

Cyclonic activity over the territory of Belarus under current climate conditions

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Cyclones are the main synoptic processes, which determine the complicated weather conditions and precipitation regime in the middle latitudes. Intensity of cyclonic activity in the center of Europe depends on dynamics of main baric centers in atmosphere of the North Atlantic (described by NAO) and location of main tropospheric flows. Therefore, the current climate changes might influence to trajectories and intensity of cyclones. The Republic of Belarus is located in the center of East Europe, therefore most of cyclones in this part of the continent are passing over its territory. The main objective of the study is analysis of trajectories and frequency of cyclones, which were moving by the territory of Belarus during the period of 1995-2015. At present, there is not enough climatic information about these processes.

During the studied period 329 cyclones are moved over the territory of Belarus. So, is about 15-16 cyclones per year affected the weather conditions. From them 22% belongs to western and northwestern types of cyclones separately, 56% consists to southern cyclones. The maximum number of all types of cyclones (21-23 cases per year) observed in 1998, 2004, 2008 and 2009. Minimum of cyclone activity (is about 10 cases) falls on 2015.

The western cyclones frequently moves over the territory of Belarus in March and in December. The northwestern cyclones most observed in January and in February. The amount of southern cyclones more evenly distributed within a year. The most cases is observed in warm season, in July, April and May. Minimum of southern cyclones occurs in January and December.

The most of western cyclones, which moved over the territory of Belarus is formed between 50N and 60N over regions of the Northwest Atlantic, the British Isles, the North Sea and south of the Baltic Sea. The main feature of these cyclones is a change of trajectories after the crossing of Belarus, further the most of cyclones turns toward northeast, but few number moves southward. The southern cyclones come to the territory of Belarus from all the Mediterranean regions, the Balkan Peninsula, the Black Sea and from Ukraine. The northwestern cyclones are generally formed over the Norwegian Sea and move through Scandinavia to the territory of Belarus, where the significant part of them turns toward northeast.

Mean pressure in the centers of cyclones over the territory of Belarus is about 992 hPa for the western and northwestern types and is about 997 hPa for the southern cyclones.

As known, southern cyclones as well northwestern cyclones are formed under the meridional atmospheric processes. So, the meridional circulation is a pattern, which occurs often over the Eastern Europe in current period. In the limiting cases, formation and movement of cyclones by quasi-meridional trajectories indicate to the end of blocking of atmospheric flow. It follows that the blocking processes were also observed often over the Eastern Europe during the study period.