

Optimisation of the Spectronus FTIR instrument for tall tower greenhouse gas observations

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The Spectronus FTIR-instrument of Ecotech has been modified to increase the performance. These modifications includes cell-temperature control and a gold-plated cell (as presentated on GGMT 2015 by Alex Vermeulen et al.). After final lab testing the instrument was installed at Cabauw tower in The Netherlands in December 2014, measuring CO₂, CH₄, N₂O and CO at four measurements heights (20, 60, 120, and 200 m).

In order to improve time-integration for the different measurements heights mixing volumes with a volume of 20 L were installed, kept at 1700 mbar sample pressure. Due to the large air volume used by the Spectronus for the measurements the calibration scheme was modified to ensure sufficient lifetimes of the calibration flasks. The time series of the spectronus measurements thus far will be presented.

The CO₂ and CH₄ measurements of the Spectronus instrument are compared to those measured by the Cabauw Picarro G2301. From August 2015 onward the Picarro is measuring from the same mixing volumes as the Spectronus. After significant effort a compromise has been found between required gas volume per measurements cycle, length of the cycle and precision and accuracy of both ambient and calibration gas cycles.