



## **Comparison of continuous background in-situ and column integrated CO<sub>2</sub> observations at Jungfraujoch with an urban site in the city of Bern**

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A six and a half year (January 2005 to May 2011) comparison of CO<sub>2</sub> concentration observations has been performed at Jungfraujoch, Switzerland and the city of Bern using two different measurement techniques run by the University of Bern (UBE) and the University of Liege (UL).

The UBE systems at Jungfraujoch and Bern are both combined systems for atmospheric oxygen and CO<sub>2</sub> measurements. The cryogenically dried air is analysed for CO<sub>2</sub> with a Mairak analyser based on the broad-band infrared absorption technique. The measurement frequency is every second but the final reported data are averages of six minute periods.

UL is measuring the solar infrared spectrum since 1950 at Jungfraujoch. On its way through the atmosphere, the solar spectrum is modulated depending on the abundant gas species and their amount in the column. Since some gases like CO<sub>2</sub> absorb the solar infrared radiation at particular wavelengths and the extinction is proportional to the gas concentration, it is possible to determine the gas concentration in the column above the sensor.

At the conference, we will present the three observational records for the six and a half year period. The results show for all three records a distinct, but different seasonality. The seasonalities of the UL and UBE record at Jungfraujoch are lower than the seasonality in the city of Bern, i.e. 4.5 ppm per year and 9 ppm per year for the column and the in-situ record respectively, whereas the seasonality in the city of Bern is 31 ppm per year. Also the maxima and minima of the Jungfraujoch measurements are delayed by several weeks compared to the measurements in the city of Bern. The annual increase of the CO<sub>2</sub> concentration of the UBE and UL records of Jungfraujoch are in good agreement with 1.94 ppm per year and 1.90 ppm per year, respectively. The annual increase of the CO<sub>2</sub> concentration at the urban site is a bit higher at 2.01 ppm per year.