onto the Eocene Pindos Flysch. The dismembered units of the Koziakas are unconformably overlain by the Oligocene-Miocene molasse of the Mesohellenic trough.

In the Koziakas massif, at the top of the "Pelagonian" succession, three ophiolitic tectonic units crop out:

a) the "Mélange and Fourka Units". At the base of the Fourka Unit scattered outcrops of ophiolite-bearing mélange are exposed. The Fourka Unit consists of thrust sheets and blocks of pillow lavas locally covered by radiolarian cherts.

b) an "Ophiolite Unit", consists of slivers of sheared serpentinites, locally containing dunite bodies, plagiogranite and boninite dykes.

All volcanic rocks studied herein come from the "Fourka Unit" and consist of basalts and basaltic andesites. Six samples display a clear alkaline affinity and are similar to the alkaline within-oceanic plate (WPB) and are interpreted to have generated in a seamount setting. Two samples display similarities with enriched MORB (E-MORB) and are interpreted as formed from a N-MORB type mantle source slightly enriched in a plume component during the early stage of oceanic spreading or in an off-axis oceanic setting.

We examined 32 samples for radiolarian analyses. The assemblages of the samples collected near the WPBs indicate Middle and Late Triassic age, while the radiolarites collected near the E-MORBs indicate Late Triassic age.

The occurrence of Late Triassic WPBs and E-MORBs points to the existence of an oceanic setting in which the N-MORB asthenospheric source was influenced by a plume-type component and resulted in the off-axis eruption of enriched alkaline basalts and enriched MORB-type basalts. This conclusion is in agreement with similar results obtained from other sectors of the Hellenide ophiolites. During the post-Late Jurassic compressive tectonic phase, which affected the Internal Hellenides, the Mélange and Ophiolitic Units tectonically overthrusted the "Pelagonian" continental margin represented by the sedimentary units of the Koziakas Massif. During the post-Late Eocene compressive tectonic phase all these units were refolded and thrusted southwestwards onto the Eocene Pindos Flysch.

Water ages in thermal system of Podhale Basin, Inner Carpathians, southern Poland

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Fissured and karstified Eocene and Mesozoic carbonate formations of the Podhale Basin represent the largest reservoir of renewable thermal waters in Poland. They outcrop in the Tatra Mts. at altitudes of 1 000-1 800 m and deep to the north under the flysch formations of the basin. The main direction of flow is to the north for abt. 15 km where the impermeable formations of the Pieniny Klippen Belt divides it and diverts to the west and east, and next to the south to the Danube watershed in Slovakia. The temperatures range from abt. 20° C near the outcrops to abt. 85° C at the most northern wells. For a better understanding of the flow pattern, environmental isotopes ($\delta^{18}O$, $\delta^{2}H$, ^{3}H, ^{14}C, $\delta^{13}C$) have been used since early seventies and recently also gaseous tracers (He, Ne, Ar and SF_6) under the grant No N 525 402334 from the Ministry of Science and Education.

The C^{14} data of thermal waters change from 37 to 0 pmc with $\delta^{13}C$ from abt. –5 to 0‰; exhibiting the influence of isotopic exchange with carbonate minerals, which makes the quantitative dating difficult. The $\delta^{18}O$ and $\delta^{2}H$ are similar to those of modern waters in springs and wells with cold water, with several exceptions characterized by shift of $\delta^{18}O$ to heavier values, which are caused by isotopic exchange with carbonate minerals. The isotopic altitude effect was estimated form the data of springs and wells within the Tatras area. For $\delta^{2}H$, the mean altitude of recharge area reads: h_2 (m a.s.l.) = $–69.1 \cdot \delta^{2}H – 4054$, with the uncertainty of about 100-200 m. The most negative $\delta^{2}H$ values of thermal waters are similar to the values observed for large karstic springs in the Tatras, which may suggest their Holocene age. However, the spatial distribution of $\delta^{2}H$ values indicates that close to the recharge area, the thermal waters are similar to those of medium springs discharging at the

lowest altitudes. Thus, the most negative δ^2H values of thermal waters observed far in the basin most probably result from recharge under cooler climatic conditions. Very high He excess contents and negative noble gas temperatures (NGT) derived from Ne and Ar concentrations are in agreement with such interpretation. The lack of ^{14}C and $\delta^{13}C$ values close to 0‰ in these wells also confirms that hypothesis.

Tracer data indicate the presence of the oldest waters in the north-eastern part of the basin whereas in the western part the exchange of water is faster by one to two orders of magnitude. That unexpected flow pattern most probably results both from the presence of some karstic channels in the western part, which enhance regional permeability, and from obstacles to horizontal flow caused by fault zones in the eastern part.

Crystallization conditions of the Xanthi Plutonic Complex (Rhodope Massif, Northern Greece): Geothermometry and geobarometry

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The Xanthi Plutonic Complex (XPC) is one of a series of Oligocene subduction-related plutonic bodies comprising an "acid" group and a "basic" group. Based on mineral compositions and assemblages of the "basic" group, the XPC is assumed to have originally crystallized at a pressure of 5.4 kbar and at a temperature of 1300^{o}C under relatively dry conditions and oxygen fugacity (fO_2) near the NNO buffer. As the basic magma migrates to shallower levels and at a temperature of about 870^{o}C, water content increases and oxygen fugacity moves towards the MH buffer. The increase of water content could be the result of open system evolutionary processes. The "acid" group crystallizes at an average temperature of 729^{o}C and at a pressure of 0.7 kbar under oxidizing conditions, between the NNO and MH buffer, suggesting a possibly different origin and/or evolution for the "acid" group.

The assessments of favorable UV conditions for human health over northern Eurasia

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UV radiation can have both positive and negative influence on human health. According to the classification of biological UV resources proposed by Chubarova (2007) we define favourable UV conditions as the conditions, when it is possible to get vitamin D3 at noon within an hour but when at the same time the UV index does not reach the high UV category. Different methods were used to estimate the thresholds for generating the vitamin D3 in the skin. One method was based on the approach, which has been proposed by Holick and Jenkins (2003), and another one was based on the recommendations given in the CIE 2006 publication. We compared both approaches by evaluating and comparing the year periods with the conditions favourable for vitamin D3 production. The periods were obtained through the calculation of biologically active irradiance using the TUV model with the 8 stream DISORT solver, and some other modifications described in Chubarova (2006). According to our estimates in midlatitudes the application of the second method leads to the increase in day number (approximately 18 days), when it is possible to get the vitamin D3 in clear sky conditions. It is necessary to emphasize that this difference takes place mainly due to the different thresholds of the skin exposure area recommended in these approaches, since both erythemally-weighted and vitamin D3 irradiance have similar absolute values at noon in spring and autumn, when a "jump" from unfavourable to favourable conditions and back for vitamin D3 production occurs. We have also revealed a large difference in sensitivity of erythemally-weighted and vitamin D3 irradiance to the changes in solar zenith angle, total