# Correlation between two different real time data acquisition systems: LIDAR Raman and Cavity Ringdown Laser Spectroscopy, for CH4 as a fugitive gas, in São Paulo Metropolitan Area

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Fugitive emissions, defined as unintended or irregular leaks of gases and vapors, are an important source of air pollution that is difficult to monitor and control. These sites, including megacities like São Paulo, are growing in size and economic activity. At the same time, there is a remarkable growth in concerns about the environmental issues associated with these activities. In a constantly changing world, with increasing concentrations of greenhouse gases (GHGs), among them methane (CH4) and volatile organic compounds (VOC), mitigation of atmospheric emission of these gases to contain global warming, make field campaigns in the metropolitan region of São Paulo very relevant. Optical remote sensing techniques as lidar can attend the need for real time and trustable information on fugitive emissions. The Cavity Ringdown Laser Spectroscopy (CRDS) technique was adopted because it is widely used in the detection of gas samples that absorb light at specific wavelengths and also for their ability to detect mole fractions up to the parts per trillion level. The Raman LIDAR system used includes a commercial laser pulsed Nd:YAG Quantel S.A., model CFR 200, with wavelengths of 355 nm, 353 nm and 396 nm, 120 mJ pulse power, with laser repetition rate of 20 Hz and pulse width of 20 s, with a spatial resolution of 7,5 m. The system includes an ethernet interface, used together with LabView software to control the measurement and readout of the acquired data. The mixing ratio of CH4 can be observed within the planetary boundary layer. The measured methane profiles correlate with the acquisitions made with the CRDS, however, an additional contribution of control data in which the Raman lines detect with high sensitivity.