Finding Argoland: reconstructing a lost continent in SE Asia

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Can continents get lost? The geological textbooks predict that when continents enter subduction zones, subduction either stops, or part of the crust is scraped off and preserved in orogens. A possible exception has been the conceptual continent of Argoland. Argoland must have been broken off the NW Australian margin in the Late Jurassic and migrated north to end up somewhere in SE Asia, but the previously identified fragments that may form candidates are too small to represent all of Argoland, and the geology shows that they were once separated by oceanic basins that are much older than the Late Jurassic.

We compiled the orogenic architecture and the geologic record of SE Asia and the NW Australian margin. We identified Gondwana-derived units that collectively may represent Argoland. These fragments are found between relics of Late Triassic to Middle Jurassic oceanic basins that all predate the break-up of Argoland. We systematically restore deformation within SE Asia in the upper plate system above the Sunda trench, use this to estimate where Gondwana-derived fragments accreted at the Sundaland (Eurasian) margin in the Cretaceous, and subsequently reconstruct their tectonic transport back to the Australian-Greater Indian margin. Our reconstruction shows that Argoland originated at the northwest Australian margin between the Bird's Head in the east and Wallaby-Zenith Fracture Zone in the west, south of which it bordered Greater India. We show that the lithospheric fragment that broke off northwest Australia in the Late Jurassic was a collage of continental fragments and intervening oceanic basins.