ИЗМЕНЕНИЕ СКОРОСТИ ВЕТРА НАД ОДЕССКОЙ ОБЛАСТЬЮ
CHANGE IN WIND SPEED OVER THE ODESSA REGION

c.geogr.s., prof. Ivus G.P. / к.геогр.н., проф. Ивус Г.П.
ORCID: 0000-0003-4118-6887
c.geogr.s., as.prof. Semergei-Chumachenko A.B. / к.геогр.н., доц. Семергей-Чумаченко А.Б.
ORCID: 0000-0001-8718-4073
MA Popova L.O. / магистр Попова Л.О.
phd student Kovalvov I.A. / аспирант Ковальков И.А.

The Odessa State Environmental University, Odessa, Lvovskaya 15, 65016
Одесский государственный экологический университет, Одесса, ул. Львовская 15, 65016

In this paper defined the modern change in wind speed over the Odessa region. The features of the space-time distribution of wind speeds are considered. Calculation and analysis of average monthly wind speeds revealed a decrease in wind speed over most of the Odessa region.

Key words: wind speed, weakening of the wind

Introduction. The wind regime is an important climatic characteristic of the territory, and the wind speed is one of the meteorological variables that have a significant impact on the lives and human activity. Wind substantially directly affect the performance of various sectors of the economy such as energy, telecommunications, agriculture, transportation (aviation, road and rail transport as well as sea and river transport) suffer large losses due to underestimation of the wind, especially strong [1].

Initial data - meteorological observations at meteorological stations Odessa-HMO, Dunayska HMO (Izmail) and Liubashivka (2005-2015), Bilhorod-Dnistrovskyi and Rozdilna (2006-2014) in the form of an interactive database [5].

Results. Over the last 30 years, there has been a gradual weakening of the wind over the southwest of Ukraine, and a large part of the Odessa region was no

exception. So, for example, the wind speed in Izmail decreased in 2005-2015 in comparison with 1961-1990, it is 0,5 m/s [6], from 3,6 to 3,1 m/s (Table 1). Only over Bilhorod-Dnistrovskyi was the reverse trend, when the average annual speed increased by 0,6 m/s from 4,0 to 4,7 m/s. The station with the least intensive wind regime turned out to be Rozdilna, with the average annual speed in 2005-2015 2,2 m/s and at this point there was a significant weakening of the wind (0,8 m/s).

Table 1

Average wind speed over Odessa Region for 1961-1990 [4] 2005-2015

Period	Months												Year
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Odessa HMO													
1961 -1990	4,6	4,6	4,3	3,8	3,4	3,2	3,2	3,3	3,4	3,9	4,3	4,3	3,9
2005 -2015	3,9	3,5	3,2	2,8	2,4	2,3	2,5	2,3	2,6	3,0	3,1	3,5	2,9
Rozdilna													
1961 -1990	3,3	3,5	3,4	3,3	3,1	2,7	2,6	2,7	2,6	2,7	3,0	3,0	3,0
2006 -2014	2,5	2,4	2,5	2,3	2,0	2,1	2,1	2,0	2,1	2,3	2,3	2,4	2,3
Bilhorod-Dnistrovskyi													
1961 -1990	4,0	4,4	4,0	4,2	3,8	3,8	3,9	3,7	3,7	3,9	4,1	4,1	4,0
2006 -2014	4,9	4,9	5,2	4,7	4,3	4,4	4,5	4,5	4,3	4,8	4,5	5,1	4,7
Izmail													
1961 -1990	4,0	4,4	4,3	4,3	3,8	3,5	3,2	2,9	2,9	3,0	3,3	3,6	3,6
2005 -2015	3,2	3,3	3,7	3,2	3,0	3,0	2,9	2,8	3,1	3,0	2,7	3,0	3,1
Liubashivka													
1961 -1990	4,1	4,3	4,1	4,0	3,4	3,0	2,9	2,9	2,9	3,2	3,7	3,9	3,5
2005 -2015	3,5	3,0	3,6	3,3	2,6	2,5	2,4	2,4	2,5	2,6	2,8	3,3	2,9

As well as over the entire territory of Ukraine, over the Odessa region can be traced a clear annual wind speed - up to the largest values it grows in January-February, and the minimum reaches in August. The maximum wind speed at Odessa-

HMO (18 m/s) observed in March 2007. At Izmail, the value of the maximum wind speed for 2005-2015 was 21 m/s (July 2015), at Liubashivka - 16 m/s in March 2013.

At the Rozdilna station the maximum average wind speed during 1961-1990 was observed in May and equaled 4,6 m/s, and in 2005-2015 it fell to 3,3 m/s in April. At the station Bilhorod-Dnistrovskyi in 2005-2015 in comparison with 1961-1990 in contrast to the whole Odessa region, wind speed increased, and the maximum average speed reached 6,8 m/s in February 2010.

Comparison of monthly mean wind speeds over Odessa for 1961-1990 and 2005-2015 found that the average wind speed decreased by 1,0 m s, that is, in the last 15 years observed weakening of the wind speed. Similar changes in the distribution of mean monthly wind velocities were also observed at Izmail, Liubashivka and Rozdilna. On average, for the year at Izmail wind speeds decreased by 0,5 m/s, at Liubashivka - by 0,6 m/s, at Rozdilna – 0,7 m/s (Fig. 1).

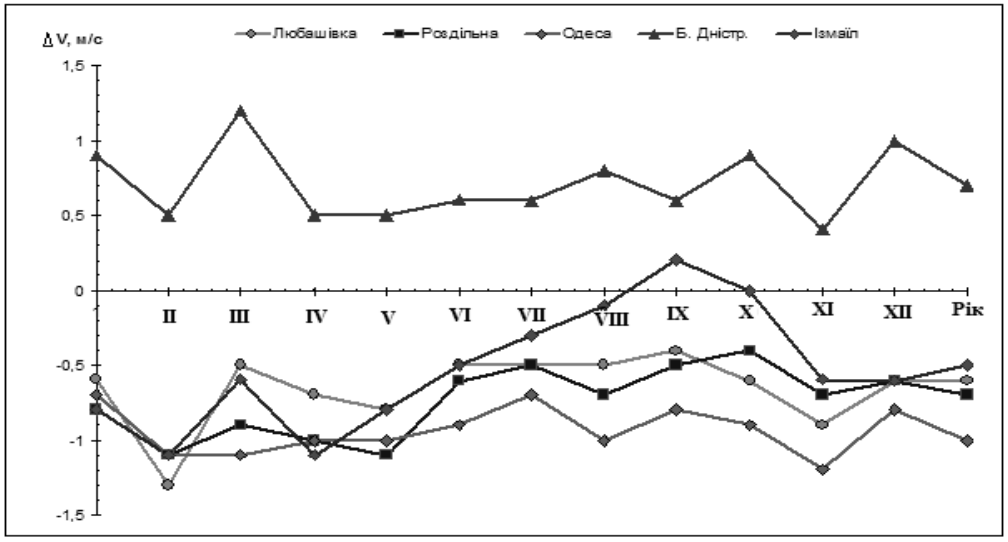

Figure.1. The change of average wind speeds from 1961-1990 [4] to 2005-2015 over Odessa region

At Izmail, in comparison with the data of wind speeds at Odessa, the wind speed decrease for the last 10 years did not happen so evenly. In August and October, the average monthly wind speed remained almost unchanged, and in September the values of average wind speeds for 2005-2015 exceeded the values for 1961-1990 [4]. At Bilhorod-Dnistrovskyi, wind intensification was more pronounced in March and December - 1,2 and 1,0 m/s. Less intensification occurred in November (0,4 m/s).

If we plot the geographic distribution of the average monthly wind speed for January and July over the Odessa region for both periods of the study (see Figure 2), we can see the distribution of the share of less intense wind, except for the Bilhorod-Dnistrovskyi area. Over the last 16 years there has been a decrease in wind speed over the Odessa region except Bilhorod-Dnistrovskyi.

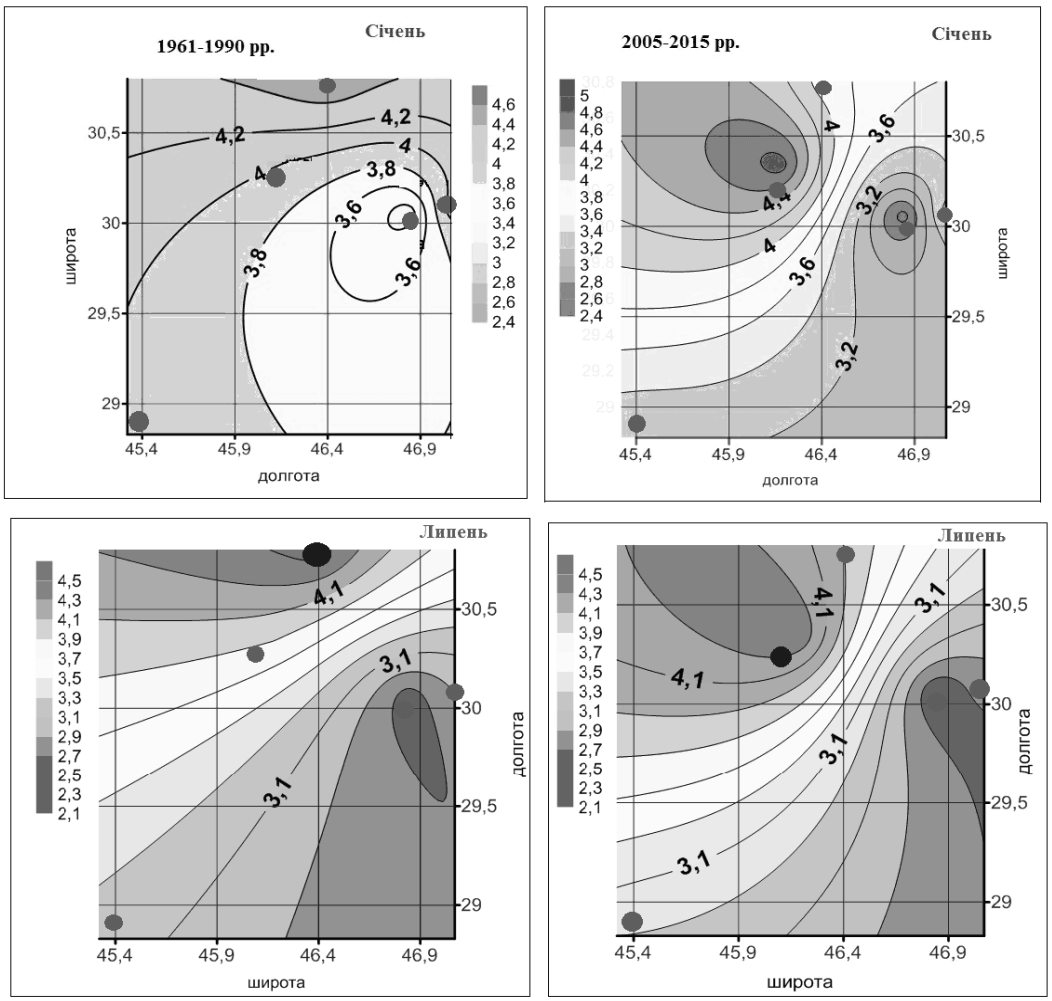

Figure.2. Distribution of average wind speeds of Odessa region in January and July for the periods 1961-1990 and 2005-2015 years

Summary and Conclusions. At the stations Odessa, Liubashivka and Rozdilna in 2005-2015 was observed a decrease in the average monthly values of wind speeds relative to 1961-1990, and most of all the wind weakened in February.

Over the Odessa region there was a clear annual wind speed with a maximum in January-February and a weakening of its intensity over the whole region was revealed, with the exception of the Danube HMO in September and Bilhorod-Dnistrovskyi throughout the year, so this weakening manifests in the cold half year.

References:

1. Ivus G.P. (2012). Spetsializovani prohnozy pohody [Specialized weather forecasts]. Odessa: TES, – 407 p.

ISBN: 966-978-2389-60-9

2. Ivus G.P., Agayar E.V., Yeshanu A.E. (2007) Osobennosti temperaturno-vetrovogo rezhima v rayone Odessy na rubezhe XXI veka [Features of the temperature-wind regime in the Odessa region at the turn of the 21st century] in *Prichornomors'kiy yekologíchniy byuleten'* [Black Sea environmental newsletter], vol. 2 (24), pp. 181-190.

URI: http://www.invaz.com.ua/Bull_2007/Bull_24.pdf

3. Ivus G.P., Agayar E.V., Mishchenko N.M. (2005) Statisticheskiye kharakteristiki skorosti vetra v rayone Odessy [Statistical characteristics of wind speed in the Odessa region] in *Kul'tura narodov Prichernomor'ya* [Culture of the peoples of the Black Sea region], vol. 67, pp. 21-24.

ISSN: 1562-0808

URI: http://dspace.nbuv.gov.ua/handle/123456789/10274

4. Climate of Ukraine. (2003). Kyiv: Publishing Rajewski, 343 p.

ISBN: 966-7016-18-8.

5. Weather in Ukraine in 22'543 localities. (n.d.). Retrieved April 03, 2017, from http://rp5.ua.

6. Popova L.O., Semergei-Chumachenko A.B. (2016) Evolyutsiya parametriv vitru nad Odes′koyu oblastyu [Evolution of wind parameters over Odessa Region] in *Zbirnyk statey za materialamy student·s'koyi naukovoyi konferentsiyi ODEKU 12-14 kvitnya 2016 r.* [Collection of articles for the materials of student's scientific conferences OSENU 12-14 April 2016]

URI: http://odeku.edu.ua/wp-content/uploads/B-Zbirnik-statej-konferentsiyi.pdf

Аннотация

В работе определяется современное изменение скорости ветра над Одесским регионом. Рассмотрены особенности пространственно-временного

распределения скоростей ветра. Выявлено ослабление ветра за последние 30 лет над Одесской областью.

Ключевые слова: скорость ветра, ослабление ветра.

Ссылки:

1. Івус Г. П. Спеціалізовані прогнози погоди – Одеса: ТЕС, 2012. – 407 с.
ISBN: 966-978-2389-60-9

2. Ивус Г.П., Агайар Э.В., Ешану А.Е. (2007) Особенности температурно-ветрового режима в районе Одессы на рубеже XXI века в *Причорноморський екологічний бюллетень,* № 2 (24), с. 181-190.
URI: http://www.invaz.com.ua/Bull_2007/Bull_24.pdf.

3. Ивус Г.П., Агайар Э.В., Мищенко Н.М. Статистические характеристики скорости ветра в районе Одессы в *Культура народов Причерноморья*. – 2006. - № 67. – С. 21-24.
ISSN: 1562-0808
URI: http://dspace.nbuv.gov.ua/handle/123456789/10274

4. Клімат України (2003). Київ: Видавництво Раєвського, 343 с.
ISBN: 966-7016-18-8

5. Погода в Украине в 22'543 населённых пунктах. (n.d.). Retrieved April 03, 2017, from http://rp5.ua.

6. Попова Л.О., Семергей–Чумаченко А.Б. (2016) Еволюція параметрів вітру над Одеською областю в *Збірник статей за матеріалами студентської наукової конференції ОДЕКУ 12-14 квітня 2016 р*, с. 255-257.
URI: http://odeku.edu.ua/wp-content/uploads/B-Zbirnik-statej-konferentsiyi.pdf

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