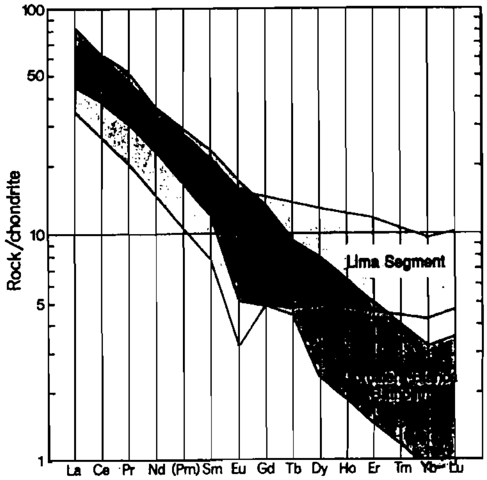
The second group, with poorly understood geotectonic settings are of Ordovician to Tertiary age eg, Tertiary plutons in the Patagonian Batholith and Lower Palaeozoic plutons such as Cachi in Argentina Fig.1. This group intrudes crust where structure and history is unclear.

Rocks from these plutons and volcanoes have high $(La/Yb)_N$, Sr/Y ratios, high Na_2O contents and low Y and Yb values, compared to the more voluminous Cordilleran Batholithic plutons such as the Coastal Batholith, Peru (Fig.2 and Atherton & Petford, 1993).

Fig. 2



Consideration of the Miocene Cordillera Blanca Batholith in north central Peru, for which we have considerable data and a good understanding of the crustal structure below the Batholith, indicates that together with the characteristics outlined above there is also a marked decrease in FeO, MgO, TiO_2 and CaO in the granites, compared to the more basic rocks. Furthermore the values are lower than rocks with similar SiO_2 contents (70-75%) from the Coastal Batholith (Fig.3), which were derived by shallow partial melting or high level fractional crystallization (Atherton, 1990). The 'dramatic' decrease in these elements and increase in SiO_2 in partial melts when garnet was stabilised at 12-18 kb was first described by Rushmer (1993) in experiments on melting hydrated basalt. Chemical modelling of the Cordillera Blanca rocks is compatible with this, with melts leaving residues of pyroxene + garnet ± hornblende ± plagioclase (Petford & Atherton, in press). Such residues are present in the experiments and are typically found in mafic lower crustal xenoliths (Rushmer, 1993).

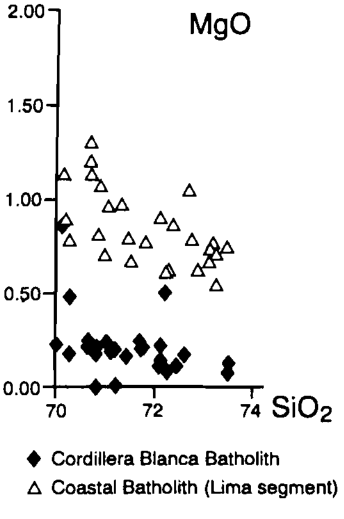


Fig. 3

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