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Stratigraphie

Le domaine Tariquide (arc de Gibraltar, Espagne et Maroc) : succession sédimentaire et événements structuraux au Lias et au Dogger

Michel Durand-Delga [a,*], Silvia Gardin [b], Manuel Esteras [c], Hélène Paquet [d]

[a] *La Pélisserie, 81150 Florentin, France*
[b] *UMR CNRS 5143, université Pierre-et-Marie-Curie, case 117, 4, place Jussieu, 75252 Paris cedex 05, France*
[c] *SECEG, 3 Estébanez Calderón, 28020 Madrid, Espagne*
[d] *Centre de géochimie de la surface, EOST, CNRS/université Louis-Pasteur, 1, rue Blessig, 67084 Strasbourg cedex, France*

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Présenté par Michel Durand-Delga

Résumé

La succession du Lias–Dogger des Tariquides diffère des séries de même âge dans les unités tectoniquement voisines de l'arc de Gibraltar : Pénibétique (Ibérie) et Dorsale calcaire (domaine d'Alboran). Les calcaires de plate-forme du Lias inférieur sont ravinés par le Domérien, base d'une série de mer ouverte, continue jusqu'au Bajocien (type J. Moussa) et, ailleurs, par une série beaucoup plus mince (type Los Pastores), à marnes parfois manganésifères (Ras Leona), déposées en trois épisodes indépendants, datés par nannofossiles calcaires, du Domérien–Toarcien au Bajocien supérieur–Bathonien. Des jeux de failles s'observent avant le Domérien et au Toarcien supérieur (Los Pastores). ***Pour citer cet article : M. Durand-Delga et al., C. R. Geoscience 337 (2005).***

Abstract

The Tariquide Domain (Gibraltar Arc, Spain–Morocco): sedimentary succession and structural events during the Lias and Dogger. The Lias–Dogger successions of the Tariquide units in the Gibraltar Arc differ from the series of tectonically adjacent units, the Penibetic (Iberia margin) and the Limestone 'Dorsale' (Alboran Domain). Lower Lias limestones are eroded and covered by the Domerian, which starts by deposits of open sea, continuous up to the Dogger (J. Musa-type successions), and elsewhere (Los Pastores-type successions) by a thin series (Upper Lias to Upper Dogger), starting by a manganesiferous episode (Ras Leona) and including marls deposited into three episodes, dated by calcareous nannofossils. Faulting events occurred before the Domerian and during the Late Toarcian (Los Pastores). ***To cite this article: M. Durand-Delga et al., C. R. Geoscience 337 (2005).***

* Auteur correspondant.

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Mots-clés : Tariquides ; Arc de Gibraltar ; Los Pastores ; Jebel Moussa ; Lias ; Dogger ; Nannoplancton ; Manganèse

Keywords: Tariquides; Gibraltar Arc; Los Pastores; Jebel Musa; Lias; Dogger; Nannoplankton; Manganese

Abridged English version

1. Introduction

The term of Tariquides [7] applies mainly to Lias limestones of the Gibraltar Arc, i.e. in Morocco, slices of the Jebel Musa [10,12,13,16] and Lechkach [9], and, in Andalusia [11], the Rock of Gibraltar [1,24, 25] and Los Pastores [6,26]. These units (Fig. 1) are observed [2,7,19] at the convergence boundary of the southern margin of Iberia (Europe), the northern margin of Africa, and the Alboran Domain. The connection of Tariquides either to Iberia (Penibetic Domain [12,13,17]) or to Alboran Margin ('Dorsale' limestone) [3,20] is discussed. In fact, the analysis of their Trias-to-Palaeocene series will make it possible to conclude to its originality in relation to these domains.

2. Lower Lias platform limestones

An original Trias [3,18] is overlain by thick-bedded or brecciated platform limestones. Their upper part is dated by Lotharingian brachiopods (Gibraltar) [21]. These facies are different from the 'carniolas' of the Iberian Subbetic [17] and also of the external 'Dorsale' (pelagic influences). A rock ground, in relation with an extensional tectonics, caps the calcareous Lias of the Tariquides.

3. Domerian–Bathonian formations: series of J. Musa type (Fig. 2)

This domain shows a succession [10,12,13,20] of nodular or marly limestones (up to 75 m) frequently coloured and displaying cherts. Ammonites date several levels from the Domerian, Toarcian, Aalenian, and Lower Bajocian. Green radiolarites follow, with associations of the basal Aalenian–Bathonian interval [13]. In the Gibraltar Rock, a similar but thinner succession [24,25] begins with Domerian levels and ends with 'radiolarian cherts' [1].

4. Domerian–Bathonian formations: series of Los Pastores type (Fig. 3)

This thin and essentially marly succession is subdivided by calcareous nannofossils (Table 1) into three episodes (Fig. 4), each of them resting by a rock ground on the Lower Lias limestones:

- Domerian (?)–Upper Toarcian (Fig. 3, sections **D**–**E**): marly limestones, firstly light (Domerian–Lower Toarcian), then purple (Upper Toarcian–?Aalenian); the last ones are reworked into polygenic breccias (section **D**), likely generated by the collapse of a submarine fault scarp;
- Upper Aalenian–Lower Bajocian (section **C**): silty manganesiferous marls (6 m);
- Upper Bajocian–Bathonian (sections **A**–**B**): usually gullying the Lower Lias; these belemnites-rich marls (2.5 m) are firstly dark, with reworked Fe–Mn accumulations (Table 2), and then light.

5. Domerian–Dogger formations in the Ras Leona Unit (Musa Group) (Fig. 2)

The Lower Lias platform limestones are locally eroded and covered by thin yellowish calcareous conglomerates (Domerian?). Above them, Mn products lie, forming thin crusts or filling a deep karst ('La Mine') [10]. This deposit may be ascribed to the Dogger, as compared to that of Los Pastores. Several techniques applied in three different locations demonstrate that this black 'crust' results from impregnation of the underlying Lias limestones. Mn is always accompanied by Fe, and sometimes by Ba. Silica (chalcedony) in the form of filaments or clusters also impregnates the Lias limestones.

6. Conclusion

Above a massive Lower Lias platform limestones, two main domains can be differentiated, related to the following events: (1) between the Lower Lias and Domerian, rock-ground, locally (Lechkrach [9]) with