

Atmospheric circulation associated to extreme rainfall events in Estonia 1961-2005

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This study aims at finding out the previous heavy rain events from the 1960s up to last summer and to give a brief analyze of their synoptical situations using cyclone tracking results and atmospheric circulation patterns.

The last two remarkable rain events in Estonia happened in towns: on 5 to 6 August 2003, 131 mm precipitation rained per 24 hours in Johvi; on 28 July to 29 2004, 145 mm rained per 48 hours in Tallinn. Both events caused damages to houses, gardens and roads and were widely exposed by media. This raised a question how unusual has this kind of heavy rainfall been in Estonia. We have defined a heavy rainfall as an event where the rate of precipitation accumulation exceeds 50 mm per 24 hours. 39 days of heavy rainfall were registered at Estonian meteorological stations during the months of July and August in 1961-2005. In the 1960s, 3 days of heavy rainfall were recorded, in the 1970s - 7, in the 1980s - 13, and in the 90s - 7; during the 5 years of the twenty first century, 9 days of heavy rainfall have been observed. It means that up to the 1990s, there was a rising trend of heavy rainfall events in Estonia. Then, during the 1990s, a less amount of heavy rainfall was detected; the first five years of this century have again shown a lot of heavy rainfall.

Our second aim was to analyse the synoptical situations that bring heavy precipitation to Estonia using the Grosswetterlagen classification of circulation patterns and Lamb's automatic circulation classification for the Baltic Sea region. The majority of heavy precipitation events in Estonia are caused by local cyclones, which have a short lifetime and trajectory. Among European circulation patterns, the most important carriers of heavy rain are Central European trough, Western European trough and South Cyclonic.