Soot extinction measurements in different heights of a petrochemical flare using lidar

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Abstract: The purpose of this paper is to show preliminary results of the remote sensing of soot inside a meter-scale petrochemical flare. These measurements were carried out using a scanning backscatter lidar system operating in the biaxial mode, scanning through successive crosssections of the flare. The light source is a commercial Nd:YAG laser (CFR 400 by Quantel S.A.) operating at the three wavelengths 355 nm, 532 nm and 1064 nm. The measurements were performed on a flare located in the vicinity of the Environmental Research Center (CEPEMA) of the University of São Paulo, in the city of Cubatão, Brazil [1]. Horizontal scans, consisting of a succession of line-of-sight backscattering lidar acquisitions, were conducted at different heights of the flame. These backscattering profiles thus contain the molecular atmospheric signal and the sharp backscattering peak attributable to the sootladen flame. The path-integrated extinction coefficient is then obtained at three wavelengths from the difference in signal before and after the flare from Beer's law. We show cartographies of the soot extinction coefficient for various conditions of a flare located at a distance of about 400m from the acquisition system.

References

[1] R. F. da Costa, E. Landulfo, W. N. Nakaema, R. Bourayou, P. F. Moreira Jr., and R. Guardani, *Preliminary Studies of the Backscattering of Industrial Flare using Lidar Technique in Cubatao, Brazil*, 26th ILRC Proceedings (2012).

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