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High Precision NO_2 and NO measurements with the ICAD instrument during s-b-s campaign Hohenpeißenberg 2016

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Nitrogen Oxides (NO_x = NO_2 + NO) play a major role in air pollution and atmospheric chemistry. Beside health effects they influence e.g. acid rain, ozone and oxidation capacity. But precise NO_2 and NO measurements are still difficult. State of the art NO_2 / NO instruments show significant interferences e.g. to H_2O and HONO, problems of zero point and calibration drifts, temperature and also vibration influences. Other systems, especially low cost sensors, feature significant problems in terms of measurement accuracy and reliability. To overcome these problems we developed a direct spectroscopic NO_2 / NO_x ICAD instrument (Iterative Cavity Enhanced DOAS). It feature high accuracy, is relatively small, mobile and requires only low power consumption.
During a side by side (s-b-s) inter-comparison campaign at the Meteorological Observatory Hohenpeißenberg (DWD) 2016 the performance of different instruments for NO_2, NO and NO_x were investigated under natural and artificial conditions. The concentration ranged from few ppt up to 100ppb.
The inter-comparison demonstrates excellent performance of our ICAD in terms of accuracy and drift. In comparison to other techniques it features no interferences to different humidity's, temperatures and interfering gases. Also the zero point and calibration is absolutely stable. As the instrument is also much simpler and easier to operate, it has many advantages in comparison to other instruments. The characteristics of the instruments and results of the campaign will be presented.