# Cloud observations by ceilometer, radiosondes and by visual observations

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A ceilometer is a meteorological instrument that plays an important role in the automated observation network. One of the main parameters of a ceilometer is the cloud base height. The Meteorological and Hydrological Service of Croatia is currently working on the automation of meteorological stations in the whole country. As a part of that process, ceilometer Lufft CHM 15k was installed at the Meteorological and Aerological Observatory Zagreb – Maksimir in September 2017 and there is a need to check the reliability of the information that the ceilometer gives on clouds, especially cloud base height. After preliminary research carried out in 2018, where ceilometer data and visual observations were compared, more detailed research is now performed. This time, we used data from 3 sources: ceilometer, visual observations and radiosondes. The measurements of the ceilometer at the Meteorological and Aerological Observatory Zagreb – Maksimir are processed to obtain cloud base heights of up to 3 cloud layers. Observers at the same meteorological station were taking additional notes and remarks on cloud base heights and cloud types in September and October 2018. During this period, Vaisala radiosondes were launched twice a day (1200 and 00 UTC) at the same location in Zagreb. The Vaisala radiosonde, that has high temporal resolution (1s), collected vertical profiles of relative humidity which are used to determine the location of the cloud base. We compared the ceilometer measurements of cloud base heights with visual observations and radiosonde data and analyzed the results, especially cases with big discrepancies. Besides cloud base height, the total cloud cover is also compared and discussed.