FUME 2.0 – Flexible Universal processor for Modeling Emissions

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Free **open-source emission processor** working with various inventories generating **model-ready** emissions for chemical transport models.

Key features

- free open-source software (Python, PostgreSQL/PostGIS)

- **import module** is flexible and configurable to minimize manual preparation of the data, it supports:
  - different formats (CSV, NetCDF, shapefile)
  - main emission inventories e.g. CAMS, EMEP, EDGAR, CEDS
  - different sources, units, geometries, projections, . . .

- **case processing** supports:
  - advanced source processing: filtering, geometrical operations (masking, surrogates), applying emission scenarios
  - spatial and temporal disaggregation
  - chemical speciation

- **output module** supports:
  - CMAQ, CAMx, WRF-Chem, PALM, generic NetCDF
  - vertical distribution of emissions

- modular structure – extendible for different input/output formats

- possibility to incorporate **external models** (currently MEGAN)
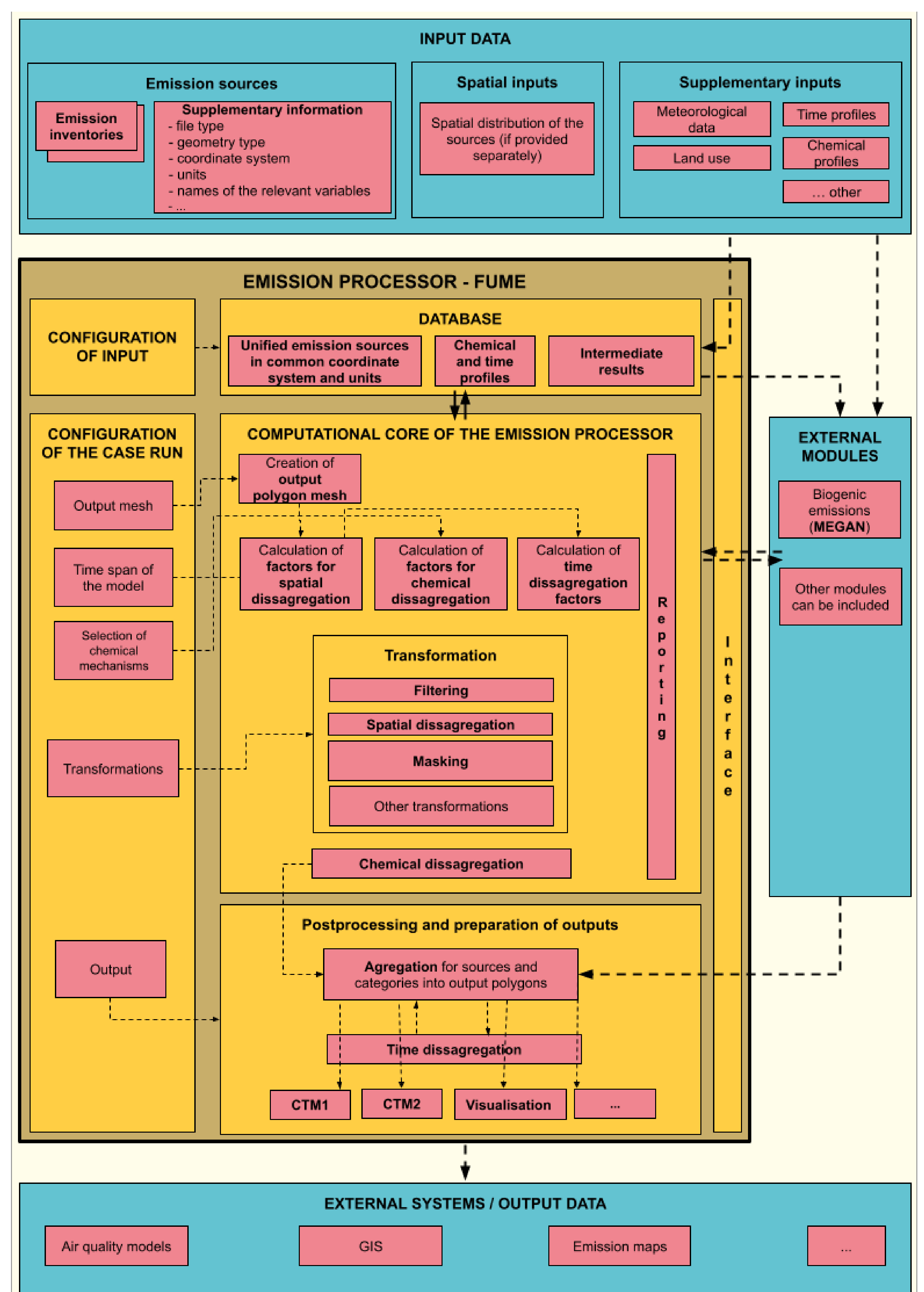
- actively used and developed

Code, data availability & paper

The FUME code, documentation and test cases available through

http://fume-ep.org/
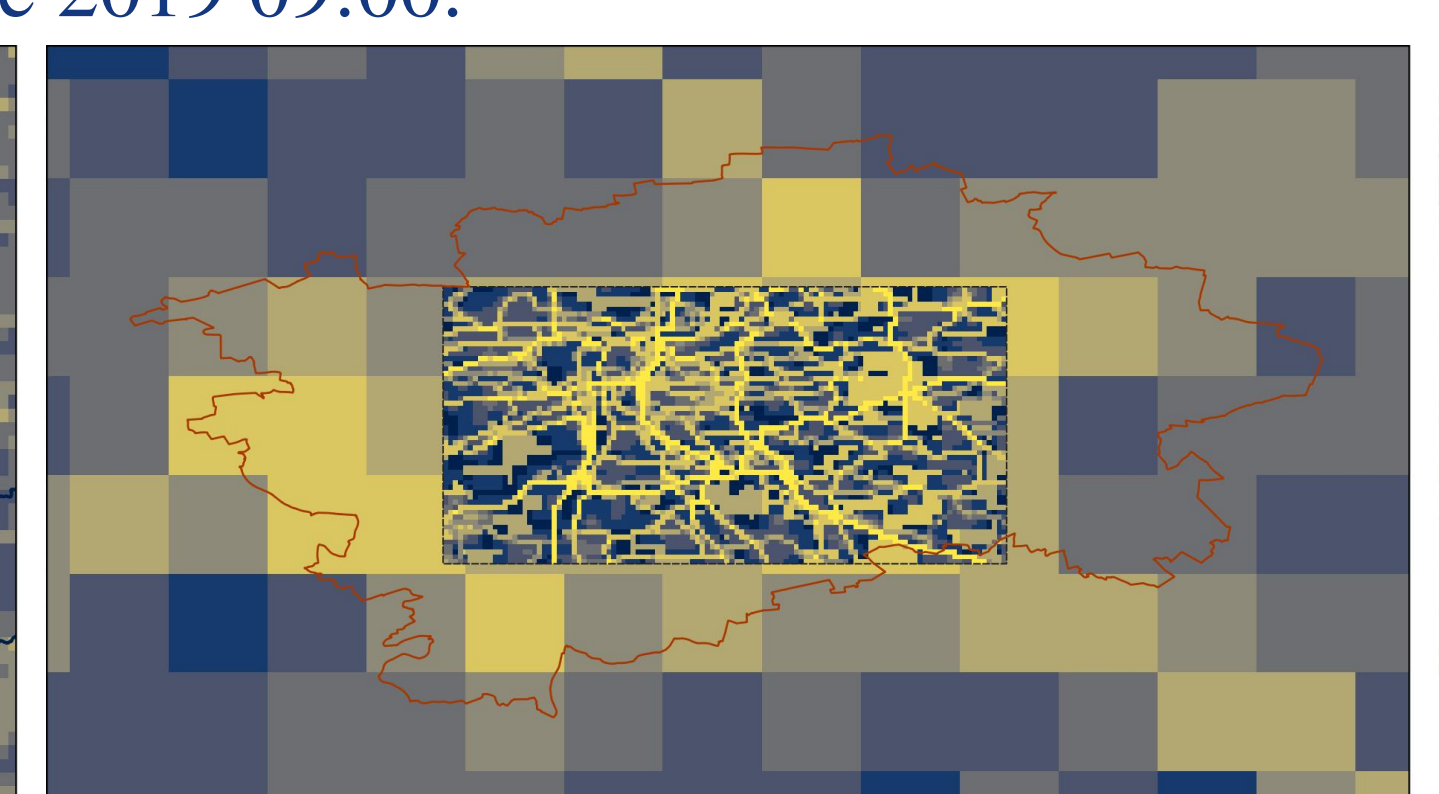
FUME workflow

Test case

- three nested domains (a, b, c)
- combination of
  - EU CAMS inventory 2019
  - detailed Czech emissions
- times to process the data
  - data import – 140 mins
  - process case (done once)
    a) 260 b) 2 c) 0.6 mins
  - prepare output (done once)
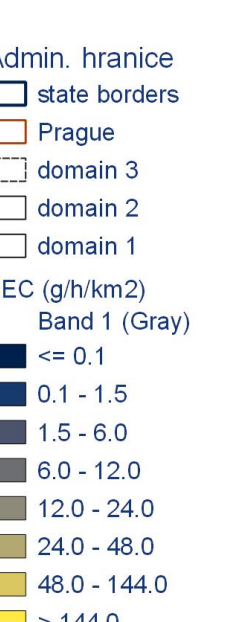   a) 180 b) 12 c) 1.5 mins
  - 1-day output
    a) 90 b) 3 c) 1 mins

FUME outputs for elemental carbon, 1 June 2019 09:00.
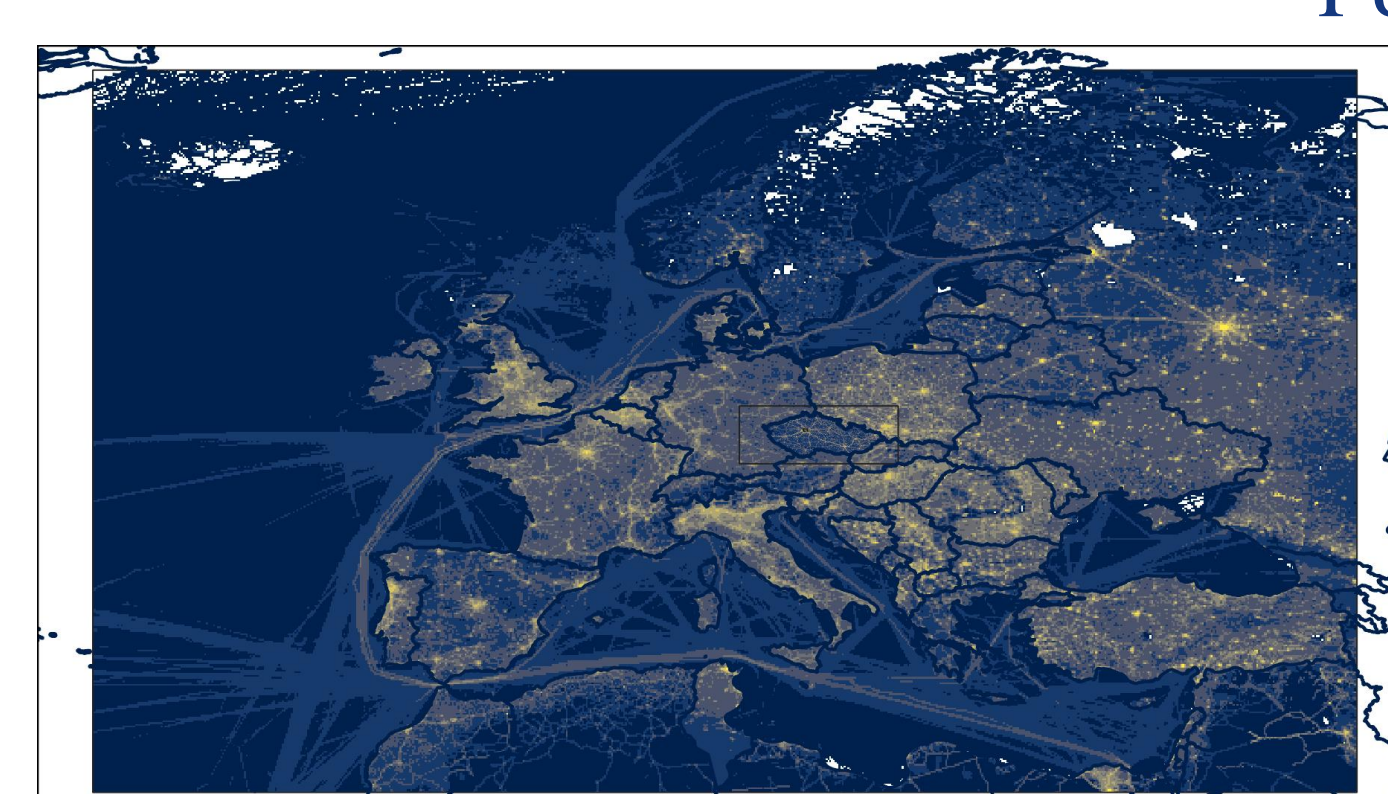
a) CAMS EU forecast domain
res. $0.1° \times 0.1°$ (700×400 grids)
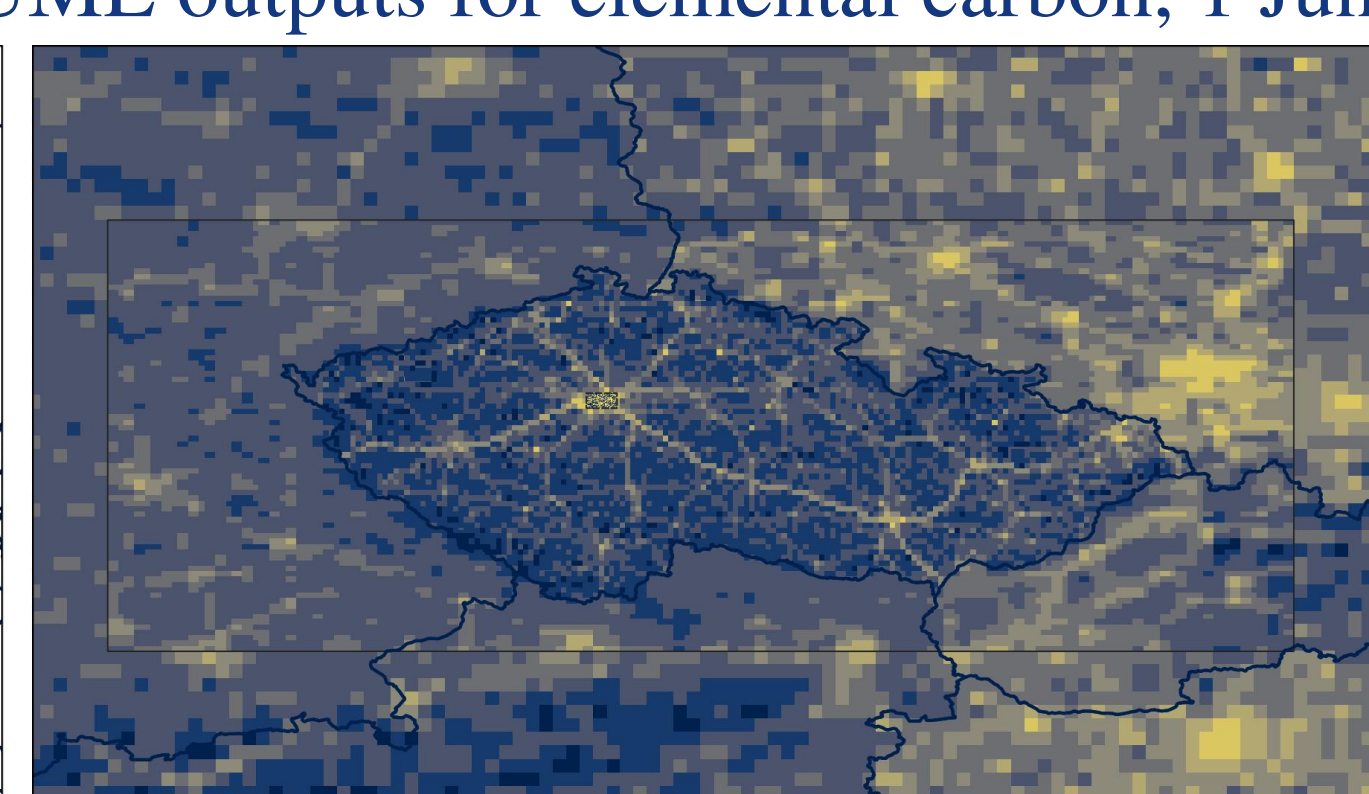
b) Czech Republic
res. $0.04° \times 0.04°$ (220×80 grids)

c) center part of the capital city Prague
res. $0.002° \times 0.002°$ (114×56 grids)

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