

Palynology of the Abderaz Formation in Hamam Ghaleh in Kopet Dagh sedimentary basin

Moradian, Fatemeh. Allameh, Mohsen

Department of geology, Faculty of sciences, Islamic Azad University, Mashhad branch, Mashhad, I.R.Iran

Abstract

Kopet Dagh sedimentary basin is located in the NE of Iran and is like as inter continental basin which there are sediments with the thickness about 6000 m in it. Abderaz Formation is in Kopet Dagh basin which is consists of limy-shales, marly-shales and limy bonds, we could identify 52 genus and 85 species of dinoflagellates. Abderaz Formation is located in two interval superzones: Conosphaeridium striatoconum interval superzone & Odontochitina porifera interval superzone. Age of Abderaz formation is Late Turonian-Early Santonian.

Discussion

Kopet Dagh sedimentary basin is located in the NE of Iran and is one of the most important sedimentary basins in this country. This basin encompasses 3.3% of the whole area of the country. Moreover, a wide part of Turkmenistan and the North of Afghanistan are belonging to this basin. Kopet Dagh sedimentary basin is a sedimentary troff which created after the early Cimerian orogeny and the sedimentary deposition is continued in it from Jurassic to Tertiary. The depth of Kopet Dagh sedimentary basin was changing constantly during cretaceous period because of tectonic movements and the cretaceous sea was retrograding and prograding continually. These changes led to deposit of different lithologies during this period in Kopet Dagh basin.

For palynological studies, 44 samples were gathered from Abderaz Formation and 270 slides were prepared in laboratory. The organic contents of palynological slides are including of palynomorphs, Structureless Organic Matters (SOM) and palynomacerals. Dinoflagellates are the most important and abundance palynological elements in Abderaz Formation. We could recognized 52 genus and 85 species of these cysts in this formation. Most of their forms are chorate, cavate and a few are proximate. Dinoflagellates are unicellular eukaryote planktons that are mainly marine and can appear on the surface of water as mobile cellules. They can feed into two ways: heterotrophic & autotrophic. The most important dinoflagellates of Abderaz Formation are as follow:

Achomosphaera ramulifera , *A. regiensis* , *Andulusiella mauthei* , *Apteodinium deflandre*, *Batiacasphaera rugulata*, *Cannosphaeropsis utinensis*, *Catastomocystis spinosa*, *Chatangiella biapertura* , *C. micracantha*, *C. porosa*, *C. tripartita*, *C. victoriacne*, *Chalamydophorella ambigua*, *Circulodinium distinctum*, *Cleistosphaeridium clavulum*, *C. multifurcatum*, *C. solidum*, *C. striatoconum* ,*Coronifera oceanica*, *C. steriolata*, *Cribroperidinium aceras*, *C. orthoceras*, *Cyclonephelium compactum*, *C. sp.*, *Cymososphaeridium benmorense*, *C.validum*, *Dapsilidinium varrenii*, *Dinogyminium acuminatum*, *D. cretaceum*, *D. longicorne*, *D. nelsanense*, *D. sibiricom*
Disphira macropylla, *Endoscrinium campanula*, *Exochosphaeridium phragmites*, *Florentinia daenei*, *F. mantellii*, *Froma fragilis*, *Glaphyrocysta retintexta*, *Gonyalocysta orthoceras*,

Heterosphaeridium heterocanthum, *Hystrichodinium palchrum*, *Hystrichosphaeridium bowerbankii*, *H. conispinum*, *H. recurratum*, *H. tubifrum*
Impagidinium crestatum, *Isabelidinium cretaceum*, *I. foucherii*, *I. glabrum*, *I. plucidum*,
Kleithriasphaeridium secatum, *K. tubulosum*, *Manumiella cflata*, *Microdinium reticalatum*,
Odontochitina coastata, *O. operculata*, *O. porifera*, *O. spinosa*, *O. sp.* *Oligosphaeridium*
albertence, *O. complex*, *O. pulcherrimum*, *Palaeohystrichophora infusorioides*,
Palaeocystodinium bulliforme, *Palaeoperidinium cretaceum*
Palambages morolusa, *Pervosphaeridium intervelum*, *P. monasteriense*, *P. truncigerum*,
Protoellipsodinium touile, *pterodinium aliferum*, *Raphidodinium facatum*, *Spinidinium*
echinatum, *Spiniferites perforatus*, *S.pesadoforcatus*, *S. ramsus*, *S. twistringiesis*,
Surculsphaeridium longiforcatum, *Tanyosphaeridium variecalamus*, *Thalasiphora pelagica*,
T.delicata, *Trithyrodinium suspectum*, *Xiphophoridom alatum*, *Xenascus ceratoides*

The investigation of dinoflagellates diversity of Abderaz Formation shows that dinoflagellates are very diverse especially in upper part of the formation. This diversity is accompany with progredation of sea level and shows that the water was contain of high oxygen rate and feeding matters which are necessary for dinocycets grow up. Also in addition to suitable product conditions, environmental conditions for dinoflagellates conservation were suitable. These conditions reduced toward the end of formation and the species diversity was going to reduce when the sea level was retrograding(Ghasemi- Nejad, et al,1990).

Shale samples are contain of high species diversity and also the shale beds which are consist of high percentage of limy and marly shales have the lowest diversity of species. It shows the effect of lithology which is related to conditions changing of sedimentary environment. Abderaz Formation is located in two interval superzones: *Conosphaeridium striatoconum* interval superzone & *Odontochitina porifera* interval superzone. The age of *Conosphaeridium striatoconum* interval superzone is upper turonian-lower santonian and is contain of index species such as follow: *Achomosphaera ramulifera*, *Achomosphaera regensis*, *Circulodinium distinctum*, *Florentinia mantelli*, *Odontochitina coastata*, *Spiniferites poros*, *Spinidinium echinatum* and also the age of *Odontochitina porifera* interval superzone is santonian-lower campanian (Helby ,et al ,1987) and is contain of index species such as follow: *Apteodinium deflandre*, *Chatangilla decorsa*, *Chatangilla porosa*, *Chatangilla williamsii* which Abderaz formation is located in the primary parts of this superzone.

Index dinoflagellates are one of the most important factors in paleo sedimentary environment analysis (Bombardiere,Gorin , 2000). Chorate dinocycets with long processes which are index of environments far from the shore increased in sea level In samples No: 2, 6, 10, 18, 25, 26, 28, 29 and 37 the followed genus are maximum: *Surculsphaeridium*, *Spiniferites*, *Oligosphaeridium*, *Cymososphaeridium*, *Tanyosphaeridium* and *Florentinia*. Some dinoflagellates without any processes which are the index of shore and near to shore environment decreased in sea level in samples No: 4, 8, 11, 12, 13, 14, 15, 16, 17, 19, 20, 24, 27 and 31 the followed genus maximum: *Glaphyrocysta*, *Palaeoperidinium*, *Spinidinium*, *Aoteodinium* and *Dinogymnium*.

Conclusions

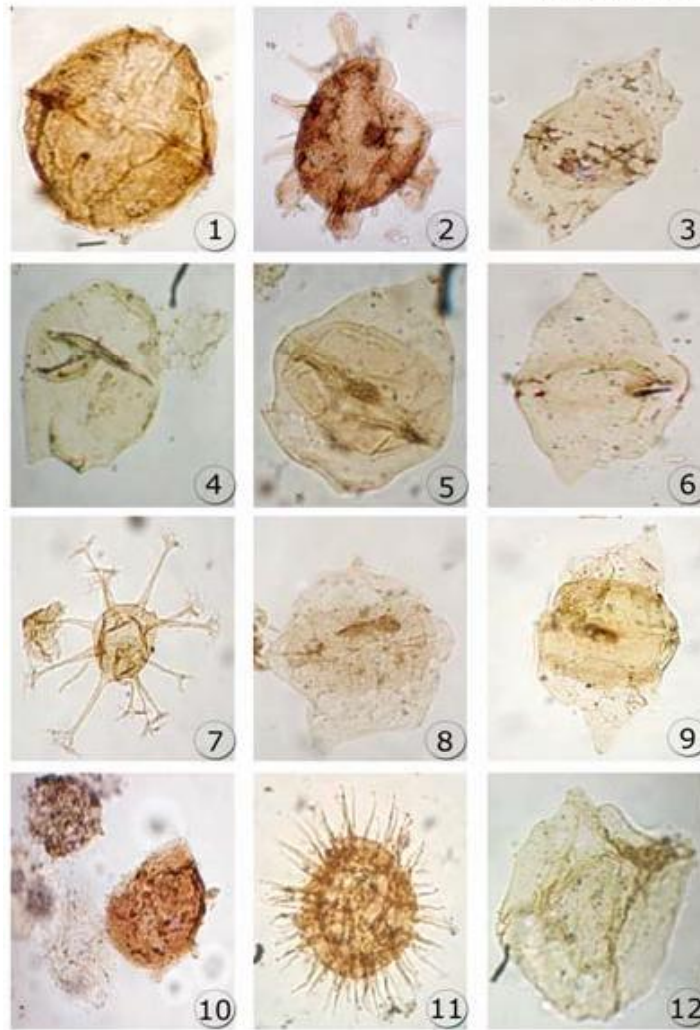
52 genus and 85 species of dinoflagellates are identified in this formation. This formation is located between two interval superzones: *Conosphaeridium striatoconum* & *Odontochitina*

porifera. . Age of Abderaz formation is Late Turonian-Early Santonian. According to the study on environmental index dinoflagellates, open marine environment with low depth and various energies is considered for Abderaz Formation.

References

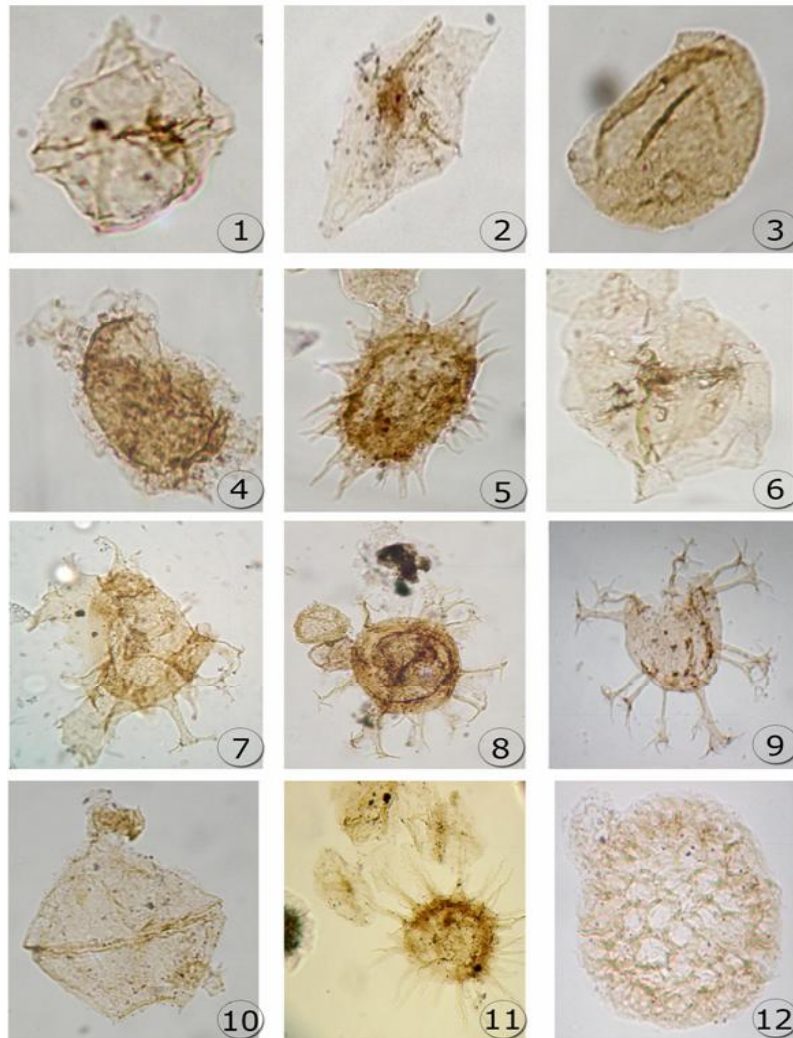
- Bombardiere, L.; Gorin, G.E.; 2000. Stratigraphical and distribution of sedimentary organic matter in Upper Jurassic carbonates of SE France, *Sedimentary Geology*, 132:177-203.
- Ghasemi-Nejad, E.; Sarjeant, W.A.S.; Gygi, R.; 1990. Palynology and Paleoenvironment of the uppermost Bathonian and Oxfordian of the Northern Switzerland sedimentary basin, *Memorie Svizzere di paleontologia*, Vol:119. 62p.
- Helby, R.; Morgan, R.; Partridge, A.D.; 1987. A palynological zonation of the Australian Mesozoic In: JELL.P.A.(Editor): *Studies in Australian Mesozoic Palynology Association of Australasian Palaeontologists, Memoir*,4:1- 94.
- Islam, M.A.; 1983. Dinoflagellate cyst taxonomy and biostratigraphy of the Eocene Bracklesham Group in the South England, *Micropalaeontology*, Vol 29:328-353.
- Mahmoud, M.S., Moawad, A.R.M.M., 2000. Jurassic-Cretaceous (Bathonian to Cenomanian) Palynology and stratigraphy of the west Tiba-1 borehole, Northern Western Desert Egypt, *Journal of African Earth Science*, 30:401-416.
- Sarjeant, W.A.S.; 1985. A Restudy of some dinoflagellate cyst Holotypes in the university of Kiel collections. Late Cretaceous Dinoflagellate cysts and other palynomorphs in the OT TO Wetzel collection., *Meyniana* 37:129-185.
- Schioler, P.; Wilson, G.J.; 1998. Dinoflagellate biostratigraphy of the middle Coniacian-Lower Campanian (Upper Cretaceous) in South Marlborough, NEW Zealand, *Micropaleontology*, Vol 44:313-349.
- Skupien, P.; 2003. Dinoflagellate study of the Lower Cretaceous deposits in the Pieniny Klippen Belt. Rochovica section, Slovak Western Carpathians. *Bulletin of the Czech Geological Survey*, Vol 78:67-82.
- Tocher, B.A.; Jarvis, I.; 1994. Dinoflagellate cyst distribution from the Lower Turonian (Upper Cretaceous) of ports, Indre-et-Loire, *Bull. Inf. Bass. paris*.31:13-23.
- Van Der Zwan, C.J.; 1990. Palynostratigraphy and palynofacies reconstruction of the Upper Jurassic to Lowermost Cretaceous of the Dra field, offshore Mid Norway. *Review of Palaeobotany and Palynology*, 62: 157 - 186.

PLATE 1



1.Cribroperidinium aceras 2.Pervosphaeridium truncigerum
3.Chatangiella tripartita 4.Manumiella sp. 5.Isabelidinium cretaceum
6.Isabelidinium glabrum 7.Cymososphaeridium benmoreense
8.Chatangiella ditissima 9.Isabelidinium pllucidum 10.Circulodinium
distictum 11.Cleistosphaeridium clavulum 12.Endoscrinium
campanula.

PLATE 2



1.Eucladinium spinosissimum 2.Spinidinium clavus 3.Canningia colleveri
4.Cyclonephelium compactum 5.Pervosphaeridium intervalum
6.Trithyrodinium suspectum 7.Xenascas ceratoides 8.Spiniferites ramsus
9.Cymososphaeridium validum 10.Palaeoperidinium cretaceum
11.Pervosphaeridium monasteriense 12.Palambages morolusa.