

THE SEDIMENTARY OLIGO - MIOCENE MOLASSIC CYCLE IN THE DEVOLLI SYNCLINE OF KORÇA BASIN (SOUTH-EASTERN ALBANIA)

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ABSTRACT

The Korça depression situated in south - east of Albania is the extension towards the North of the Mesohellenic basin. This study is limited in Devolli syncline that represent its eastern tectonic unit. The field observations as well as biostratigraphic data indicate a successive sedimentary cycle from Middle Oligocene until Langhian. Some formations distinguished there especially Drenica formation, "chama clays," and lithothamnium ones are found in all parts of Korça basin showing their regional extension. The others are of local value. Several biozones or associations have been identified based on calcareous nannofossils, planktonic and larger foraminifera, macrofauna as well as palynology. A comparison with the results obtained in Greek sections is realised too.

KEY WORD: Lithostratigraphy, biostratigraphy, molasse, calcareous nannofossils, foraminifera, macrofauna, palynology, Devolli syncline, Korça basin, Albania, coralline .

I. INTRODUCTION

The depression of Korça represents the northern part of Mesohellenic basin in Albanian territory. The geological recent studies realised there(Kumati Ll. et al. 1995, 1997) have individualised some tectonic units. Here we are interested in the Devolli syncline situated in the eastern part of the basin(Fig.1).

It is to be noted that the orientation of this synclinal is north - south whereas the direction of the Mesohellenic is NNW - SSE. In order to explicate this direction further observations are necessary.

The litho - biostratigraphic data are mainly based on the study of some representative sections (Fig. 2). In order to realise a biostratigraphy as fine as possible of the deposits and paleoecological interpretations, the complex of paleontological methods as macrofauna, planktonic and benthic foraminifera, calcareous nannofossils and palynology have been used.

The interpretation of all required data obtained by field observations and conclusions of above mentioned paleontologic methods, indicates a successive molassic sedimentary cycle in the Devolli syncline beginning at the Middle Oligocene (upper part), and ending in Langhian stage (lower part). In terms of plankton stratigraphy this cycle includes the interval of *Sphenolithus distentus*(NP24) or *Globorotalia opima opima* with *Globigerina ciperoensis angulusuturalis*, at the base, and *Sphenolithus heteromorphus* (NN5) or *Praeorbulina* s.l. at the top.

It is to be noted the presence of a thickness of deposits between the ophiolitic substratum and Middle Oligocene. These deposits of red colour here are considered as incised - fill valley ones. They do not contain any kind of fossils, but have been interpreted to belong to the Upper Eocene - Middle Oligocene(lower part) age.

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II. STRATIGRAPHY

The oldest deposits belong to Mborja + Dishnica formation, considered here as continental deposits. Their outcrops extend only on western flank of the Devolli syncline. The origin of these deposits is of incised - fill valley type. The lower part consists of an unsorted conglomeratic - pebble mass with the ophiolitic - sand material. The nature and dimensions of the grains and pebbles are different, as ophiolite, limestone (Triassic and Cretaceous), terrigenous (Eocene), metamorphic and acid rocks, etc. In the upper part the conglomerated breccia lithofacies occurs. It consists mainly of ophiolitic fragments, rarely sandstone layers and here and there the gravely unregular lenses are observed. In general they are characterized by reddish - colour very distinguishable in the terrain. These deposits overlain the ophiolitic substratum and an angular disconformity has been observed between them and Middle Oligocene (upper part) deposits. Take into considerations all the component of these continental deposits, the Upper Eocene - Middle Oligocene (lower part) age can be attributed.

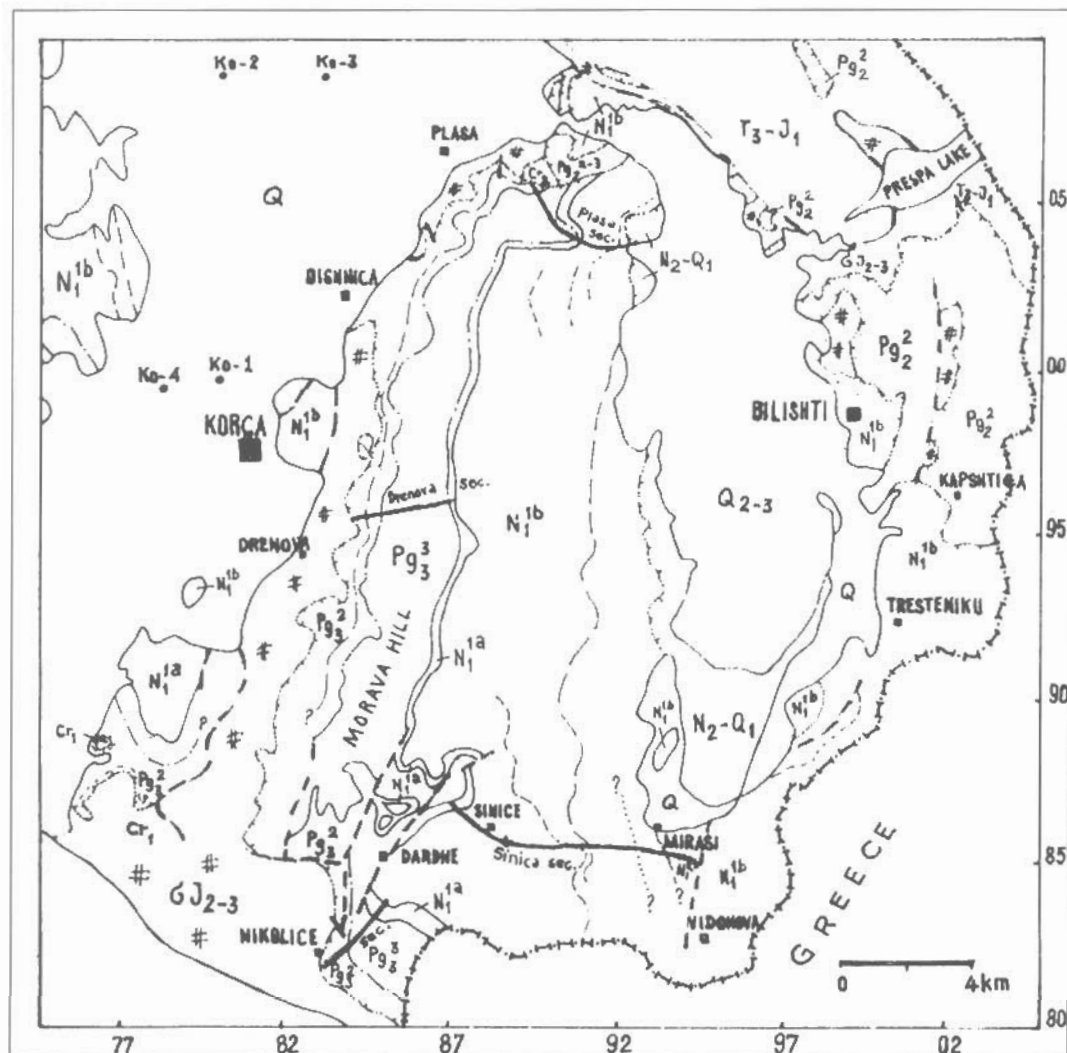


Fig. 1: The geological map of Devolli syncline (Korca Basin)

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II. 1. THE OLIGOCENE SERIES (Pg₃)

The Oligocene Series is represented by its middle and upper parts identified especially in Plasa and Drenova sections.

II. 1. 1. THE MIDDLE OLIGOCENE (Pg₃²)

The Middle Oligocene deposits crop out on western flank of the Devolli syncline, forming a narrow belt going parallelly to the ophiolitic rocks extension. Lithologically, three units have been described: the formations of Drenova and Drenica and "chama clays."

Drenova formation includes the first sediments brackish water following by the normal marine ones. Really, the sedimentary cycle of Korna basin begins with these deposits. The lower part is characterised by coastal - plain and freshwater - marine/lagoonal sediments. It is to be noted the alternations of deposits and lateral variations. Generally, they consist of calcareous clays, marls bearing the coal seams with intercalation of sandstone, siltstone, and conglomerate (Fig. 2). The upper part is represented really by marine sediments based on the persistent stratification, and macrofauna (requering normal salinity and temperature) and the presence of calcareous nannofossils. The lithology consists of silts, marly - clays with intercalations of sandstone and conglomerates.

The calcareous nannofossil association characterize the *Sphenolithus distentus*(NP24) zone of Middle Oligocene (upper part). This age is supported also by the palynological data.

The Drenova formation overlaps the Morava ophiolitic massif and it crops out different levels. The thickness of it is variable(0+100m).

Drenica formation lies successively on the Drenova formation but somewhere contacts directly the ophiolite. It is represented by few levels of bioclastic limestones(laterally varies into fossiliferous sandstone and conglomerates) and fine silt - sandstone alternations between them.

There are three levels of fossiliferous sandstone in Plasa section well known by the geologists as "coralline" ones. The two first are 2+3m in thickness and the third ~12m. In another outcrop this "coralline" level shows a thickness about 15+16m. It is to be noted the rich coral colony and molluscs. The last level is changed into conglomeratic ones. In the coal - bearing zone "the coralline" level is transformed in conglomeratic one. Thus, the lithology and the thickness of Drenica formation is variable from few to 50m

The calcareous nannofossils analysis determine the *Sphenolithus distentus* (NP24) zone of Middle Oligocene and the presence of *Lepidocyclus* (*Eulepidina*), *dilatata*(Plasa section) indicates an age not older than Middle Oligocene.

The "Chama clays" formation lies normally on the Drenica formation and mainly as its name indicates, consists of clays containing *Chama*. In the upper part the thin - middle sandstone beds with paleoflora fragments are dominant. The thickness of the "Chama clays" varies and it is 70m and 200m in Plasa and Drenova sections, respectively.

The Middle Oligocene age is well characterised by *Sphenolithus distentus*, *Globorotalia opima opima* (*Globigerina ciperoensis angulusuturalis* subzone) and *Nummulites* s.l.+ *Lepidocyclus* s.l. zones (nannoplankton, planktonic and larger foraminifera, respectively) determined in numerous samples of Drenova and Plasa section.

In the Greek sections the comparable benthic and planktonic foraminifera associations containing *Globorotalia opima opima* and *Globigerina angulusuturalis* species, are observed(Soliman & Zygojannis, 1979).

II. 1. 2. THE UPPER OLIGOCENE (Pg₃³)

The Upper Oligocene deposits lies successively on Middle Oligocene ones. It is to be underlined that different formations have been described in these deposits but they are of local value. The main formation is called **Plasa sandstones**. It is represented by thin - bed sandstone intercalation silts (in Plasa section).

whereas 3+4 massive sandstones strata about (15+30m) predominate in Drenova section. Southwards these massive sandstones became conglomerates. There is numerous horizontal and vertical dwelling structure under the every massive sandstone. The following of sections are mainly represented by sandstone strata while the conglomeratic ones are transformed into lenses, frequently as gravelitic by nature.

The Bozdoveci formation is a local unit characterised by a alternance of siltstone and sandstone records appearing like middle - thin rhythm flysh (Plasa, Drenova Section). A conglomeratic body, about 2+3km in length and ~25m in thickness showing an erosive diastem is present in Drenova section.

The "Guri Cjapit" formation follows successively the above - mentioned formation. Generally it is represented by conglomerates and thick - massive sandstone. The terminal parts consists of bluish silt - massive with intercalation of sandstone and rarely conglomeratic lens. Southward, in the Nikolica profile, the Upper Oligocene is represented by clays with intercalation of thin - sandstone layers, and rarely medium grain size sandstone pinched out laterally. The thickness of the Upper Oligocene deposits varies from 400+750+840m in Nikolica, Plasa and Drenova sections, respectively.

The upper Oligocene age is based on calcareous nannofossils and planktonic foraminifera data determining *Sphenolithus ciperoensis*, and *Globigerina ciperoensis ciperoensis*, as well as *Globorotalia kugleri*, respectively.

II. 2 THE MIOCENE SERIES (N₁)

This series is represented by Aquitanian, and Burdigalian stages (Lower - Miocene) and Langhian stage (Middle Miocene).

II. 2. 1. THE AQUITANIAN STAGE (N₁^{1a}).

The Aquitanian deposits outcrop on western flank of Devolli syncline forming a narrow belt but the its extension is debatable. Biostratigraphically the presence of this stage is proved only in Sinica section and Nikolica profile. There, the foraminiferal assemblages indicate the *Globoquadrina dehiscens* and it is to be noted the existence of *Lepidocyclina morgani*. In Sinica section, calcareous nannofossils determine the lower part of *Helicosphaera carteri* (~NN1), supporting the result of the microfauna.

The Aquitanian deposits consist of clay marlstone, bluish carbonatic clays, rarely with intercalation of centimetric sandstone. Thanks to this lithology, the mapping of the Aquitanian deposit bottom is very difficult.

There is an interval of deposits biostratigraphically not determined in Plasa section. It consists of sandstones and here and there conglomerates with intercalations of marls, clays and silts. It is limited at the bottom by Upper Oligocene and at the top by Burdigalian. So, an Aquitanian age can be attributed to these deposits.

In Drenova section, too, there is an interval of deposits, represented mainly by siltstones with rare thin - sandstones beds, undetermined by calcareous nannofossils and planktonic foraminifera. The palynologic analyses have been demonstrated the *Deflandrea aranitaensis* + *Hystrichosphaeridiaceae* complex indicating the Upper Oligocene - Aquitanian age. This interval is following by Burdigalian deposits.

Taking into considerations all the data, the above - mentioned interval has been interpreted as Aquitanian age.

In Sinica section, the Aquitanian deposits thickness is about 220m.

II. 2. 2 THE BURDIGALIAN STAGE - N₁^{1b}

The deposits of this stage are largely represented both in western and eastern parts of Devolli syncline. In the eastern part the Burdigalian deposits onlap the older ones.

The lower boundary of Burdigalian deposits, observed in western parts of the syncline, usually corresponds with a limestone lithomammon layer containing as well as large foraminifera, bivalves and

corals. In the south part, it is about 15+20m, whereas northwards, it is represented of 2+3 matrix supported conglomerate levels where the gravel and pebble are carbonatic. In Nikolica section, it is represented by a thick conglomerate about 10x15m.

The large foraminifera study indicates *Miogypsina globulina* level determining the lower Burdigalian.

The Burdigalian deposits are represented by bluish marlstones, siltstones and clays with rare thin sandstones beds (0.1+2m) containing lithothamnion balls and in any case channel bodies and potent lithothamnion strata (40m, Sinica section). The upper parts consist of massive sandstones (5+15m) and terminates with soft clays.

Calcareous nannofossil and planktonic foraminifera analysis distinguished the *Helicosphaera carteri* (upper part), *Helicosphaera scissura*, *Helicosphaera ampliaperta* and *Catapsydrax gr. dissimilis* - *Globigerina trilobus*, *Globorotalia scitula* - *Globorotalia acrostoma* and *Globigerinoides bisphaericus* zones, respectively.

Comparable planktonic foraminifera are distinguished in the Mesohellenic basin by Fermeli & Ioakim (1992).

II. 2. 3 - THE LANGHIAN STAGE - N₁^{2L}

The Langhian deposits have been identified for the first time in this basin by our Group (Myftari & Vathi, 1995; Kumati et al. 1994). They have been observed only in Sinica section, near the Albanian - Greek boundary state. The Langhian follows successively the Burdigalian and is represented by marls, clays, silts and sandstones. The clays content coaling organic matter. The sandstones, as in the upper part of Burdigalian, show carbonatic cement concretions with a diameter up to 0.6m

In these deposits the *Sphenolithus heteromorphus* and *Praeorbulina* s.l. zones of nannoplankton and planktonic foraminifera are determined respectively.

The Langhian stage has not been found in the Greek sections (Fermeli & Ioakim, 1992). However, our opinion is that the younger basins migrate towards the south - east direction. Thus the extension of Langhian deposits in the Greek part of the basin is to be expected.

III. CONCLUSIONS

The basin of Korça represents the northern extension of Mesohellenic basin. The orientation of the Devolli syncline is north - south whereas the Mesohellenic basin direction is NNW - SSW. It may be results of tectonic events and further observations are necessary overall in Greek territory, for a final statement.

The mollusc sedimentary cycle of the Devolli syncline starts in the upper part of Middle Oligocene and continues until Langhian.

A reddish conglomeratic - pebble mass (Mborja+Dishnica formation) exists between the ophiolitic rocks and the veritable Middle Oligocene marine sediments. It does not contain any kind of fossils and is considered as continental incised - fill valley type of Upper Eocene - Middle Oligocene (lower part) age.

Among the formations described, only the Drenica formation, the Chama clays and the lithothamnion level have a regional value. These units will be expected to continue in Mesohellenic basin because they have been observed just in the boundary state.

A planktonic (nanno+forams) zonation comparable to Ionian zone is applicable in Korça basin.

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