

foreland basin. They root into previous normal faults and/or a detachment within Early Cretaceous marine shales. Deformation was active until the Eocene (Diraison *et al.*, 1997a; Ghiglione *et al.*, 2002; Rossello *et al.*, 2004). Fault-slip data provide information on the relative importance of strike-slip and dip-slip faulting. This can be visualized by plotting the pitch of striations versus the strike of the corresponding fault plane. For localities in Fuegian foothills there is a predominance of strike-slip faults (where striations pitch between 0° and 45°), left-lateral and right-lateral ones being equally numerous whereas two families trend more nearly N and E, respectively (Diraison *et al.*, 2000).

THE FAGNANO-MAGELLAN FAULTING ZONE

The Fagnano-Magellan Fault zone (**FFM**) is a regional wrenching with sublatitudinal disposition and sinistral displacement affecting the northern foothill of the Fuegian Cordillera along the whole Island of Tierra del Fuego (Argentina-Chile). This structure has been recognized for some time by several investigators attributing it diverse geotectonic connotations and mechanical operations. This way, it was considered as the expression of the suture between the South America and Scotia Plates (Olivero and Martinioni, 2001) like a continental transform fault. Some researchers consider the **FFM** as the superficial expression of the suture separating the continental South American and oceanic Scotia Plates, remarked as one of the few emerged locations where it takes place (Lodolo *et al.*, 2002a, 2002b and 2003). However, the same continental compositional nature of the metamorphic lands and acid or mesosilicic crystalline lens of the nucleus of the Fuegian Cordillera towards the south of the **FFM** would inhibit this statement since they support the presence of equally continental materials. Also, the regional geologic reports on the western projection toward Magellan's Strait (Diraison *et al.*, 1997b) and neighbouring regions of its trace in the Peninsula Brunswick and Island Riesco in the Chilean territory (Cunningham, 1993, 1995) do not show significant changes toward the north or south of the **FFM**.

This structure has a very strong superficial expression on the whole foothills of Tierra del Fuego Island (Fig. 2) that for its best description it is divided in the following sectors from East to West: **i)** Eastern sector, **ii)** central sector and **iii)** western sector.

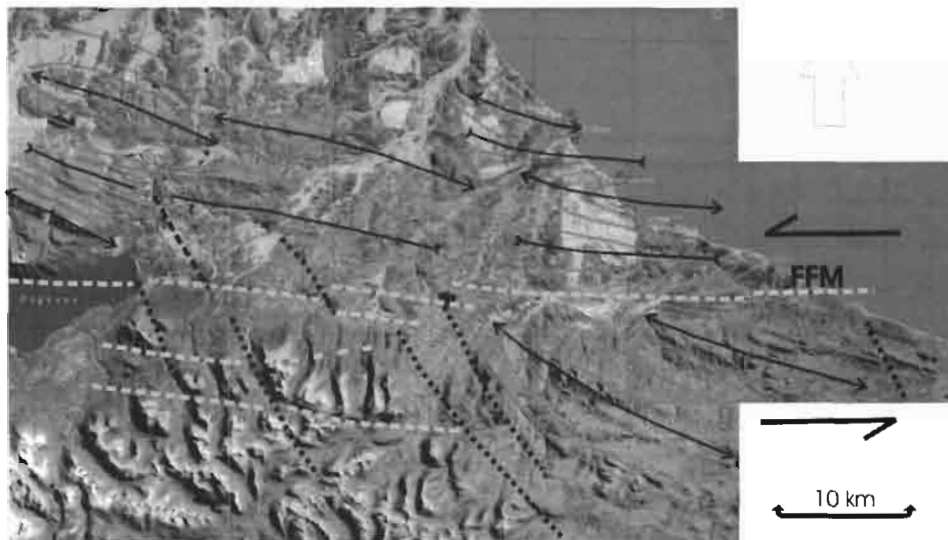


Figure 2. Tectonic schema of the FFM on satellite images of the foothills of the Fuegian Cordillera indicating main en-echelon folding and subordinate faulting (yellow and black dashed lines).

i) Eastern segment, oriented sublatitudinal at about $54^{\circ} 32'$ South between the Atlantic coast and Tolhuin town as a rectilinear feature in the depressed and filled topography of the area (Landsat and SPOT images) where it controls the disposition of the Turbio river (that flows toward the Lake Fagnano) and part of Irigoyen river that drain toward the Atlantic ocean. In the Atlantic coast, it is located in the proximity of the Malengüena Cap where it puts in contact the Paleocene and the Oligocene units limiting to the north the Cretaceous metamorphic outcropping units (Fig. 3).

ii) Central segment, since it coincides with the position of the Lake, most of it inside the Argentinean territory there is no outcrop. This lake occupies a narrow glacial valley and is limited in its oriental end by front moraines oriented East-West and controlled by the **FFM**. Limits the Jurassic outcropping of the Lemaire Fm. to the south with the Cretaceous Beauvoir Fm, to the north of those developed in the homonymous mountain (Fig. 3).

iii) Western segment. It runs from the Fagnano Lake to the west coinciding with the sublatitudinal disposition to WNW of the Almirantazgo fiord of Magellan's Strait, also of a glacial nature to the one that should have controlled, totally inside the Chilean territory.

The **FFM** separates two tectonic blocks. In the western part of the northern block, Jurassic to Quaternary strata of the foothills dip homoclinally northwards; whereas, in the eastern part of the southern block, folded Eocene to Oligocene sequences overlie metamorphic rocks (Fig. 3).

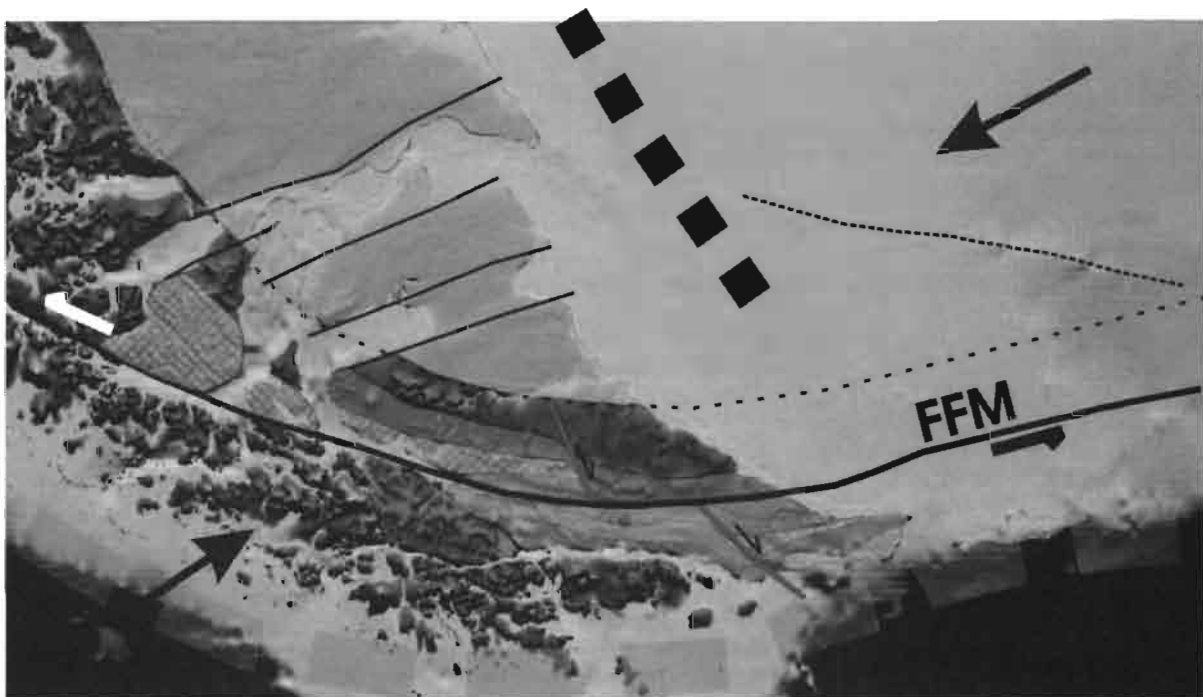


Figure 3. Tectonic schema of the Fueguian Cordillera and the FFM position. *Blue*: Jurassic-Cretaceous; *Light green*: Upper Cretaceous; *Red*: plutonic rocks; *Brown*: Paleocene; *Green* Miocene; *Yellow*: Plio-Pleistocene. *Red lines*: **RCRC** and **ECBS** subordinate lineaments.

Both blocks contain secondary fault zones, which strike NNW-SSE: the Río Candelaria - Río Claro fault zone (**RCRC**) in the northern block and the Estancia La Correntina - Bahía Sloggett fault zone (**ECBS**) in the southern block). These secondary faults show an apparent left-lateral offset of about 55 km along the main **FFM**

(Rossello *et al.*, 2004). Also, each apparently underwent a right-lateral slip of about 20 km, from Middle Eocene to Miocene times, prior to motion on the FFM. We infer that the RCRC and ECBS formed as parts of an early single anti-Riedel fault, and that these parts were later offset by about 55 km of left-lateral slip along the main FFM. From surface and subsurface data, we estimate the following rates of horizontal slip on the fault zones: 2.2 cm/yr for the right-lateral RCRC and ECBS; and 0.27 cm/yr for the main FFM.

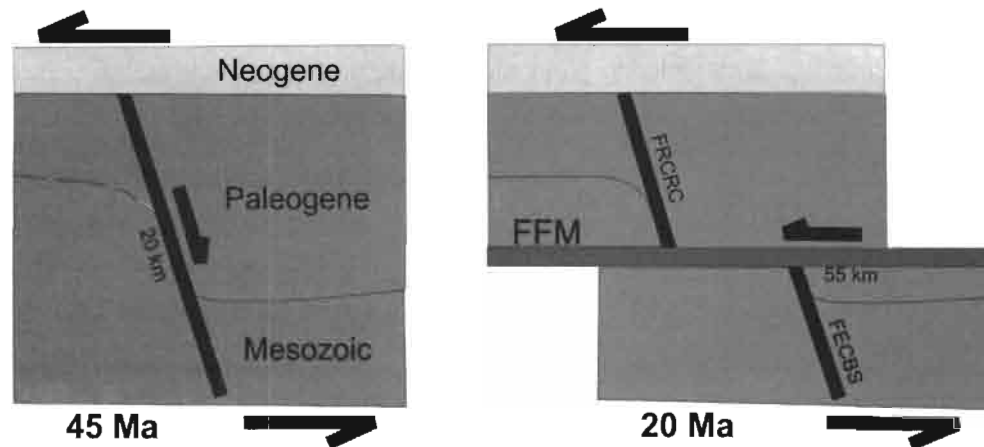


Figure 3. Cartoon of the kinematics of the Fagnano-Magellan Fault zone estimated at 45 Ma and 20 Ma. *Black lines:* Río Candelaria - Río Claro fault zone (RCRC) and Estancia La Correntina - Bahía Sloggett fault zone (ECBS). *Red line:* Fagnano-Magallanes Fault zone (FFM).

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