The thesis is divided in two parts. The first part deals with the areal distribution of short-term convective rainfalls with regard to the influence of altitude. Precipitation estimates based on combination of rain gauge and radar data are used for this purpose. Statistical tests proved that the areal distribution of hourly convective rainfalls does not depend on altitude. Besides data containing precipitation events only, all measured data were statistically analysed regardless of the fact whether precipitation occurred or not. In this case it was found out that the relationship between hourly rainfall totals and altitude depends on the considered threshold of rainfall totals. When all data were considered, i.e. a threshold value was set to zero, an increase of rainfall totals well correlated with altitude. The dependence slowly disappeared with an increasing threshold. The areal distribution of 6 hour rainfall totals proved higher values in the area of south Bohemia. The most frequent synoptic patterns were northwest cyclonic situations (NWC) and cyclone over the Central Europe (C).

The second part of the thesis is focused on satellite data exploitation, as measured by meteorological satellite Meteosat Second Generation, for convective precipitation estimates. The Convective Rainfall Rate (CRR) algorithm, which computes rain rates and precipitation estimates on the basis of measured satellite data, was used in the thesis. The algorithm was modified and calibrated for the area of the Czech Republic using radar data from the Czech weather radar network. Qualitative, quantitative and “fuzzy” verifications showed an improvement of obtained results in comparison with the original version of the algorithm.