

## Tectonostratigraphic evolution of the Arauco-Itata forearc basin, Central Chile

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The Arauco-Itata basin in central Chile is a complex forearc basin, part of the central-southern Chilean forearc system, located between 36° and 38°20' S where the oceanic Nazca plate descends beneath the continent. It is bounded to the east by the Late Paleozoic Cordillera Nahuelbuta accretionary complex and the volcanic arc, extending westward near to the edge of the continental platform. Longitudinally, structural features subdivide the basin in several sub-basin aligned in a NNE trend with a total dimension about 350 km long by 60 km wide, reflecting some combination of differential subsidence and nonuniform deformation along strike.

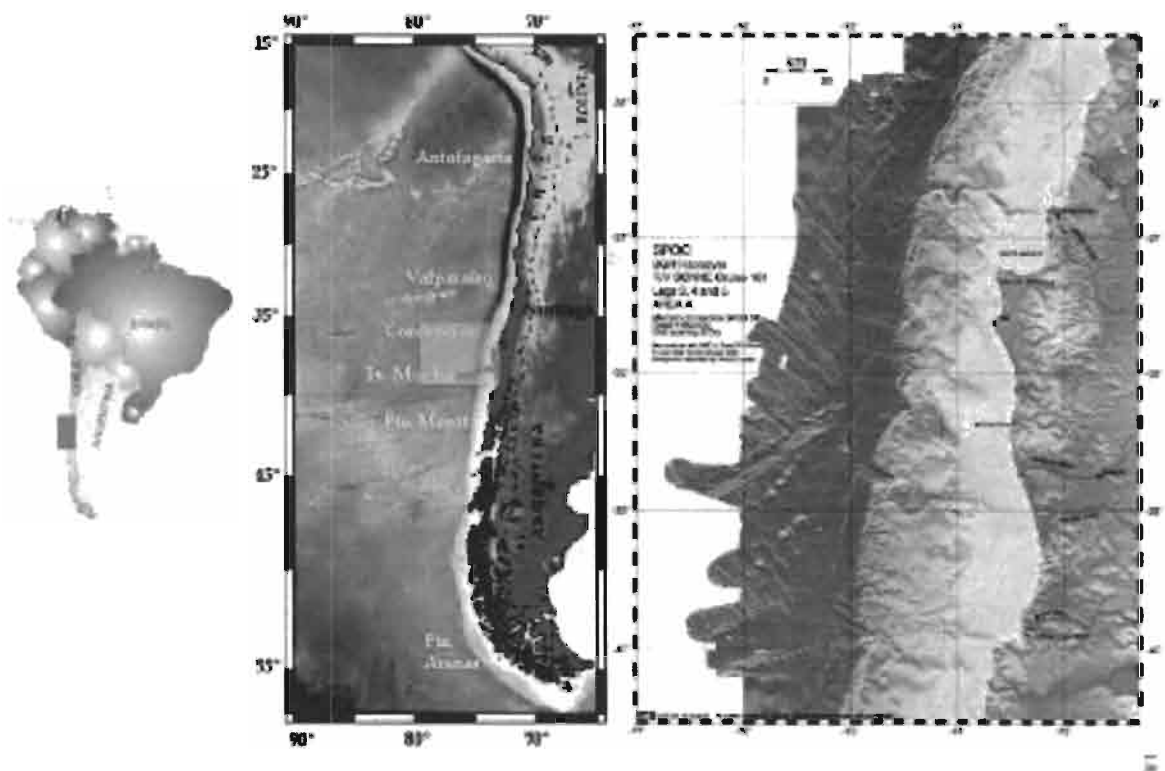


Figure 1: Location map

The Arauco-Itata basin can be described as an overfilled shelved shallow marine forearc basin with a sedimentary fill composed by four main stratigraphic sequences with a total thickness of about 3500 m. During its geological history the Arauco-Itata basin always has been placed in a forearc position and each of the sequences forming the sedimentary fill record a particular stage of the geological evolution.

The first sequence corresponds to the Santonian-Maastrichtian. It is characterized by the sedimentary fill of an extensional basin stage (Wenzel, 1972, Elgueta and Arcos, 1994) and maybe representing a period of tectonic

erosion of the forearc crust (Dickinson, 1995). This sequence include the Quiriquina formation its geometry reveal strong variations in thickness ranging between a maximum of 1300 m and a minimum of 200 m and even no deposition in some places.

The following sequence is the Paleocene-Eocene and is characterized by the sedimentary fill of a regional subsiding basin stage deposited in a broader surface compared the previous sequence limits. This sequence includes the Boca Lebu Group and comprises a constant thickness of about 400 m. The third sequence is the Miocene-Oligocene (?). It is characterized by the sedimentary fill of a regional subsiding basin stage after or synchronous to a deformation event associated with intrabasinal structures as the Mocha Island and the Peninsula Arauco area, although no growth strata have been recognized. This sequence includes the Ranquil formation and is characterized by 800 m sedimentary pile and with angular unconformable relations at its base in the vicinity of those intrabasinal structures.

The last sequence is Pliocene in age and includes the Tubul formation. It is characterized by the sedimentary fill of regional subsiding basin coexisting with the uplift and deformation of compressional intrabasinal structures. The synchronism between sedimentation and deformation allow recording growth strata in the vicinity of these growing structures such as Mocha and Santa Maria Island and the Peninsula Arauco area. The thickness of this sequence varies significantly inside the basin from a maximum of 500 m to a minimum of 100 or even no deposition on top of some structures.

The Cretaceous extensional features have been tectonically inverted during the Late Eocene-Early Oligocene (?) and Late Pliocene contractional event. This inversion produced a series of anticlines forming the aligned topographic highs of Santa María Island, Rumena, Lebu and Mocha Island, exposing the sedimentary basin fill. An ongoing, more detailed, study of the Arauco-Itata basin will provide important clues to understand the evolution of the forearc basins of South-central Chile.

## References

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