

Patagonia Batholith

<http://www.explore.com/oper/2413/hour/43255/Patagonia.jpg>



Jen
Somerville

Feb. 25, 2005

Overview

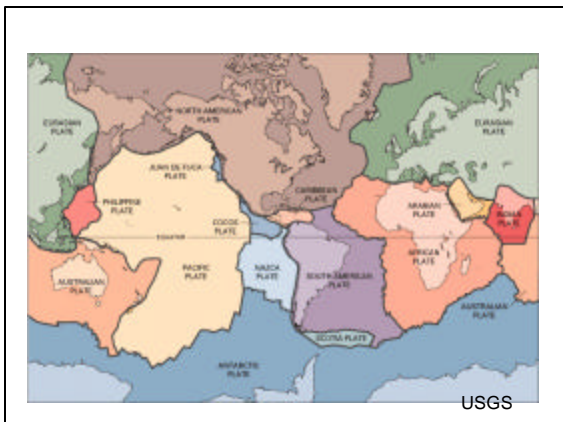
- General information
- What caused the Patagonia Batholith
- Extension that occurred in the Patagonia area
- Ages of the plutons
- Compositions of the plutons



http://tezaur.net/photo/chile/patagonia_map.jpg

General Information

- The Patagonia Batholith forms the core of the Southern Andes for about 1900 km
- The batholith extends along the active margin of SW South America, near the subduction of the Nazca and Antarctica plates beneath the South American.
- Rolando (2002)
- It is one of the worlds largest cordilleran plutonic complexes that is related to subduction at a continental margin.



Emplacement

- Emplacement of the batholith occurred episodically between the Late Jurassic and Late Cretaceous

What caused the batholiths?

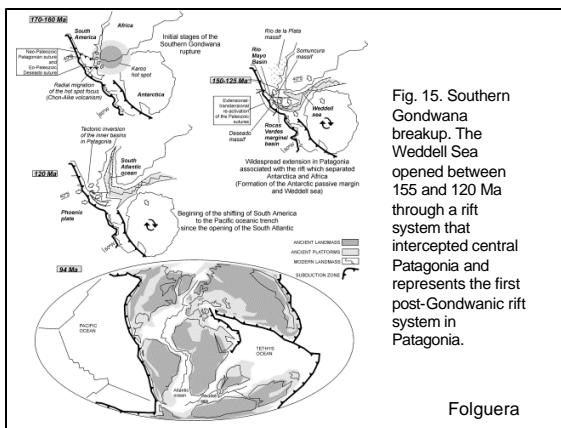
- The Patagonian lithosphere was extended during the Mesozoic through a series of Pacific transgressions that formed the Rio Mayo basin.
- The Cordillera in this area formed during the Cretaceous due to subduction of a series of Pacific plates and the general westward motion of the South American plate

Folguera

Extension in the Patagonia area

- The first rifting occurred 155 mya and is related to widespread extension due to the breakup of Antarctica from Gondwana.
- At the Pacific margin
 - Extension was between 140-125 mya
 - Can be seen in the westernmost part of the batholith

Folguera

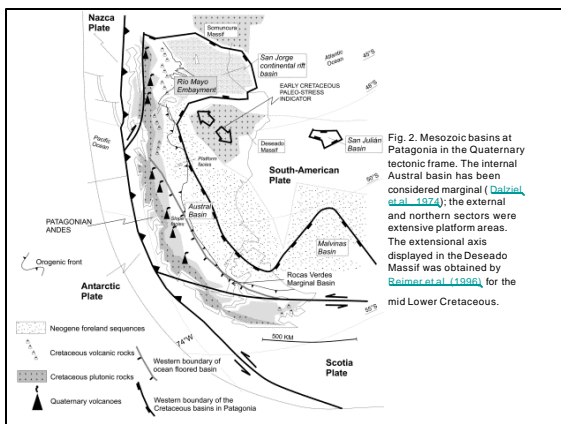


Folguera

Extension continued

- Between 130-120 mya the volcanic front migrated and two volcanic axes were formed.
- One axis is related to the Rio Mayo basin (western part of the batholith).
- Other axis is related to the Divisadero volcanic group and the eastern part of the batholith.

Folguera



Age Progression of plutons

- The batholith ages are zoned.
- The older granitoids are in the west and the younger in the east.
 - This age difference is due to a shift in the volcanic front between 140-100 mya.

Ages con't

- Studies have shown a gradual change from mafic to felsic plutons between 50 and 100 my.
- Shows that the plutons did not crystallize from a single evolving magma, but probably from several different sources from different events.
- New U-Pb age testing shows that the plutons were intruded during three major magmatic events from the late Paleozoic to the tertiary.

rolando

Lithologies

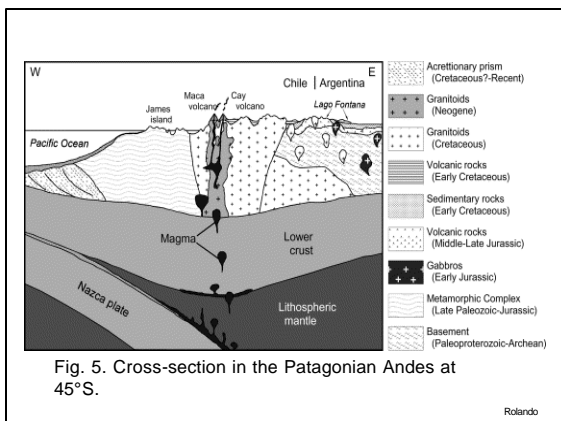
- Early Cretaceous
 - Taitao granodiorite (SW part of northern batholith)
 - Coarse grained hornblende-biotite granodiorites and tonalites
 - Western edge of batholith
 - Abundant quartz mega crystals (same lithology as Taitao)

Lithologies continued

- Middle Cretaceous
 - Lago Verde granite (eastern part of batholith).
 - isotropic pink monzogranites with associated amphibole-biotite tonalites, diorites and gabbros.

Lithologies continued

- Late Cretaceous
 - Medium to fine grained biotite granites and medium grained hornblende biotite granodiorites.



North American correlation

- The Mesozoic orogenies of both continents seem to be related to the emplacement of the oldest Atlantic ocean crust (about 170 mya).
- 170 mya also seems to mark the beginning of westward movement of the continents over the Pacific Ocean and periods of crustal thickening and uplift.

References

- Coney, P.J. & Evenchick, C.A (2003). Consolidation of the American Cordilleras.
- Folguera, Andres, Iannizzotto, Noelia (2004). The Lagos La Plata and Fontana fold-and-thrust belt: long-lived orogenesis at the edge of western Patagonia. *Journal of South American Earth Sciences* (16), 541-566.
- Pankhurst, R (1999). Mesozoic-Cenozoic evolution of the North Patagonian Batholith in Aysen, southern Chile. *Journal of the Geological Society*, July.
- Rolando, A.P, Hartman, L.A, Santos, J, Fernandez, R, Etocheverry, R, Schalamuk, I, & McNaughton, N (2002). SHRIMP zircon U-Pb evidence for extended Mesozoic magmatism in the Patagonian Batholith and assimilation of Archean crustal components. *Journal of South American Earth Sciences* (15), 267-283.

Questions

?