MIDDLE AND LATE JURASSIC MARINE REPTILE FAUNAS OF THE SOUTHEASTERN PACIFIC, BASED ON DISCOVERIES IN ARGENTINA AND CHILE

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ABSTRACT

The South American record of Jurassic marine reptiles complements the northern hemisphere record both geographically and stratigraphically. Middle Jurassic marine reptiles fill a gap from the Aalenian to the early Callovian, when the records are scarce or absent elsewhere. Early Bajocian ichthyosaurs from the Neuquén Basin document the co-occurrence of non-ophthalmosaurids and ophthalmosaurids and include the oldest record of Ophthalmosauroidae. Similarly, the record of South American metriorhynchids is older than that of Europe. The oldest Metriorynchus in Chile is early Bajocian, whereas in Europe, it is early Callovian. Metriorynchus aff. M. brachyrhynchus in northwestern Patagonia is late Bathonian whereas the oldest M. brachyrhynchus in Europe is early Callovian. Early-Middle Jurassic plesiosaurs are extremely scarce worldwide, and Maresaurus from the early Bajocian represents almost the only plesiosaur of this age. The highest abundance and taxonomic diversity, however, occurs in the Late Jurassic (Tithonian) of the Neuquén Basin and includes pleurodiran and cryptodiran turtles (Notomemys laticentralis and Neusticemys neuquina), ophthalmosaurid ichthyosaurs (Caypullisaurus bonapartei, Ophthalmosaurus sp. and Aegirosaurus sp.), plesiosaurs (Pliosaurus sp., Liopleurodon sp.) and metriorhynchids (Metriorynchus sp., Geosaurus araucanensis and Dakosaurus andinitens). Jurassic marine reptile faunas from the Southeastern Pacific are closely related to Western Tethyan faunas. These close similarities can be explained in terms of a marine connection (Caribbean seaway) between both areas. The Caribbean seaway (“Hispanic Corridor”) played an important role for dispersion of marine reptile since the Middle Jurassic, or even before. Toward the end of the Jurassic in the European Tethys, mass extinctions diminished the diversity of marine reptiles. However, in the Southeastern Pacific (Argentina and Chile) no evidence suggests massive extinctions, at least in the record of marine reptiles.

INTRODUCTION

One important bias in the interpretations of Mesozoic marine reptile faunas is that they are mainly based on the record of the northern hemisphere. But, as Massare (1997) pointed out, to understand the diversity, biogeography and evolution of marine reptiles, it is very important to include data from southern oceans. Within this frame, the South American record of Jurassic marine reptiles is significant in that it complements the northern hemisphere record both geographically and stratigraphically. Thus, in the northern hemisphere, Early Jurassic and middle Callovian- Kimmeridgian times are well documented, whereas the early Middle Jurassic is poorly documented. By contrast, Early Jurassic marine reptiles are almost unknown from the Eastern Pacific margins of South America (this can be explained in terms of uneven collecting efforts) (Fernández and Lanés, 1999), but significant material is known from the Aalenian- early Callovian. Concerning the Late Jurassic, the Tithonian herpetofauna of South America complements the one recorded in the northern hemisphere, and together, they demonstrate the diversity of pelagic reptiles of those times.

In 1994, we were invited by Dr. Elizabeth Nicholls and Jack Callaway to contribute to the book Ancient Marine Reptiles which was published few years later (Callaway and Nicholls, 1997). Our contribution was restricted to Tithonian marine reptiles of the Eastern Pacific (Gasparini and Fernández, 1997). Since that publication, new material has been found from the Middle and Late Jurassic (Gasparini and Fernández, 1997: fig. 2; and Figure 1) and the systematics of the groups involved has improved.