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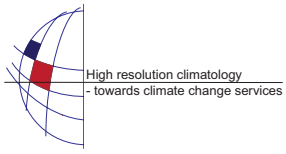

Extreme precipitation events in Estonia and associated atmospheric circulation patterns

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This study aims at finding out the previous heavy precipitation events in Estonia from the 1960s up to 2005. The second aim of the research was to analyse the synoptic situations that bring heavy precipitation to Estonia and to test the ability of atmospheric circulation classifications to distinguish the heavy precipitation causing circulation patterns. For this reason we analyse the synoptic situations that bring heavy precipitation to Estonia using several atmospheric circulation classifications for the Baltic Sea domain selected to catalog COST733cat-2.0.

This study is based on dataset of 24-hour accumulated precipitation from 40 Estonian stations. To quantify extreme precipitation in stations we use values of 0.95 and 0.99 percentiles of daily precipitation distributions. Percentiles are found for cold and warm seasons separately. November to April is defined as cold and May to October as warm season. The 0.99 percentiles of daily precipitation distributions for Estonian stations vary between 18.9 – 25.3 mm in the warm season and 9.9 – 15.8 mm in the cold season, the 0.95 ones are respectively 9.3 – 13.1 mm and 5.2 – 8.8 mm. As the atmospheric circulation in case of frontal and of convective precipitation may be very different we want to distinguish between these two types of events. Extreme precipitation event is expected to be of frontal origin if the percentile was exceeded in more than one station at the same day or in previous or next day.

Frequency distributions of weather types occurences in case of heavy precipitation days and all days were compared. All classifications give strong connections between heavy rainfall cases and intense cyclones. Anticyclonic types altogether bring heavy precipitation in about 10% of cases (depending on classification).