PETROLOGY AND EMPLACEMENT OF FRONTAL CORDILLERA GRANITOIDS, MENDOZA PROVINCE, WESTERN ARGENTINA (33-34°S)

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The area discussed is a 30 km transect along the Mendoza City to Santiago de Chile road in western Mendoza Province, Argentina (32°25'-33°10', 69°- 69°20). The most southerly point on the map (Fig. 1) is situated 30 km west of Mendoza City. Previous work by Caminos (1965) showed that two stocks of granitic rocks, Guido and Cacheuta, lie in a NNE/SSW trending basin of mainly acidic volcanic rocks of the Choi Yoi Lower Triassic, and syn and post rift sedimentary rocks of Upper Triassic age. Although both stocks intrude the Choi Yoi, they remain to be dated isotopically. Sedimentary rocks of Carboniferous and Devonian age crop out in the area, as well as a faulted basement slice. To the south of Cacheuta Stock is an contact between granitic and older dioritic rocks. Dykes of basalt and basaltic andesite intrude both stocks. All older lithologies have been affected subsequently by extensive brittle deformation.

GRANITE PETROLOGY

Guido Stock

Guido Stock has an ellipsoid outcrop pattern with a long axis parallel to the trend of the sedimentary basin the separates the stock from Cacheuta Stock (Fig. 1). It covers an area of approximately 60 km^2 and forms a mountainous terrane of peaks mostly over 2000m above sea level. Guido Stock granitic rocks can be subdivided into discrete facies (see Fig. 1) on the basis of petrological evidence. These are: 1) *Quartz-rich granitic rock*, 2) *Coarse k-spar-rich granitic rock* and 3) *Xenolithic granitic rock.* Enclave size ranges from 1-10cm in diameter, and undeformed examples tend to be roughly circular in shape and occur with a frequency of 0-10 m^2. A narrow band of xenotilths occurs along the road at the southern contact with a hornfelsed lithology of as yet unidentified age. Magmatic enclaves are also present in this facies.

Cacheuta Stock

Cacheuta Stock is ellipsoid in outcrop pattern with a NNE/SSW trending long axis; its area is approximately 90km^2 with peaks up to 2500m. Cacheuta Stock can also be subdivided into 2 discrete granite facies: 1) *Rapakivi granitic rock* and 2) *'Normal' granitic rock* containing coarse k-spar, quartz and plagioclase, with biotite flakes and occasional fine euhedral hornblende (Fig. 1).

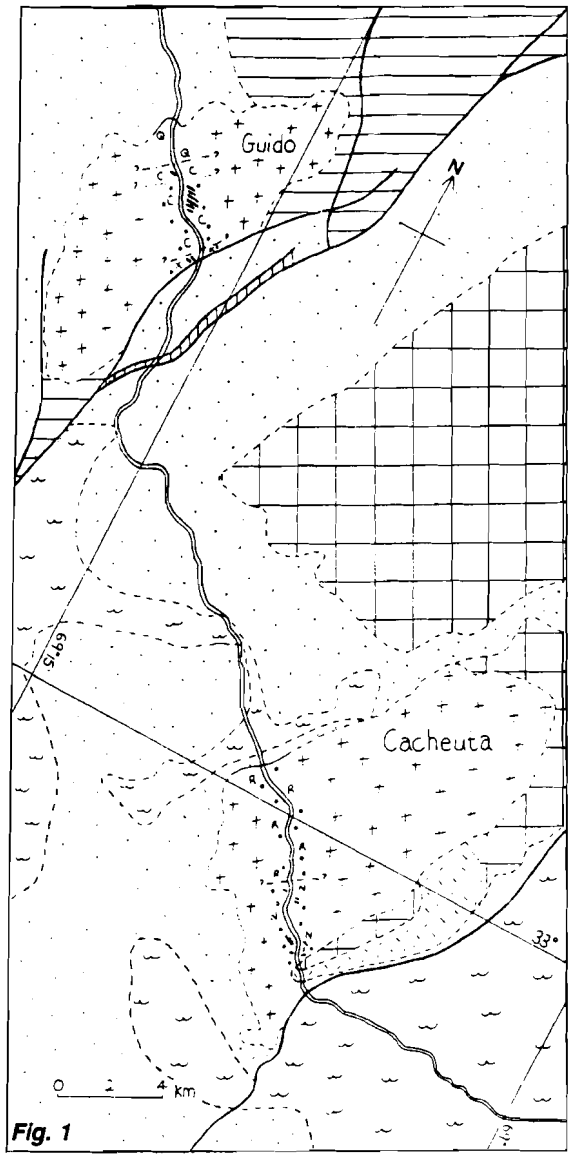


Fig. 1

Cacheuta & Guido Granitic Stocks and the Geology of the Surrounding Area.

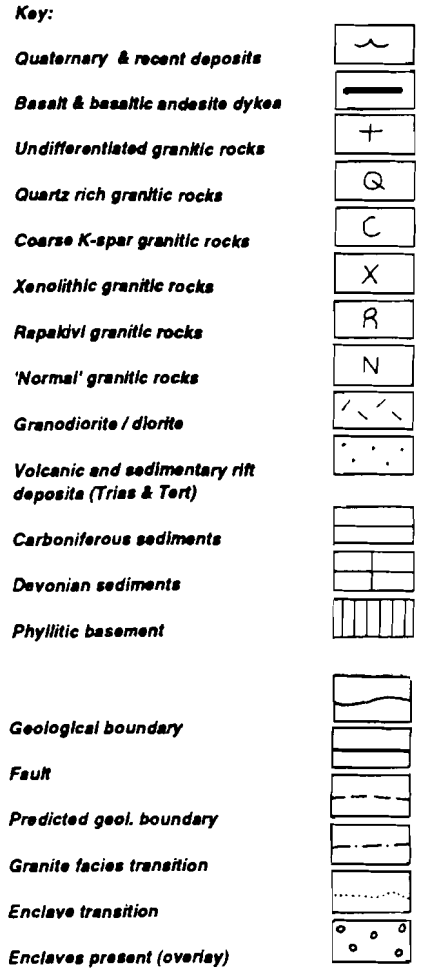


Fig. 2 Guido Dyke Trends

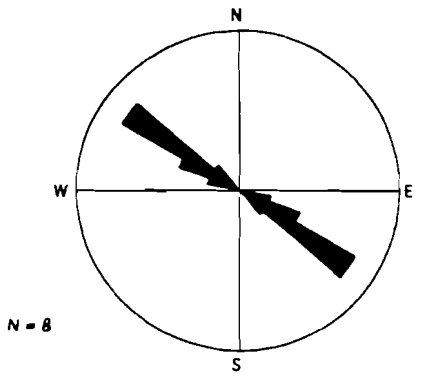
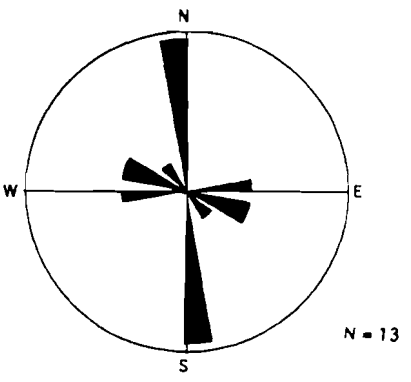


Fig. 3 Cacheuta Dyke Trends



GRANITE STRUCTURES

Metric scale faults bisect the intrusions with orientations parallel to the main joints. Later fault movement has occurred along some planes. Abundant cataclasites were found in the *xenolithic* granitic rocks. Near the southerly contact of Guido Stock they have shallow dip angles with strikes ranging from N/S to NE/SW dipping to the W and NNE. Most importantly, brittle shearing on both the centimetric and metric scale was observed in both stocks. Shallow angle roof and sole faults of duplexes occurring in the *xenolithic* and *rapakivi* granitic rocks gave a dextral shear sense (Fig. 4).

DYKES

Both stocks are cut by dykes of more mafic compositions; Guido by basaltic andesite, and Cacheuta by basalt. The near vertical dykes vary in width from 0.5 - 22 m. All dykes exhibit a marked sinuosity in their outcrop pattern, although dyke-granite contacts are sharp, indicating that they intruded at a late syn-plutonic stage. The dykes of both plutons have a common orientation with those of Guido clustering around trends approximately NW/SE, whilst those of Cacheuta Stock cluster around orientations between E/W and NW/SE and also have a marked occurrence of N/S trends (Figs. 2 and 3). It is likely that the dykes are exploiting structures formed in relation to the large NNE/SSW trending faults of the area, and their significance will be discussed along with the granite emplacement.

GRANITE EMPLACEMENT

By combining field data from both stocks with regional structures around 33°S, a tentative model for the emplacement of the Frontal Cordillera granitoids can be made (Fig. 4). Regional fault sets trending NW/SE intersect major N/S fault lineaments at approximately 75° and are thought to define R_1 Riedel shears. Dextral movement along these faults is consistent with an overall sinistral shear sense along the major faut axis. Dyke orientations within the plutons reflect emplacement during extension associated with 'P'shearing and granitoid emplacement (eg. Tikoff &Teyssier, 1992). We conclude that the grainitc rocks of the Frontal Cordillera were emplaced during a period of left-lateral strike-slip motion concurrent with regional plutonism.

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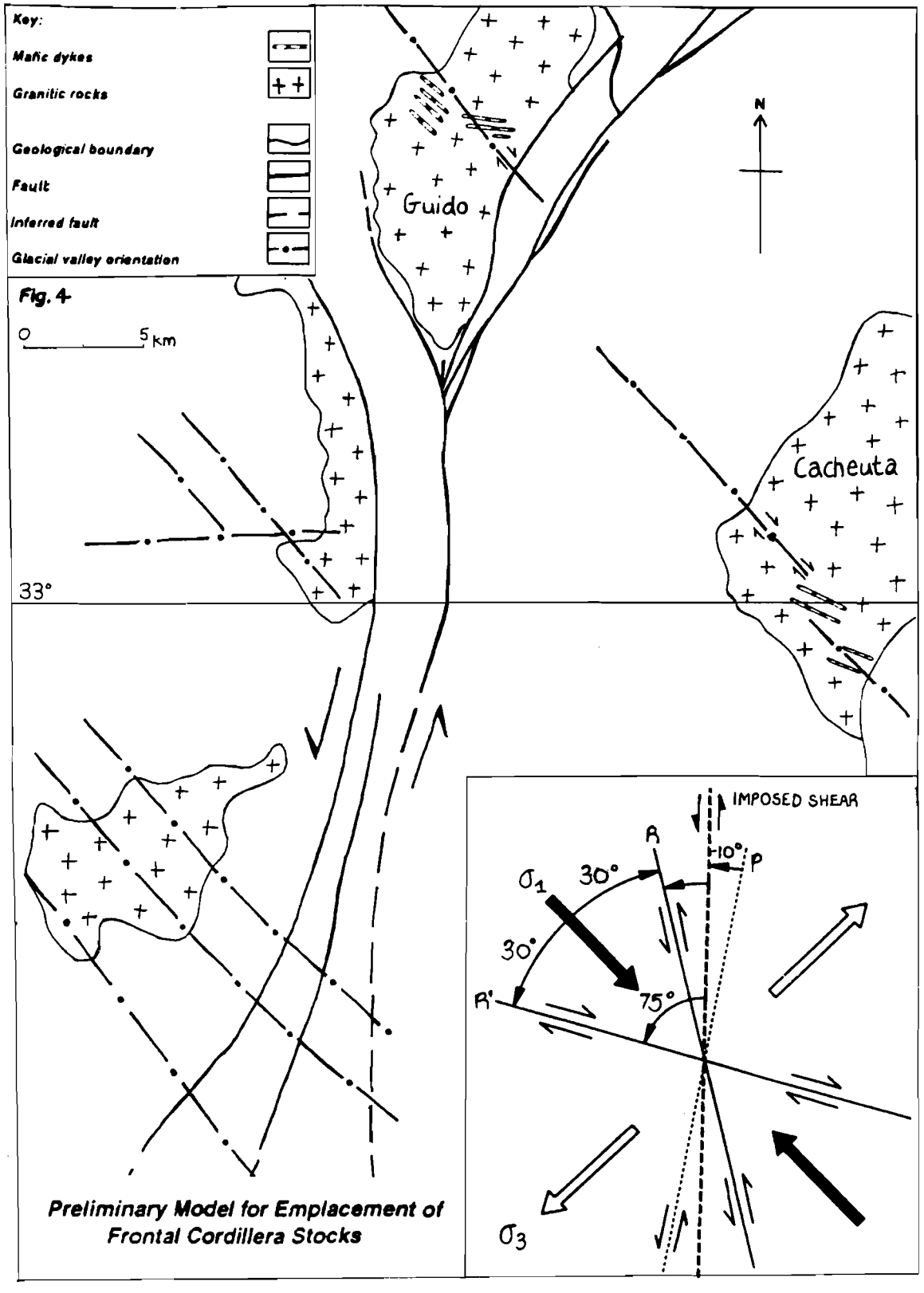
Key:
Mafic dykes
Granitic rocks
Geological boundary
Fault
Inferred fault
Glacial valley orientation
Fig. 4
0 5 km
N
Guido
Cacheuta
33°
IMPOSED SHEAR
R
P
10°
30°
30°
σ1
R'
75°
σ3
Preliminary Model for Emplacement of
Frontal Cordillera Stocks