Constraints on the timing and isotopic evolution for the 150 my emplacement history of the South Patagonian batholith, Southern Chile.

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Our database of 70 U–Pb zircon ages (mostly determined by SHRIMP) shows that the South Patagonian batholith resulted from the amalgamation of subduction-related plutons from the Late Jurassic to the Neogene. Construction of the batholith began with a voluminous, previously undetected, bimodal Late Jurassic body mainly composed of leucogranite and some gabbro, emplaced along its present eastern margin within a restricted time span (~155 to ~150 Ma). This episode is coeval with the voluminous rhyolitic ignimbrites of the Tobífera Formation and the quasi oceanic floor of the deep Rocas Verdes Basin east of the batholith. Changes in subduction parameters then triggered generation of the earliest Cretaceous plutons (~145 – ~135 Ma) westwards of the Late Jurassic ones. This westward shift in plutonism culminated in the late Early Cretaceous (~536 – 110 Ma) along the present western margin of the batholith. After the opening of the southern Atlantic Ocean, Late Cretaceous (~100 – 78 Ma) and Paleogene (~65 – 40 Ma) granitoid plutons are geographically restricted, mainly emplaced between previously established margins of the batholith. During the Neogene plutonism (~22 – 16 Ma), a recurrence of coeval volcanism is recognised within and east of the batholith. Common εNdt values for the granitoids vary from strongly negative (-5.0) in the Late Jurassic, to progressively higher values for the earliest Cretaceous (-3.6), the late Early Cretaceous (+0.3) to Late Cretaceous (+2.3) and the Paleogene (+5.0), followed by lower and more variable ones in the Miocene (+2.5). These variations may reflect different modes of pluton emplacement, mainly by incremental assembly of small plutons in the higher εNdt late Early Cretaceous to Paleogene plutons, and those which developed large magma chambers giving rise to eruptions over vast areas in the Late Jurassic, Miocene, and probably also in the earliest Cretaceous, even if no coeval volcaniclastic deposits of the latter are known from the South Patagonian batholith area.