rare earth element geochemistry of rocks from the above five volcanic centres, showed that the lavas from the back-arc volcanic centres of the Aegean (i.e. Kalymnos, Patmos and S. Chios) exhibit some similarities but also important differences to those from the volcanic centres of Nisyros and Kos, which form the eastern sector of the Aegean volcanic arc.

The lavas from all the five volcanic centres show a high enrichment in LIL relative to HFS elements and negative Nb and Ti anomalies, characteristics of subduction related magmas. The LILE/HFSE ratios are lower for the rocks from Nisyros and Kos, while they are significantly higher for tha back arc volcanics with the highest ratio shown by the Patmos K-rich lavas.

All the lavas, show a LREE relative to the HREE enrichment which is also higher for the back-arc volcanics than for the lavas from Nisyros. The highest LREE/HREE ratio, like the LILE/HFSE ratio, is shown by the Patmos K-rich lavas.

Ploting all the lavas on the Ba/Zr vs. Ce/Zr and Ce/Nb vs. Th/Nb diagrams it is clear that the parental magma of each of the volcanic centres has been developed as a mixture of an arc-like source component and a small but important N-type MORB source component. The contribution of each source in the formation of the parental magmas depends on the position of each volcanic centre, as the extension of the Aegean lithosphere and the depth to the asthenosphere varies spatially and temporally. The variety of the petrographic types occuring in each of the volcanic centres can be attributed to fractional crystallization processes under varying conditions from centre to centre.

PALEOGEOGRAPHICAL AND PALEOCOLOGICAL CHARACTERISTCS OF SARMATIAN IN SERBIA

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During the Sarmatian the greatest part of northern Serbia belonged to the large marine area-Paratethys.

Both intensive and extensive subsidences in the early Badenian were followed by a relatively quiet interval through the Badenian and lower Sarmatian. However, the generally quiet interval included new subsidences of the early Sarmatian in parts of northern Shumadides and Moravides. The subsidences provided for expansion of marine (brakish) areas to the south into the realm of Badenian dry land (Kragujevac and Paracin-Kruševac gulfs of the Velika Morava basin).

In the area of Paratethys during the Sarmatian two large provinces existed: Pannonian and Dacian with a number of marine basins and gulfs within their realms.

In a part of the Pannonian region (territory of Serbia) one can recognize several paleogeographical units: Kolubara Basin, Baograd and its environment, Sopot Canal, Vencac-Arandelovac Canal and Velika Morava Basin.

In the Dacian region the large Sarmatian sea flooded the north of eastern Serbia (Negotin-Štubik gulf). Marine regime was remarkably regressive in this region. Sarmatian time left no traces in the Zajecar-Negotin gulf, which existed during the Badenian.

For a reconstruction of life conditions that prevailed during the Sarmatian, a study has been made of systematic composition of fauna, ecological composition of fauna, ecological characteristics of the most common genera or associations, relations between organisms and characteristics of sediments.

Based on this study, an attempt is made at reconstructing the life conditions during the Sarmatian, for each basin, and at drawing paleoecological conclusions for the entire province (Pannonian and Dacian).

The conditions under which Sarmatian sediments were deposited, in spite of great lithofacial and faunal diversities and existence of several sea basins, were similar in the whole of the Pannonian domain. They are briefly described as follows:

1. Sarmatian sea was shallow and had loose (clay mud) or rocky bottom. The latter is indicated by sets of ostrean beds, and the fish *Scorpeana* living at rocky coasts and drilling rocks with its teeth. The loose overgrown bottom is indicated by herbivorous gastropods: *Pirenella, Cerithium, Hydrobia, Gibbula* etc., and pelecypods *(Irus, Mactra, Ervilia* etc) which buried themsevles into loose soil. Most of the fishes were also associated with the littoral zone, as indicated by their morphological characteristics. Elongated and laterally flattened body of the fish is indicative of the littoral environment with mud-clay bottom *(Trachinus, Atherina, Mullus)*, or a plant-grown bottom *(Mugil, Gobius, Bodianus)*. The presence of flat-fishes *(Rhombus, Solea, Microchirus)* is another indication of shallow sea. Continental plant remains, found together with brackish fauna also indicate the closeness of the coast.

2. A high percent of fauna is brackish in character. The presence of typical marine organisms, however, together with brachynaline and euryhaline, and fresh-water ones, indicates significant water regime variations (salinity) in the Sarmatian.

3. Climate in the Sarmatian was warm and rather arid, which caused increased heating of the shallow water column and higher concentration of calcium carbonate in water. The evidence of the increased calcium carbonate are sets of ostrean beds. For construction of large massive skeletons, ostrea needs large amounts of calcium carbonate. Warm sea is indicated by an abundance of fish, recent representatives of which are inhabiting warm or moderate seas. Bryozoan-serpulid reefs could have been

formed only in warm water. Finally, vegetation of the adjacent land: *Cynamomun, Ulmus etc. is the vegetation of a warm climate.*

Unlike the Pannonian Province, where Lower Sarmatian is predominant (Middle Sarmatian only partly developed), the Dacian Province includes all three divisions of the Sarmatian: Lower, Middle and Upper. Palaeoecological features of the two provinces, however, are very similar, like those in the Badenian. Sarmatian sediments of the Dacian Province were also formed in a shallow and warm sea.

Significent data about characteristics of a climate and life environments on land in the early Sarmatian, besides vegetation, are obtained from fossil land mammals. In the succession of Tertiary mammal fauna, during Badenian and Volinian, the Prebreza-fauna exists which may be correlated with Chios-fauna in Greece and Platybelodon-fauna in Asia. The structure of Prebreza-fauna shows that even in the early Sarmatian, steppes and savannas prevailed in these areas. Numerous diverse highly specialized bovids *(Hypsodontus, Eotragus etc.) point to that, as well as accompanying steppe predators* (*Gobicyon, Crocuta* etc.). Still, besides steppe ones, forrest inhabitants are also found there *(Anchitherium, Listriodon etc.)* which had a predominant role in the previous, Angustidens-fauna. Out of the steppe-savanna part of the Prebreza fauna, a new, even richer, steppe Hipparion fauna will have been developed, which will have migrated south and will have dominated duning Mio-Pliocene (Pickermi-fauna).

KINEMATIC ANALYSIS AND TERTIARY EVOLUTION OF THE PINDOS-VOURINOS OPHIOLITES (EPIRUS-WESTERN MACEDONIA, GREECE)

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Pindos and Vourinos ophiolites are continuous at depth below the Meso-Hellenic Trough and represent fragments of the destroyed oceanic lithosphere of Neo-Tethys. Kinematic analysis of the structures was carried out using shear criteria and Kinematic indicators, in order to distinguish the tectonic features of the successive events that affected both Pindos and Vourinos ophiolites. Field data, mainly striated faults, computed using numerical methologies (quantitative analysis) is an approach to define the strain ellispoid for each tectonic event.

Stretching lineations observed in the amphibolites of Pindos metamorphic sole, as well as in the Vourinos ophiolite and the underlying carbonates, are remained elements of the initial emplacement of the ophiolites but they are not associated with the significant kinematic indicators for the sense of the emplacement movement. Tertiary evolution started in Late Eocene time with a compressional, folding, thrusting and