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Monitoring fluorocarbon atmospheric concentrations and emission sources

July 2020

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For many years atmospheric monitoring stations around the globe have collected air samples and analysed them for a whole range of pollutants including fluorocarbons, carbon dioxide, methane, and nitrous oxide (see below). Spikes in specific pollutants can be traced to a general source area based on prevailing air flow patterns. The sources of the pollutant may be well known and could be from existing banks of fluorocarbons in equipment such as refrigerators, air-conditioners, or motor vehicles if recovery and destruction of the fluorocarbon is not undertaken and may not be linked to current fluorocarbon manufacturing. Equipment such as refrigerators can have lifetimes of over 10 years before disposal. In the case of fluorocarbons used in insulating foam, there is a slow leakage through the closed cells of the foam over a long period of time but most of the emission can occur after the foam is scrapped (if no provision is made to capture and destroy it).

The atmospheric lifetimes of fluorocarbons, carbon dioxide methane, and nitrous oxide are established and these lifetimes together with their concentrations in the atmosphere enable the magnitude of any emissions to be calculated. If the substance is being destroyed in the atmosphere faster than it is being emitted then the atmospheric concentration will decrease. Conversely, significant new sources of emissions will be detected.

Atmospheric Monitoring

In the Advanced Global Atmospheric Gases Experiment, the concentrations of some 40 atmospheric trace gases (including 6 CFCs and 11 HFCs) are monitored continuously at 13 stations distributed globally. Results are reported at agage.mit.edu.

EFCTC

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www.fluorocarbons.org

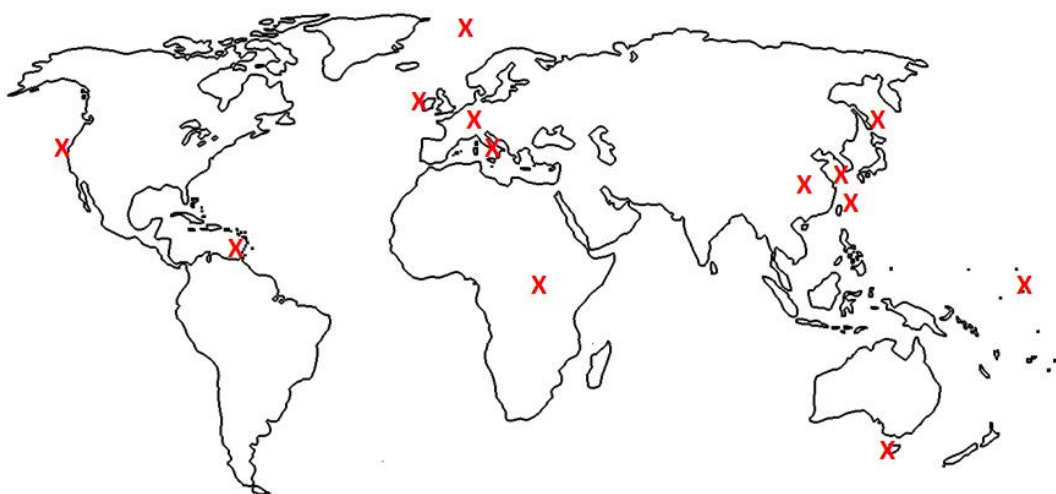
EU Transparency Register n° 64879142323-90

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AGAGE Monitoring Stations are at:

Ragged Point, Barbados; Shangdianzi, China; Mace Head, Ireland; Monte Cimone, Italy; Hateruma, Japan; Cape Ochiishi, Japan; Gosan, Jeju Island, S. Korea; Mt. Mugogo, Rwanda
Point Matatula, American Samoa; Zeppelin, Svalbard; Jungfrauoch, Switzerland; Cape Grim, Tasmania; Trinidad Head, California, USA, with approximate locations shown on the map.

NOAA Earth System Laboratory Monitoring

The U.S. National Oceanic and Atmospheric Administration's Earth System Laboratory, based in Boulder Colorado also operate a global measuring system for a similar set of compounds but use sampling flasks rather than continuous monitoring (<https://www.esrl.noaa.gov/gmd/ccgg/flask.php>), reported in their *hats* database.