



## **Climatology of water vapor pressure conditions and muggy days incidence in Slovakia**

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In the field of theoretical climatology there has been a reasonable presumptions, now confirmed by empirical measurements, that air humidity and the content of water vapor in the atmosphere (throughout the troposphere) could have increased over the continents and the oceans as a result of global warming. Because of the fact that high-temperature weather and muggy weather present a serious threat to human comfort, economic development, water resources, and the environment, we can also assume that negative impacts on human society could progressively deteriorate in the future under the well-known temperature scenarios. In the paper we deal with temporal and spatial analysis of water vapor content in the atmosphere (using water vapor pressure data) as well as muggy weather incidence (when water vapor pressure is above 18,8 hPa) using continuous hourly humidity measurements at 15 selected automatic weather stations in Slovakia in the period of the last circa 20 years (1998-2016), and 1951-2016, respectively. Besides of analysis of daily and yearly climate regime of humidity we also focused on investigation of long-term changes and vertical gradient conditions of humidity within a boundary layer of the atmosphere (from 100 to 2500 m a.s.l.). The results are summarized as follows. Through the year, the maximum (minimum) of water vapor pressure occurs (with no respect to altitude) predominantly in July ([U+F07E] 7,0-17,0 hPa) and January ([U+F07E] 2,0-5,5 hPa) respectively. On average, the highest water vapor pressure and the most severe humidity conditions dominate in July, mostly in the southern and south-eastern Slovakia. On daily timescale there can be found less pronounced time dependent variations in air humidity with initial maximum in the morning (10-11 a.m.) and secondary maximum in the evening (8-9 p.m.) – predominantly in lowlands), and minimum through the night and early morning (5-6 a.m.). As expected, a significant vertical gradient (water vapor pressure decrease with increasing altitude) occurs within the summer months, especially in July (its average value: [U+F07E] -0,37 hPa every 100 m level increase). Over the period 1951-2016, apparent but statistically insignificant increase in total number of muggy days has been observed, especially in southern and eastern part of Slovakia. The years with the most number of such a days occurred in 2010, 2005, 2007 or 1957 and 1963. The extreme number of muggy days was recorded in 2010, which coincides with incidence of extreme amount of precipitation in the spring and early summer (the wettest year in history).