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A review of the geochronology of the Margate Terrane of the Natal Metamorphic belt

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The incremental accumulation of geochronological data from the Margate Terrane over the past two decades has progressively exposed a tectono-magmatic history of longer duration and greater complexity. The Margate Terrane has been described as the southern-most of three Proterozoic island arc terranes that accreted onto the southern margin of the Kalahari Craton and form the Natal Metamorphic belt [1]. Early geochronological data suggested that the Margate Terrane was the youngest of the three terranes [2]. Moreover, age bracketing of deformational fabrics indicated that the Margate Terrane was still tectonically active at ~ 1090 Ma [2, 3], some 60 Ma after the northernmost Tugela Terrane was obducted onto the Kalahari Craton (~ 1155 Ma) and tectonically stable [4].

More recent U-Pb zircon data show that the magmatic development of the Margate Terrane goes back as far as ~ 1180 Ma (Fig. 1), indicating that it is not younger than the Tugela or Mzumbe terranes [3]. Nevertheless, age bracketing of tectonic fabrics indicate two nearly coaxial tectonic events that affected the Margate and Mzumbe terranes [5], but not the Tugela Terrane which is thought to have escaped these events by being supported by the underlying southern margin of the Kalahari Craton [6, 7]. The youngest plutons and tectonic fabrics (~ 1030 - 1040 Ma) have been interpreted as post accretionary and related to escape tectonics [7], but recent data allow reinterpretation in terms of collisional tectonics associated with the assembly of Rodinia [5]. Moreover, the longer magmatic history indicated by the data of Mendonidis et al. [3] also places some doubt on the interpretation that the Margate and Mzumbe terranes accreted at ~ 1090 Ma [6], because, although the Margate Terrane is underlain by considerable volumes of foliated plutonic rocks of this age, there is no way to rule out the possibility of older, overprinted fabrics that could suggest earlier accretion, and that the ~ 1090 Ma event was also post-accretionary.

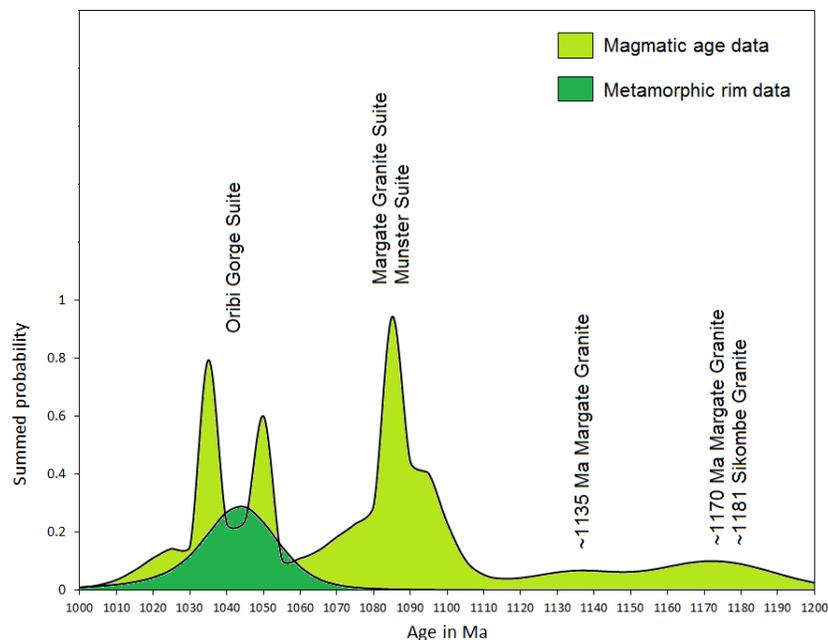


Figure 1: Summed probability distribution of U-Pb Zircon ages from the Margate Terrane, after Mendonidis and Armstrong [3].

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