

Disastrous hot in Moscow city in summer of 2010 by results of meteorological measurements



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In summer of 2010 anomalous hot weather took place at the Central part of European Russia – in Moscow city and in some other regions around the Russian capital. Since the second part of June till the mid of August extremely steady, high (up to 100 hPa isobaric level) and long-living blocking anticyclone existed above the East of European Russia.

As a result, extremely hot Tropical air mass was invading from Africa and from Central Asia into Central Russia by steady Southern and South-Eastern winds during a long time.

On July 29th the maximal air temperature T_{max} at the Moscow University consisted of 38.1 °C (see Fig.1) whereas previous maximum-maximorum value for Moscow city was equal only to 36.8 °C by the data of 1920. At the city centre T_{max} was equal even to 39.0 °C – probably due to the additional local effect of the urban ‘heat island’. Thus, the air temperature in Moscow at the first time exceeds 100 °F and a body temperature of healthy person.

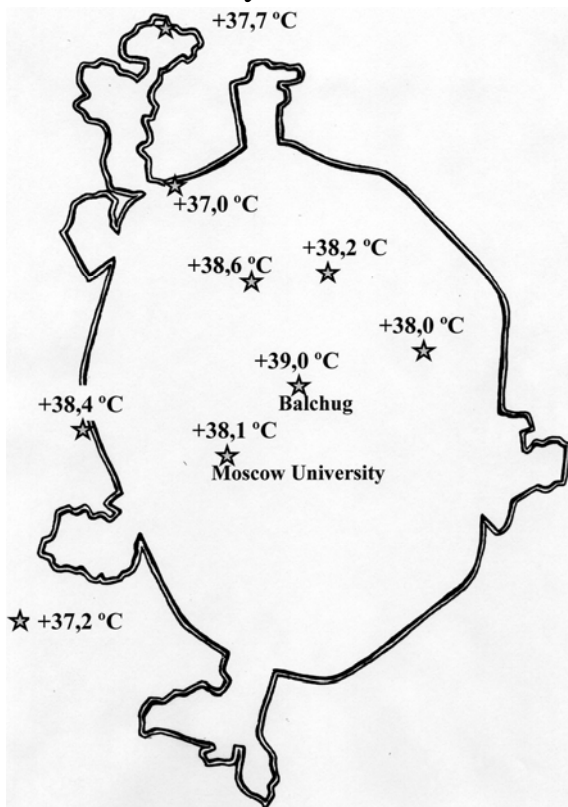
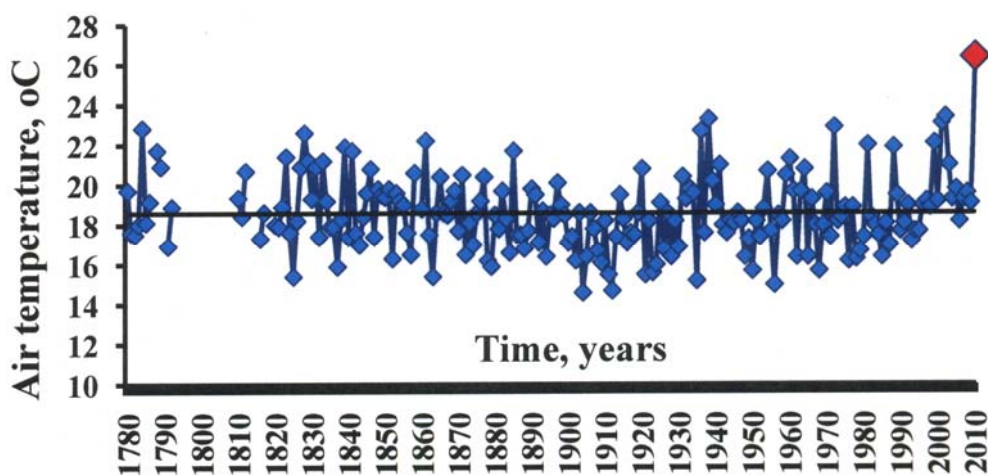


Fig.1. The maximal air temperatures on July 29th, 2010 – the warmest day in Moscow city during last

130 years. Double lines are margins of the city; asterisks are meteorological stations.



The monthly-averaged air temperature for July of 2010 in Moscow consisted of 26.4 °C that is the most value during last 230 years since 1780 (see Fig.2). This value is on 3 °C more than previous maximal monthly-averaged value for July.

The monthly-averaged air temperature for August 2010 (22.2 °C) became the

Fig.2. The course of monthly-averaged air temperature in Moscow in July during all the history of meteorological measurements.

most value as well during whole the history of meteorological measurements in Moscow for August. The daily maximal air temperature 23 times (during 4 separate days on June, 10 days on July and 9 days on August) was more than maximal values for these days since 1879 (Fig.3). The surface temperature in Moscow at the first time consisted of more than 60 °C.

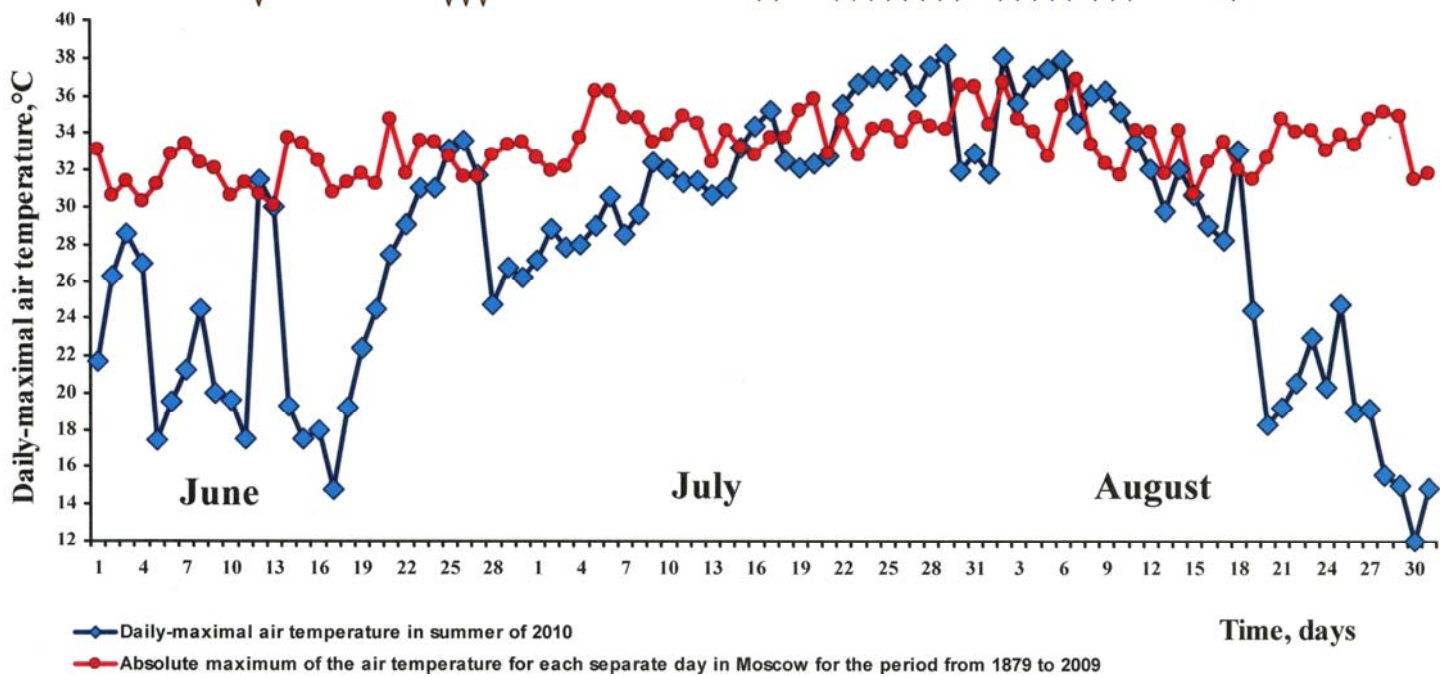


Fig.3. The course of daily-maximal values of the air temperature in Moscow in 2010. Arrows indicate days of recordable values.

The minimal relative humidity was equal to 16 %; the maximal humidity deficit at the first exceeds 50 hPa. As a result of extremely low precipitation amount (only 7.4 mm during July which is the smallest value for this month during all the history of measurements since XIX century) a lot of forest fires took place in Moscow region. The thermal wave connected with the disastrous hot has been detected at the soil depth of 320 cm below a surface till the middle of December, i.e. during four months later (see Fig.4).

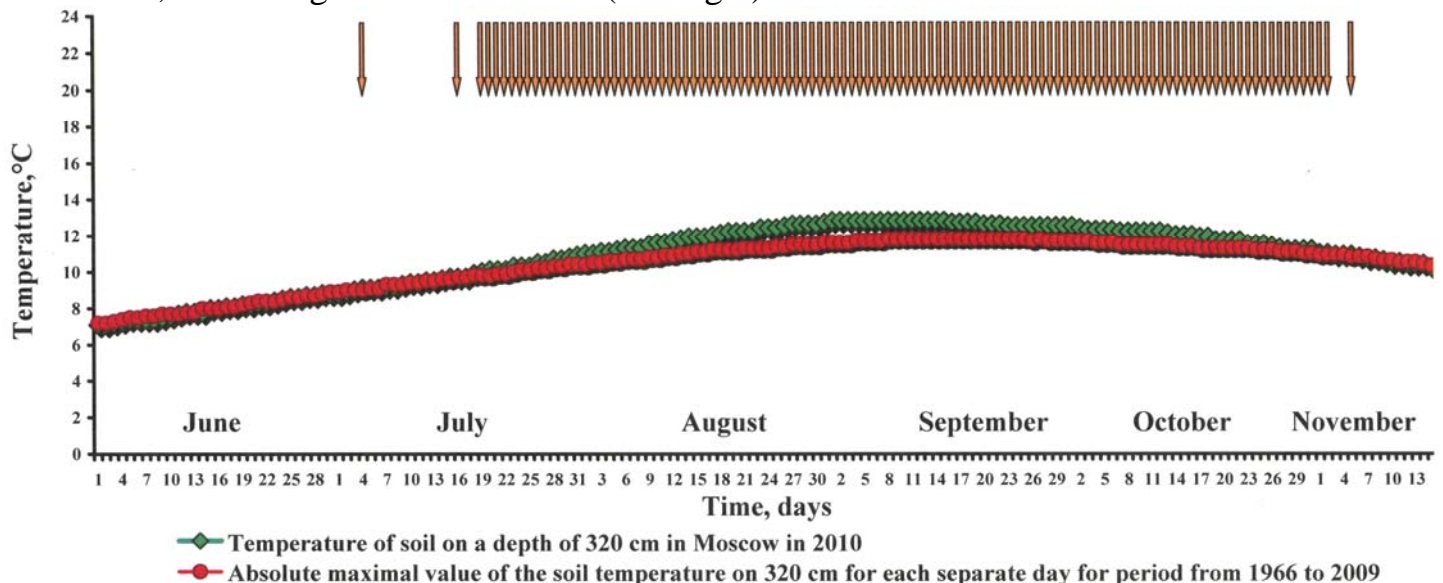


Fig.4. The course of the soil temperature daily values on 320 cm depth in Moscow in 2010. Arrows indicate days of recordable values.

The monthly-averaged wind speed in July was extremely low in Moscow (only 1.5 m/s on the level of 15 m by the data of vane and 4.0 m/s in the air layer from 40 to 200 m by the sodar data) due to closeness of the city to the centre of blocking anticyclone.