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Long path DOAS tomography by the use of Multibeam DOAS instruments: Results of an indoor validation campaign

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Long path DOAS (Differential optical Absorption Spectroscopy) tomography uses 10 to 40 intersecting light beams to probe 2-3 dimensional concentration distributions of various trace gases (e.g. NO_2, SO_2, ozone, HCHO) in the measurement area. From the average concentrations measured along the different light paths the concentration distributions can be reconstructed with suitable inversion algorithms. First indoor tomography DOAS with the recently developed Multibeam Long path DOAS instruments were performed in an empty facility hall in Heidelberg/Germany in order to validate the method. The measurement setup used three Multibeam instruments and a total of 39 different light paths. The size of the test field was 10 m $\times$ 15 m. The concentration distribution consisted of one or two NO_2 filled cylindrical polycarbonate containers placed inside the test field. The results of the reconstructions using the Simultaneous Iterative Reconstruction Technique (SIRT) are shown.