TERTIARY STRATIGRAPHY AND STRUCTURE AROUND LAGO GENERAL CARRERA, SOUTHERN CHILE: IMPLICATIONS FOR PLATE MARGIN EVOLUTION.

David J. PRIOR, Stephen FLINT, Fran RAY, Nick PETFORD (1)
Sue AGAR (2)
Peter TURNER (3)
Rita ARQUEROS (4)

(1) Department of Earth Sciences, Liverpool University, L69 3BX, U.K.
(2) Department of Geological Sciences, Northwestern University, Evanston, Illinois, USA.
(3) School of Earth Sciences, Birmingham University, Edgbaston, Birmingham, U.K.
(4) Universidad de Chile, Santiago, Chile

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INTRODUCTION

The Tertiary stratigraphy and structure of southern Chile between 44° S and 47°S is poorly known yet is critical to the understanding of the evolution of the Andean Plate margin in this region, most specifically the evolution of the Chile Triple Junction (Forsythe & Prior, 1992). Field studies carried out in the Cosmelli area ,10km east of Guadal, and in the Cerro Rocosso area, 15km south of Chile Chico, have provided new data relevant to the Tertiary evolution of southern Chile. Here we outline these reconnaissance studies together with some ideas as to their implications for the Tertiary plate dynamics of this region.

GEOLOGICAL WORK

Our studies show that immediately south of Lago General Carrera four distinct lithostratigraphic formations overly the Devisadero Formation (Cretaceous: Niemeyer et al., 1974). The successions at the western and eastern ends of Lago General Carrera are:

West (Cerro Rocosso)	East (Cosmelli)
Galera Fm	*Galera Fm*
Guadal Fm	*Guadal Fm*
San Jose Fm	*San Jose Fm*
Cerro Rocosso Fm	*Divisadero*
Divisadero	

The Galera Fommation contains a Tertiary Fauna (Niemeyer et al., 1974) although this does not discriminate the age within the Tertiary. The age of the San Jose Fomation and the Cerro Rocosso Fomation are not tightly constrained. These are mostly conformable with each other and pass conformably into the Guadal and we postulate that these are Tertiary. The

Cerro Rocosso Formation may be equivalent to the Chile Chico Formation, postulated to be Tertiary by Niemeyer (M. Suarez, pers comm).

The Cerro Rocosso Formation comprises acidic and intermediate volcanics and volcanogenic fluvial/alluvial sediments. This passes upwards, mostly conformably but locally unconformably, into the San Jose Formation; a series of alluvial plain and fluvio-deltaic sediments and intercalated ash deposits Palaeocurrents are to the east corresponding with a change from floodplain sediments in the west to deltaic in the east. The top of the fluvio-deltaic succession is locally marked by a coal shale horizon in the east.

In the Cosmelli area the Guadal Formation overlies the San Jose conformably and comprises estuarine sandstones and marine silts/sands. The lower parts of the Guadal Succession are dominantly open marine and are laterally extensive over a 10km scale. The upper parts show tidal influences and lateral variations in facies on a kilometre scale. The succession contains basaltic sills. In the Cerro Rocosso to the east the San Jose Formation is conformably overlain by at least a kilometre of basaltic lavas. Within the first 100m a there is marine succession which contains identical lithostratigraphic and faunal elements to the Guadal of further west.

The Galera Formation comprises a few km thickness of unfossilifierous, continental, fluvial sandstones and silts with palaeocurrents to the east. The Galera is unconformable upon the Guadal sediments in the west and upon the Guadal equivalent basalts in the east.

The sedimentary succession observed indicates some significant base-level changes, most notably the Guadal marine incursion and the rapid change to continental sedimentation represented by the Galera. There may be base-level changes of similar or greater significance correspondent with fluvial facies changes within the Galera Formation.

The Tertiary is folded and imbricated by a series of N-S striking thrusts and backthrusts. The deformation is active during San-Jose to Upper Guadal/ Lower Galera deposition in the west and may be responsible for the observed base-level changes. In the west deformation continues later into the Galera and suggests that deformation propagated in a west to east direction.

Tertiary alluvial/fluvial sediments north and south of the study area, dated at ~18Ma using mammal bones, are conventionally correlated to the Galera Formation. Identification of earlier alluvial/fluvial systems (San Jose & Cerro Rocosso Formations) lends the possibility of a different correlation. The lithostratigraphy of the dated sections corresponds much more closely to the San Jose/Cerro Rocosso than to the Galera. This new correlation is crucial to a geodynamic understanding of this region.

CONCLUSIONS

The implication is that the Guadal and Galera formations and associated tectonics and magmatism must have developed in the Late Miocene or Pliocene, corresponding to the time period over which the Chile Triple Junction has evolved. The basaltic volcanism has been related to the passage of slab windows corresponding to continued subduction of segments of the Chile Ridge (Ramos & Kay, 1991). The thermal and gravitational anomaly associated with the passage of slab windows may also explain the observed base level changes and tectonic evolution within the Tertiary sediments.

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