ma zircons, so probably not that young. And no unusual zircons--exotic terrane not required (but not impossible, either).



...though note that the Holland et al. paper identified some in SoCal not evident on this map. Also note this is during Belt deposition.





This is related to assembly of Rodinia-final accretionary event on SE side of Laurentia























There is a big break in the Crystal Spring between middle and lower. And upper part now broken out as Horsethief Springs Frm as there is a 300 Ma gap and a regional unconformity.





Fig. 21. Comparison of major orogenic, sedimentation and magmatic events in East Antarctica, Australia, and western Laurentia. Ages of igneous glacial clasts from this study shown by circles as in Fig. 20; inferred presence of East Antarctic crust with these ages shown by circles with dashed outlines. Cratonic elements > 2 Ga shown in pink. Correlations based on both age and Hf-isotope compositions shown by magenta lines (see Fig. 20 for references). Inferred sedimentary provenance links shown by blue arrows. Tectonic activity associated with assembly of the Columbia–Nuna and Rodinia supercontinents (at ~1.8 and ~1.1 Ga, respectively) shown in light brown. Named geologic units and events are representative or indicative of a given age and not meant to be comprehensive. Ties between discrete igneous and metamorphic ages, isotopic compositions of distinctive igneous events, sedimentary provenance linkages, and general stratigraphic and orogenic pattern indicate that these three cratonic elements shared a common geotectonic history between about 2.0–1.0 Ga, including alternating periods of crustal extension and arc-related convergence, that reflects a long–lived association. References include: (a) East Antarctic glacial clasts (Goodge et al., 2008, 2010; this study); (b) East Antarctic crust (Goodge et al., 2001; Goodge and Fanning, 2016); (c) western Australia (Betts et al., 2002); (d) central Australia (Betts and Giles, 2006; Fanning et al., 2007; Hand et al., 2007; Berry et al., 2008; Betts et al., 2008; Goodge and Vervoort, 2006; Whitmeyer and Karlstrom, 2007; Zirakparvar et al., 2010; Vervoort et al., 2011; Furlanetto et al., 2016); (e) southern Laurentia (Doughty et al., 1998; Goodge and Vervoort, 2006; Whitmeyer and Karlstrom, 2007; Zirakparvar et al., 2010; Vervoort et al., 2014; Mulder et al., 2015; Furlanetto et al., 2016).



Most of these interpreted to be in foreland of Grenville Orogen.





Timmons et al., 2005





Note the scale at right. This is a thick section!



caption in paper is scrambled. Muscovite probabilities are apparently Ar-Ar dates



Using carbon isotopes and fossils for correlation here.



Detrital zircons from Grenville in Aust and Ant need source like this. UMG/BCF is Uinta Mtn Group/Big Cottonwood Frm, MM is McKenzieMtns basin, CG is Chuar Group







Big Bear group is clearly younger, but zircons don't look NAM and the sedimentary structures suggest a source to SW--is this last record of adjacent material?





Late Proterozoic correlations now made with use of detrital zircons and presuming some glacial correlations.



An example of how detrital zircons can be misleading—look at 01AY09







Note magmatism in here.















