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A TERRANE CONFIGURATION FOR THE NORTHERN ANDES

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INTRODUCTION

Various terrane configurations have been published for the Andes of Colombia (e.g. McCourt et al., 1984; Aspden et al., 1987; Restrepo and Toussaint, 1988; Forero, 1990); Ecuador (Feininger and Bristow, 1980; Lebrat et al., 1986; Feininger, 1987); and Peru (Mourier et al., 1988); along with regional appraisals (e.g. Megard, 1987). In these models there is broad agreement regarding the presence of allochthonous Cretaceous-to-Tertiary oceanic terranes within the coastal belt and western Cordillera but less definition regarding the presence and configuration of older terranes with continental crust further inland. Ongoing studies in Ecuador (Aspden and Litherland, in press), based on field work over the metamorphic provinces, reveals more data on these older continental terranes.

TERRANES IN ECUADOR

The Ecuatorian Andes are dominated by two cordilleras, the structure of which is, in part, thought to be controlled by ancient sutures (Litherland and Aspden, in press). The ophiolitic Pujilí fault (Fig. 1), marks the eastern limit of the Cretaceous-to Tertiary oceanic terranes of the Western Cordillera (Megard, 1987). To the east, the ophiolitic Peltetec fault, divides the older continental terranes of Chaucha and Loja, with an intervening Jurassic greenstone (?island arc) terrane (Aspden and Litherland, in press) too narrow to show on Figure 1. Further south, the Chaucha and Amotape terranes come together along the Raspas suture (Feininger, 1987). In the Sub-Andean region there is no visible ophiolitic suture to divide the Loja

terrane from the Amazonic craton, which has been an autochthonous block since Precambrian times.

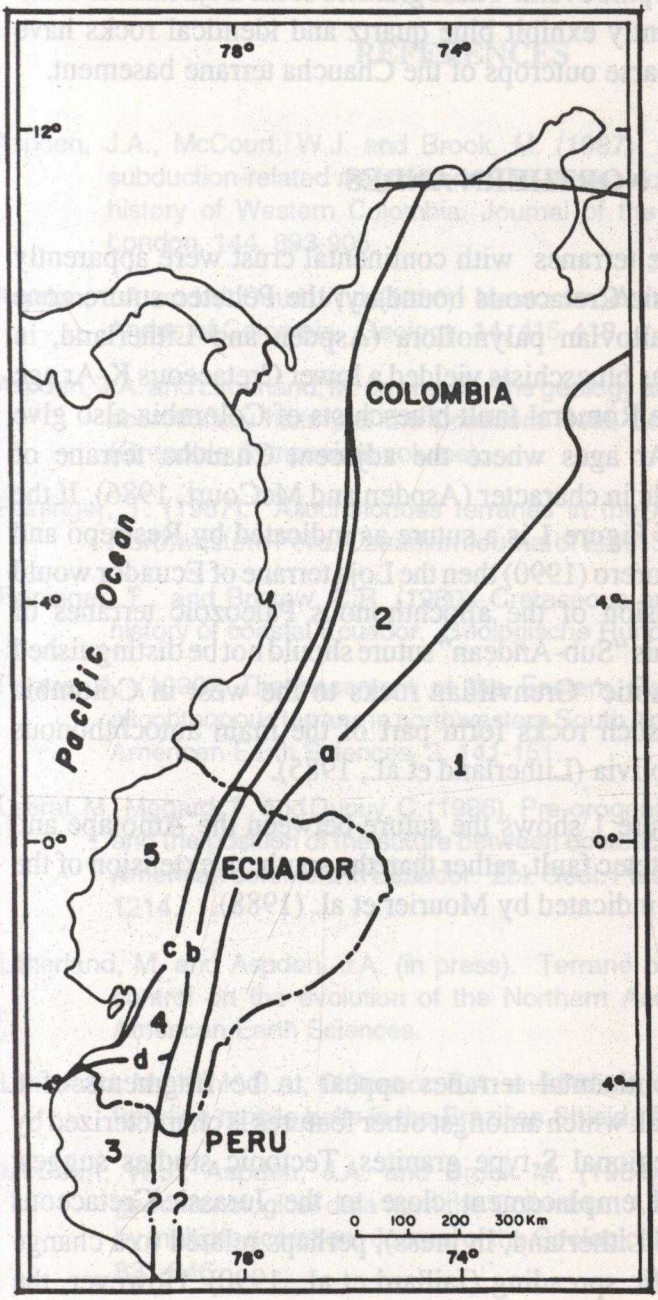

Figure 1: Simplified terrane configuration for the northern Andes. 1 = Autochthonous block; 2 = Paleozoic ?allochthonous terranes; 3 = Paleozoic Amotape terrane; 4= Paleozoic Chaucha terrane; 5 = Cretaceous-to-Tertiary oceanic terranes; a = Sub-Andean suture; b = Peltetec-Romeral suture; c = Pujilí-Cauca suture; d = Raspas suture.

The rocks of the Loja, Chaucha and Amotape terranes of Ecuador show remarkable similarities. Great thicknesses of low- to medium-grade semi-pelitic, flysch sediments, which include Carboniferous faunas at Amotape (Newell et al., 1953), and basaltic ?sills, are intruded by peraluminous S-type granite batholiths of probable Late Triassic age corresponding to a major tectono-metamorphic event. These granites of the Loja terrane of the Cordillera Real frequently exhibit blue quartz and identical rocks have been noted from the sparse outcrops of the Chaucha terrane basement.

TERRANES IN THE NORTHERN ANDES

In Ecuador the three terranes with continental crust were apparently sutured near the Jurassic/Cretaceous boundary; the Peltetec suture zone contains Oxfordian-Callovian palynoflora (Aspden and Litherland, in press), whilst the Raspas blueschists yielded a lower Cretaceous K-Ar age (Feininger, 1987). The Romeral fault blueschists of Colombia also give lower Cretaceous K-Ar ages where the adjacent Chaucha terrane of Figure 1 may be oceanic in character (Aspden and McCourt, 1986). If the "Sub-Andean" fault of Figure 1 is a suture as indicated by Restrepo and Toussaint (1988) and Forero (1990) then the Loja terrane of Ecuador would be the southern extension of the allochthonous Paleozoic terranes of Colombia. However, this "Sub-Andean" suture should not be distinguished by the presence of 'exotic' Grenvillian rocks to the west in Colombia (Forero, 1990), since such rocks form part of the main autochthonous Amazonic craton in Bolivia (Litherland et al., 1985).

Traced to Peru, Figure 1 shows the suture between the Amotape and Loja terranes as the Peltetec fault, rather than the southern extension of the younger Pujilí fault as indicated by Mourier et al. (1988).

DISCUSSION

The Ecuadorian continental terranes appear to be fragments of a common Paleozoic block which amongst other features is characterized by the development of regional S-type granites. Tectonic studies suggest dextral transpressional emplacement close to the Jurassic/Cretaceous boundary (Aspden and Litherland, in press), perhaps related to a change from Tethyian to Pacific spreading (Jaillard et al., 1990). However, the

Paleozoic terranes of Colombia are provisionally interpreted as derived from North America during Paleozoic or Mesozoic times (Restrepo and Toussaint, 1988; Forero, 1990). Perhaps the block was emplaced from the north sinistrally, then fragmented later by dextral shear.

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