3. Коваленок, Т.П. Формирование специальных способностей в процессе профессиональной подготовки / Т.П. Коваленок. // Методист. – 2018. – № 7. – С. 48–51.

4. Таканова, О.В. Разработка профессионально ориентирующего содержания общеобразовательных дисциплин в агроинженерном вузе: автореферат дис. ... кандидата педагогических наук : 13.00.08 / Таканова Ольга Владимировна; [Место защиты: Моск. гос. агроинженер. ун-т им. В.П. Горячкина]. – Москва, 2009. – 22 с.

УДК 551.51

INVESTIGATION OF THE DYNAMICS OF THE ATMOSPHERIC BOUNDARY LAYER OVER AN INHOMOGENEOUS SURFACE

Chikalova Anastasiia Vladimirovna, *external PhD student in applied mathematics and physics, Moscow Institute of Physics and Technology, anastasiya.chikalova@phystech.edu*
Fomina Tatiana Nikolaevna, *academic advisor, senior lecturer, Department of Foreign and Russian Languages, Russian State Agrarian University – Moscow Timiryazev Agriculrural Academy, t.fomina@rgau-msha.ru*

Abstract: *This paper presents a study of the dynamics of the boundary layer on a small northern lake surrounded by a forest in winter of 2015. A series of experiments were carried out on lake Verhnee located near the biological white sea station of the Moscow State University.*

Keywords: *boundary layer, inhomogeneous surface, weather models.*

The planetary boundary layer is the lower part of the troposphere lying in direct contact with the surface of the planet. Active turbulent mixing of air takes place in the boundary layer of the atmosphere. The interaction of the atmosphere with the underlying surface is an important part of its circulation on a temporal and spatial scale, since the underlying surface is a source (sink) of momentum, moisture and heat. Quantification of momentum, heat and mass transfer between the atmosphere and the underlying surface is a key problem in the study of the atmospheric boundary layer.

In order to study turbulence, usually measures of the lower parts of atmosphere (tens of meters) are taken, where the effect of the Coriolis force can be neglected. In general, it is necessary to fulfill the following conditions:

The underlying surface need to be smooth. The temperature and wind fields should be homogeneous in the horizontal direction.

Stable weather conditions are required. The temperature and wind speed fields are statistically stationary.

Under such conditions, the meteorological fields of statistical characteristics does not depend on time nor on the horizontal coordinate of the measurement point.

Weather conditions significantly affect the values of the turbulent characteristics. Both Wind speed and the gradient of the vertical temperature determine weather patterns.

The main purpose of processing the experimental data, is to determine the universal characteristics of the temperature and the structure of the wind speed fields.

In recent years, the turbulence field structure over an inhomogeneous surface has been a topic of interest in various scientific areas, such as meteorology, hydro-aerodynamics and ecology. Research is usually carried out on forest clearings, curved valleys and small lakes surrounded by forests. Besides, nowadays parametrisation of underlying surface-atmosphere flows is very relevant for weather forecasting systems, climate modelling, environmental impact studies, etc.

Interactions between the atmosphere and underlying surface are characterised by the fluxes of momentum, water vapour, heat and gas impurities. Lakes are the important type of underlying surface and occupy about 3% of dry land. As for the northern regions, lakes cover approximately 7% of land. The surface area of most of these lakes is less than 10 square kilometers. Since lakes have a lower albedo and higher heat capacity compared to land, lakes absorb more solar radiation and accumulate more heat. Moreover, often the lake's temperature differs from the temperature of the surrounding landscape. Lakes can be sources and sinks of heat and moisture in the atmosphere. The lake surface is aerodynamically smoother than the land surface covered with vegetation. It leads to significant changes in the fluxes of impulse, moisture, heat and gases between the underlying surface and atmosphere.

The atmosphere affects not only physical, but also biological and chemical processes in lakes. In addition, lakes are an important component of regional carbon stocks, where terrestrial and atmospheric sources and sinks of carbon can release greenhouse gases such as carbon dioxide and methane.

To improve the accuracy of modelled interactions between the atmosphere and the underlying surface, it is most likely necessary to include lakes in climate and weather models. The estimation of Lake-atmosphere fluxes are often taken from experimental studies carried out in the ocean or on large lakes. But most likely such values can not be applied for all types of lakes, especially for small lakes.

This paper presents a study of the dynamics of the boundary layer on a small northern lake surrounded by a forest in winter of 2015. A series of experiments were carried out on lake Verhnee located near the biological white sea station of Moscow State University. Experiments were carried out in winter in order to distinguish the influence of landscape inhomogeneities on the turbulent exchange in the atmosphere-underlying surface system and exclude the influence of the thermal regime of the lake. The surface area of the lake is 15.469 square kilometres. Wind field characteristics were measured using three two-component and four three-component sonic anemometers. Three-component acoustic anemometers were located along one diagonal northwest - southwest. A gradient mast was installed at the same distance from the north and south anemometers (two anemometers at heights of 2 and 4 meters). Three-component anemometers measured the air temperature and the total wind vector.

In general, physical quantities which characterise the state of the water and the atmosphere for each point fluctuate randomly. A detailed description of changes in physical fields as a function of space and time can not be made due to the chaotic nature of motions in the water and the atmosphere. Therefore, statistical calculation methods are used to study turbulent motion.

Graphs of main dependencies were plotted as a result of the statistical analysis of the boundary layer characteristics.

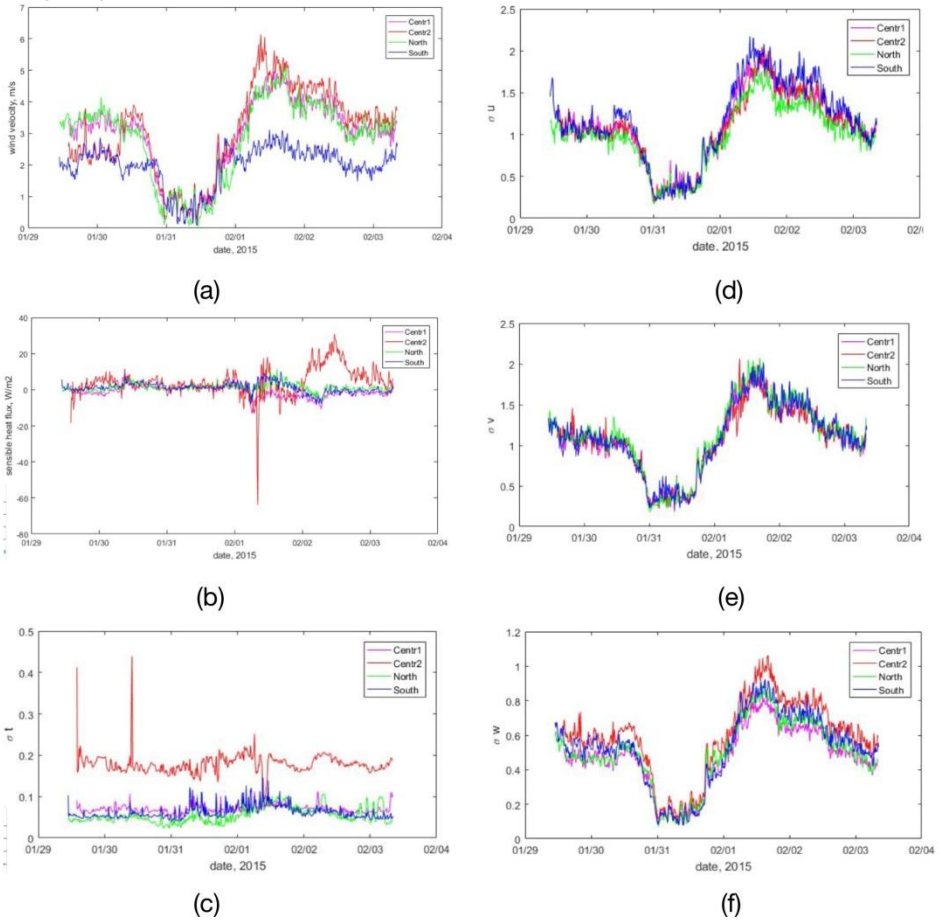

Fig. 1.

Analysis of the plots:

A plot of average wind speed as a function of time (a) showed that the profiles of average wind speed at the central and northern points are very similar. However, at the southern point the average velocity is approximately 40% lower for almost the entire period. Notice that the southern point is located close to the edge of the forest and, apparently, it is significantly affected by the surface inhomogeneity.

The plot of heat flux over time (b) shows that the heat fluxes at the south and north of the lake are similar. Therefore, there is no noticeable effect of the location of the southern anemometer on the heat flow. The greatest differences in heat flux are observed at the central point at a height of 4 meters.

The plot of the standard deviation of the temperature as a function of time (c) shows that for the northern, southern and central points these deviation are almost the same at height of 2 meters. However, the temperature deviation for the central point at a height of 4 meters differs sharply and is approximately 3 times greater than for

the other three points. It means that the dispersion of values for temperature relative to its average value increases with height above the underlying surface.

The dependance of the standard deviation of the vertical velocity component on time (d), (e), (f) illustrates that, in general, for all points and for both considered anemometer heights the spreads are approximately the same.

Conclusion: As a result of the calculation and analysis of the results obtained, it was revealed that inhomogeneous turbulent flows arise in an inhomogeneous boundary layer. There is a dependence of the wind flow structure on the height above the underlying surface and on the coordinates on the surface. It was also noticed that the points located close to the lake shores are most affected be the heterogeneity of the landscape.

References

1. Ronald Queck, Christian Bernhofer, Anne Bienert, Fabian Schlegel, The TurbEFA Field Experiment - Measuring the Influence of a Forest Clearing on the Turbulent Wind Field, Springer Science+Business Media Dordrecht 2016

2. Jordan S. Read, David P. Hamilton, Ankur R. Desai, Kevin C. Rose, Sally Macintyre, John D. Lenters, Robyn L. Smyth, Paul C. Hanson, Jonathan J. Cole, Peter A. Staehr, Lake-size dependency of wind shear and convection as controls on gas exchange // Geophysical Research Letters. – 2012. – Vol. 39. – (doi:10.1029/2012GL051886)

УДК 378.016: 811.42

CUSTOMS DISCOURSE IN ONLINE MEDIA

Elena Aleksandrovna Yazbek, *Lecturer of the Department of Foreign Languages, Belarusian State Pedagogical University named after Maxim Tank, Minsk lenayazbik@gmail.com*

Annotation: *The article identifies and examines the main components of institutional customs discourse. Scientific novelty of the research lies in the fact that customs discourse is analyzed as a specific type of institutional discourse for the first time, the influence of the online media on the features of this discourse is considered. As a result, it is proved that the online media has a significant impact on the components of institutional customs discourse.*

Keywords: *customs discourse, online media, institutional discourse.*

The research topic is relevant due to the significant interest of researchers in the specifics of different types of institutional discourse. The effective work of modern legislative institutions and organizations of local, national and especially international level is impossible without on-time presentation of the results of this work and the prospects for further development in the media. Internet technologies make it possible to conduct this work in the mass media of the Internet space, covering the largest possible audience. By reporting on their organization's work in the media and speaking on its behalf, the authors become participants of an