

## PRELIMINARY APPROACH ON DEPOSITIONAL ENVIRONMENTAL OF THE UBERABA FORMATION (UPPER CRETACEOUS), PEIRÓPOLIS SITE, MINAS GERAIS STATE, BRAZIL: AN INTRODUCTION

**Carlos Roberto dos Anjos Candeiro**  
Prof. Dr. da Universidade Federal do Tocantins  
[candeiro@yahoo.com.br](mailto:candeiro@yahoo.com.br)

**Rodrigo Pinto de Azevedo**  
Graduando do Curso de Ciências Biológicas/UFRJ  
[rodrigopfa@gmail.com](mailto:rodrigopfa@gmail.com)

**Priscila Maria da Silva**  
Graduanda do Curso de Ciências Biológicas/UNIARAXÁ  
[priesilvio@hotmail.com](mailto:priesilvio@hotmail.com)

### ABSTRACT

The Coniacian-Santonian Uberaba Formation of Triângulo Mineiro region has yielded a important paleofauna from fluvial and associated paleoenvironments. Although poor, fossil content are represented by invertebrates and vertebrates. The paleontological and geological data suggested that Uberaba Formation is characterized by a fluvial of a braided type.

**Keywords:** Uberaba Formation, Upper Cretaceous, depositional paleoenvironment, Minas Gerais State, Brazil

### RESUMO

A Formação Uberaba (Coniaciano-Santoniano), na região de Triângulo Mineiro (Minas Gerais) possui o registro de uma importante paleofauna relacionada à paleoambientes fluviais e outros associados a estes. Apesar de ainda ser pobremente representado, o registro fóssil dessa formação está representado tanto por ocorrências de invertebrados como de vertebrados. Os dados paleontológicos e geológicos da Formação Uberaba sugerem um paleoambiente deposicional do tipo fluvial entrelaçado.

**Palavras-chave:** Formação Uberaba, Cretáceo Superior, Paleoambiente deposicional, Estado de Minas Gerais, Brasil

### INTRODUCTION

From the beginning of 20th century the presence of diamond in the Triângulo Mineiro region (Minas Gerais State, Brazil) has been calling the attention of various works. RIMMAN (1917) denominated as "Uberaba" the greens group of rocks which characteristic bearing diamonds from the Triângulo Mineiro. However only in 1937 by Barbosa were these rocks introduced into lithological literature made their states to Uberaba Formation. Since then the important works have been carried out with the proposal over better understanding the distribution and genesis of this rocks.

The objective of the present works is discussed of the Uberaba Formation depositional environment and their fossil content.

---

Recebido em 12/04/2007  
Aprovado para publicação em 26/08/2007

### Geographical and geological setting

Given the fact that the Uberaba Formation is limited to the Triângulo Mineiro region (Fig. 1), the area depicted in this study will be understood as the city of the Uberaba municipality. The geological subdivision of the Bauru Group (Bauru Basin) here after adopted, follows FERNANDES and Coimbra (1996). According to Barcelos (1984) the lower contact with the Uberaba Formation is given due to the parallel discordance with Serra Geral Formation (magmatic rocks, Upper Jurassic?) and/or due angle discordance with sandstone of the Botucatu Formation (Lower Cretaceous). Possibly there is correlation with Adamantina (Bauru Group) sediments to the west. The upper contact is proportional and is made with the Ponte Alta Member of the Marília Formation composed by white sandstones (Dias-Brito et al. 2001).

The Uberaba Formation consists of epiclastic rocks, kind of bushy limestones associated with silts, conglomeratic limestones and sandstones. These sediments derived from pre-existent volcanic rocks associated with other sources of volcanic sediments, a fact that explains the presence of the green sandstones, while the reddish portions are derived iron-oxidation process.

The sedimentological environment and climatic conditions are still objects of controversy. According to Hasui (1968) the sediments were deposited in a fluvial environment with a limited movement and alternation between dry and humid region.

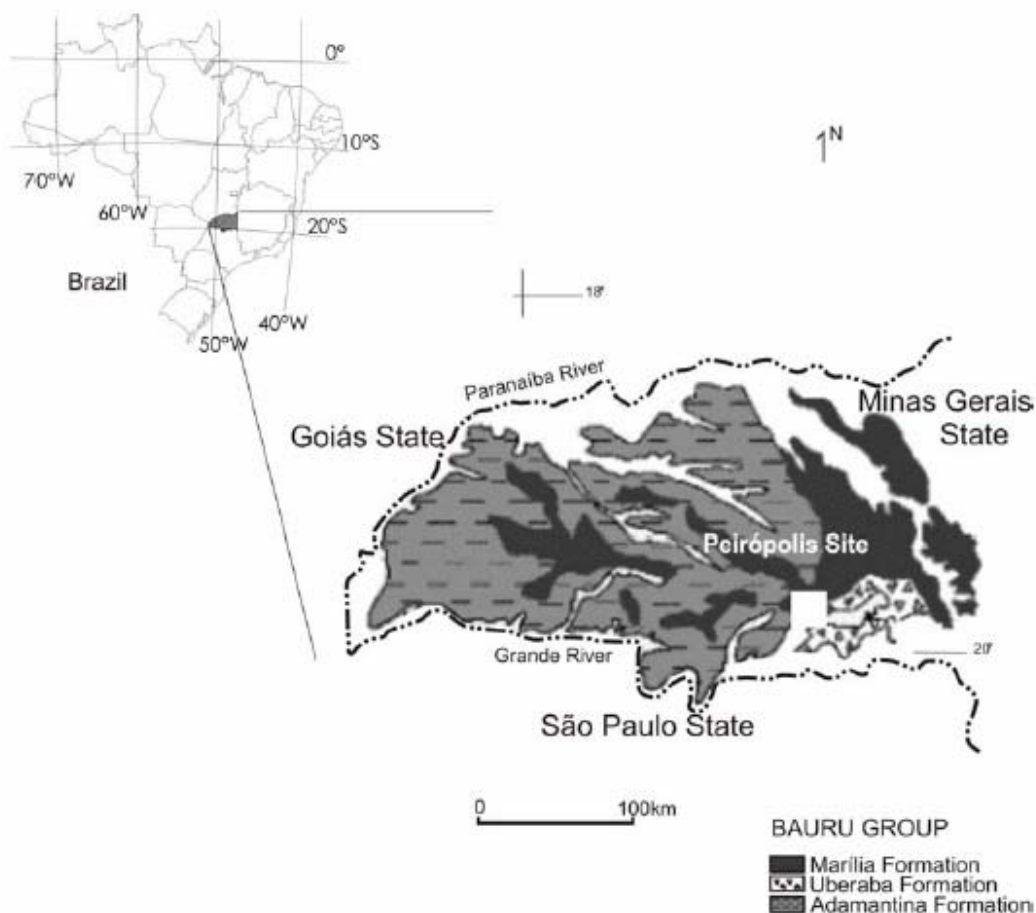


Figure 1 - Geological map of the triangulo Mineiro Region modified from Fernandes and Coimbra (1996)

conclusion that those were deposited by muddy inflows in a form alluvial branch during dry climate. According to Suguio (1981), fluvial-lacustrine conditions predominate with a strong volcanic and alkaline contribution combined with a hot, relatively humid climate, however with dominant dry periods. Barcelos et al. (1987) classified the finer deposits (fluvial anastomosing with an intense contribution of material of volcanic origin). Fulfaro & Barcelos (1991) agree with a fluvial meandering system suggested by Suguio (1981). However they disagree about the climate conditions, which according to them would have been humid with vegetational coverage.

**Uberaba Formation**

The Uberaba Formation is mainly exposed in the Uberaba municipality, Minas Gerais State. Lithologically these strata are composed of freshwater limestones, sandstones, and based conglomerate, all cemented by carbonate (CaCO<sub>3</sub>) together with volcanoclastic sediments (BARCELOS, 1984). The Uberaba Formation is up to 140 m thick (FERNANDES; COIMBRA, 1996). According to Dias-Brito et al. (2001), this formation is Coniacian-Santonian in age (Fig. 2).

Among the fossils collected in these sediments are microfossils, titanosaurids and indeterminate dinosaur remains, turtles and icnofossils.

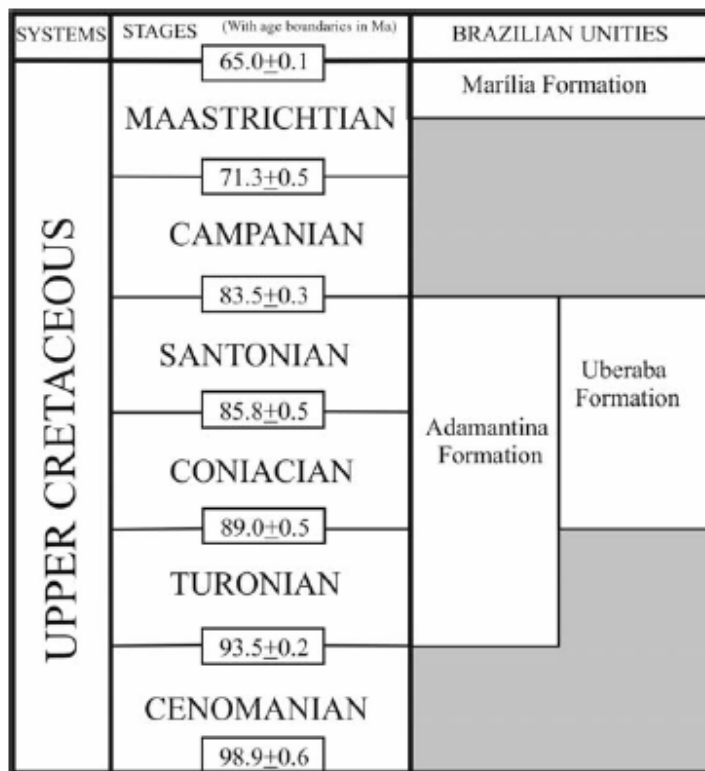


Figure 2 - Chronological chart of the Bauru Group (ages according DIAS-BRITO et al., 2001).

## Paleontology

The Uberaba Formation has produced a few diverse terrestrial fauna (Table 1), consisting of invertebrates, chelonians and dinosaurs remains (FERNANDES, 1998). The sauropod dinosaurs fauna is diverse as well, and includes an undescribed basal sauropod (SANTUCCI, 2002), and undescribed dinosaur eggs represented by an excellent dinosaur nesting (RIBEIRO, 2002).

**Table 1**  
Faunal content of the Uberaba Formation

Taxa	Selected references
<b>Invertebrates</b>	
Invertebrata indet.	FERNANDES (1998)
<b>Vertebrates</b>	
Chelonia indet.	FERNANDES (1998)
Dinosauria	
Sauropoda indet.	CAMPOS and BERTINI (1985), RIBEIRO (2002)
Titanosauria indet.	SANTUCCI (2002)

## Depositional environment

The preliminary data allows us pointed out a standard profile for the Uberaba Formation, in the studied area, a fluvial system, possibly braided type, with various cycles of fining upward. A large energetic variation can be observed, mainly in the outcrop of Uberaba River, which originated basal conglomerate followed by various clay cycles and energy reactivation with deposits of new conglomeratic material.

The mentioned can also be observed in the lower profile, but with less intensity. This part shows a lower variation of energy, and by less variation of energy, characterized by overlaps of fine sand with certain clay particles. According NICHOLS (1999) the fluvial system-braided type shows a number of bars and islands which characterize a high variety in flux of energy, a state that is a reflection of large luviometric variations which occurred in a dry to semi-arid climate. Those deposits are fining upward cross-bedding over tabular structure with parallel lamination.

## Conclusions

The fluvial and associated environments of the Coniacian-Santonian Uberaba Formation preserve a poor terrestrial assemblage. Although the body fossil record is limited, it records a fauna that includes invertebrates and vertebrates. The fossil content is preserved in green sandstones deposits, probably a result of both paleoecology and taphonomy. The paleontological, petrological and lithostratigraphical data suggest that the Uberaba Formation is characterized by a fluvial of a braided type.

## References

- BARCELOS, J.H. Reconstrução paleogeográfica da sedimentação do Grupo Bauru baseada na sua redefinição estratigráfica parcial em território paulista e no estudo preliminar fora do Estado de São paulo. 1984. 190p. **Tese** (Livre-Docência), UNESP, Rio Claro. 1984.
- BARCELOS, J.H., SUGUIO, K.; GODOY, A.M.; HIRATA, R.A.; GONTIJO, R.C. Aspectos litoestratigráficos da Formação Uberaba, Cretáceo da Bacia do Paraná. **Geociências**, v. 5/6, p. 31-42. 1987.

CAMPOS, D.A.; BERTINI, R.J. Ovos de dinossauro da Formação Uberaba, Cretáceo Superior do estado de Minas Gerais. In: CONGRESSO BRASILEIRO DE PLAEONTOLOGIA, 9, 1985.

**Resumos das comunicações**, Fortaleza, SBP, 1985, p. 19.

DIAS-BRITO, D.; MUASSACHIO, E.A.; CASTRO, J.C.; MARANHÃO, M.S.A.S.; SUÁREZ, J.M.; RODRIGUES, R. Grupo Bauru: uma unidade continental do Cretácico do Brasil – concepções baseadas em dados micropaleontológicos, isotópicos e estratigráficos. **Revue Paléobiologie**, v. 20, p. 245-304. 2001.

FERNANDES, L.A.; COIMBRA, A.M. A Bacia Bauru (Cretáceo Superior, Brasil). **Anais da Academia Brasileira de Ciências**, v. 68, n. 2, p. 195-205. 1996.

FÚLFARO, V.J.; BARCELOS, J.H. Grupo Bauru no Triângulo Mineiro: uma nova visão litoestratigráfica. In: SIMPÓSIO REGIONAL DE GEOLOGIA, 2, São Paulo, 1991. **Atas, Sociedade Brasileira de Geologia SP-RJ**, São Paulo, 1991, p. 59-66.

HASUI, Y. A Formação Uberaba. In: CONGRESSO BRASILEIRO DE GEOLOGIA, 22, Belo Horizonte, 1968. **Anais, Sociedade Brasileira de Geologia**, Belo Horizonte, p. 167-179. 1968.

NICHOLS, Gary. **Sedimentology & Stratigraphy**. 1 ed. Blackwell Publishing Limited; 1999. 355p.

RIBEIRO, C.M. Ovo e cascas de ovos de dinossauros da região de Uberaba, Minas Gerais (Formação Marília, Bacia Bauru, Cretáceo Superior). 2002. 205p. **Tese** (Doutorado em Geologia), Departamento de Geologia, UFRJ, Rio de Janeiro. 2002.

SANTUCCI, R.M. Revisão dos titanosaurídeos do Cretáceo Superior do Brasil. 2002. 179p. **Dissertação** (Mestrado) Instituto de Geociências, Universidade Estadual Paulista, Rio Claro. 2002.

SUGUIO, K. Fatores paleoambientais e paleoclimáticos e subdivisão estratigráfica do Grupo Bauru. In: Mesa Redonda: A Formação Bauru no Estado de São Paulo e áreas adjacentes. **Sociedade Brasileira de Geologia/SP**, São Paulo, n. 7, p. 15-30. 1981.

SUGUIO, K.; SCIERO, D.P.; FELLITTI FILHO, W. 1979. Conglomerados polimíticos diamantífero de idade cretácica de Romaria (MG): um exemplo de sedimentação de leques aluviais. In: SIMPÓSIO DE GEOLOGIA, 2, Rio Claro, 1979, **Atas, Sociedade Brasileira de Geologia**, Rio Claro, v. 1, p. 217-229.