TUCAVOC: A Novel Automated Tool for Uncertainty Calculation for Atmospheric VOC Measurements

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TUCAVOC:

A Novel Automated Tool for Uncertainty Calculation for Atmospheric VOCs

Volatile organic compounds (VOCs) are precursors of secondary organic aerosols and tropospheric ozone and they indirectly contribute to radiative forcing. Their measurement is normally performed by the challenging gas chromatography technique, where the calculation of uncertainties is based on several independent factors.

Within the EURAMET-EMPIR project MetClimVOC, we are developing the user-friendly simplified digital tool TUCAVOC (**T**ool for **U**ncertainty **C**alculation for **A**tmospheric **VOC** Measurements), which allows data providers calculating the uncertainty propagation, following the principles established in the GUM (Guide to the Expression of Uncertainty in Measurement, GUM; JCGM 100:2008). The program is written in Python.

For the uncertainty calculation, different methods are in use for atmospheric VOC measurements. However, in the new Guideline for Measurements of VOCs, which is under review at WMO, a common approach will be enforced. This is the basis for the program, TUCAVOC, which supports responsible authorities and end-users in submitting comparable uncertainty estimates.

Summary and outlook

TUCAVOC is a novel approach to tackle the problem of contributing uncertainties to measurement data. This information can then be used not only to check for the quality itself but also as input variable to further modelling approaches, such as positive matrix factorization (PMF) or inverse modelling for emission verification. This will create impact through the homogenisation of the uncertainty calculations that are provided by the measurement sites to European and global databases.

The program has a potential to be used not only for VOCs but also for measurements of other air pollutants and greenhouse gases as well as for pollutants in other environmental compartments.

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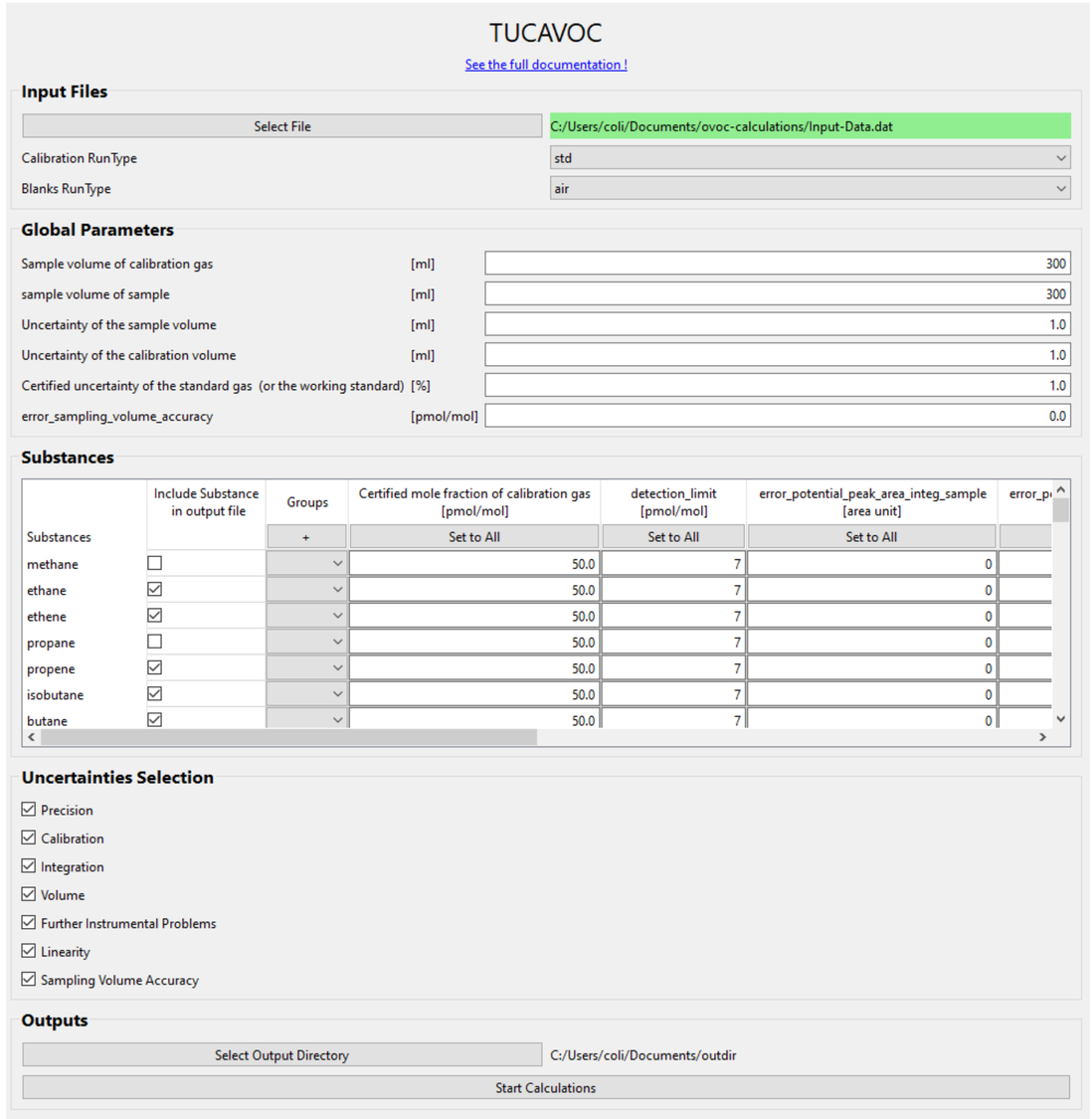

Draft GUI of the TUCAVOC program, which will be further revised during the MetClimVOC project.

Documentation:
https://tucavoc.readthedocs.io

Download at:
https://gitlab.com/empa503/atmospheric-measurements/tucavoc