Boundaries of Upper Cretaceous hypostratotypes at the profile Djebel Fguira Salah, Tunisia

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In the Upper Cretaceous section at Djebel Fguira Salah, El Fahs, Tunisia, the following stage boundaries are defined on the basis of macro- and microfaunas: Albian-Cenomanian, Cenomanian-Turonian, Turonian-Coniacian, Coniacian-Santonian, Santonian-Campanian and Campanian-Maastrichtian.

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Albian-Campanian sediments of the standard profile at Djebel Fguira Salah (near Pont du Fahs, 50 km SW of Tunis, see fig. 1) have been proposed as neostratotypes or hypostratotypes of the stages Albian, Cenomanian, Turonian, Coniacian, Santonian and Campanian respectively (Salaj 1973, 1974, 1978; Salaj; Azzouz & Maamouri 1976; Salaj & Bellier 1978). During the plenary discussion at the symposium on Cretaceous Stage Boundaries held in Copenhagen, October 21, 1983 it emerged that some of these units may be suitable for proposal as stratotype boundaries: i.e., the Albian-Cenomanian; Coniacian-Santonian and Santonian-Campanian boundaries. In the following we define the boundaries of the individual stages as they are developed at Djebel Fguira Salah.

Albian-Cenomanian boundary

This boundary is defined by a rich ammonite fauna (Solignac 1927, p. 170, Gastany, p. 189, Salaj & Bellier 1978, p. XXI, 2, Salaj 1980, p. 68–69). Thus, in the basal Cenomanian beds the species *Neostlingoceras carcitamensis* is found abundantly (samples Z-1925, 1193/11). Simultaneously, the foraminifera *Thalmanninella brotzeni* Sigal and *Schackoina cenomana* (Schacko) appear.

The detailed lithological characterization and stratigraphy of the whole Cenomanian succession was demonstrated during the Micropaleontological African Colloquium (Salaj 1974). See aerial photo in Salaj, Azzouz & Maamouri (1976).

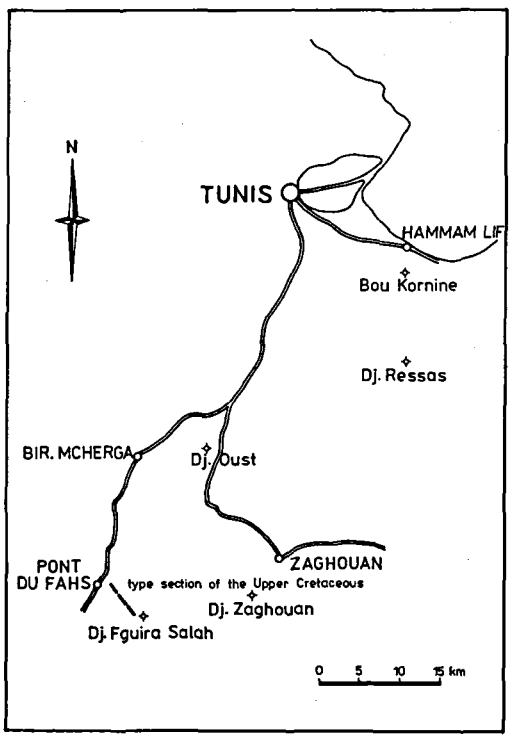

Fig. 1. Topographic situation of the Upper Cretaceous section of Djebel Fguira Salah

Cenomanian – Turonian boundary

If the uppermost layers of the *Rotalipora cushmani* Zone (samples 1183 e,f,g,h) (assigned by Salaj 1980 to the basal Turonian) belong to the Cenomanian, then the base of the following zone of "larger Hedbergellas" or *Whiteinella gigantea – Dicarinella imbricata* Zone (see Salaj & Gašpariková 1983) would define the Turonian base (sample 120 a). In this case there would be no problem with the Cenomanian-Turonian boundary. On the basis of ammonites (Hancock 1983, Bengtson 1983) (*Metoicoceras geslinianum* Zone) the Cenomanian-Turonian boundary falls within the *Whiteinella gigantea – Dicarinella imbricata* Zone (see Wright & Kennedy 1981, p. 125–127, Hancock 1983, p. 61). In this case it would be difficult to establish the boundary on account of condensed sedimentation (about 120 cm thickness) in the studied foraminifer zone. For this reason, solution of the problem of the Cenomanian-Turonian boundary on the basis of macrofauna at the profile of Dj. Fguira Salah is unsuitable.

Turonian-Coniacian boundary

In the beds overlying the Upper Turonian with *Hippurites requiemi,* echinoids (Salaj & Bellier 1978) and *Marthasterites furcatus* (Salaj & Gašpariková 1983), the Upper Coniacian base (sample Z-38) is defined on the basis of foraminifera by the apperance of *Dicarinella concavata* (Brotzen) and *Dicarinella assymetrica* (Sigal). Among the macrofauna, rudists and crinoids are both found, but have not been studied in detail.

Coniacian-Santonian boundary

In the beds overlying the Upper Coniacian (samples 1302d, 1302e) (see Salaj 1980, pl. 50) with *Protexanites* (determination by Wiedmann, 1974), representatives of *Inoceramus* (*Platyceramus*) *siccensis* (Perv.) appear in limestone horizons, which unambiguously determine the Santonian base. The foraminifera *Sigalia carpathica* Salaj & Samuel also appears. About 10 m higher up, representatives of the species *Texanites oliveti* appear (between samples 2007–2008, determination and finds by Wiedmann, Kennedy).

Santonian-Campanian boundary

This is determined by appearance of the species *Globotruncana arca* (Cushman) (foraminifera) and *Aspidolithus parcus* (Stradner) (nannoplankton). These species are found in beds overlying the Upper Santonian proved by a rich fauna of ammonites and rudists (Wiedmann, in Salaj 1980, p. 92, fig. 31).

Campanian-Maastrichtian boundary

The Maastrichtian base is determined by the appearance of the species *Globotruncana falsostuarti* Sigal. However, taking into account the condensed nature of the sedimentation at the Campanian-Maastrichtian boundary, this section is not suitable for resolving the question of the Campanian-Maastrichtian boundary. For the solution of the Campanian-Maastrichtian boundary problem as well as of Campanian-Maastrichtian stratigraphy in Tunisia, the area of El Kef is most suitable (Kat ez Zerblia & El Haria, see Salaj & Maamouri, 1983).

Dansk sammendrag

I et profil ved El Fahs, Tunis, er følgende øvre kridt etagegrænser defineret på basis af makro- og mikrofossiler: albien-cenomanien, cenomanien-turonien, turonien-coniacien, coniacien-santonien, santonien-campanien og campanien-maastrichtien.

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