

## **Methane sources in Hong Kong – identification by mobile measurement and isotopic analysis**

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Hong Kong (22.4°N, 114.1°E) has a wide variety of natural and anthropogenic sources of methane within a small densely populated area (1106 km<sup>2</sup>, population ~7.3 million). These include emissions from important source categories that have previously been poorly studied in tropical regions such as agriculture and wetlands. According to inventories (EDGAR v.4.2) anthropogenic methane emissions are mainly from solid waste disposal, wastewater disposal and fugitive leaks from oil and gas.

Methane mole fraction was mapped out across Hong Kong during a mobile measurement campaign in July 2016. This technique allows rapid detection of the locations of large methane emissions which may focus targets for efforts to reduce emissions. Methane is mostly emitted from large point sources, with highest concentrations measured close to active landfill sites, sewage works and a gas processing plant.

Air samples were collected close to sources (landfills, sewage works, gas processing plant, wetland, rice, traffic, cows and water buffalo) and analysed by mass spectrometry to determine the  $\delta^{13}\text{C}$  isotopic signatures to extend the database of  $\delta^{13}\text{C}$  isotopic signatures of methane from tropical regions. Isotopic signatures of methane sources in Hong Kong range from -70 ‰ (cows) to -37 ‰ (gas processing).

Regular sampling of air for methane mole fraction and  $\delta^{13}\text{C}$  has recently begun at the Swire Institute of Marine Science, situated at Cape d'Aguiar in the southeast of Hong Kong Island. This station receives air from important source regions: southerly marine air from the South China Sea in summer and northerly continental air in winter and measurements will allow an integrated assessment of emissions from the wider region.