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Magmatism: A crustal and tectonics perspective

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1 **Magmatism : A Crustal and Tectonics Perspective**

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12 **ABSTRACT** - The Earth's continental crust constitutes a major interface between the inner
13 and outer envelopes of the planet, controlling the differentiation of magmas produced in the
14 mantle and their transfer to the surface. This close link facilitates the use of different chemical
15 proxies to qualitatively unravel the crustal thickness related to fossil magmatic systems based
16 on the message carried by magmas. This paper aims to bridge different results of statistical
17 petrology, recently obtained at different scales of observation, in a global geodynamic model.
18 Statistical analyses applied to a large multidimensional database of magmatic rocks show that
19 crustal thickness could actually exert a first-order control on the composition of magmas,
20 which become more calc-alkaline and comparatively less tholeiitic with increasing crustal
21 thickness. Using this correlation, we document the progressive build-up of a thick (> 40 km)
22 Jurassic to Cretaceous accretionary belt along the Circum-Pacific Orogenic Belts (CPOB) that
23 bounded the Panthalassa Ocean. The destruction of this thick belt started at ca. 125 Ma and
24 was initially recorded by the thinnest magmatic systems hosting amphibole-bearing magma.
25 Thinning of the CPOB became widespread in the northern regions of western America and in

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