

The WMO-GAW-VOC network with contributions of AGAGE

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GAW and AGAGE

The trace gas composition of the atmosphere is a major driver of climate change and air pollution events. Long-term observations with known quality are crucial for detecting trends of major air constituents. Networks with global coverage such as GAW (Global Atmosphere Watch) and AGAGE (Advanced Global Atmospheric Gases Experiment) work on this. Here we propose the possibility to evaluate the cooperation between these activities in analyzing non-methane hydrocarbons (NMHCs) in air.

GAW/AGAGE Synergies

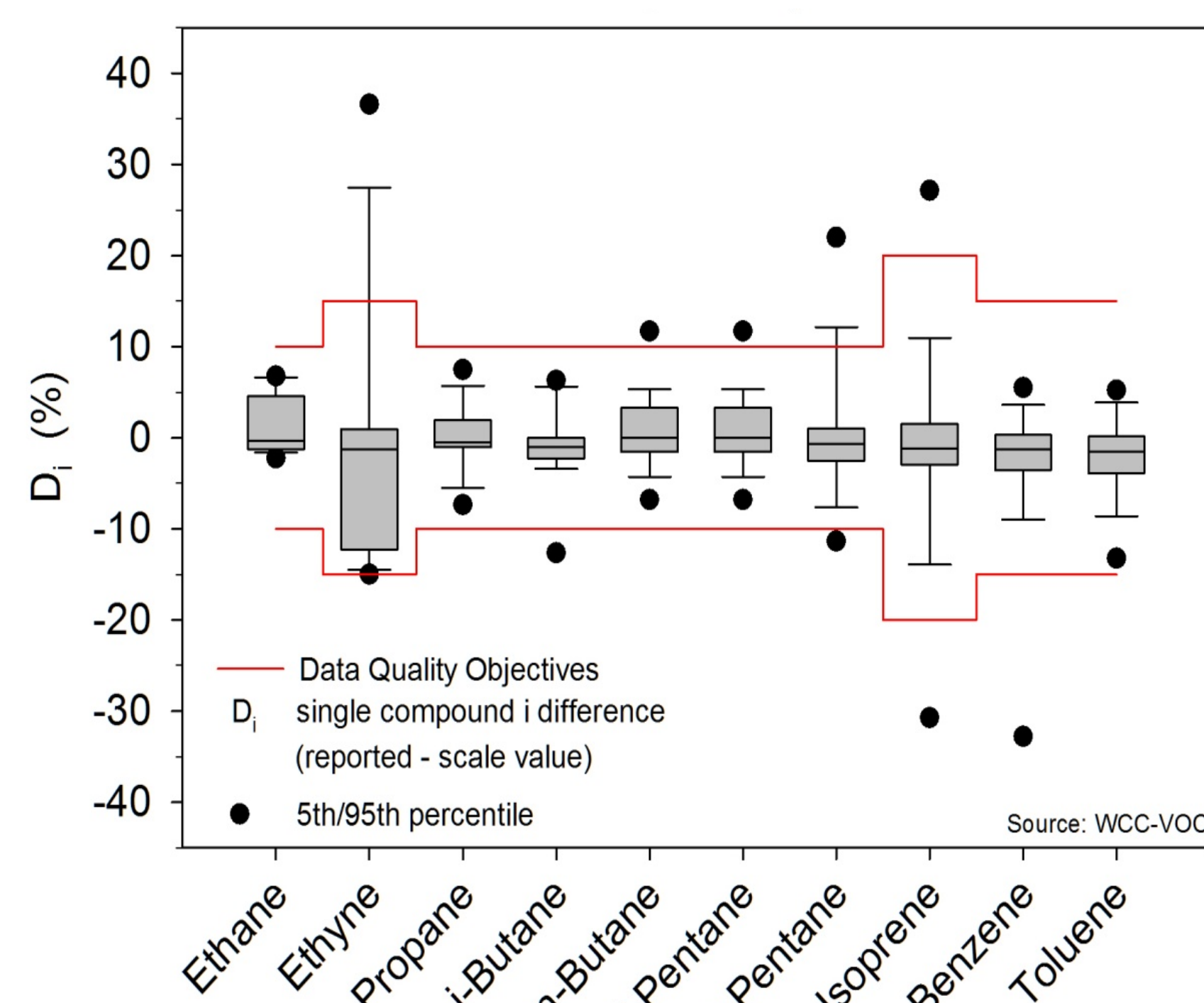
By combining network activities a significant increase in the global coverage for NMHC reporting stations is achieved for

- ❖ assessing environmental risks to society,
- ❖ strengthening the capabilities to predict climate, weather and air quality and,
- ❖ contributing to scientific assessments in support of environmental policy developed.

In consequence **emphasizing quality assurance and quality control better** integrated products and services of relevance to users are developed.

The GAW-VOC Network Data Compatibility

Results of 20 intercomparisons at 14 facilities (2007 to 2016)
NMHCs traceable standards in nitrogen
(single compound range: 1 - 4 nmol/mol)

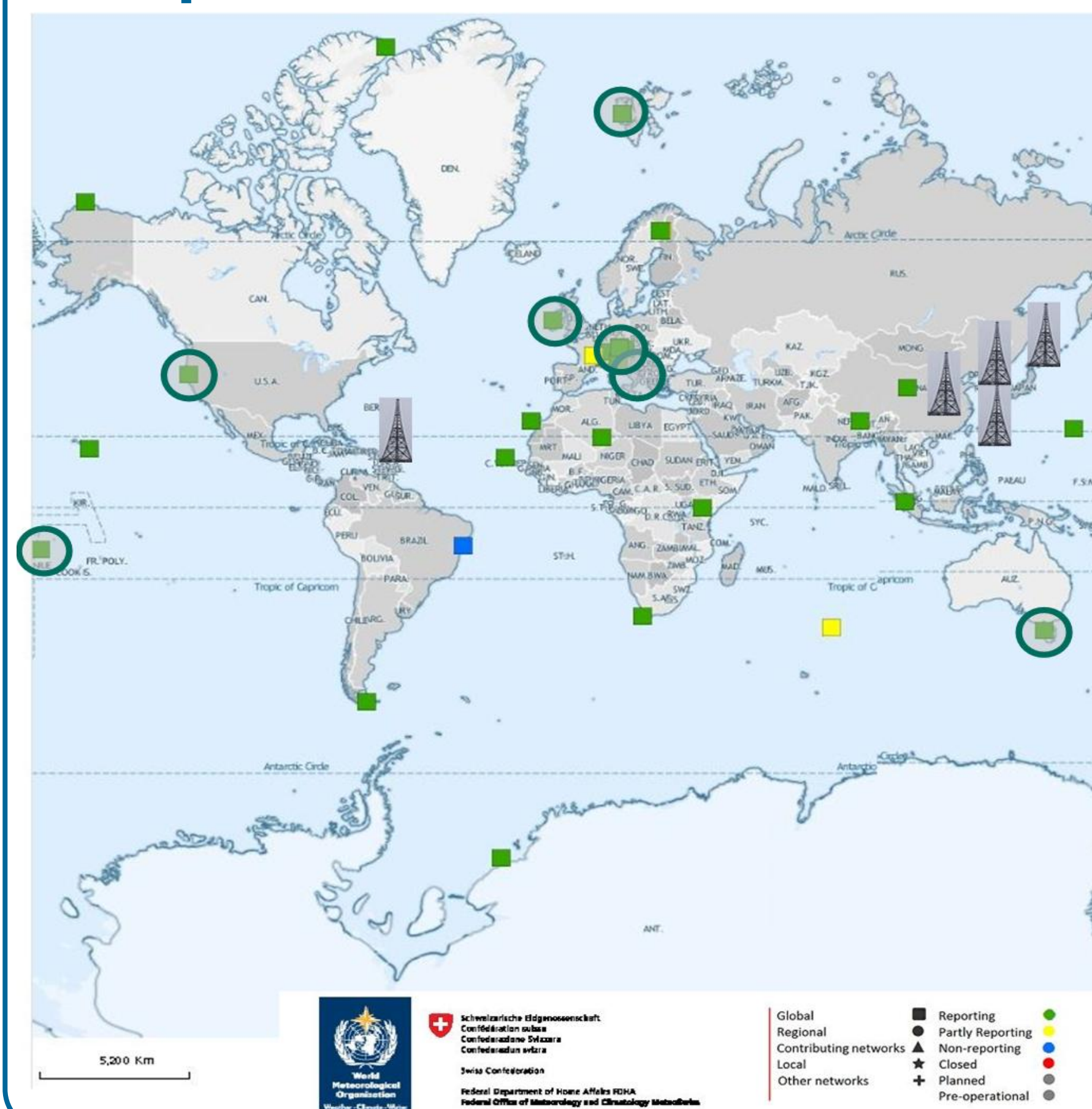


❖ The boxplot (25th/75th percentiles) highlights the good analytical performance in the GAW-VOC network for NMHC targets.

❖ Improvements possible for ethyne analysis.

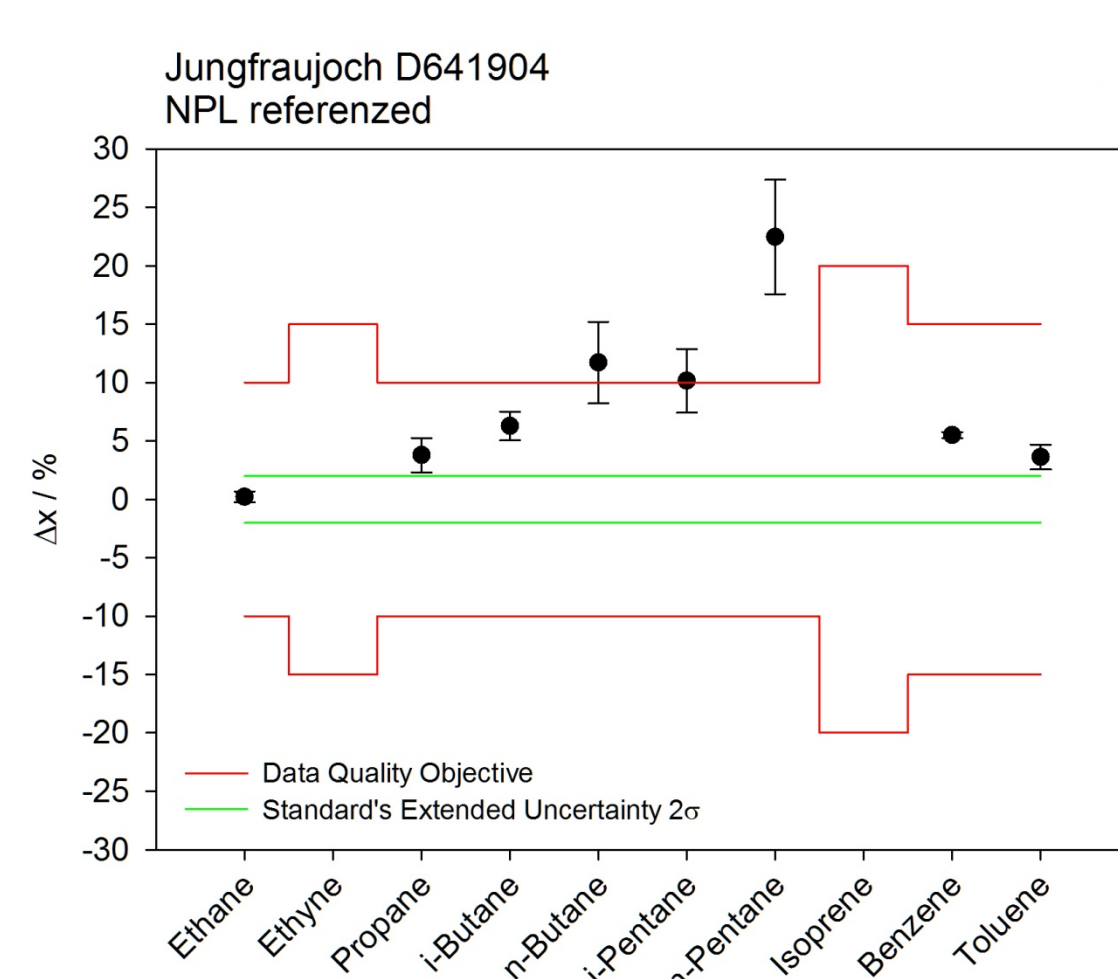
❖ Future: QA/QC for all GAW-VOC targets, possibly with real air standards.

The potential GAW-VOC/AGAGE Network



The Network of GAW-VOC; green and yellow squares). The stations of (AGAGE) within GAW-VOC are circled. Towers mark further AGAGE and affiliated stations so far not part of the GAW-VOC network.

The GAW-VOC/AGAGE Data Compatibility



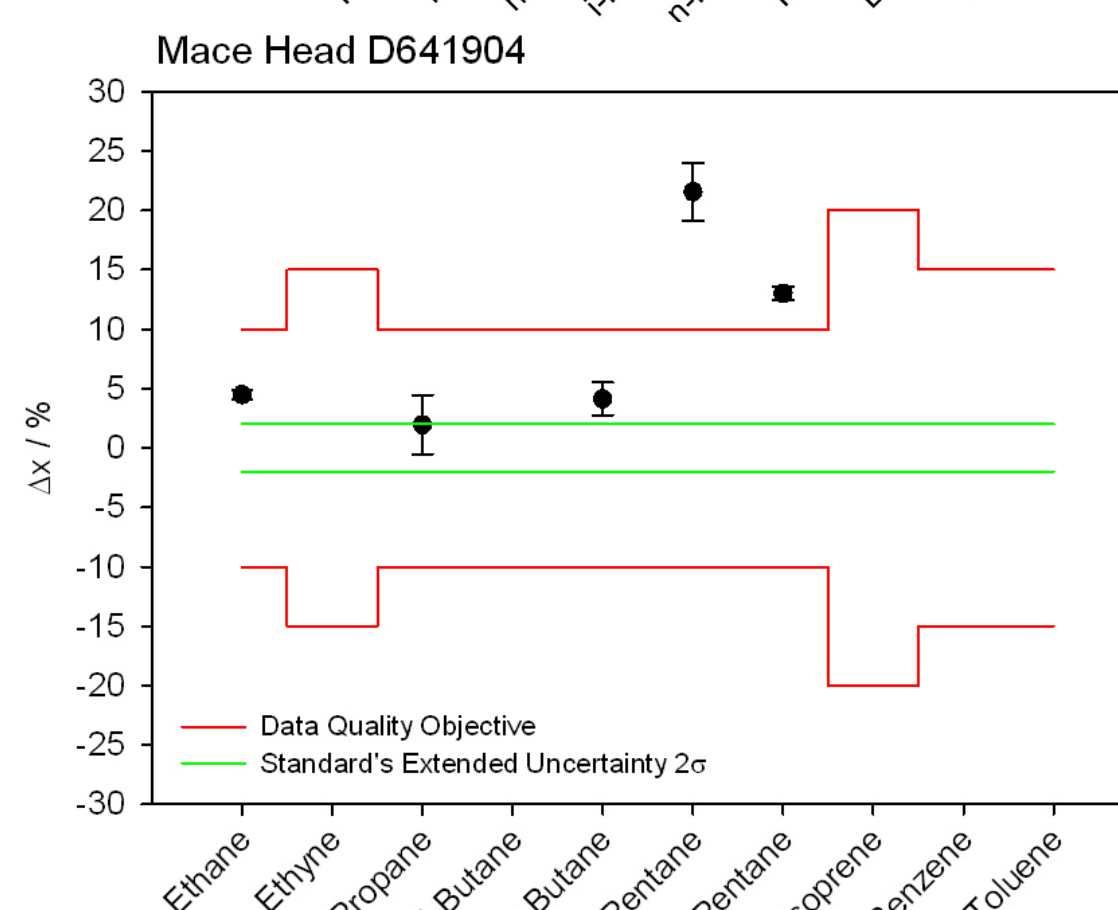
Jungfraujoch 2011:

excellent compatibility for:

- ethane, propane, benzene, toluene

Some compatibility problems may occur for:

- n-butane, i-pentane, n-pentane



Mace Head 2012:

excellent compatibility for:

- ethane, propane, n-butane

Some compatibility problems may occur for:

- i-pentane, n-pentane

Conclusion and Outlook

- Recent GAW audits for non-methane hydrocarbon analysis at GAW/AGAGE stations Mace Head and Jungfraujoch revealed that up to 80% of NMHCs GAW targets can be reported with data qualities matching data quality objectives of GAW-VOC.
- Thus, this is a very good start for joining WMO-GAW and AGAGE network activities to increase the global coverage for VOC reporting stations.
- Future challenges exist in developing a joint strategy to create synergies between the GAW-VOC and AGAGE networks.
- Specifically, agreeing on protocols to establish WMO-GAW compatible traceability, QA/QC measures and data reporting at the stations for maintaining and reporting high quality data.

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GLOBAL
ATMOSPHERE
WATCH

Umwelt
Bundesamt

References: http://www.wmo.int/pages/prog/arep/gaw/gaw_home_en.html;
<http://www.imk-ifu.kit.edu/wcc-voc/>