# Monitoring of the Mediterranean cyclones and their influence on the Natural Hazards in Russia

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## Introduction

There are many works about the Mediterranean cyclones. In one of the first Pisarsky [6] elaborated the classification of the Mediterranean cyclone trajectories in Europe. One of the most detailed international researches [4] describes the results of studies of cyclone cloud systems in the Mediterranean basin from satellite data. The peculiarities of cloud cover connected with the evolution and movement of cyclones are analyzed.

This work discusses the change of the Mediterranean cyclones frequency and their connection with the frequency of meteorological extremes and the Natural Hazards.

## Methods and data

For monitoring of the Mediterranean cyclones frequency the classification of the Northern Hemisphere atmospheric circulation elaborated by B.L. Dzerdzeyevskii [1] was used. This classification gives opportunity to analyze the circulation conditions in a certain region of the Northern Hemisphere. It includes 41 elementary circulation mechanisms (ECM). For each ECM there is the map-scheme with typical cyclone trajectories, in particular Mediterranean cyclones. The daily time-series of ECM were elaborated for the period 1899-2005 [9]. Analysis of change of annual duration of ECM with Mediterranean cyclone outlets during this period gives a chance to evaluate the change of the Mediterranean cyclones frequency for 107 years.

## Change of the Mediterranean cyclones frequency

Average annual duration of ECM with the Mediterranean cyclones in the period 1899-2005 is 276 days per year. There are 2 periods with negative deviations: 1899-1911, minimum in 1904 (217 days) and 1924-1954, minimum in 1948 (193 days). The fluctuation near average take place in the period 1972-1983, and besides maximum was near 300 days per years, but minimum has decrease to 240 days. There are 3 periods with positive deviations: 1912-1923, maximum (306 days) in 1917, 1955-1971, maximum (318 days) in 1968 and from 1984 to present with maximum (338 days) in 2003. Average for last 22 years is 315 days per years, what is 9 days more that maximum of 1917.

## Frequency of meteorological extremes and the Natural Hazards.

Heavy and catastrophic showers over western and eastern coasts of Black Sea have

connected with Mediterranean cyclones [8]. Heavy showers are one of the extreme weather processes. They are responsible for such hazardous processes as floods, mud-flows and landslides. Heavy snow-falls are cause of avalanching. These hazardous processes are increase in last decades, especially in Northern Caucasus [2, 3, 4, 5]. Heavy snow-falls are increase in European Russia [7].

**Conclusion**

Atmospheric circulation over Northern Hemisphere in last decades forms the high frequency of Mediterranean cyclones. They bring the heavy and catastrophic showers over western and eastern coasts of Black Sea and over Central and Eastern Europe, what is caused of many Natural Hazards in these regions.

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