

Methane determination in São Paulo coastal regions using the Cavity Ring-Down Spectroscopy (CRDS) technique

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Abstract: Methane is one of the main greenhouse gases due to its high radiation absorption capacity. The increase in methane emissions from anthropogenic sources causes concern in the entire scientific community due to the aggregated uncertainties, generating several works focused on the identification and quantification of generating sources. This work aims to quantify methane in two distinct regions, the first study region is in Cubatão city, located in the São Paulo coast. It is an important petrochemical complex with high industrial activities and environmental impact, presenting 25 large companies in the chemical sector, distributed in an area of 143 Km². Another region observed is Intanhaém, on the coast of the state of São Paulo. This region doesn't present industrial activity and has a low population index. The technique used to detect methane in the atmosphere was Cavity ring-down spectroscopy (CRDS), which consists on analysis of atmospheric components, in a small cavity that has a laser and high reflectivity mirrors of 99.999%, allowing the signal travel for kilometers inside the cavity, in a short time, increasing the sensitivity of detection of compounds in the sample.

Keywords: Methane; CRDS; greenhouse gases.

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