Trend analysis of surface longwave and shortwave radiation over Europe

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The results of a detailed trend analysis of surface longwave and shortwave radiation over Europe are presented on a basis of data from the ISCCP project (International Satellite Climatology Cloud Project). The ISCCP FD SRF dataset includes spatially and temporally homogenized up-welling and down-welling longwave (LW = 5.0-200.0 microns) and shortwave (SW = 0.2-5.0 microns) radiation estimates coming from the synergistic use of satellite data and models. The area of interest, Europe, consists of equal area grids with a spatial resolution of equatorial 2.5x2.5 degrees (280 km^2). The temporal resolution of the data is 3 hours while the dataset spans from January 1984 to December 2007. In order to study the long-term variations of the longwave and shortwave radiation, monthly mean values of the above mentioned period were considered. A statistical analysis is applied to derive trends and seasonal variability for this time period over Europe. To fit the time series, a model with a linear trend and a seasonal component for the annual cycle of radiation has been used. The seasonal component is estimated by a harmonic analysis. The significance of the longwave and shortwave radiation trend is also determined. As it is shown here, the observed trends and their significance are rather variable for different areas in Europe.

Mantle source characteristics of Late Miocene-Pleistocene alkaline basalts, western Pannonian Basin, Austria

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Late Miocene-Pleistocene alkaline mafic magmas were erupted in the Carpathian-Pannonian Region following the Eocene to Miocene subduction-related calc-alkaline volcanism. The lavas range from hy-normative basalts through alkali olivine basalts and basanites to nephelinites.

The majority of basaltic lavas are fresh, olivine-phyric and holocrystalline, whereas olivine is coupled by clinopyroxene phenocrysts in some samples. The olivine phenocrysts contain occasionally spinel inclusions. The matrix consists of plagioclase, clinopyroxene and olivine along with titanomagnetite, ilmenite, and apatite. Phlogopite, interstitial alkali feldspar, nepheline and leucite also occur in some of the lavas. In contrast, nephelinites are rich in clinopyroxene and nepheline and contain titanomagnetite in the groundmass along with subordinate amounts of olivine, apatite and leucite.

Olivines mg-numbers vary between 88-66. They are generally zoned and began to crystallize with Fo around 87 and 79. In the course of crystallization Fo decreases to 84-66 at the rims of phenocrysts being similar to Fo in the groundmass. The NiO of the olivines decreases with decreasing MgO content, while CaO and MnO increase.

Clinopyroxene compositions range from augite to diopside. They exhibit both oscillatory and sector zoning as a result of disequilibrium crystallization. The compositional difference between cores and rims follow the normal pyroxene fractionation trend; the cores are richer in Mg, Si and Cr and poorer in Fe, Mn and Ti than the rims. The majority of the clinopyroxenes have Al^{VI}/Al^{IV} (0.0-0.65) typical for low pressure clinopyroxene and support shallow level crystallization.

Most alkali basalt corresponds to the criteria for primitive rocks having high mg-number (>0.62), high MgO (>9 wt. %) and high Ni (>192 ppm) and Cr (>286 ppm). These