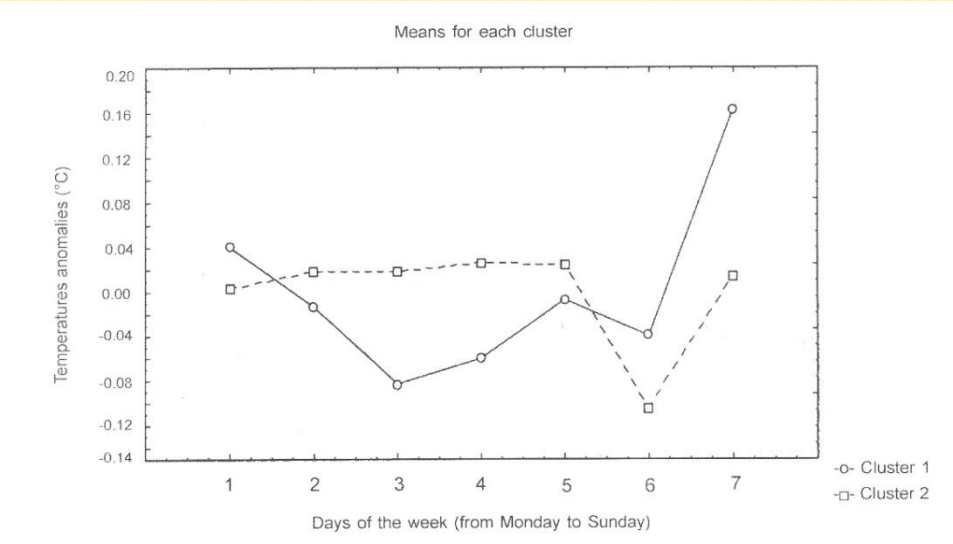
WEEKLY VARIATIONS OF THE PARAMETERS OF THE AMBIENT ENVIRONMENT

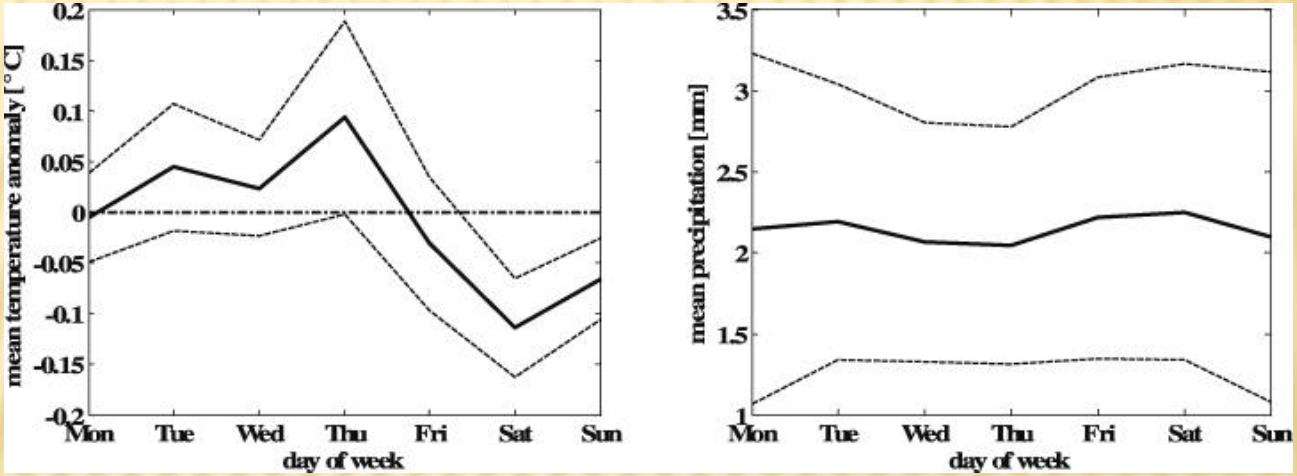
Anna Soina, Alex Paznuhov, Andry Koloskov, Y.M.Yampolsky

Institute of Radio Astronomy National Academy of Science of Ukraine

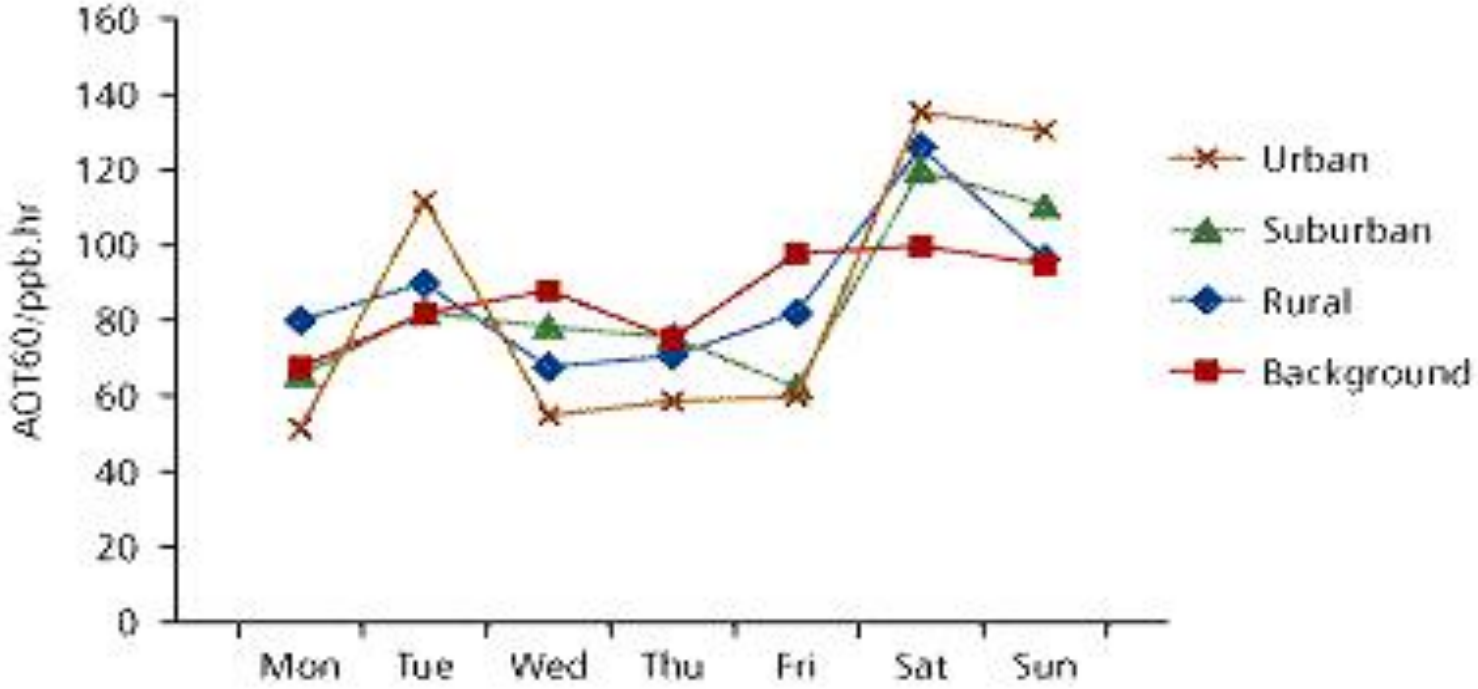
Kharkov



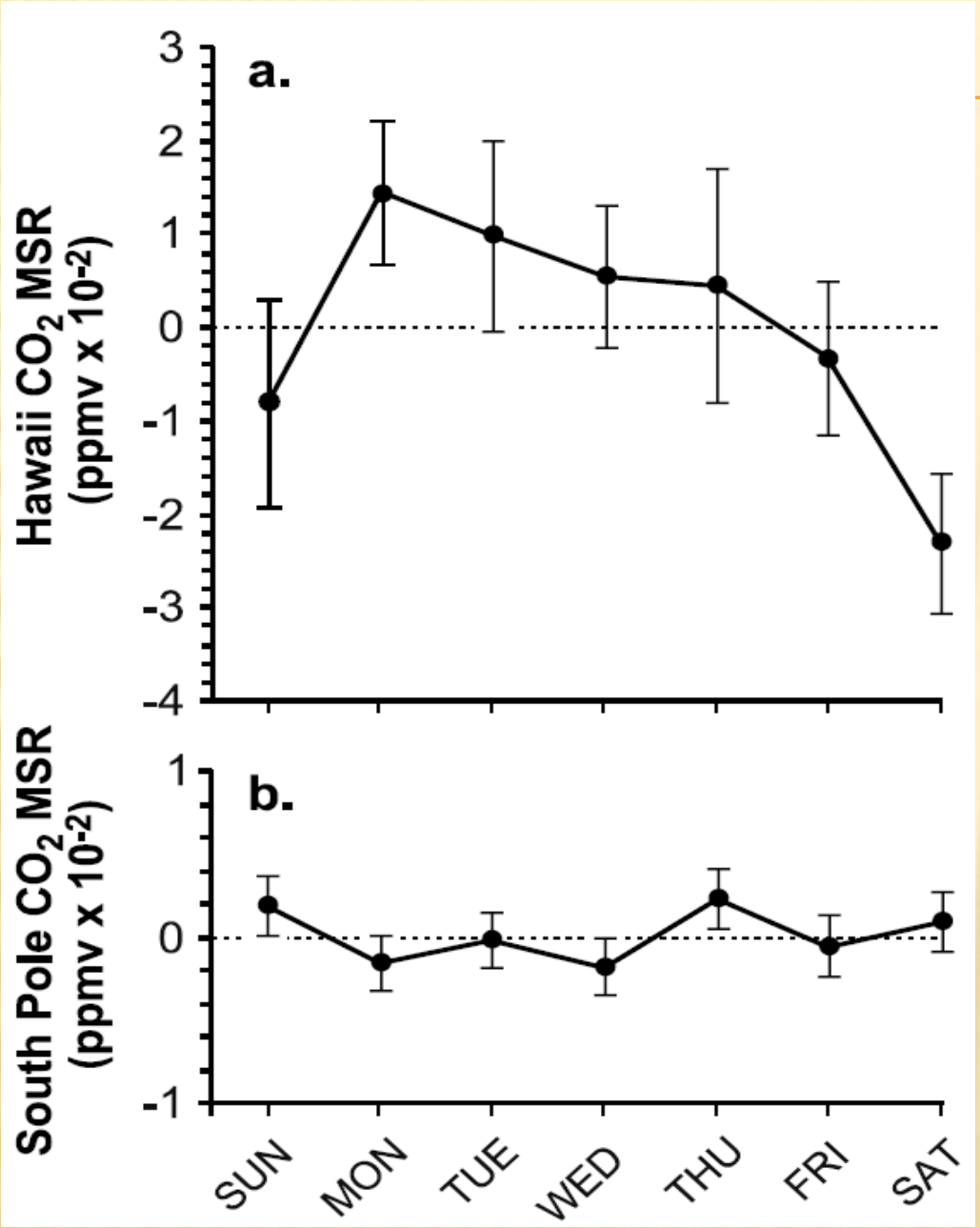
Weekly cycle of surface temperature deviation from the average value for 2 clusters.
[Tesouro M., 2005]



Mean temperature anomaly (left) and mean precipitation (mm) (right) meteorological observation stations in Germany by day of the week (1991–2005). The thick solid line represents the mean values and the dashed lines the standard deviation.
[Patrick Laux, Harald Kunstmann, 2008]

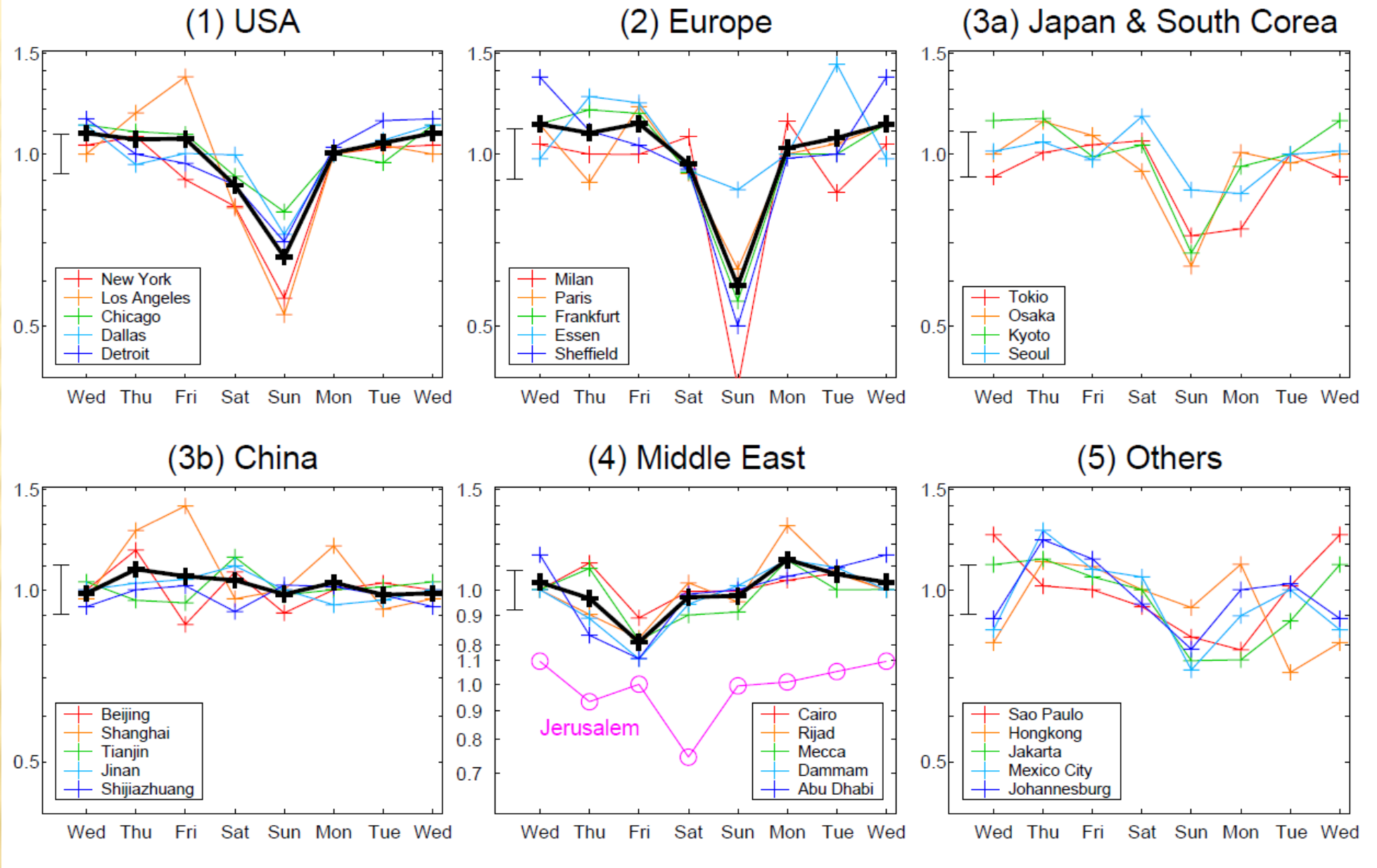


Seven-day variations in the concentration of tropospheric ozone
[Bruckmann P., 1997]

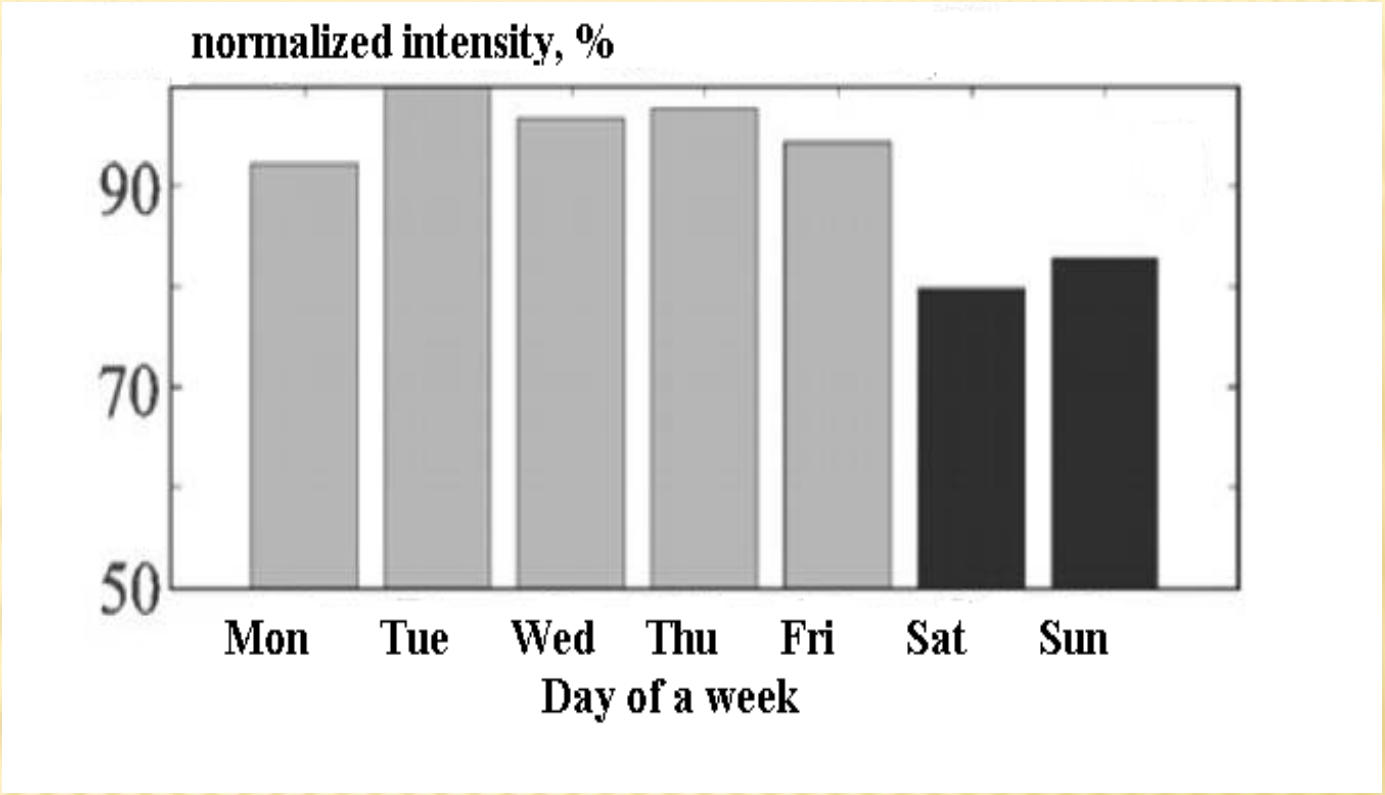


Mean values of CO2 concentration (ppmv) as a function of day of the week:
a) Measurements from Mauna Loa, Hawaii;
b) Measurements from South Pole.

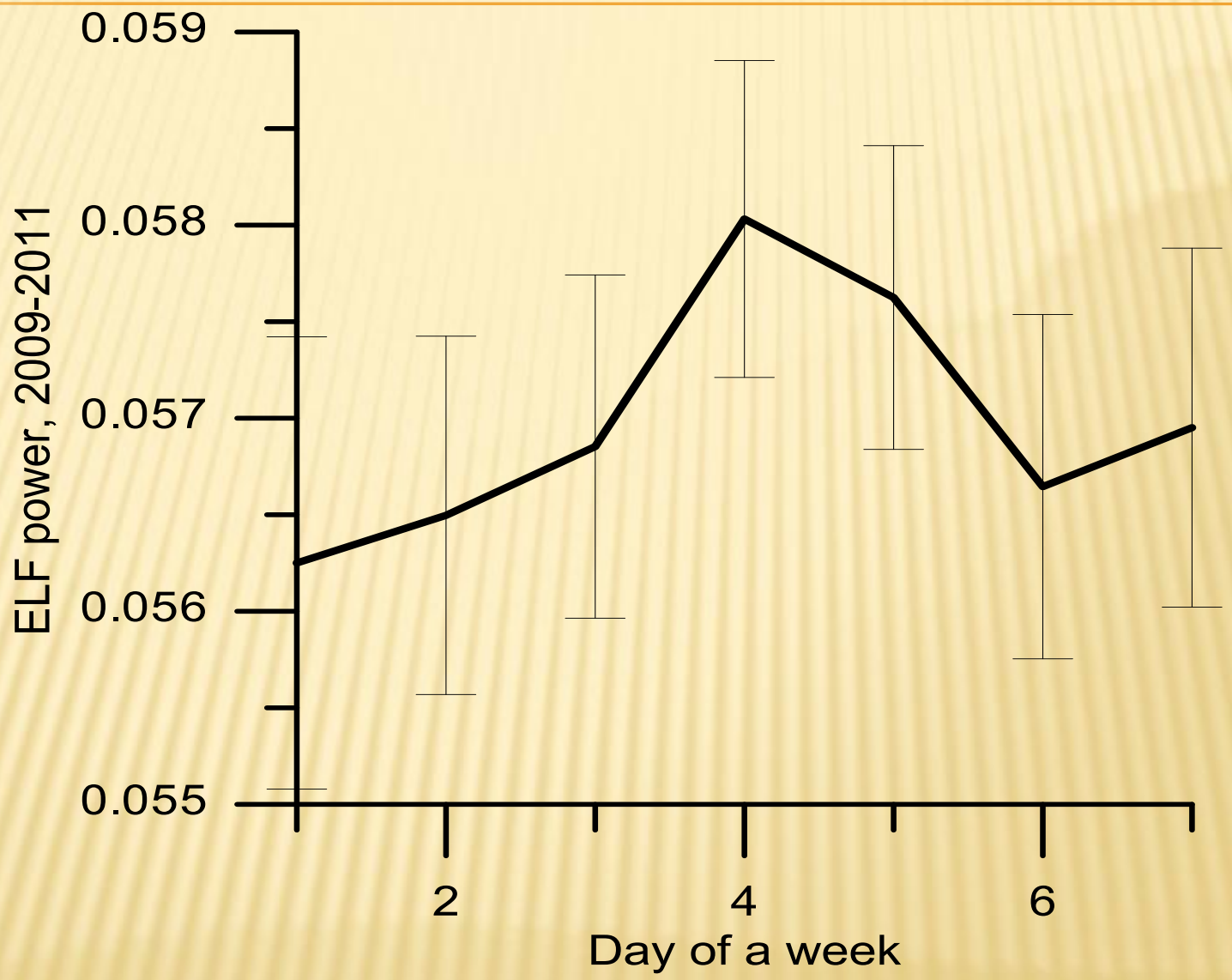
[Randall S. Cerveny and Kevin J. Coakley, 2002]



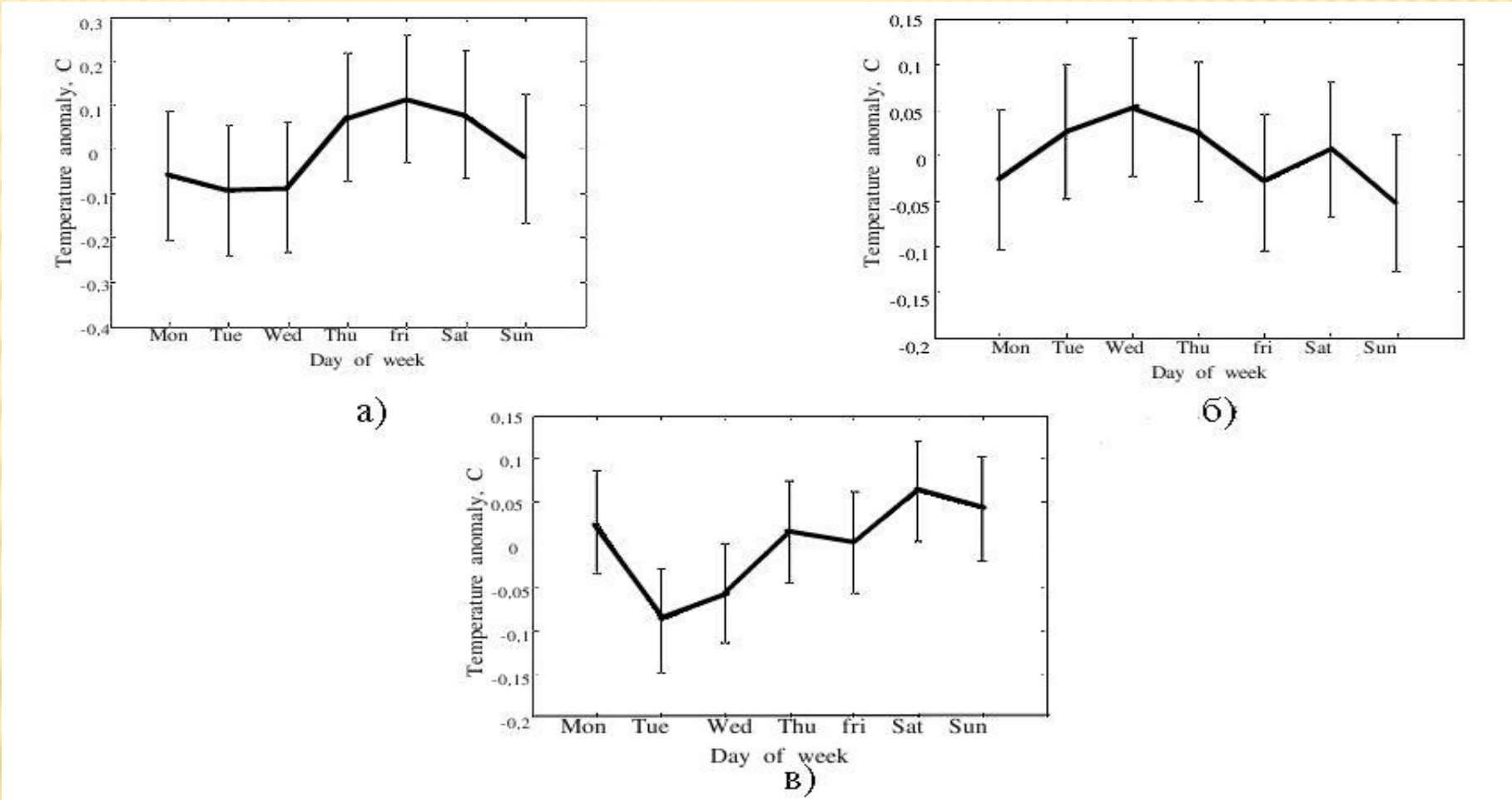
Weekly cycle of mean (1996–2001) tropospheric NO2 for the different regions. The values are normalized with respect to the median weekly value (relative units). Black lines are averaged curves. The scale is logarithmic.
[S.Beirle, U. Platt, M. Wenig, and T. Wagner, 2003]



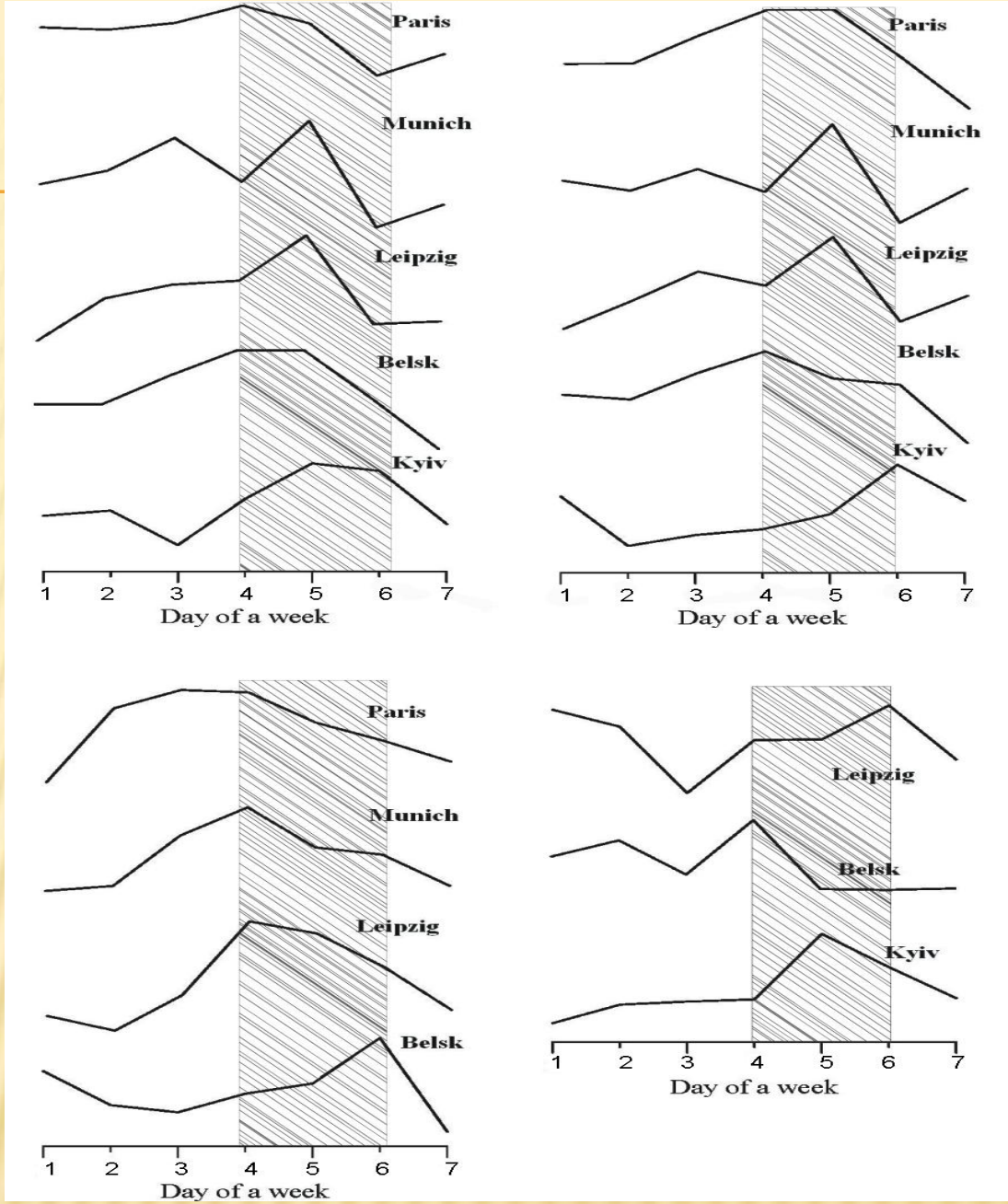
Proceedings of the line intensity of 60 Hz per week (03.2003 - 02.2004)
[A.V.Koloskov Yu.M.Yampolsky, 2009]



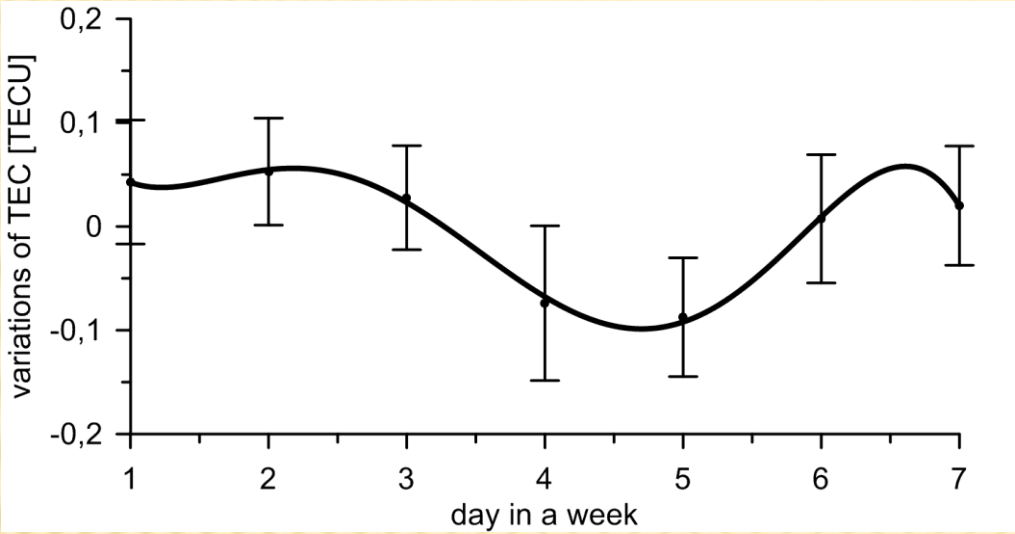
Weekly progress in the level of noise in the ELF frequency range of 5 - 25 Hz (2009 - 2011)



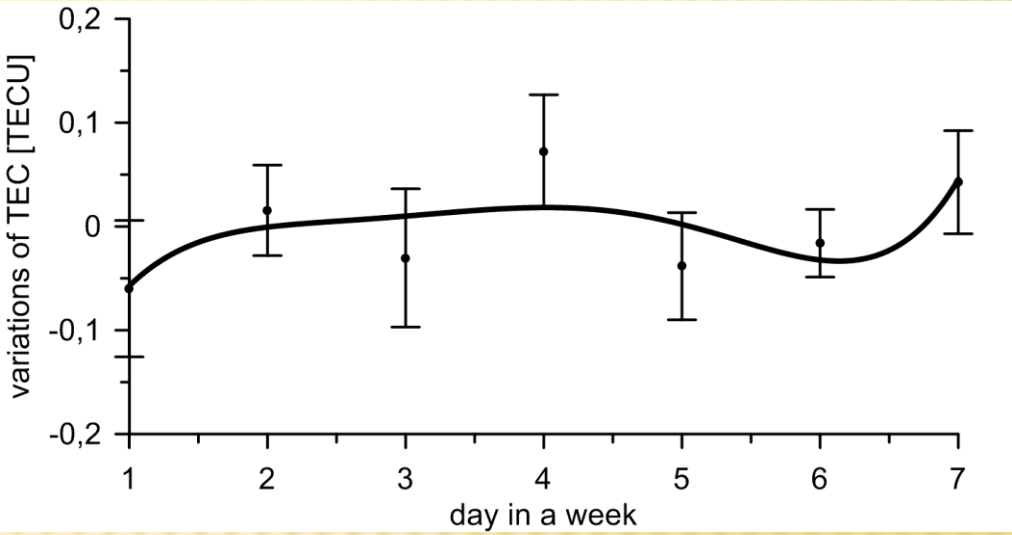
Seven-day variation of the deviation from the average temperature of the air and) Western Europe b) Equatorial Africa: Gulf of Guinea and the Indian Ocean; a) Sub-Saharan Africa: The central part of the African continent.



Comparative analysis of weekly periodicity for different localities:
a) AOT (440); b) AOT (870); c) the amount of water vapor; g) Angstrom parameter.



a)



b)

Weekly variation of the total electron concentration (TEC) (2002 - 2014):
a) Over Boston, b) overTibet

Conclusions I:

1) Due to the review of articles in the fields of meteorology and climatology established the presence of a seven-day cycle of variations of different atmospheric parameters, identified by the authors with the consequences of anthropogenic activity. Searching of the weekly variations has increasing attention and one can talk that this phenomenon is global and there is a global interest for its study.

2) Systematic analysis of long-term ELF observations carried out by the Institute of Radio Astronomy in Antarctic and Ukraine made it possible to detect weekly variations in the global thunderstorm activity which is seemingly of the anthropogenic origin.

3) To confirm the suggested hypothesis, we analyzed the data of air temperature in Europe from 2007 to 2012. The study found that the average temperature in Europe reaches the maximum value by weekend (chart). Also analyzed the weekly cycle in the air temperature in central Africa (as a region with minimal anthropogenic activity). The studies held in two zones: with maximum values in the middle of the week and with the maximum values at the weekend.

4) Also conducts search "weekend effect" in the aerosol optical thickness and moisture content for five European cities (2009-2011). It was found the presence of "weekend - effect" in the time behavior of the aerosol optical thickness (AOT).

5) Detection weekly periodicity concentration of atmospheric aerosols stimulated technological activity, confirms the hypothesis about "weekend - effect" in the behavior of the intensity of the VLF noise on a planetary scale.

6) The main problems which need further development are: simulation of influence of human activity on the emergence of the weekend effect, that allow to predict this phenomenon in the scale of the Earth, and some of the most industrialized regions. For better understanding of this process it is necessary to continue monitoring in the areas with different climatic conditions and different degrees of urbanization.

Considering the relationship between various environmental parameters, the study of weekly variations allow to understand better the mechanism of human impacts on the environment and to predict changes in the environment, will give the opportunity to find solutions of the problem of anthropogenic influence on it.

Thank you

for your attention.