Overview

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

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.

Extension in the Patagonia area

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

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.

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.

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
  - 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


Questions

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