

Assessing the rift to sag evolution of Parnaíba Basin, NE Brazil, through U-Pb detrital zircon geochronology and provenance

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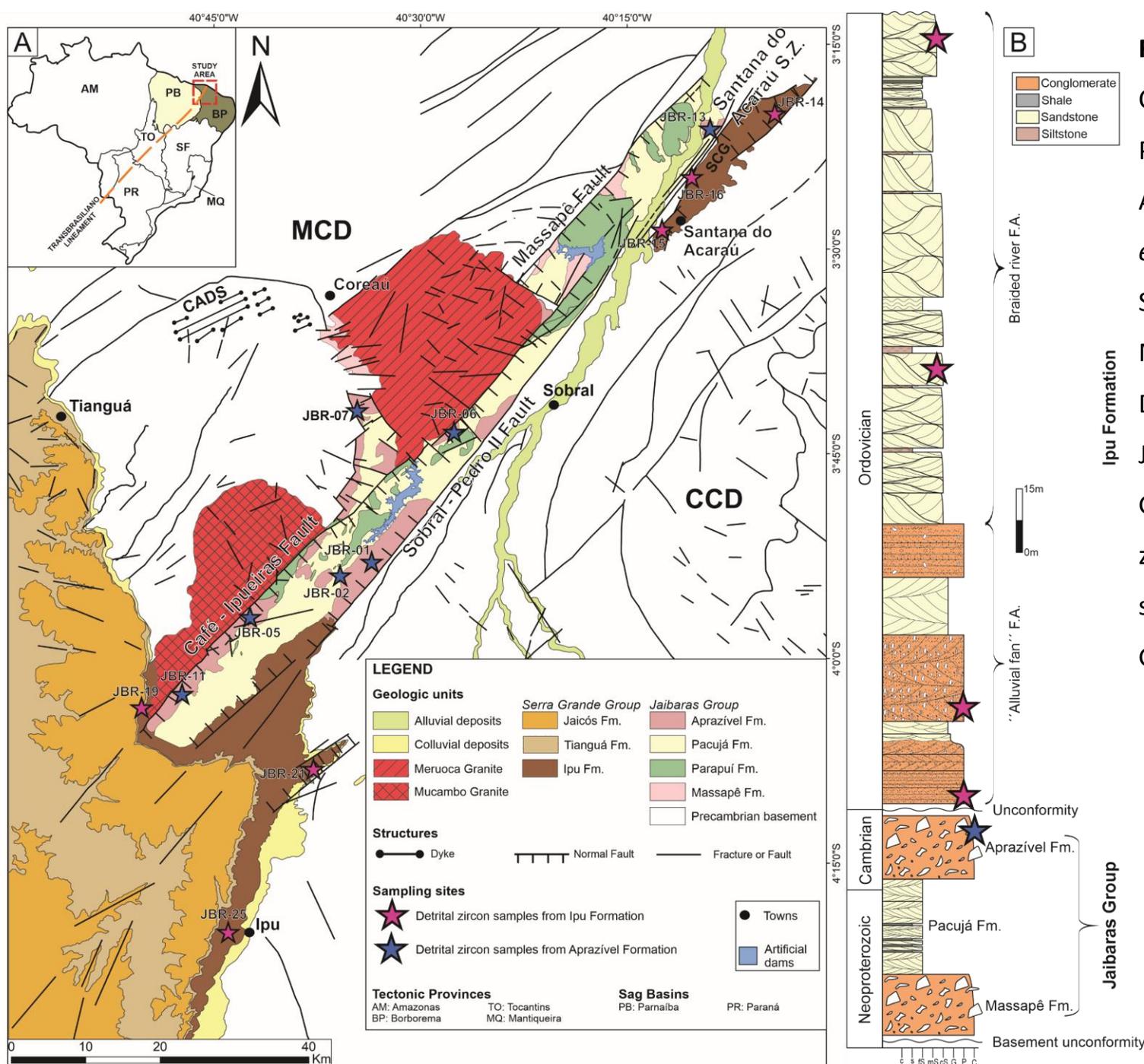


Figure 1: (A) Geological map of the Ediacaran - Cambrian Jaibaras Basin and the east margin of Parnaíba Basin (compiled from Costa *et al.*, 1979; Abreu *et al.*, 2014; Gorayeb *et al.*, 2014; Silva Junior *et al.*, 2014). CADS: Coreaú-Aroeiras dyke swarm; SCG: Santana do Acaraú Graben. S.Z.: Shear Zone. MCD: Médio Coreaú Domain. CCD: Ceará Central Domain. (B) Composite stratigraphic section of Jaibaras Basin and Ipu Formation (Serra Grande Group); showing stratigraphic position of the detrital zircon samples. F.A.: Facies association; c: clay; s: silt; fS: fine sand; mS: medium sand; cS: coarse sand; G: gravel; P: pebble; C: cobble.

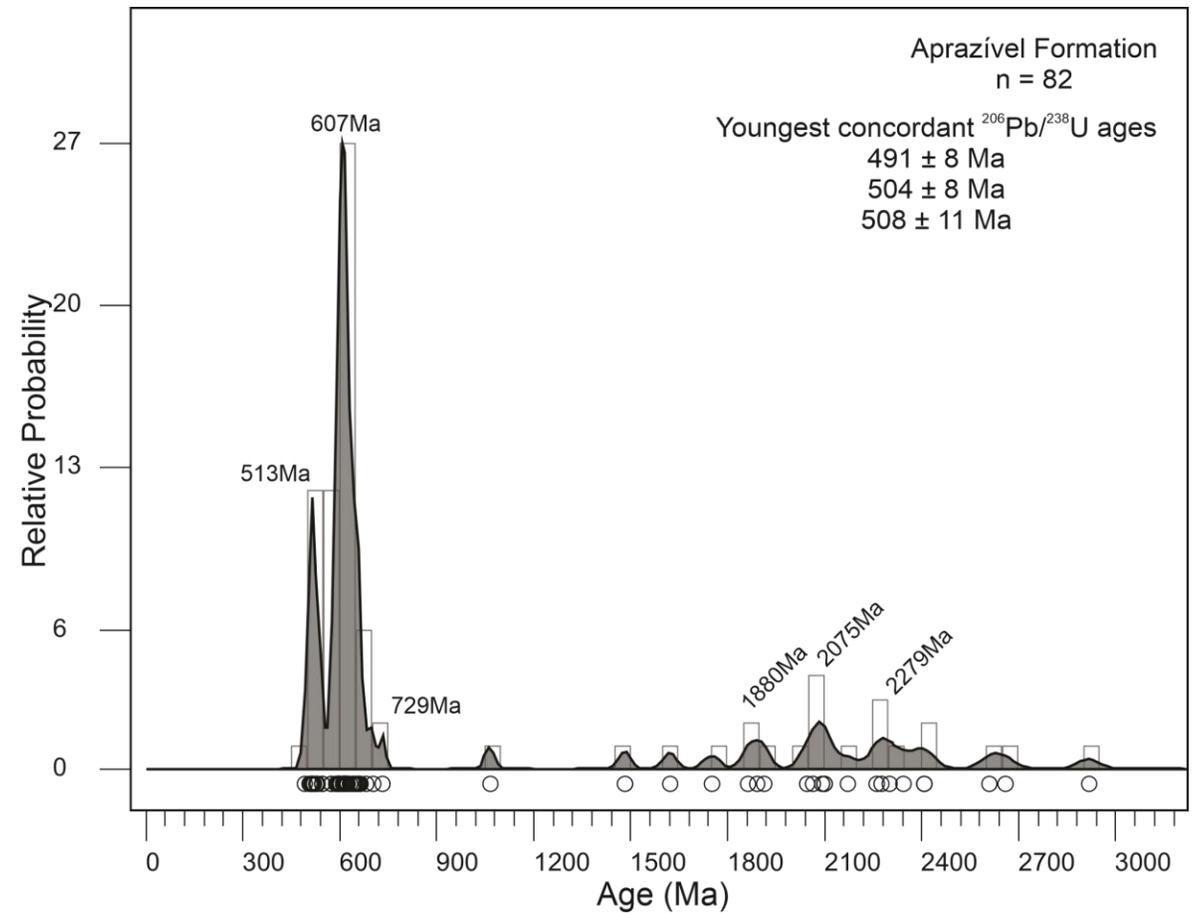
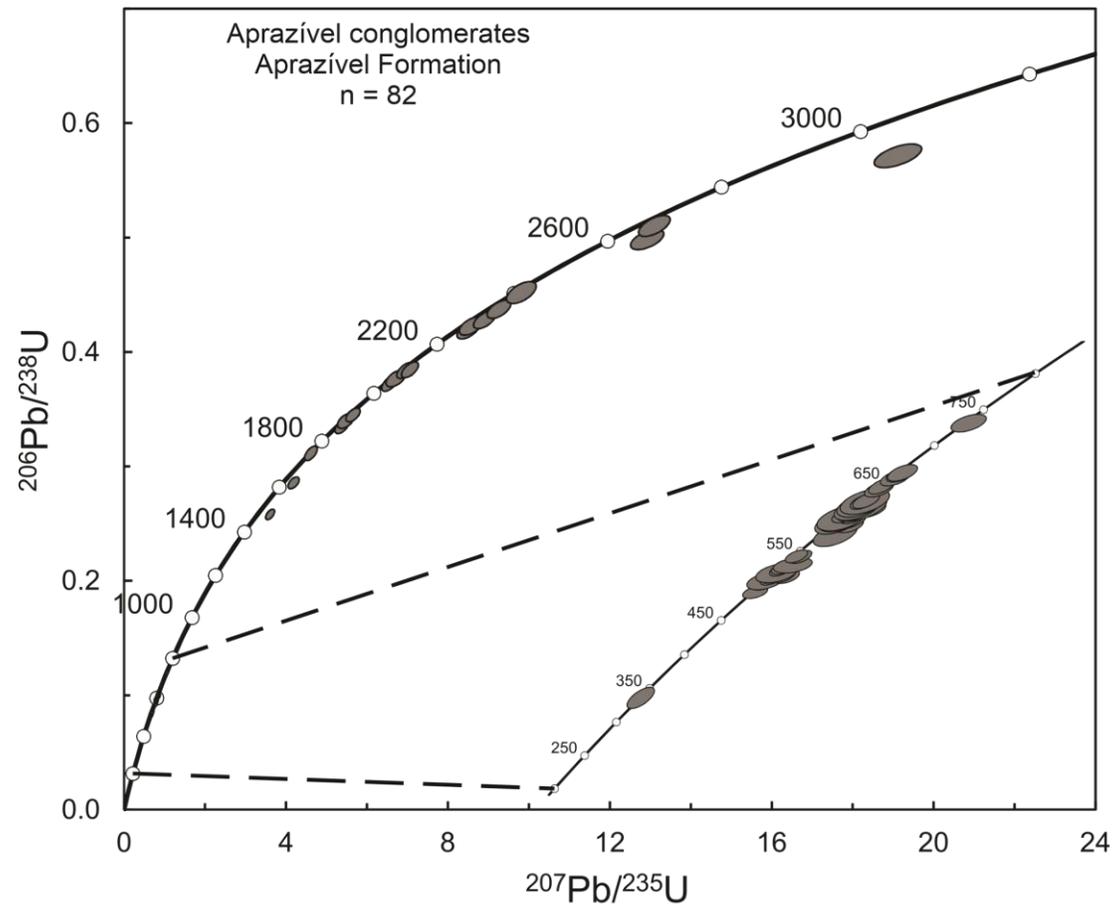


Figure 2: Concordia diagram (left) and age probability plot (right) for the analyzed detrital zircons of the Aprazível Formation. n is the number of detrital zircons analyzed. Histograms and KDEs were built using Density Plotter Java application (Vermeesch, 2012).

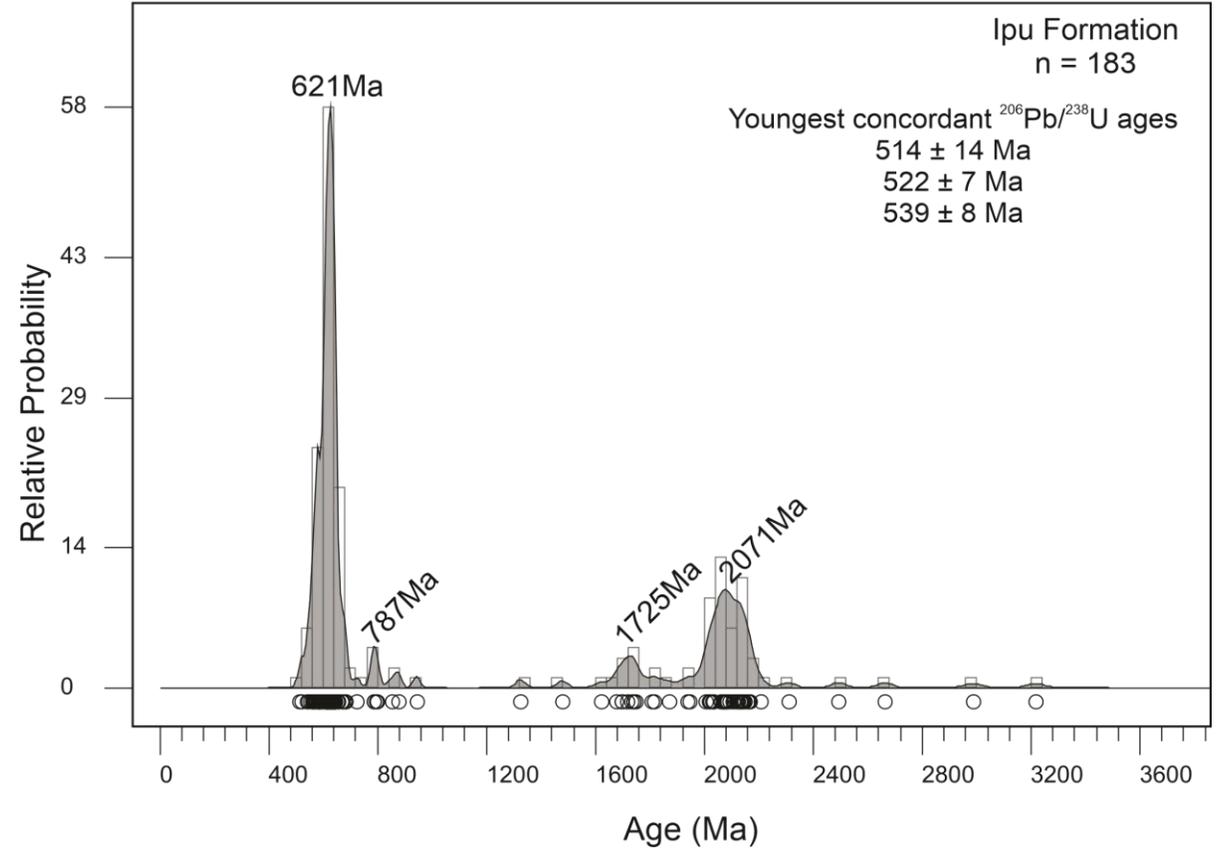
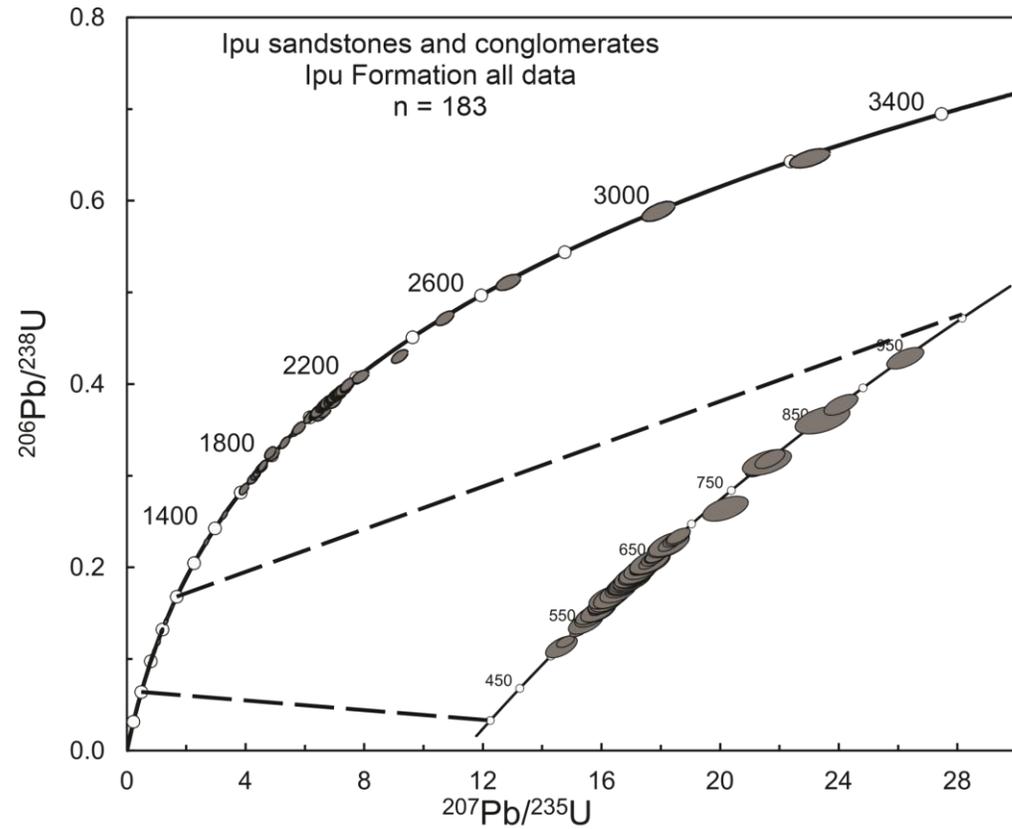


Figure 3: Concordia diagram (left) and age probability plot (right) for the all analyzed detrital zircons of the Ipu Formation. n is the number of detrital zircons analyzed. Histograms and KDEs were built using Density Plotter Java application (Vermeesch, 2012).

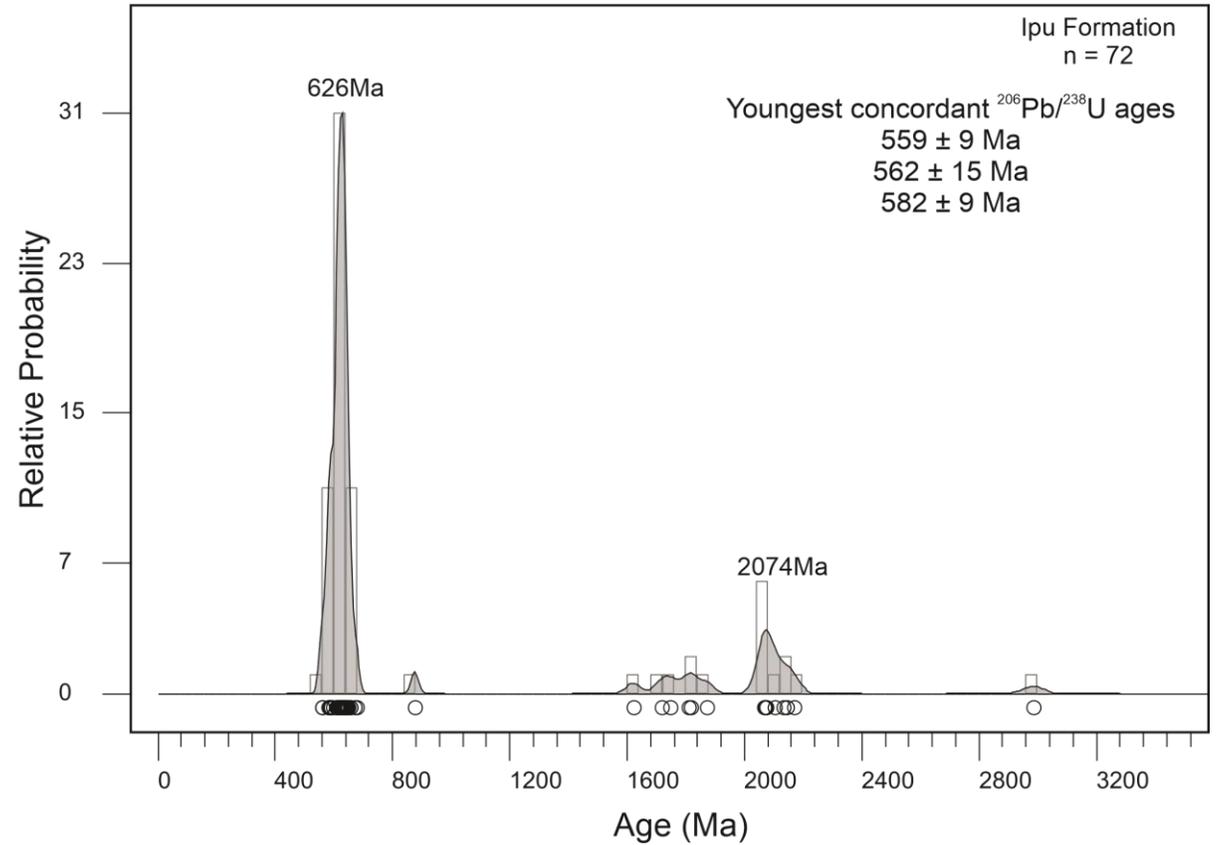
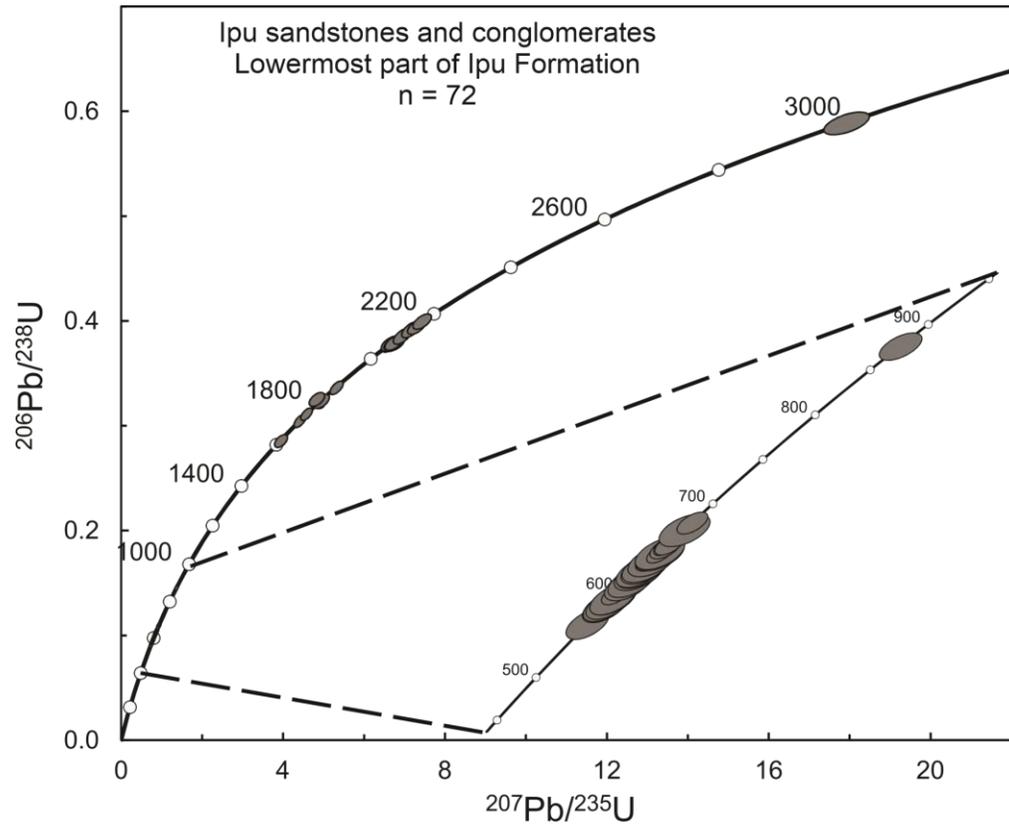


Figure 4: Concordia diagram (left) and age probability plot (right) for the analyzed detrital zircons of the lowermost part of Ipu Formation. n is the number of detrital zircons analyzed. Histograms and KDEs were built using Density Plotter Java application (Vermeesch, 2012).

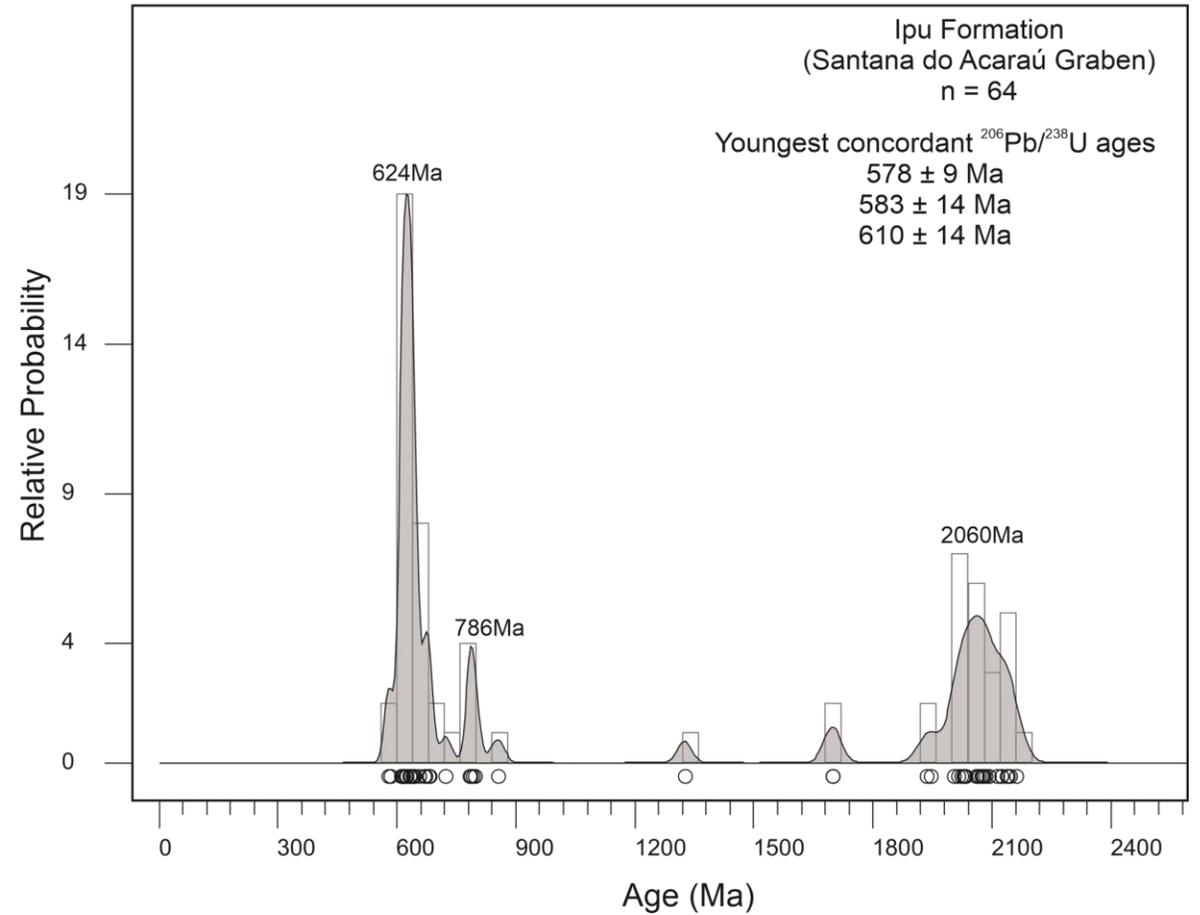
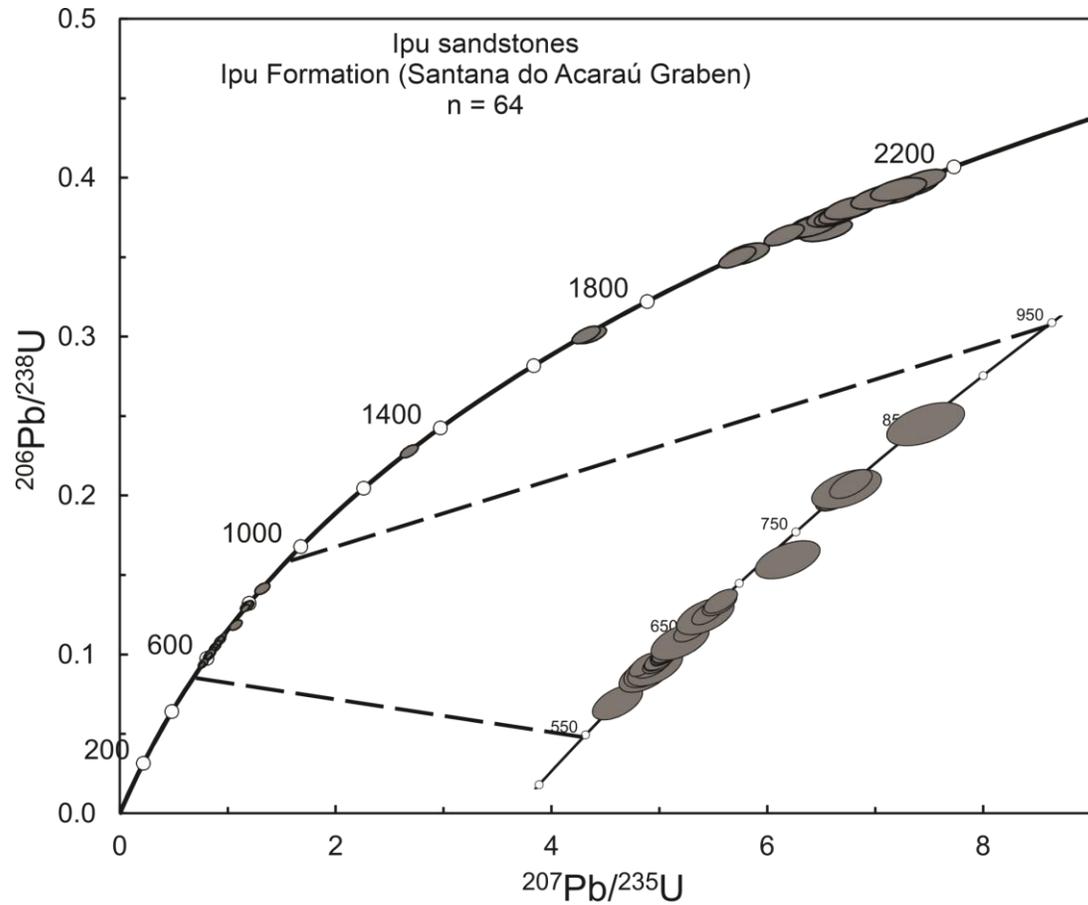


Figure 5: Concordia diagram (left) and age probability plot (right) for the analyzed detrital zircons of the intermediate part (Santana do Acaraú Graben) Ipu Formation. n is the number of detrital zircons analyzed. Histograms and KDEs were built using Density Plotter Java application (Vermeesch, 2012).

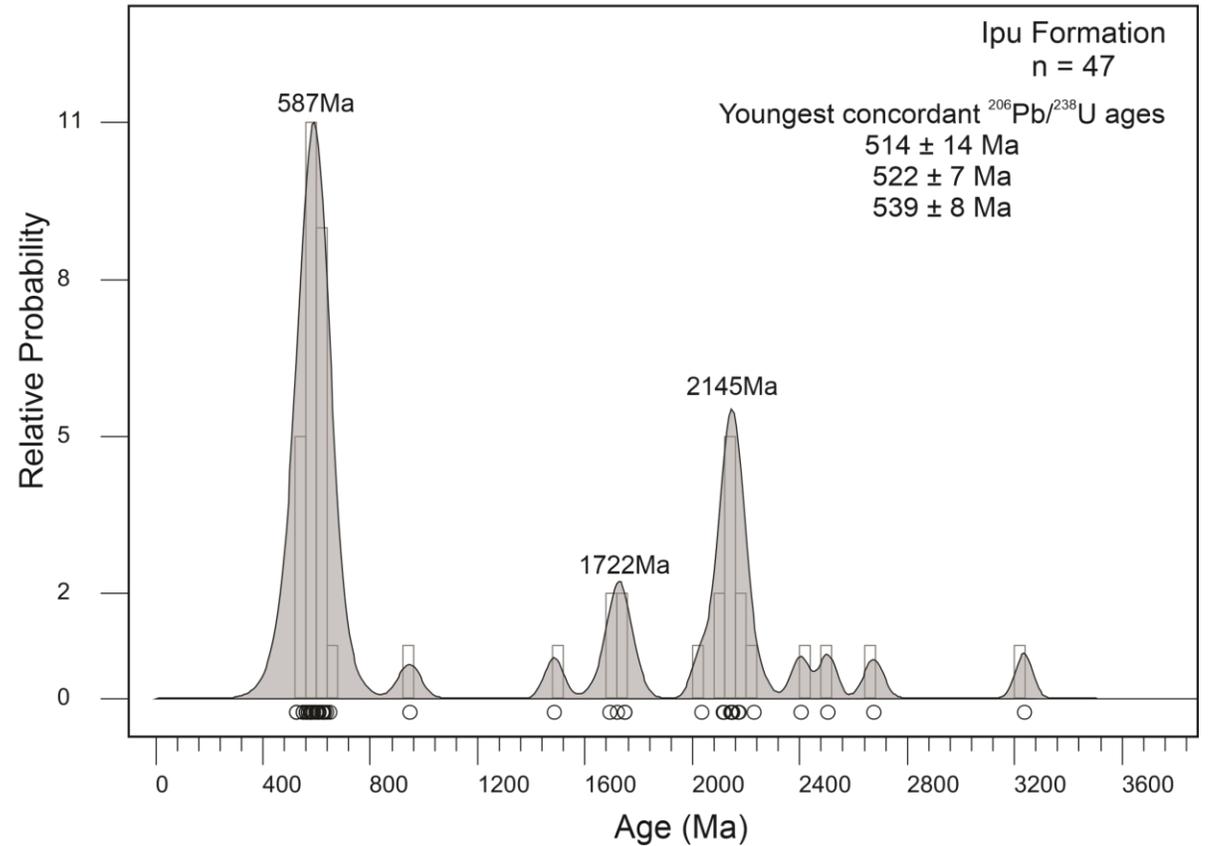
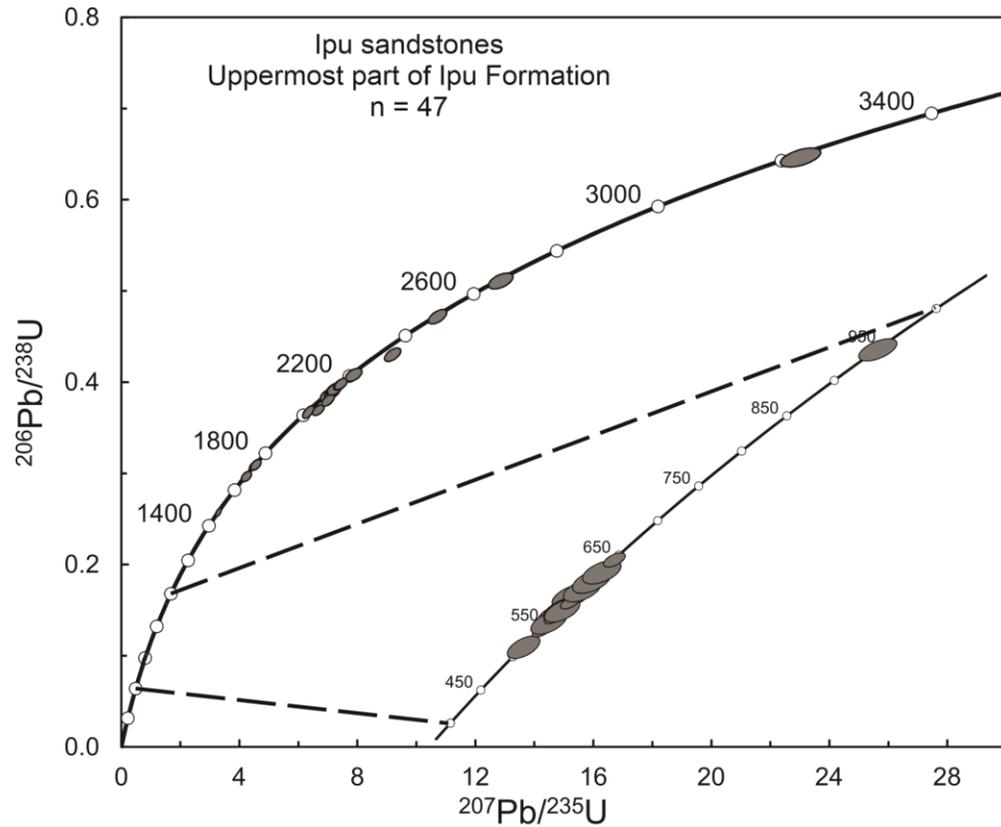
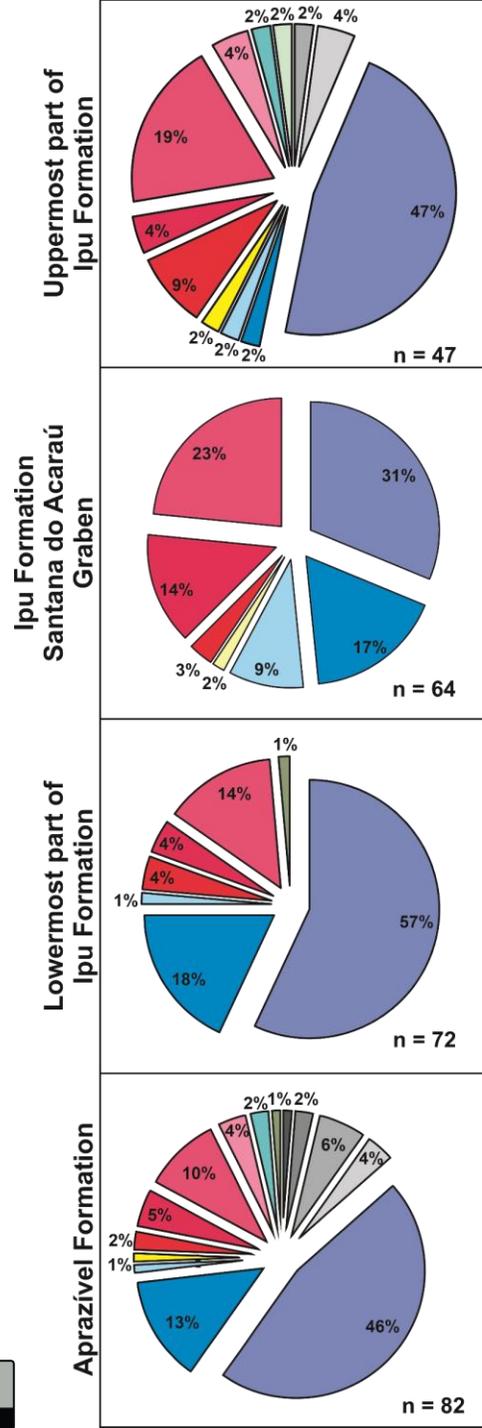


Figure 6: Concordia diagram (left) and age probability plot (right) for the analyzed detrital zircons of the uppermost part of the Ipu Formation. n is the number of detrital zircons analyzed. Histograms and KDEs were built using Density Plotter Java application (Vermeesch, 2012).



Cambrian	Furongian (485 - ~497 Ma)
	Miaolingian (~497 - 509 Ma)
	Series 2 (~509 - 521 Ma)
	Terreneuvian (~521 - 541 Ma)
Neo-proterozoic	Ediacaran (541 - ~635 Ma)
	Cryogenian (~635 - 720 Ma)
	Tonian (~720 - 1000 Ma)
Meso-proterozoic	Ectasian (~ 1200 - 1400 Ma)
	Calymmian (~ 1400 - 1600 Ma)
Paleo-proterozoic	Statherian (~ 1600 - 1800 Ma)
	Orosirian (~ 1800 - 2050 Ma)
	Rhyacian (~ 2050 - 2300 Ma)
	Siderian (~ 2300 - 2500 Ma)
Archean	Neo-archean (~ 2500 - 2800 Ma)
	Meso-archean (~ 2800 - 3200 Ma)
	Paleo-archean (3200 - 3600 Ma)

Figure 7: Pie charts showing the percentage distribution of detrital zircons age populations for Aprazível and Ipu formations. n is the number of detrital zircon grains analyzed. Ages according to the International Chronostratigraphic Chart 2019/05.



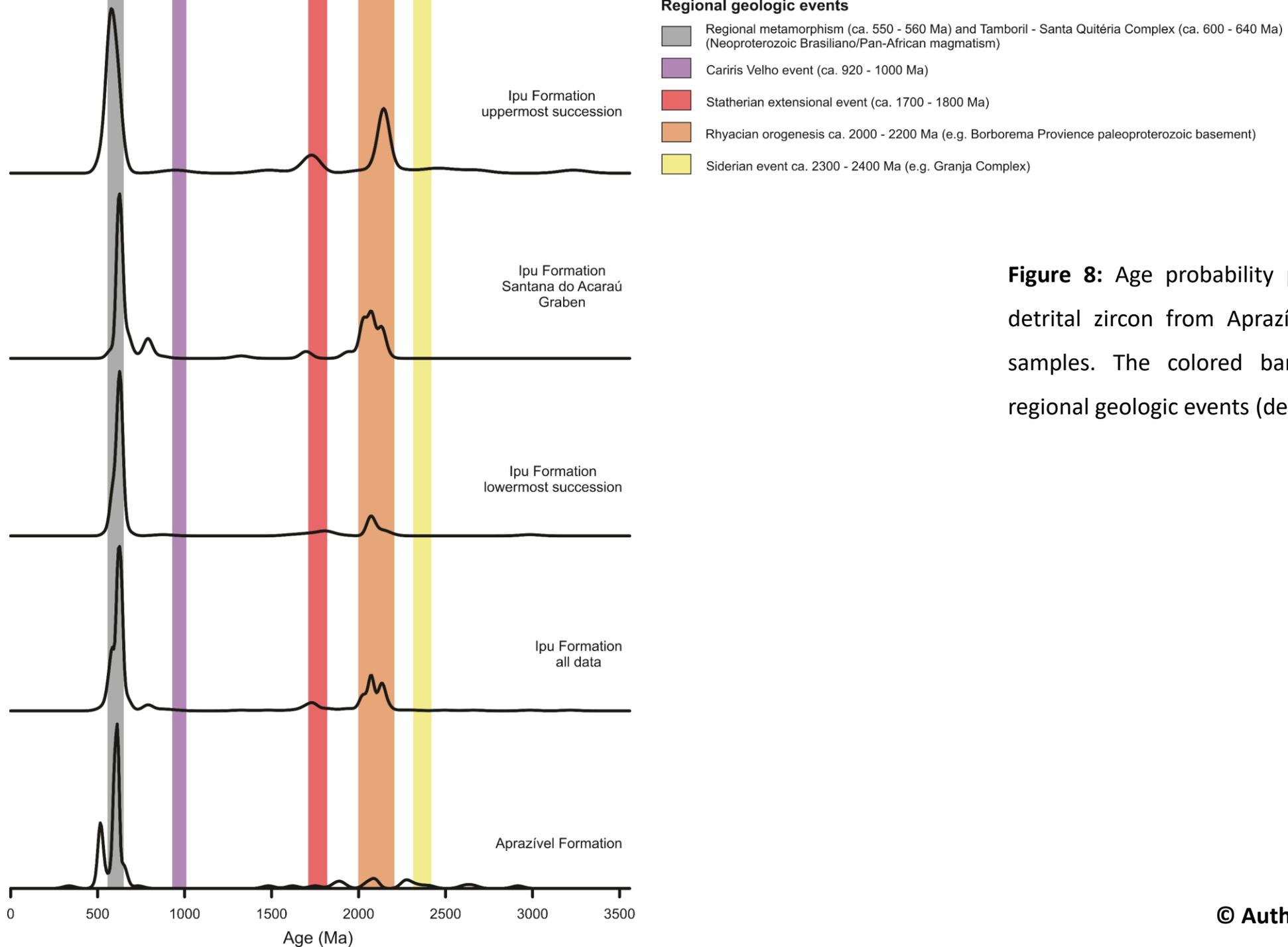


Figure 8: Age probability plot comparing ages of detrital zircon from Aprazível and Ipu formations samples. The colored bars represent the main regional geologic events (de Araújo et al., 2012b).

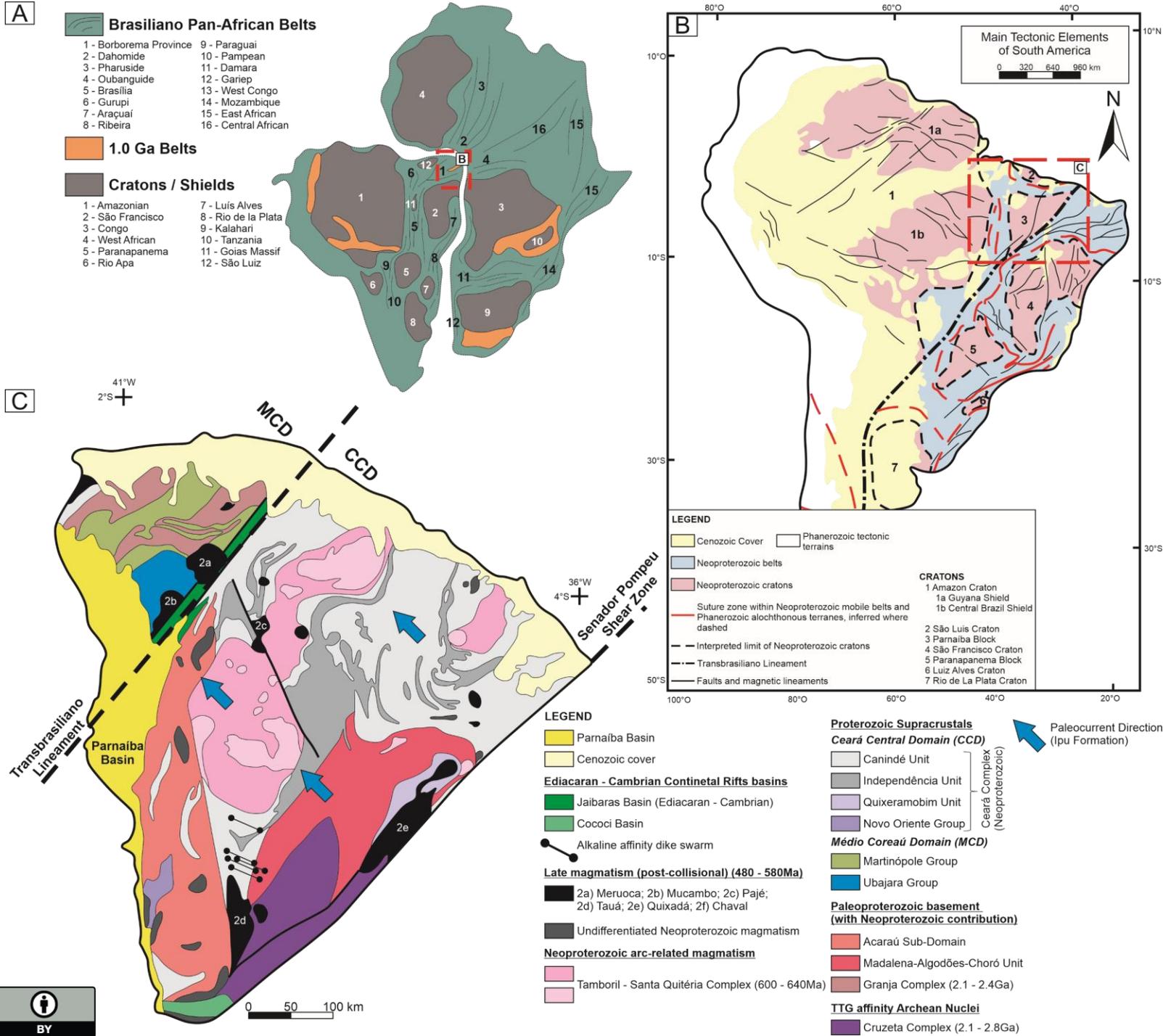


Figure 8: Tectonic elements and geological units of the study area in the context of South America continent. (A) Location of the principal cratons/shields and the Brasiliano Pan-African belts; (B) Tectonic sketch of South America Continent, highlighting the Neoproterozoic cratons, faults and mobile belts; (C) Borborema Province geological map with the preferential source areas for Aprazível and Ipu formations. Modified from de Araújo et al. (2010, 2012a,b) and Cordani et al. (2016).

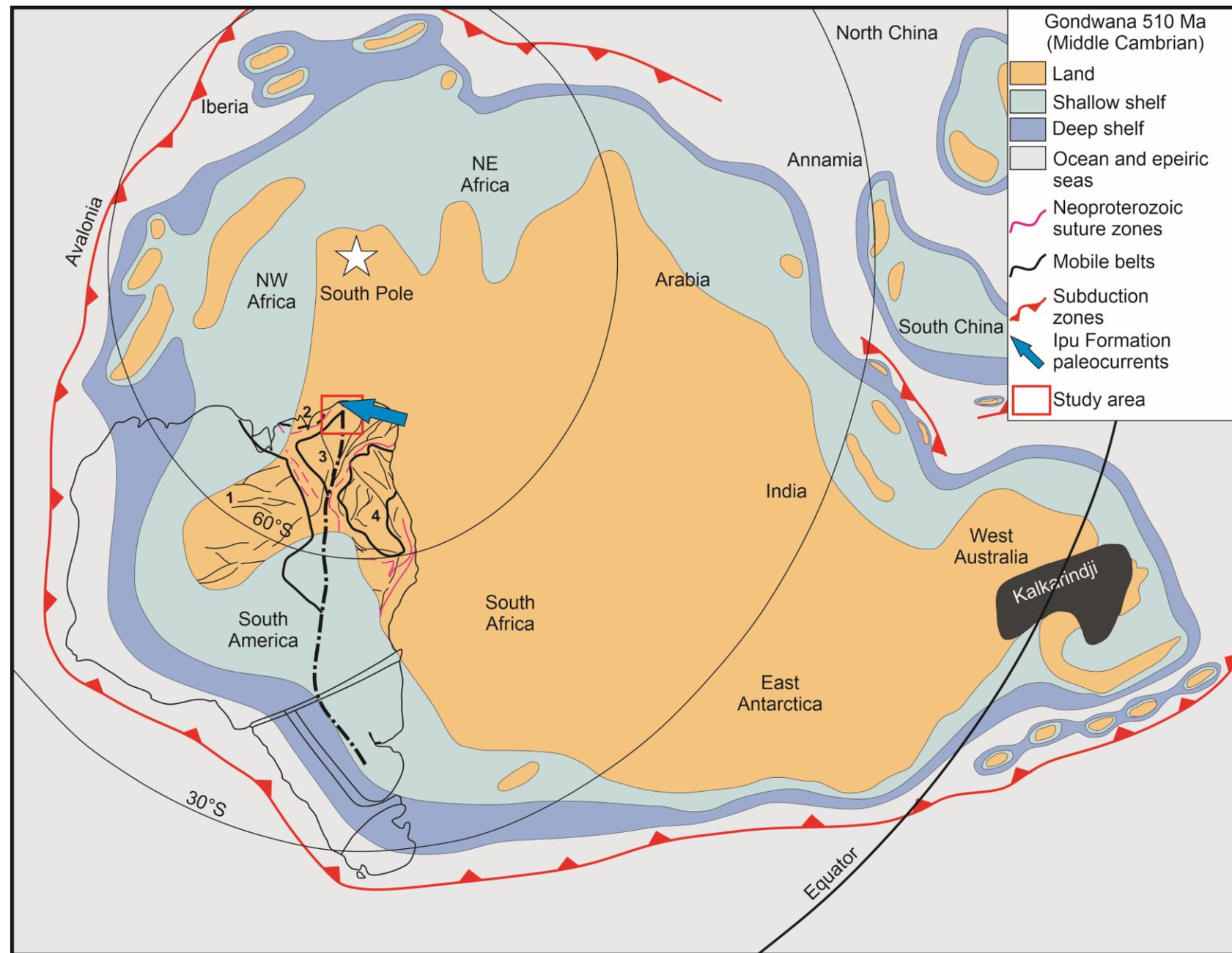


Figure 8: Gondwana reconstruction at 510 Ma highlighting the South America continent and Neoproterozoic suture zones (pink line) and mobile belts (black line). 1) Amazon craton; 2) São Luis craton; 3) Parnaíba Block; 4) São Francisco Craton. Modified from Torsik & Cocks (2013) and Cordani et al. (2016).

Acknowledgments

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