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FEATURES OF TEMPORAL CHANGES OF AIR TEMPERATURE IN GEORGIA (TBILISI) AND IN POLAND (WARSAW)

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We present preliminary results of temporal changes of a surface air temperature based on the monthly data in Tbilisi (Georgia) for the period of 1881-2013 and in Warsaw (Poland) for the period of 1781-2013. We show that global centenary warming in Tbilisi and in Warsaw (northern hemisphere) has the some peculiarities: a) an average global warming effect $\Delta C = \sim (0.95 - 1.10) \text{ C/per } 100 \text{ years}$ is observed in Georgia and in Poland for 1881-2013, b) a warming effect is about twice larger in winter season ($\Delta C \sim 1.50 \text{ C/per } 100 \text{ years}$) than in other seasons (average warming effect for these seasons $\Delta C \sim 0.71 \text{ C/per } 100 \text{ years}$) based on Tbilisi data; while by data of Poland the seasonal effect of the global warming is 2-3 times less. We recognize that a centenary warming is mainly related to the increase of solar activity (estimated by relative sunspot numbers (RSSN)); particularly, a time interval about 80 years (1885-1965), when a correlation coefficient $r = 0.82$ between RSSN and T, solar activity contributes decisively in the global warming ($\Delta C \sim 1.10 \text{ C/per } 100 \text{ years}$). For Last 40-50 years (1960- 2013), when human activities increased significantly, a global warming effect almost equals zero ($\Delta C \sim 0.05 \text{ C/per } 100 \text{ years}$). We show that a global warming effect equals zero based on data of Poland for period 1781-1881, when human activities were relatively less than in 1881-2013. Thus, we show that a role of human activities in creation of global warming is to question based on temperature data in Tbilisi and in Poland for period of 1881-2013. Additionally, it is worth to mention about a feeble ~ 22 -year periodicity recognized in changes of T by Tbilisi data, most likely related with the 22-year solar magnetic cycles. Generally, changes of global temperature associated with climate needs more fundamental studies.

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