



The rotation vector of the Earth and the global temperature

P. Varga (1), E. Groten (2), G. Satori (1), J. Zavoti (1)

(1) Geodetic and Geophysical Research Institute, Sopron, Hungary, (2) Darmstadt

University of Technology, Institute for Physical Geodesy, Darmstadt, Germany

More than three years of continuous hourly GPS observations are investigated in terms of polar motion (PM) and length of day (LOD) in view of annual/sub annual variations. The Earth orientation parameters are compared with the global temperature derived from the electromagnetic phenomenon of Schumann resonance (SR). The SR is a global phenomenon measurable in a single point of the Earth's surface. Due to the fact, that all the atmospheric, oceanic and hydrological phenomena influencing the PM and LOD are connected to temperature changes, the study of the connection of the components of the Earth rotation vector with the Schumann resonance could help to understand the physical background of the annual/ sub annual changes in PM and LOD and can lead in the future to successful prediction of them on basis of the observations carried out in a single point of the Earth's surface. It was found that both the radial and the azimuthal components of PM are behind the SR by ~ 25 days. In the same time the results of comparison of SR data observed at the Nagycenk Geomagnetic Observatory with hourly LOD data show a clear maximum in case of the cross-covariance calculation, but the phase delay is not so doubtless than in the case of PM and seemingly it runs of about 200 days ahead the global temperature variations represented by Schumann resonance. The results of more detailed investigations indicate that complicated connection between the global temperature and LOD. The complicated shape of the cross-covariation curve of PM and LOD shows: these phenomena reacts not equally to the phenomena disturbing the Earth spin.