



Temporal and spatial variability of air temperature inversions over Europe based on ERA-Interim reanalysis

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Temperature inversion, which is defined as a phenomenon of increasing air temperature with altitude, seems to be an important feature of climate, as well as a critical factor affecting air quality and fog formation. The primary goal of this study is to investigate the temporal and spatial variability of air temperature inversions over Europe. It is based on the data derived from ERA-Interim reanalysis for the period of 1981-2015. The data consist of air temperature with 6-hourly sampling (00, 06, 12, 18 UTC) on 22 levels of the L60 model (i.e. from the surface to approx. 5.5 km AGL) and with horizontal resolution of $0.75 \times 0.75^\circ$. The study examines multiannual, seasonal and diurnal variability of the surface-based and elevated inversion based on their frequency, depth (ΔZ), strength (ΔT) and intensity ($\Delta T/\Delta Z$). Moreover, an attempt to determine the relationship between the abovementioned inversion parameters in selected regions was made. The results confirmed high seasonal and diurnal variability in occurrence of the surface-based inversions as well as elevated inversion with the base below 1 km AGL. The properties of the low-level inversions, i.e. the surface-based and elevated inversions with the base below 3 km AGL, were also characterized by strong spatial heterogeneity. It was related among others to the influence of the relief and the solar elevation differences in local time at different longitudes.