



## **LONG TERM TEMPERATURE CHANGES OVER POLAND FROM RADIOSONDE MEASUREMENTS SINCE 1961**

**Z. Litynska**, B. Kois and A. Jaczewski

Centre of Aerology, Institute of Meteorology and Water Management  
(Zenobia.Litynska@imgw.pl)

Long-term variations in the vertical temperature structure of the atmosphere play an important role in the detection of climate change. Over Poland, these changes can be studied with the available data from upper air stations at Legionowo, Leba, and Wrocław. For trend calculations, a multiple linear regression model, including the dependence on macro circulation patterns, was applied to monthly mean temperatures of the series 1961-2002 from the surface up to 200 hPa, and for the period 1979-2002 up to 50 hPa. Estimations of the temperature trends indicate accelerated warming of the boundary layer and free troposphere since 1979, exceeding 2K/decade for winter months. In the upper troposphere, the temperature trends reverse. At the tropopause negative trends for 1961-2002 can be observed throughout the year. Significant cooling at the heights 1-2 km around the tropopause has been stated. The maximum negative trend, exceeding -2K/decade for January, is related to the increase in the tropopause height. An enhanced subtropical advection over Poland in late autumn and early winter manifested itself by the increased occurrence of the multiple tropopause. At higher levels in the stratosphere, increasing cooling, reaching -2K/decade in cold season was observed. The acceleration of the cooling of the stratosphere has been stated since 1979. It can be attributed to large negative ozone trends observed on Legionowo soundings. The frequency of episodic intrusions of ozone depleted air masses from the cold Arctic polar vortex has increased over Poland since the early 1990s.