

## **From Gondwana to Europe: the journey of Elba Island (Italy) as recorded by U-Pb detrital zircon ages of Paleozoic metasedimentary rocks**

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The configuration of the northern Gondwana margin throughout the Paleozoic is difficult to reconstruct owing to the complex geodynamic setting of the Mediterranean region in Mesozoic to Cenozoic times. Detrital zircons in early Paleozoic to early Mesozoic metasedimentary rocks on Elba and mainland Tuscany record the Gondwana provenance of Adria and its rifting from the northern Gondwana margin. A large new LA-ICP-MS and SIMS U-Pb zircon data set allows us to trace this history. Three main stratigraphic units have been investigated on Elba Island. The oldest Porto Azzurro Unit was deposited in the early Cambrian and has zircon age distributions indicating a typical northern African provenance, most likely sourced from the Saharan Metacraton. The Ortano Unit has a simple, mostly unimodal Ordovician age distribution that is entirely dominated by metavolcanic rocks and their erosional products; a sample of the metavolcanic Ortano Porphyroids provided a SIMS U-Pb zircon age of  $460 \pm 3$  Ma. This phase of intense volcanism is related to the subduction of the Rheic Ocean beneath Gondwana, terminating with initial rifting and subsequent opening of the Paleotethys. This also marks the onset of the separation of a range of European terranes, including Adria and future Elba Island, from Gondwana. The Permo-Triassic Monticiano-Roccastrada Unit is the first to show a European provenance with the appearance of large amounts of Variscan and late to post-Variscan detritus. The presence of Variscan detrital zircons in the Permo-Triassic sediments is unexpected, since a Variscan age signature is so far not well recorded in the Adria Plate. This dataset is the most comprehensive detrital zircon data set so far available for the Adria Plate and documents Adria's close affinity to Africa in the Lower Paleozoic, as well as its initial rifting within an active continental margin setting during the Ordovician and its final separation and independent evolution since late Palaeozoic times.