



Estimation of Bioclimatic Resources of Odessa Region

LOGO

Introduction

Influence of meteorological factors on human body is multifaceted and it comes out through the specific weather conditions. Indicators of heat feeling allow to assess bioclimatic resources of definite areas, to identify their recreational potential, etc. The main parameter of bioclimatic indices is air temperature, therefore consideration of the effect of relative humidity and wind speed is expressed in the form of amendment to the air temperature, which allows to determine heat feeling of the human body and condition assessment of comfort or discomfort of the environment more objectively.

Methods and data

In bioclimatology for evaluation of complex meteorological conditions that determine heat feeling of a human, above all, the system of calculated effective temperatures is used. One of the most common bioclimatic indicators is NEET, that is normal-equivalent effective temperature for a man dressed in ordinary, normal wear.

For the calculations we used the results of meteorological observations of air temperature (t), relative humidity (f) and wind velocity (v) at 12 o'clock daily each central month of the four seasons (January, April, July and October) for a five-year period (2003 -2007 years) at 11 meteorological stations of Odessa region: Lyubashevka, Zatyschya, Serbka, Rozdil'na, Odessa, Illichivsk, Bilgorod-Dniestrovsky, Sarata, Bolgrad, Vylkove, Izmail.

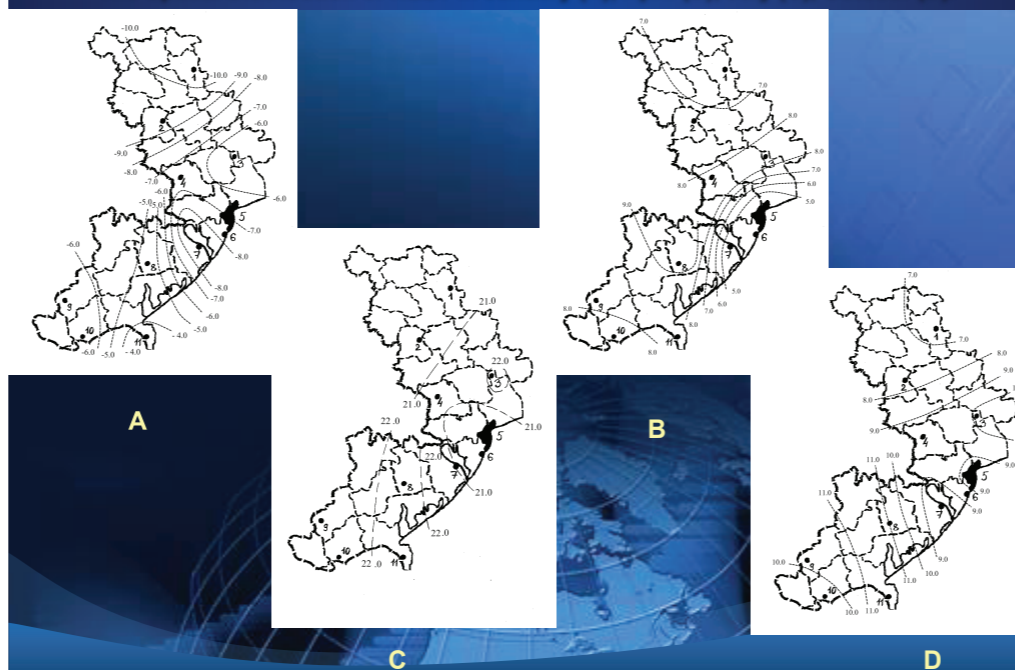
Normal Equivalent-Effective Temperature*

$$NEET = 37 - \frac{37 - t}{0.68 - 0.0014f + \frac{1}{1.76 + 1.4v_2^{0.75}}} - 0.29t \left(1 - \frac{f}{100}\right)$$

t - air temperature, °C
 f - relative humidity, %
 v - wind velocity, mps

* By Misenard

The Spatial Distribution of NEET in January (A), April (B), July (C), October (D).



Results

- 1. Human body usually doesn't feel interdaily temperature variability in Odessa region (0-2 °C). Maximum repeatability of these values is observed, as a rule, in coastal areas. In January and October at 64% and 73% of the stations respectively interdaily variability exceeds 12 °C which is irritable to a human. In April repeatability of such values is much lower (only 36% of stations), and in July it is generally minimal (18%).
- 2. In January, comfortable humidity conditions prevail throughout the region. However, often the relative humidity is above 80%. In April comfortable by hygrometric characteristics air preponderates in the coastal districts of Odessa region. In the rest of the area dry conditions prevail. In July comfortable conditions usually occur in Belgorod-Dniestrovsky, Odessa, Illichevsk and Vilkovo. In October comfortable humidity conditions dominate entire Odessa region (repeatability 61-74%).
- 3. The same heat feeling can be perceived at different combinations of air temperature, relative humidity and wind speed. In this work we used one of the most popular complex bioclimatic indices - NEET - normal equivalent-effective temperature. In January very cool conditions predominate throughout the region. In April heat feeling "very cool" prevails in Odessa, Illichevsk, Belgorod-Dniestrovsky. In other areas dominates "cool" heat feeling. The most comfortable conditions are in the southern territories and Serbka. In July heat feeling can vary from "very cool" to "severe thermal loadings". The most comfortable conditions are observed in July in Odessa. In October in most cases cool conditions occur. In the southern areas "moderately warm comfortable" heat feeling is observed usually.