The geochemistry and petrogenesis of volcanic rocks within ophiolitic formations at the Northeast Othris Region, Greece

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Volcanic rocks from ophiolitic formations in northeast Othris region are categorized based on their geochemical characteristics in two distinct groups. The first includes volcanic rocks from the ophiolitic formations of Eretria and Velestino, which, as their immobile element chemistry and geochemical plots indicate, seem to have formed in an N-MORB environment with 5-15% partial melting of a fertile or moderately depleted mantle source and extensive fractional crystallization processes. The second group is exclusively from the ophiolitic formation of Aerino having rocks with generally higher MgO contents, subduction related features (e.g. low Ti/V<10) and having been derived from a highly depleted mantle source but with similar partial melting degrees (10-20%). These differences may reflect an evolution from an earlier MORB to a latter IAT volcanism within the same oceanic basin or correspond to two separate oceanic environments.

Database of geomagnetic induction vectors across the Carpathians and modelling of the regional conductivity distribution

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Study of the geoelectrical structure of the Carpathians has a long history. The first induction studies performed in the late fifties revealed reversals in orientation of the geomagnetic induction vectors. Untill the nineties, geoelectric groups from former Czechoslovakia, Poland, Hungary, Ukraine and Romania carried out a series of deep induction experiments and covered the whole Carpathian region by number of field stations clustered along profiles crossing the Carpathian arc. The collected long period electromagnetic induction data made it possible to map the surface trace of the Carpathian geoelectrical anomaly and to estimate the depths range and conductivity of the causative electrical conductor in the crust. Various methods were applied to model the electrical structure beneath the Carpathians. Based on a compilation of previous results as well as on our original modelling experiments we present a generalized conductivity model of the Earth's crust of the western, northern and eastern parts of Carpathians. Electromagnetic induction data from the period range of 400 to 6000 s collected on the territory of former Czechoslovakia, Poland, Hungary and Ukraine were used to study the crustal structure of the electrically anomalous zone. Along several profiles, magnetotelluric data were acquired which provided information on the directional properties of subsurface structures and on their directionality. 2D electrical cross-sections along the magnetotelluric profiles were constructed by stitching formal 1D anisotropic inverse models obtained from complete magnetotelluric impedance tensors and, further, by employing the 2D REBOCC inversion procedure. The obtained models were used as pilot conductivity distributions for a subsequent quasi 3D modelling. 3D modelling and inversion aimed at fitting the geomagnetic induction data across the whole area by a regional distribution of the integrated electrical conductivity (conductance) and was carried out by applying a thin sheet approximation of the crustal structures as well as by utilizing results of numerical simulations of the horizontal magnetic