Provenance and formation model of Ti-Zr placers of Murray basin (southeastern Australia) from SHRIMP data on dating recrystallization crystals

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Reconstruction schemes of formation conditions of those deposits Mindary and Wim-150 were elaborated in the system: bedrock – weathering crust – intermediate collector – placer. For each element of this scheme, distinguishing characteristics of inner structure, types of minor element distributions and U-Pb dating in primary detrital zircons and late recrystallization rims developed on them were studied with the use of methods (Opt, CL, SHRIMP-II, LA, EPMA and others). It was established that (1) in both deposits detrital zircon cores show polymodal values of U-Pb age in the range of 3000 to 1050 Ma (concordant values are 1190–1000 Ma); (2) later recrystallization rims of zircons of Mindary placers and their bedrocks of Kanmentu belt have concordant age of 6000 Ma, and rims of WIM-150 placers and their primary sources of Ballarat belt are of 400Ma. These data suggest that Ti-Zr sands formation within Murray basin had different history in the frame of common model: stage 1 (pre-metamorphic) — paleosedimentary accumulation of detrital zircons; stage 2 (synmetamorphic) — metamorphism and deformation with newly formed recrystallization rims in detrital zircons; stage 3 (postmetamorphic) — erosion of ancient complexes with removal from them of zircon grains with newly formed recrystallization rims and accumulation in MZ-KZ coastal-marine placers.