

A FLUVIO-EOLIAN SEQUENCE OF PROBABLE MIDDLE
TRIASSIC-JURASSIC AGE IN BOTH ANDEAN AND
SUBANDEAN BOLIVIA

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Resumen

El análisis estratigráfico del Mesozoico inferior de las partes andina y subandina de Bolivia y su comparación con los datos de los países vecinos sugieren fuertemente la existencia en Bolivia de una importante secuencia sedimentaria fluvio-eólica de edad Triásico medio - Jurásico.

Key-words : Bolivia; fluvial deposits; eolian deposits; rift; Middle Triassic-Jurassic.

Introduction

The rich Phanerozoic stratigraphic record of Bolivia has been traditionally thought to lack any Jurassic sediments. However, recent investigations suggest that certain stratigraphic units from the Subandean belt and from the Andean domain should be correlated (fig. 1) and assigned a Middle Triassic and Jurassic age.

Southern Subandean belt

The Ipaguazú Fm overlies the Late Permian - Early Triassic (1) Vitiacua Fm with a non-erosive disconformity. It consists of fluvial to lacustrine red beds (locally with gypsum and halite beds) deposited in a NNE-trending narrow graben, in which it is overlain by basaltic flows up to 130m in total thickness (the Entre Ríos Basalt). Coincidence of extension and basic magmatism suggests a rifting process. The oldest apparent age obtained on the Entre Ríos Basalt is 233 Ma (Middle Triassic) and might be close to its real age given the stratigraphic constraints. The overlying units are the fluvio-eolian Tapehua Fm, the fluvial Castellón Fm and the eolian Ichoa Fm (fig. 1), which all extend over a large area. The

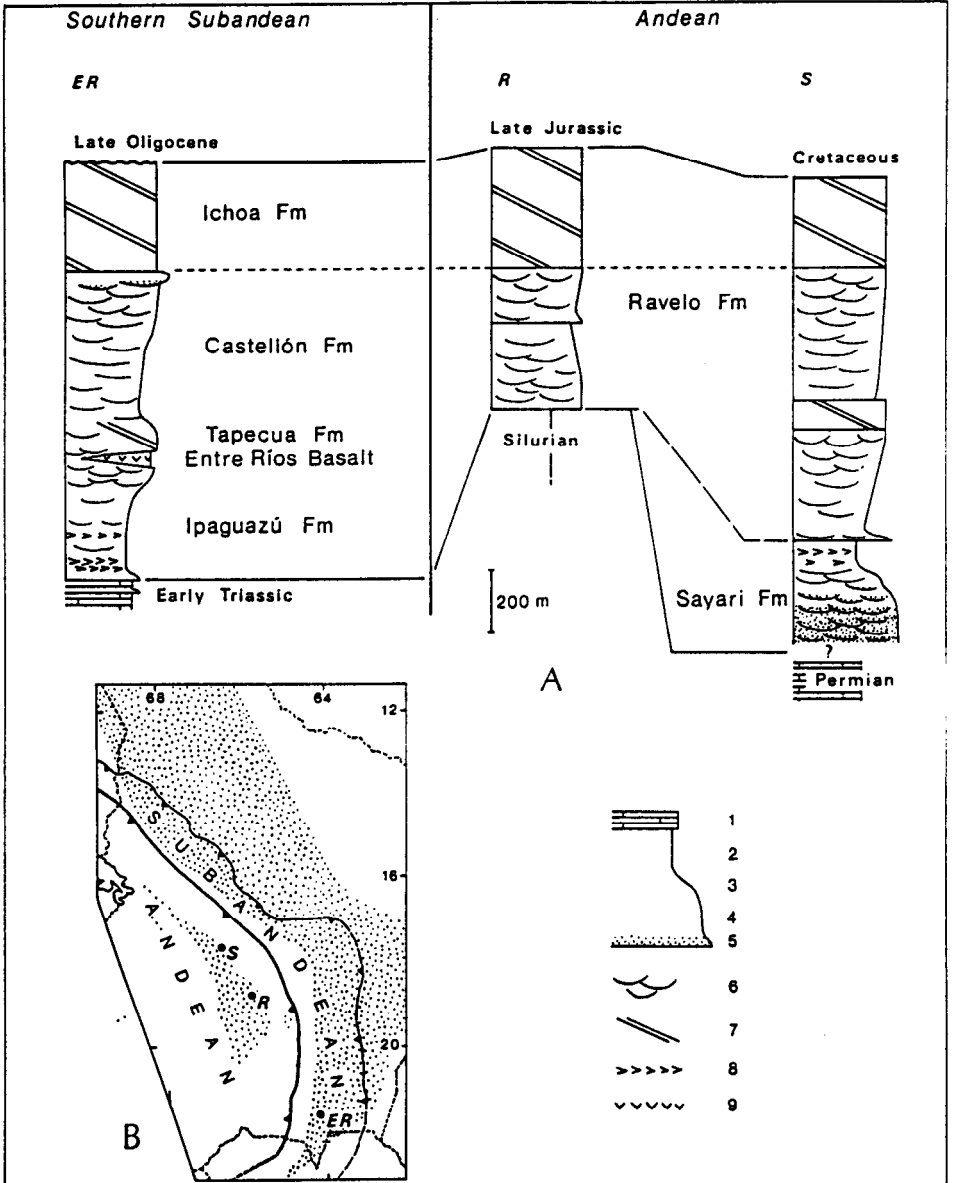


Fig.1. A: Simplified stratigraphic sections (localized in B) of the Entre Rios area (ER), Ravelo (R) and Sayari (S). 1: carbonates; 2: mudstones; 3: medium- to fine-grained sandstones; 4: coarse to medium-grained sandstones; 5: conglomerates; 6: mostly alluvial facies (channels); 7: mostly eolian facies (dunes); 8: evaporites; 9: basalts. B: Location of stratigraphic sections shown in A. Dotted areas: known (or supposed) extension of the Middle Triassic-Jurassic sequence discussed in text. Political borders are shown by dashed lines.

latter is capped by a thick silcrete, on which lies in pronounced disconformity the Late Oligocene Petaca conglomerate. Sedimentary continuity characterizes the Ipaguazú-Ichoa interval, which must thus cover a continuous time span.

Central and northern Subandean belt

Eolian and minor fluvial deposits compose the Ichoa and Beu Fms in these areas. Both units are disconformably overlain by fossiliferous Late Cretaceous deposits, and post-date normal faulting and block tiltings that affect units as young as Permian.

Cordillera Oriental

Most of the Cordillera Real granitoids were emplaced at the roots of a Middle to Late Triassic NW-trending rift system (2). The Sayari and Tiquina Fms post-date Late Permian-Early Triassic units and consist of fluvial, locally gypsiferous, red beds; they do not extend outside 2 narrow NW-trending strips defined by their outcrops, which probably represent paleo-grabens. The Sayari Fm is overlain by the extensive Ravelo Fm, which comprises a fluvial member followed by a thick eolian member (fig. 1). The Ravelo Fm may be more than 1 km-thick, contains several basalt flows and locally shows paleoalteration at its top. It is usually truncated, in many localities to complete erosion, by coarse red beds overlain by Cretaceous units. This sharp unconformity is assigned to the widespread Kimmeridgian Araucan event (3, 4). No eolian sandstones are known from undisputed Cretaceous units in Andean Bolivia.

Correlations, age of the sequence and conclusions

It is clear (fig. 1) that the units described above belong to the same sequence, which seems to cover the Middle Triassic-?Oxfordian interval and is characterized by : (a) initial rifting processes, with deposition of (gypsiferous) red beds in narrow troughs; (b) extending fluvio-eolian sandy sedimentation; (c) extensive erg development.

A similar evolution, albeit lacking the initial rifting, is known from the Paraná basin of Brazil, where the sequence is assigned a well constrained Middle Triassic - Jurassic age (5). Middle Triassic rifting is known from western Argentina, Chile and Perú, where it is followed by Late Triassic and/or Jurassic marine incursions (6). These data can be summarized on a cartoon cross-section of western Gondwanaland in the Early Jurassic (fig. 2). It shows the development of an extensive desertic environment on the inclined craton that flanked the subsident carbonate basin established on the Pacific margin.

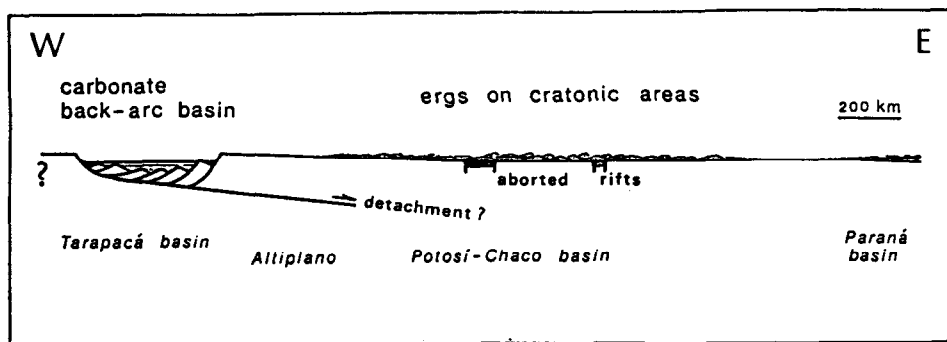


Fig.2. Cartoon cross-section across part of the Liassic Western Gondwanaland. No vertical scale.

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