

Planktonic foraminiferal biostratigraphy and paleoenvironment of the Upper Coniacian-Lower Campanian succession in Northern Tunisia



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ABSTRACT

Three exposed Upper Coniacian-Lower Campanian stratigraphic sections (Jbil, Fguira Salah and Jebel Ejehaf) have been subjected to biostratigraphic study based on planktonic foraminifera in northern Tunisia. The interval of deposits studied belongs to the upper part of the Kef Formation, which consist of alternation of marl, indurate marl and limestone and the lower part of the Abiod Formation, which consists mainly of limestone. Three hundred eighteen samples were collected and examined. Assemblages of planktonic foraminifera are well preserved and composed mainly of *Wittheinella*, *Margino-truncana*, *Dicarinella*, *Contusotruncana*, *Globigerinelloides*, *Globotruncanita*, *Globotruncana*, *Heterohelix*, *Sigalia*, *Planoglobulina*, and *Ventilabrella*.

Several bioevents are recorded in these (interval) deposits including the last occurrence (LO) and the highest occurrence (HO) of *Dicarinella asymetrica*, LO of *Costellagerina pilula*, LO and HO of *Sigalia deflaensis*, *Sigalia carpatica*, *Ventilabrella decoratissima*, last occurrence (LO) of *Ventilabrella eggeri*, *Sigalia bejaouensis*, *Planoglobulina manuelensis*, *Globotruncanita elevata*, and *Globotruncana arca*. The thickness variation of the Upper Coniacian-Lower Campanian interval deposits in the present study areas reflects synsedimentary tectonism.

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1. Introduction

Northern Tunisia is characterized by widely distributed and well exposed outcrops of Upper Cretaceous deposits, which allowed many biostratigraphic studies (e.g. Salaj 1980; Bellier 1983; Nederbragt (1991, 1993); Rami et al., 1997; Robaszynski, 1999; Arenillas et al., 2000; Robaszynski et al., 2000; Elamri and Zaghib-Turki, 2005; Robaszynski and Mzoughi, 2010; Elamri and Zaghib-Turki, 2014; Elamri et al., 2014; Rami et al., 2014).

In this work, we have chosen three sections within the upper part of the Kef Formation (Fournié, 1978) and lower part of the Abiod Formation of Upper Coniacian to Lower Campanian age, respectively (Burolet, 1956). We carried out biostratigraphic and paleoenvironment studies using the diversity and relative abundance of planktonic and benthic foraminifera.

2. Geographical and geological setting

The first section named Jbil is located at coordinates 36°10'2.9"N; 08°45'3.1"E (Geological map n°44 of El Kef) where upper Cretaceous outcrops are well exposed including the Cretaceous/Tertiary boundary Global Stratotype (GSSP) (Keller et al., 1995; Robin and Rocchia, 1998; Molina et al., 2006). This section outcrops about 5 km east of the Kef City, in the northern part of the SE flank of the syncline structure of Kef Ed Dir. The outcrop is oriented in a NW-SE direction (Fig. 1). The second section studied is the Ejehaf located in the Zaghuan area (Fig. 1), indicated by the geographical coordinates 36°9'N; 9°55'E on the geological map of Jebibina labelled 48 (Saadi et al., 1997) which constitutes a part of the southeastern flank of the Ejehaf anticline structure (Jauzein, 1967; Turki, 1985; Saadi, 1997). The last section is Fguira Salah located about 6 Km of El Fahs City to the East of the road to Kairouan (Fig. 1). It is found on the geological map of Zaghuan n°35 (Bajanik et al., 1977) at the following coordinates 36°36'1.5"N, 09°91'4.6"E. This particular section has been studied by Solignac (1927); Salaj (1980, 1996, 1997) and Elamri (2008) and constitutes a part of complex faulted monoanticline structure. The studied

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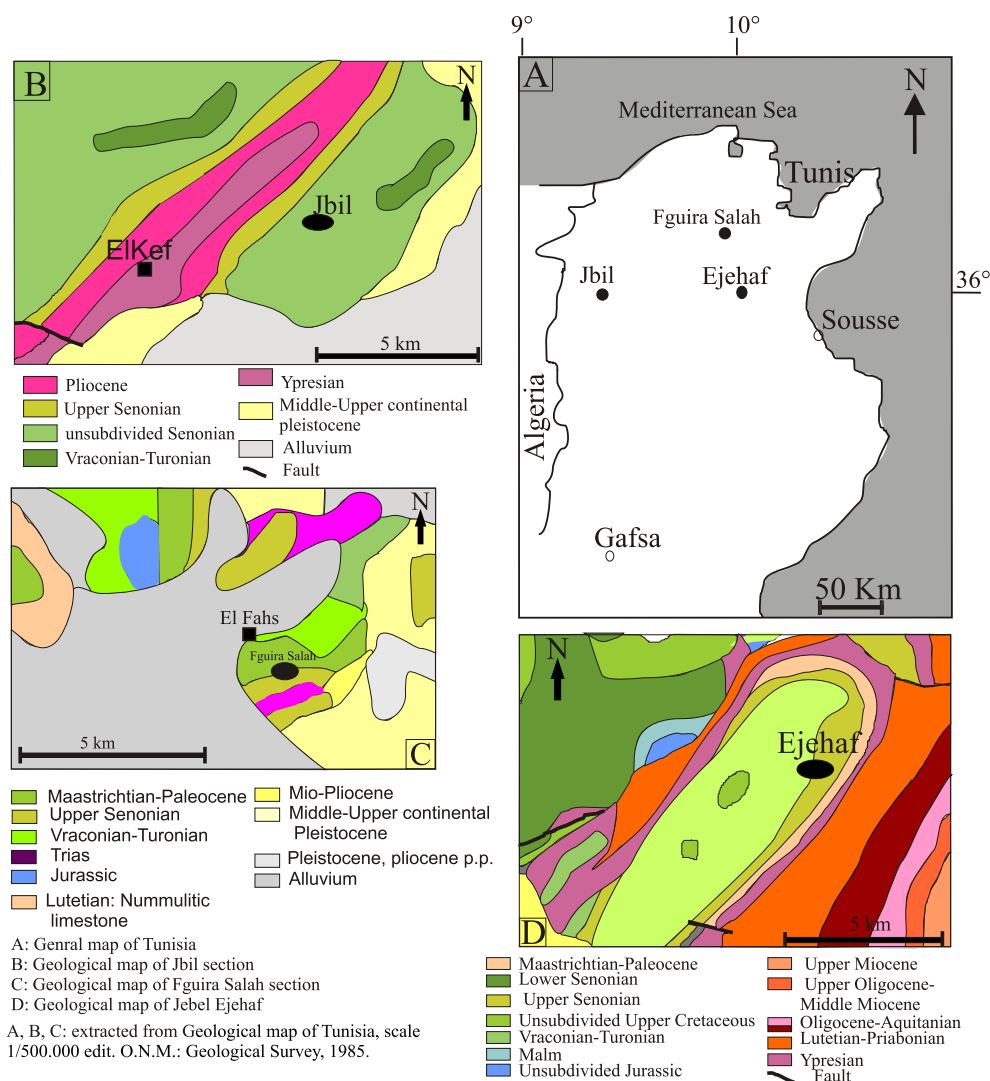


Fig. 1. Geological location of the studied sections.

interval is characterized by deeper marine facies (Burolet, 1956; Rami, 1998; Elamri and Zaghib-Turki, 2014).

3. Materials and methods

Three sections Upper Coniacian-Lower Campanian deposits in Northern Tunisia encompassing the upper part of the Kef Formation (Fournié, 1978) and the lower part of the Abiod Formation (Burolet, 1956) were chosen for this study. Three hundred eighteen (318) samples were collected from the Kef Formation and lower part of the Abiod Formation and examined to planktonic foraminiferal assemblages. The studied intervals contain a rich and diverse planktonic and benthic foraminifera. The samples were collected at a distance ranging from 50 cm in the soft marls to 2 m in the indurated limestone units. The samples were washed following the classic micropalaeontological method. Dry rock samples were disaggregated and soaked in dilute hydrogen peroxide (H_2O_2). Dried residues were then size-sorted through sieves from 500 μm down to 63 μm . Foraminifera were picked using a fine brush under the binocular microscope and studied from the residue (63–500 μm size fractions) for foraminifera.

4. Lithostratigraphy and foraminiferal distribution

The present study deals mainly with the upper part of the Kef Formation (Fournié, 1978) below the Abiod Formation (Burolet, 1956). The Kef Formation consists mainly of marl and limestone deposited in a pelagic or hemi-pelagic ramp setting.

4.1. Jbil section (J)

The Jbil section was previously studied by Jarvis et al. (2002) and Elamri and Zaghib-Turki (2005). Thickness of the studied interval is approximately 365 m. We subdivided this section into four units (U1, U2, U3 and U4).

Unit U1: (From the base to sample J70). This unit is composed of calcareous marl alternating with hemimetric to metric limestone containing Inoceramids. The planktonic foraminifera assemblages consist of *Whiteinella paradubia*, *Praeglobotruncana gibba*, *Marginotruncana shneegansi*, *M. tarfayaensis*, *M. undulta*, *M. sinuosa*, *Dicarinella concavata*. *Dicarinella asymetrica* appears in sample J18, and *Globotruncana manauensis* and *Costellagerina pilula* appears respectively in samples J37 and J46 (Fig. 2).

Unit U2: (samples J70 to J120). This unit is composed of marl-stone rich in *Heterohelix globulosa*, *Hx. pulchra*, *Dicarinella*

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