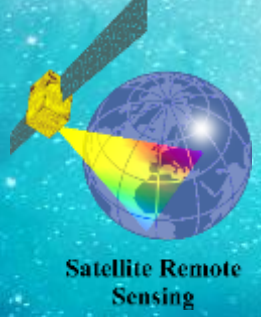

Using TROPOMI L2 NO_2 Measurements to Fine-Tune a High Resolution Regional Atmospheric Chemistry Model and Inter-Comparison Procedure

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23/09/2021

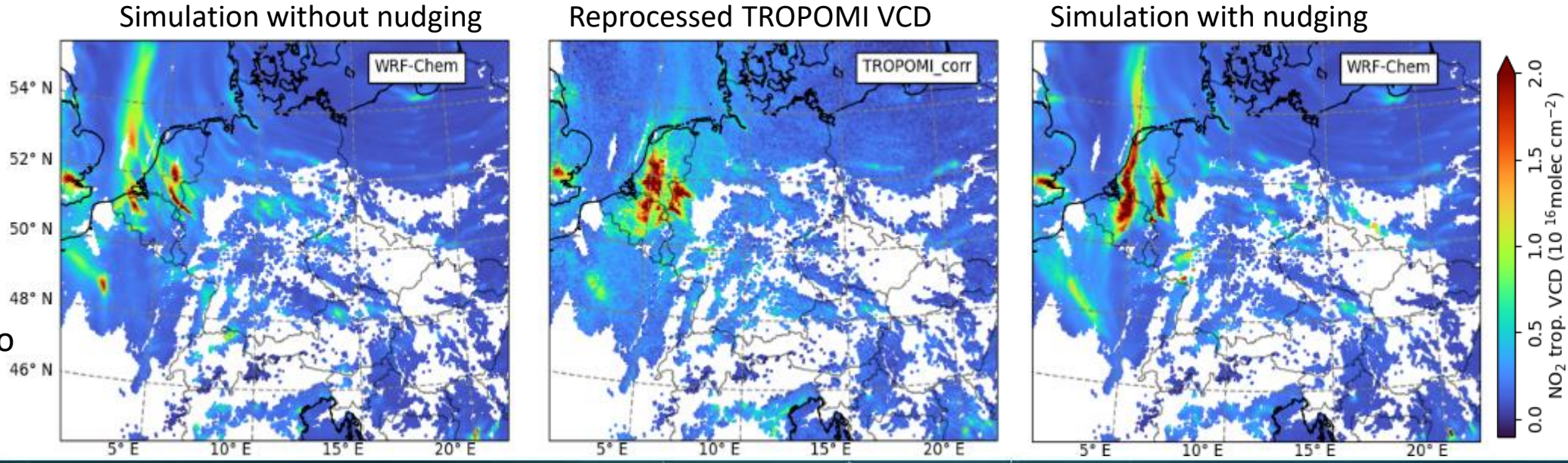
Highlights of the study

- High spatial resolution atmospheric models achieve comparable spatial resolution as that of new generation satellite instruments.
  - ❑ Performance of such models have been rarely evaluated at day-to-day basis with respect to satellite observations.

- Regional atmospheric chemistry transport model WRF Chem was set–up at 3×3 km^2 spatial resolution over western Europe and evaluated with respect to individual TROPOMI orbits as well as temporal means.

Illustrative example of orbit 2952 09 May 2018

Gaps are caused due to clouds and quality assurance filter



Improvements presented in this study

- Improved meteorology using spectral nudging in WRF Chem for more accurate simulation of plume direction and dispersion. With spectral nudging, simulated values of U, V and T are relaxed towards ERA5 reanalysis data on large scale.

- More realistic composite emission inventories using global and regional data. Special consideration to sector and country specific temporal variability (seasonal, day of week and diurnal) of emissions.

- Idealized evaluation process with respect to TROPOMI by strict consideration of overpass time at specific pixels.

- Use of averaging kernels and high resolved a priori NO_2 profiles for a consistent retrieval of VCDs both from TROPOMI and WRF Chem.

- Two different NO_2 tropospheric VCD products were used for evaluation : Operational product and regional reprocessed products with CAMS a priori.

Poster P 1.5.8 in the
Calibration and Validation session