

TECTONIC AND CLIMATIC CONTROL OVER THE GEOMORPHOLOGICAL EVOLUTION OF THE CHILEAN MARGIN BETWEEN 36° AND 38° S

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INTRODUCTION

The active margin of central Chile is a remarkable feature of the Pacific rim (Aguirre, 1985; Dalziel, 1986; Hervé et al., 1987; Mordojovich, 1974; see figure; Cicco, 1994). To develop an aerophotogrammetric approach of its geology, a study has been conducted to frame the subduction processes belonging to a margin with an alternate tectonic history and relatively shallow seismic foci (Barazangi, 1976) that drove to look for tangible evidences within the surface structures.

The investigation was aimed at the local morphologies observed using airborne imagery in the Gulf of Arauco. Also, from the detected features, the study has subsequently addressed those large- and medium-scale structures produced by the evolution of the margin (Aguirre, 1985; Hervé et al., 1987; Jordan et al., 1983).

Notably, this work has focused on the two-way link existing between the morphological evolution of a turbulent area such as the one herewith described and the relatively deeper phenomena close to the crust-atmosphere interface (Barazangi, 1976; Jordan et al., 1983). Such interaction may show up with a substantial influence on the landscape setting.

Morphotectonic maps arising from the study of the available aerial stereo-imagery are herewith presented, to display the five main geomorphological domains observed. The phenomena described are in most cases ongoing, when not in their infancy (Kaizuka et al., 1974).

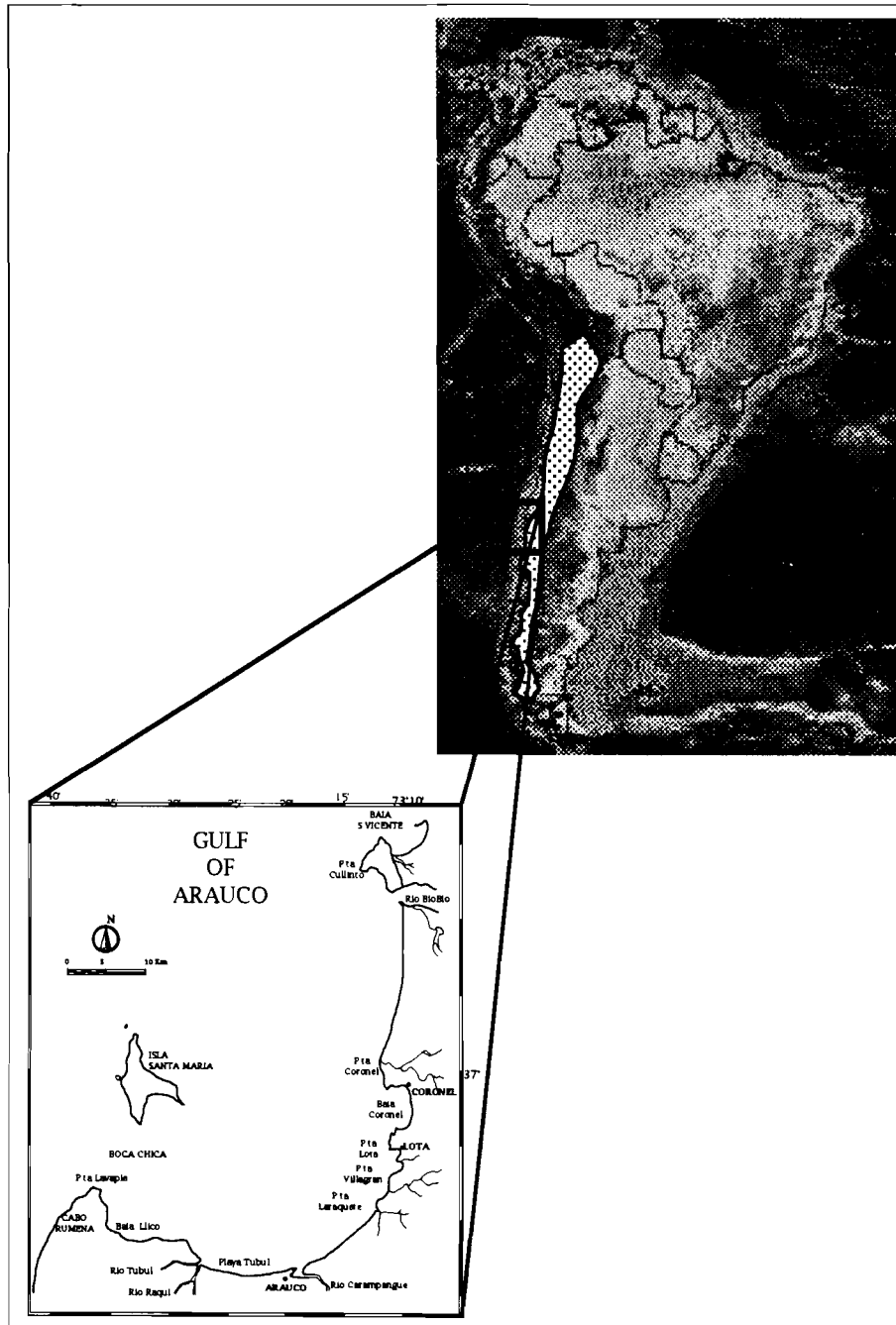
CONCLUSIONS

The morphotectonic evolution of the VIII Chilean region is heavily influenced by two basic factors. The tectonic framework, both past and present, is active and it actively shapes the drainage pattern. As opposing to this constraint, the wind action is such to condition distribution of continental sedimentation and river discharge (Thornburg, Kulm and Hussong, 1990).

The present tectonic setting displays a N-S fault system which generated the Arauco graben west of the Coastal Cordillera. Swarms of lineations and faults are bound NE-SW and displace the western rim of the N-S graben. The lithologies thus exposed govern the abrupt morphology of the foot wall in the grabens.

The activity of the wind, from SW towards NE, is witnessed by the vigorous erosion due to the Pacific wavesets, by extensive dune fields and by the control over the drainage pattern, especially in flat

Location Map



areas and nearby the shoreline. In several cases, rivers are forced by the tectonic pattern to flow shorebound, whereas the action of the wind pushes the streams landwards.

As a result of this steady interaction, a morphotectonic element is deemed to be caused. The system is composed by the N-S graben, the western promontory displaced by the NE-SW faults and the following pocket beach, open towards SW. Conversely, the displaced promontory is exposed to erosion; the pocket beaches get the reworked and redeposited material being transported northwards alongshore.

On a regional scale, the above system is envisaged to be repeated several times along the Chilean margin, from 20° to 40° S (Armijo and Thiele, 1990), and a remarkable example of such system is represented by the Gulf of Arauco (37° S).

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