



MAGM-1: Arcos magmáticos fanerozoicos

Geochemical evolution of Cenozoic arc-related magmas in Southern Central and North Patagonian Andes

Vanesa Dafne Litvak¹, Sofía B. Iannelli¹, Lucía Fernández Paz¹, Stella Poma², Andrés Folguera¹.

(1) Departamento de Ciencias Geológicas, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Instituto de Estudios Andinos "Don Pablo Groeber" (IDEAN, UBA-CONICET), Buenos Aires, Argentina

(2) Departamento de Ciencias Geológicas, Facultad de Ciencias Geológicas, Universidad de Buenos Aires, Instituto de Geociencias Básicas y Aplicadas de Buenos Aires (IGEBA, UBA-CONICET), Buenos Aires, Argentina

Geochemical variations in arc-related magmas allow correlating their magmatic evolution with changes in the geodynamic context of the Andean subduction zone. This work focuses on Cenozoic times, comparing geochemical evolution of arc-related products through different Andean segments, including those located both in a frontal and in a retroarc position, together with alkaline retroarc volcanism associated with arc dynamics. During Paleocene to middle Eocene arc magmatism along the Southern Central Andes was constrained to the volcanic front and showed variable slab input. On the contrary, in the North Patagonian Andes, intraplate alkaline-like magmas are registered in the retroarc zone. By late Eocene to middle Oligocene times, low volumes of arc volcanism were erupted along the Andes with mostly tholeiitic composition. Arc volcanism changed to a more typical tholeiitic to calc-alkaline Andean-type by late Oligocene in the Southern Central Andes, associated with the breakup of the Farallón plate; meanwhile, arc-derived magmas in North Patagonia still showed mostly tholeiitic composition. Arc magmatism by Miocene to middle Pliocene times in Southern Central Andes show typical calc-alkaline features, while arc-derived products were expanded to the east, associated with a progressive shallow subduction regime, developed both in the present-day Pampean-Chilean flat-slab segment (~28°-33°S) and the late Miocene Payenia shallow subduction segment (~33°-38°S). Particularly in the Pampean-Chilean segment, middle Miocene to late Miocene arc rocks show trace elements, and Sr, Nd whole-rock isotopic ratios and in-situ Hf and O isotopic composition that display a trend towards an increase of crustal contributions, either by assimilation during magma ascent through a thick crust or linked to forearc subduction erosion and/or sediment contributions into the mantle wedge. Coeval arc magmatism in North Patagonia also showed calc-alkaline geochemical features but was mainly spatially restricted to the main Andean axis. Overall, geochemical evolution of Cenozoic arc magmas reflects the direct influence of the variable geodynamic parameters along Southern Central and North Patagonian Andes.