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## Determination of hygroscopic aerosol growth based on the OPC-N3 counter

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In this study the OPC-N3 low-cost particle matter counter was used to determine the hygroscopic properties of the aerosol. The work shows the first results of aerosol hygroscopicity conducted in Poland. The study was performed during Spring 2020 (lock-down period) and Winter 2020/2021. The research was conducted in the Geophysics Institute at the University of Warsaw, close to the city center.

Two OPC-N3 sensors were connected to the outlet from two legs of the Aerosol Conditioning System ACS1000. In one of them, low relative humidity was kept at the level of 20%, and in the other, the relative humidity was changed in the range of 50-90% in cycles.

The calculation of growth factor was done by dividing the PM1 measured from wet pipe by PM1 measured in the dry channel. The hygroscopicity parameter  $\kappa$  was calculated from  $\kappa$ -Köhler theory, showing a fluctuation of the  $\kappa$  parameter which depends on aerosol type.

The variability of  $\kappa$  during Spring was ranging from values of 0.075 up to 0.437 (growth factor range 1.294 – 2.625). The observed  $\kappa$  for Winter oscillates between 0.018 - 0.077 (growth factor range 1.057 – 1.246). The values of hygroscopicity of aerosol in winter are smaller than the ones corresponding to Spring, in line with respect to previous literature reports.

The study shows possibility to use OPC-N3 for calculation of the hygroscopic properties of the aerosol, however it means that the measurements of PM done by OPC-N3 can be biased by high relative humidity.