

The development of a database for radiolarian assemblages from the Kalur Cherts of Albania

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Abstract

The present paper deals with the development of a database in order to manage all the data regarding the well-preserved radiolarian assemblages from the Kalur Cherts of Albania. This data are reported from 18 chert sections belonging to the siliceous sedimentary cover of the ophiolites of the Mirdita Zone (Albania). The database is developed through the application of the MS-ACCESS program and SQL language programming. It creates the possibility to add and edit data from different users in a simple and friendly way, by using the interactive forms. Furthermore, we can use different queries to find every needed information. The data obtained from the chert sections, contributes to better understand the picture of siliceous deposition in Albania.

The investigated data regarding the occurrence and abundance of different radiolarian forms indicate that the major part of species in the radiolarian assemblages from the Kalur Cherts of Albania are typical of the chert sections of Japan.

Keywords: *Radiolarian species, Kalur Cherts, ophiolites, database, Albania.*

1. Introduction

Albanian ophiolites, extending over 4000 km², link together the Dinaric and Hellenic ophiolites. They can be subdivided into two parallel and continuous belts (western and eastern ophiolitic belts), which are different in their internal stratigraphy, petrography and geochemistry [11].

The western belt is composed of lherzolitic mantle tectonites, an overlying cumulitic suite and high-Ti basalts comparable to MORB. The eastern belt is characterized by strongly depleted mantle tectonites, mainly harzburgitic, associated with cumulitic intrusives, low-Ti extrusives and sheeted dikes. The ophiolites of the eastern belt are considered to have evolved in a supra-subduction basin, whereas those of the western belt are attributed to a classic oceanic environment [3].

A siliceous sedimentary cover (Kalur Cherts) overlies the ophiolites in the western as well the eastern belt and represent the first sedimentary cover of the ophiolites. The sedimentary cover of the ophiolites of both belts, when preserved, is composed of chert (Kalur Chert formation), *mélange* (Simoni *mélange*) and *flysch* (Fierza *flysch*).

Well-preserved radiolarian assemblages from this cover are extracted and examined in both belts. The radiolarians are of late Bajocian-early Oxfordian age [5], [8], [10], [6]. The data reported here come from the following chert sections: Fushe Arrez, Shebaj, Gziqi, Stalosi, Lumthi, Kaçinari, Lubonja1, Lubonja 2, Bukemira, Perlati i Eperm, Qershiza, Gurthi, Kthella, Simoni, Kaluri, Pershqesh i Siperim, Blinisht-Kullaxhi, Lumi i Zi; six sections belong to the western belt and ten sections lie in the eastern ophiolite belt. Two sections (Shebaj and Fushe Arrez) consist of siliceous deposits intercalated in basalt flows. The western and eastern belt cannot be distinguished from one other on the basis of the age of the Kalur Cherts. However the oldest ages recorded belong to

the western belt and the youngest ages are limited to the northern part of the eastern belt.

2. Analyzing the database

We have projected a database in order to manage the abundant information about Radiolarian assemblages of Jurassic age belonging to the Kalur Cherts of Albania.

Every chert section has many properties such as name, localization, lithostratigraphical column, section picture, bottom age, top age, geographical position and geological position. Several samples are taken from chert sections. Every sample has also its properties, such as sample name, sample position, bottom age, top age and the section name where it is taken. Every sample yielded a radiolarian assemblage. The species properties are: species name, author, first occurrence, last occurrence, species picture, section and sample name where this species are found.

All this data are related to each other; the digitalization of this data permit us to search them in a very simple and interactive way. For this purpose we have used the MS Access technique [4] SQL language programming [7].

Before building the database, we have determined all the data needed to be digitalized and the way the data are related to each other. This program will be used by different users. They can insert new data or edit the existing data in a very simple way, any time.

The program defines all the necessary searches to find the data we are looking for. Four different searches are designed, such as: Synchronization Search, Simple Search, Search by Age and Search All. The Synchronization search is designed to search simple data by entering data in a synchronize way.

The Simple Search is designed to search data by choosing the data from a combo box. The Search by Age is divided in two parts. By choosing two ages from two combo boxes we find two different data, data that has exactly the interval time that we have selected or data that includes this interval time.

The Search All is designed to search every properties about one type of data.

Every search is accompanied with a print preview form making possible that every data searched can be easily printed by users.

3. Construction of the database

3.1 Design of tables and their relationships

We have designed nine tables which contain all the data needed. This tables are related between them with

different relationships such as one to many and many to many relationship (Fig. 1).

The basic table is the section table with the properties mentioned above. Some of these properties are related with other tables. The Section_Bottom_Age and Section_Top_Age are related with the table Age which

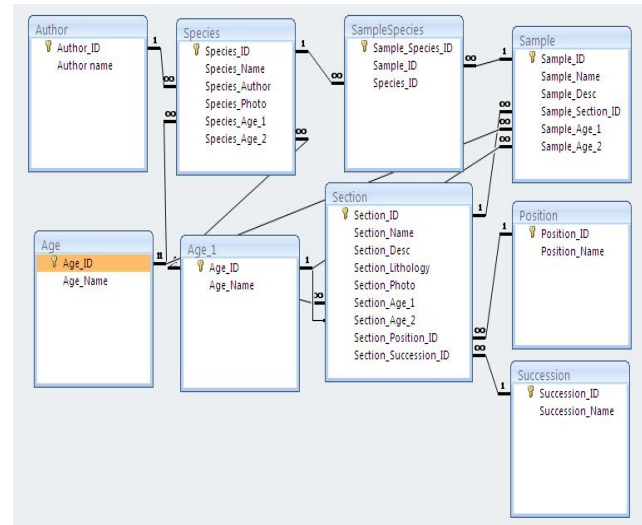


Fig. 1 Relationship of the tables.

contain the data about the Ages and their codes. In the table Section we have two ages, so it is necessary to add another table (named Age_1) above table Age, with the same data of table Age. In the table Section are stored only the codes of section Age 1 and 2. These tables are related with one to many relationship, so one Age code in table Age is found many times in the table Section. Section has also a Geological Position and a Geographical Position. These positions are stored in two different tables which contain position_name and their position_ID. Table Section is related with these tables with a one to many relationship, so one position in the position table is found many times in the table Section. Another very important table is the Sample table which contains many properties. We will explain three of them. The Bottom Age and Top Age are related with the Age table with one to many relationship. The Sample_Section_ID in the Sample table is related with one to many relationship with the table Section, so the ID of one section is found many times in the Sample table. The Sample table is related with the table Species with a many to many relationship because one sample can have many species and one species can be found in many samples. A third table, named SampleSpecies, has been used in many to many relationship. The table Species has also two ages: the first occurrence Age and the last occurrence Age. These properties are related with the table Age and the table Age_1 in the same way as mentioned above for table

Section and table Sample. The data about species author are stored in another table named Author. They are related with a one to many relationship, because many species can have the same author, so one author ID is found many times in the table Species.

3.2 Design of queries

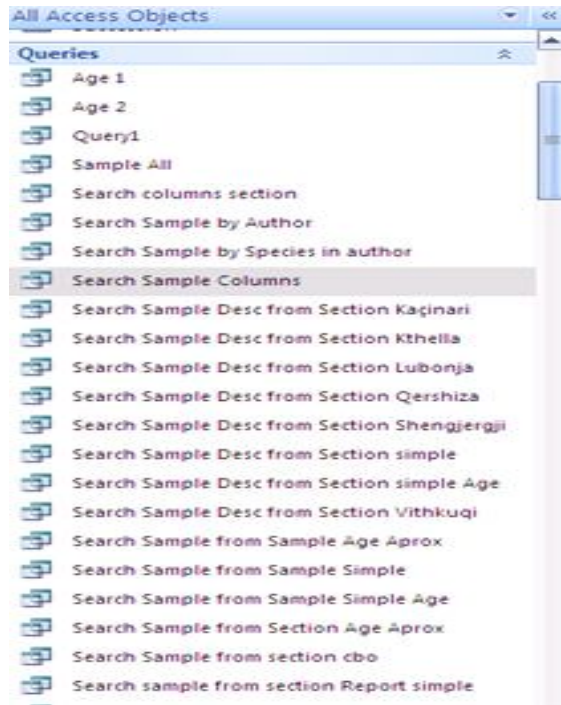


Fig. 2 The list of Queries.

After building the tables and their relationships, we have builded more than 80 queries for different Searches (Fig. 2). Some of the queries are in SQL language.

In the Synchronization Search we can find the sections that are in a certain Geological Position and Geographical Position, the samples collected in this Section and the species founded in these samples.

In the Simple Search we can find the Section Properties, Sample Properties and Species Properties for every section, sample, species or author.

In the Search All we can find all the Section Properties, Sample Properties and Species Properties.

In the Search by Age we can find the sections and samples that have the exact Bottom Age and Top Age attributed to an determined interval time and all the species, that their first and last occurrence coincide with this interval time. We can also find the sections, samples and species which include the determined interval time. To build these queries it was necessary using complicated formulas with different type of operators (Fig. 3).

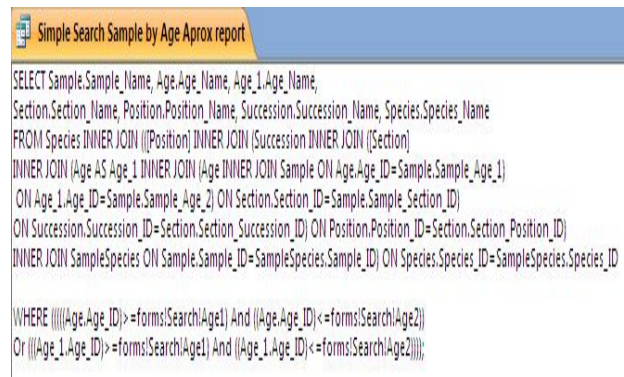


Fig. 3 Sample of a query.

3.3 Design of Forms and Reports

We have created more than 50 forms and more than 70 reports [9]. In the Form Home are shown the maps and two buttons (Fig. 4). One of buttons serves to add and edit data; the other button, connected with the Search Form, can be used to make more than 20 different searches.

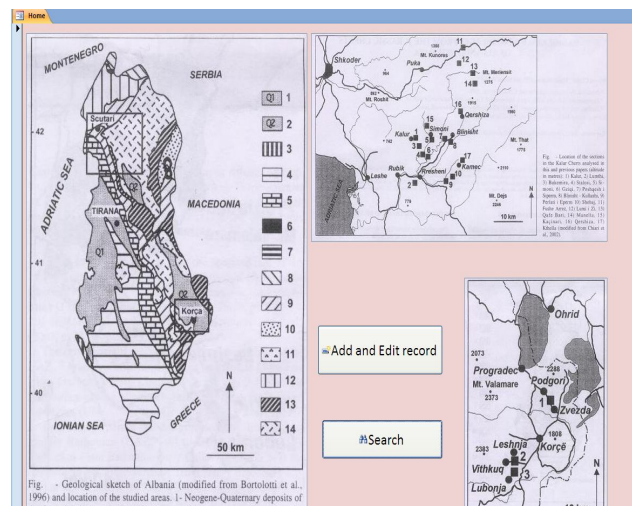


Fig. 4 Form "Home".

To Add or Edit data about the Age, Geological Position, Geographical Position, Section Properties, Sample Properties, Species Properties, Species for each sample or Author, we have created six forms (Fig. 5).

To search data we have created different friendly forms based on queries, in order to facilitate the search of every data. By clicking the "search button" appears the basic

form - Search form, with all the kinds of Search (Synchronization Search, Simple Search, Search by Age and Search All) (Fig. 6).

Fig. 5 Form "Add or Edit".

Fig. 7 Synchronization Search.

Fig. 6 Form "Search".

In the Synchronization Search (Fig. 7), by choosing, in the combo boxes, a given Geographical Position or Geological Position, will appear in another combo box, the sections related to this position. By choosing a section in the combo box will appear in another combo box the samples taken in this sample. By choosing a sample, will appear in a list box the species founded in this sample. For more information we can click the respective Print Preview button to view all the data in a Report view.

In the Simple Search by choosing a section, sample, species, author from a combo box we can find, by clicking the respective Search button, the data about Section Properties, Sample Properties, Species Properties related to the data selected in the combo box.

Fig. 8. Simple Search.

If we choose one Section (Fig. 9), we can obtain all the information for this section properties, the samples properties taken in this section and the species properties yielded in the samples. In the same way, by choosing a given Sample we can obtain all the information regarding this sample properties, section properties where this sample is taken and the species properties found in this sample. If we choose a Species we can find all the

information for this Species Properties, the Samples properties where this species is found and the section properties where these samples are taken. If we choose an Author we get all the information for the Species of this Author, the Samples where these species are found and the sections where these samples are taken. All this information can be printed by clicking the “Print Preview” button in every page of the Forms: Search by Section, Search by Sample, Search by Species or Search by Author, or the “Print Preview All” button, in the top of these Forms. Print Preview button is connected with many different reports, such as reports about Section Properties, Sample Properties or Species Properties. If we want all this information in one report, we can click “Print Preview All” button.

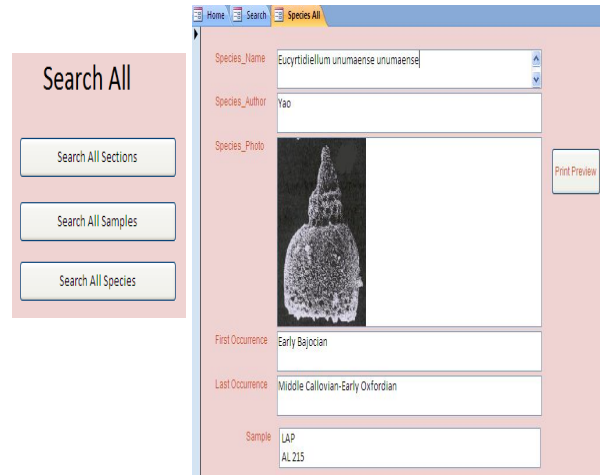


Fig. 10 Search All.

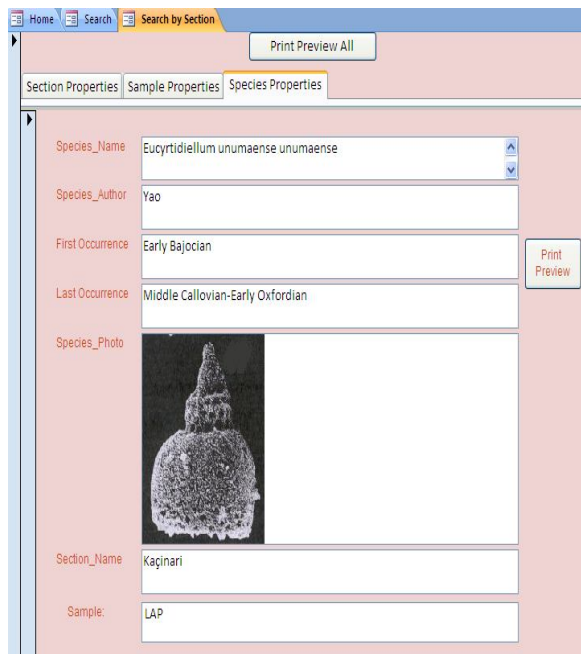


Fig. 9 Search by Section.

In the Search All (Fig. 10) we can find information about all the data related with Sections, Samples or Species. They can also be viewed in the report view, and then printed.

In the Search By Age (Fig. 11), by choosing a given interval time in two combo boxes, we can obtain two different information: data coinciding with this interval time and data including this interval time. Three combo boxes display all the sections, samples and species which have this exact interval time and three other combo boxes display all the sections, samples and species which include this interval time. For more information, by clicking the “Print Preview Simple” button, we can obtain all the data regarding the selected interval time.

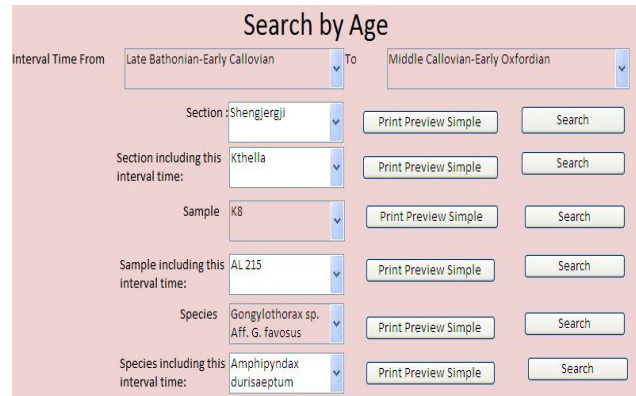


Fig. 11 Search by Age.

Finally, this database is connected to the geographical map of Albania. By clicking the section name in the map (Fig. 12) we can find all information about this section (Section Properties, Sample Properties and Species Properties). This data can be easily printed.



Fig. 12 Geographical Map of Mirdita Region (Central Albania).

4. Conclusions

This database is designed to manage all the data regarding the radiolarian assemblages from the Jurassic Cherts of Albania. It creates the possibility to add and edit data from different users in a simple and friendly way, by using the interactive forms. Furthermore, we can use different queries to find every needed information. The data obtained from the chert sections, by simply clicking in the map, contributes to better understand the picture of siliceous deposition in Albania.

The aim of this work is focused in analyzing the data regarding the occurrence and abundance of different radiolarian forms belonging to the Jurassic cherts of Albania. The data reported from the age of the chert sections indicate that about 90 % of examined samples can be attributed to the 5-7 U.A.Z (latest Bajocian –early Bathonian to late Bathonian- early Callovian interval time), [1], [2]. Considering the radiolarian assemblages for this interval time, we reported the list of radiolarian species in order of their occurrence:

1. *Saitoum levium* De Wever (present in 38% of samples)
2. *Protunuma turbo* Matsuoka (present in 36% of samples)
3. *Tettysetta dhimenaensis* s. l. Baumgartner (present in 36% of samples)
4. *Eucyrtidiellum unumaense* s. l. (Yao) (present in 28% of samples)
5. *Striatojaponicapsa conexa* Matsuoka (present in 26% of samples)
6. *Sethocapsa funatoensis* Yao (present in 26% of samples)
7. *Acanthocircus suboblongus* s. l. Yao (present in 26% of samples)
8. *Stichocapsa robusta* Matsuoka (present in 24% of samples)
9. *Dictyomitrella* (?) *kamoensis* Mizutani & Kido (present in 24 % of samples)
10. *Unuma* sp. A ne Baumgartner et al., 1995 (present in 24 % of samples)
11. *Protunuma* (?) *ochiensis* Matsuoka (present in 22% of samples)
12. *Stichocapsa japonica* Yao (present in 22% of samples)
13. *Striatojaponicapsa plicarum* s. l. Yao (present in 22% of samples)
14. *Transhsuum maxwelli* gr. (Pessagno) (present in 22% of samples)
15. *Stichocapsa convexa* Yao (present in 18% of samples)
16. *Stylocapsa oblongula* Kocher (present in 18% of samples)
17. *Bernullius cristatus* Baumgartner (present in 16% of samples)
18. *Archaeodictyomitra* (?) *amabilis* Aita (present in 14% of samples)
19. *Eucyrtidiellum ptyctum* (Riedel & Sanfilippo) (present in 14 % of samples)
20. *Eucyrtidiellum unumaense unumaense* (Yao) (present in 14% of samples)
21. *Guexella nudata* (Kocher) (present in 14 % of samples)
22. *Striatojaponicapsa tetragona* Matsuoka (present in 14 % of samples)
23. *Eucyrtidiellum unumaense pustulatum* Baumgartner (present in 12 % of samples)
24. *Theocapsomma cordis* Kocher (present in 12 % of samples)
25. *Zhamoidellum ventricosum* Dumitrica (present in 10% of samples)
26. *Unuma latusicostatus* (Aita) (present in 10 % of samples)

In previous papers [6], we mentioned the coexistence of several radiolarian forms of the Kalur Cherts of Albania, which are widespread in the Jurassic radiolarian cherts of Japan, with species typical of the Tethyan successions of the Perimediterranean area.

The radiolarian assemblages of species listed above indicate that the major part of them are typical of the chert successions of Japan; the other part are widespread in the chert sections of the Perimediterranean area. This data can confirm the hypothesis about the existence of a connection between the “Eastern Mediterranean“ section of the Tethys and the Jurassic basins of Japan.

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