

## Air-Water Temperature and Heat Flux Dynamics due to the Turbulence by Measurements at 60 GHz

Konstantin P. Gaikovich, Roman V. Troitsky  
Radiophysical Research Institute,  
B.Pecherskaya st., 25, Nizhny Novgorod, Russia, 603600,  
Phone: (8312)367294, Fax: (8312)369902, E-mail: gai@nirfi.nnov.su

### Results

Theory of the simultaneous solution of emission transfer and thermal conductivity equations [1] has been applied to determine the evolution of temperature profile in the water subsurface layer (which is called thermal film), the temperature dynamics in the air viscosity sublayer (both are shown in Fig.1), and the heat and mass exchange through air-water interface from laboratory measurements of water radiobrightness dynamics at 60 GHz in the process of the turbulization of the air above the water surface. The measurement cycle (1-3 minutes) included dynamics which was related with the turbulization of the air (using the fan) and with the relaxation process after the turbulization stop. The influence of water turbulence on depth and temperature evolution of thermal films has been investigated.

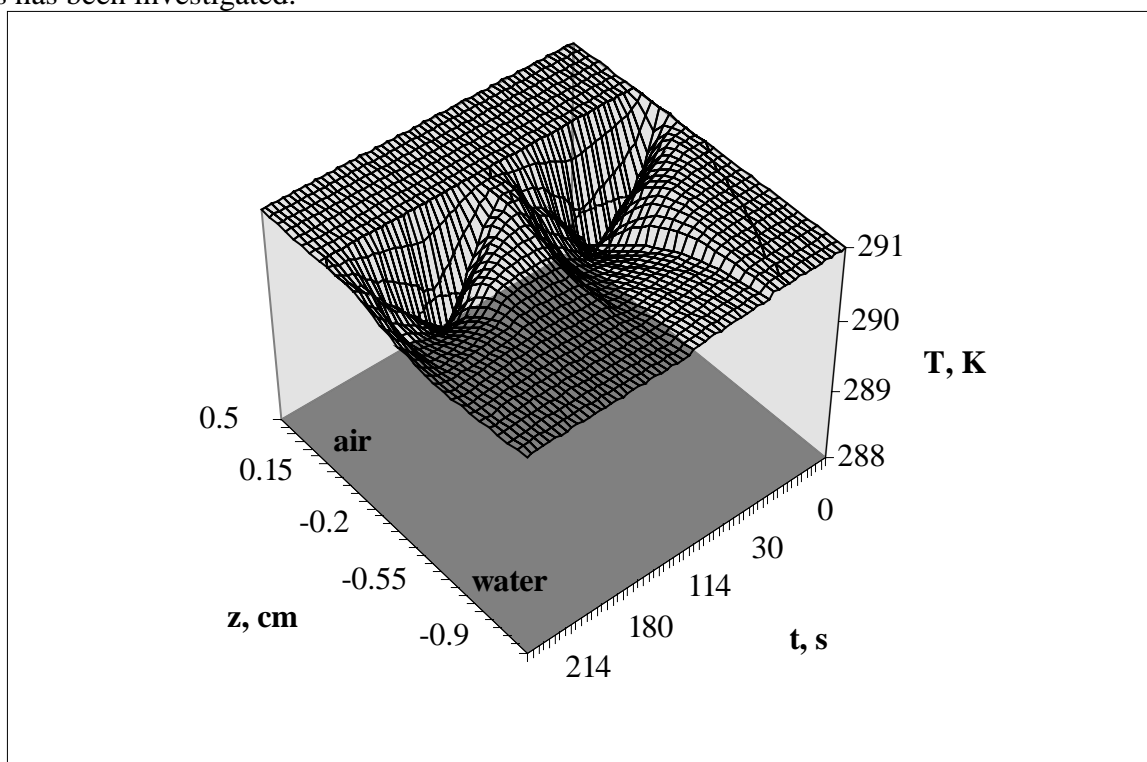


Fig.1. Temperature dynamics in two turbulization circles

The development of periodic convection process in the water has been observed at the critical value of Rayleigh number which it is possible to achieve only in the absence of turbulence in the water.

### References

- [1] K.P.Gaikovich, IEEE Trans. Geosci. Remote Sensing, 1994, **32**, 4, p.885-889.