THE 2013 CANADIAN AIR QUALITY MODELLING PLATFORM AND THE FUTURE BASE CASES USED FOR POLICY REGULATIONS

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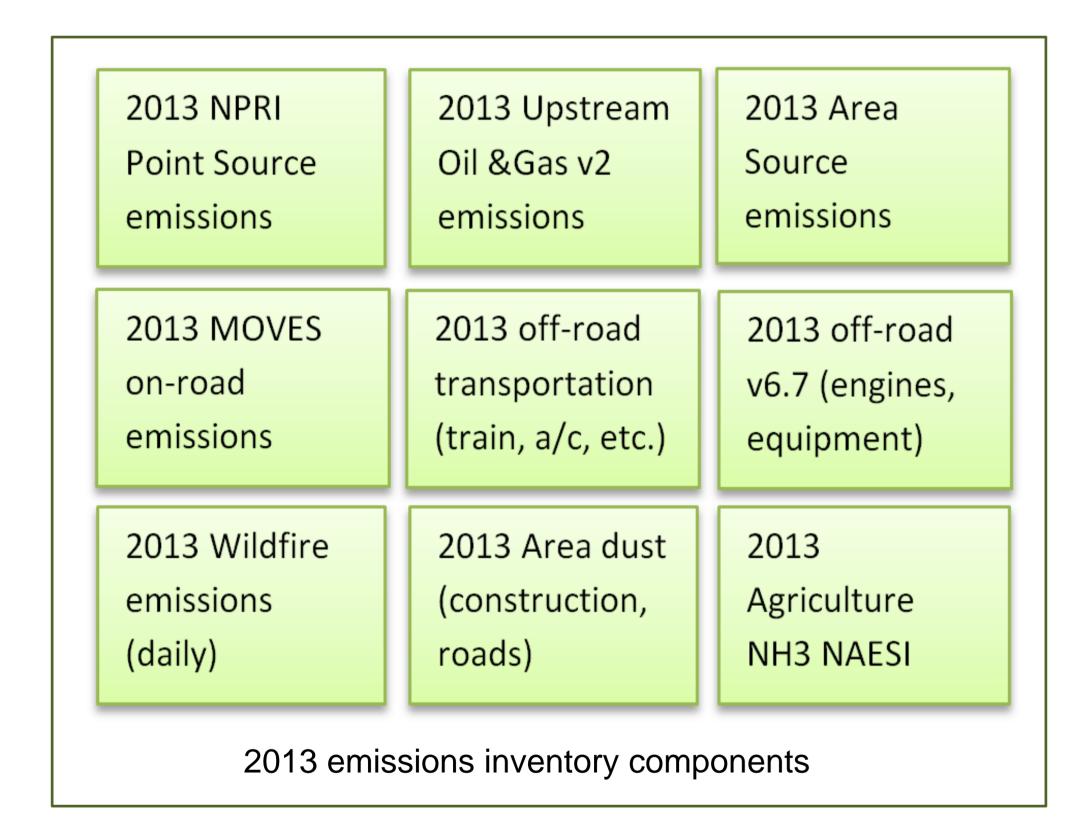
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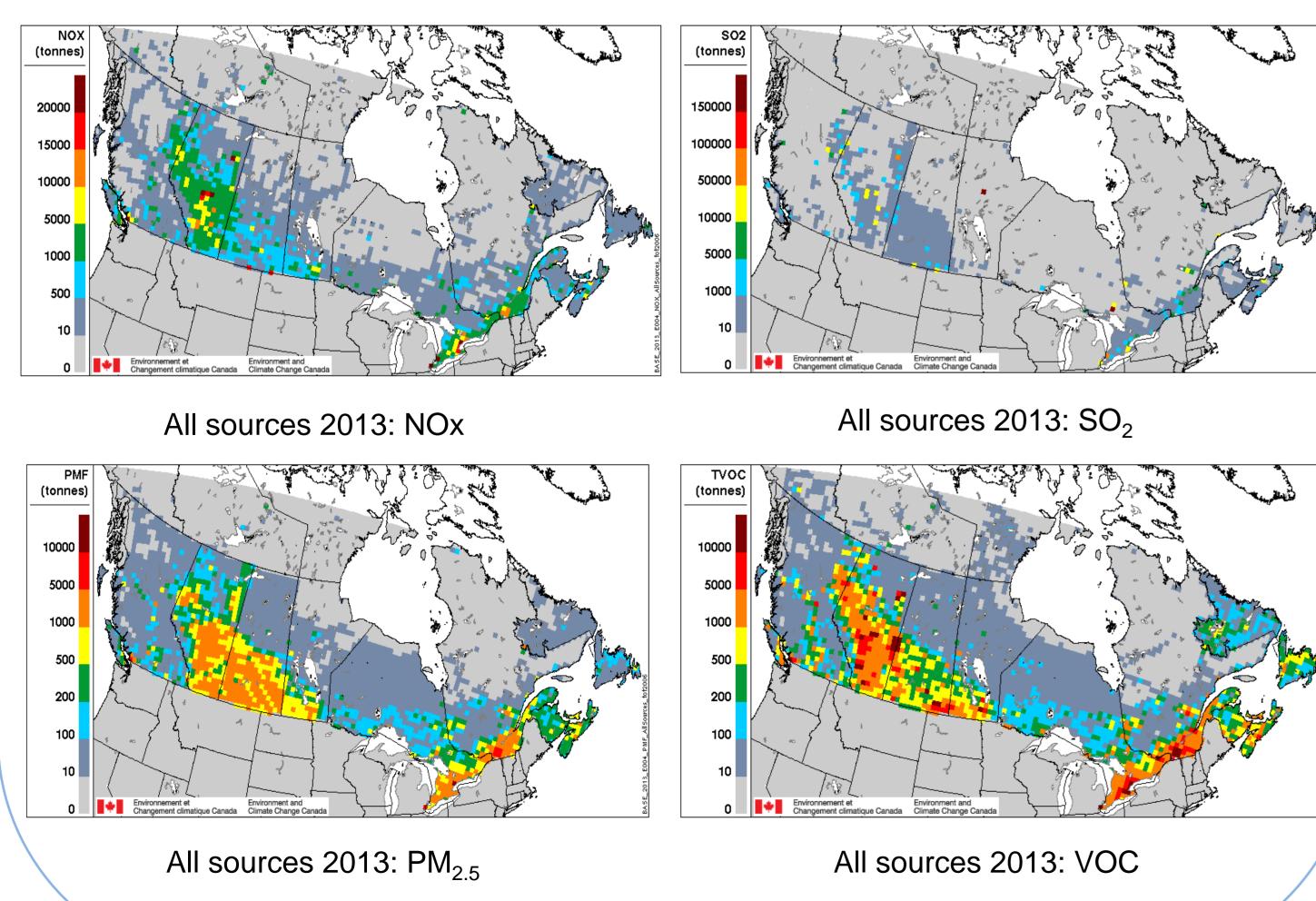
Environment and Climate Change Canada   Environnement et Changement climatique Canada

Introduction

The Air Quality Modelling and Applications Section (AQMAS) of Environment and Climate Change Canada (ECCC) has upgraded its modelling platform used to assist Canadian air quality regulators in policy developments. The updated platform based on year 2013, contains various changes and substantial improvements from the previous 2010 platform, notably the base case and the future *business as usual* (BAU) projections, based on the latest available emission inventories for transportation, industrial sectors and wildfires.
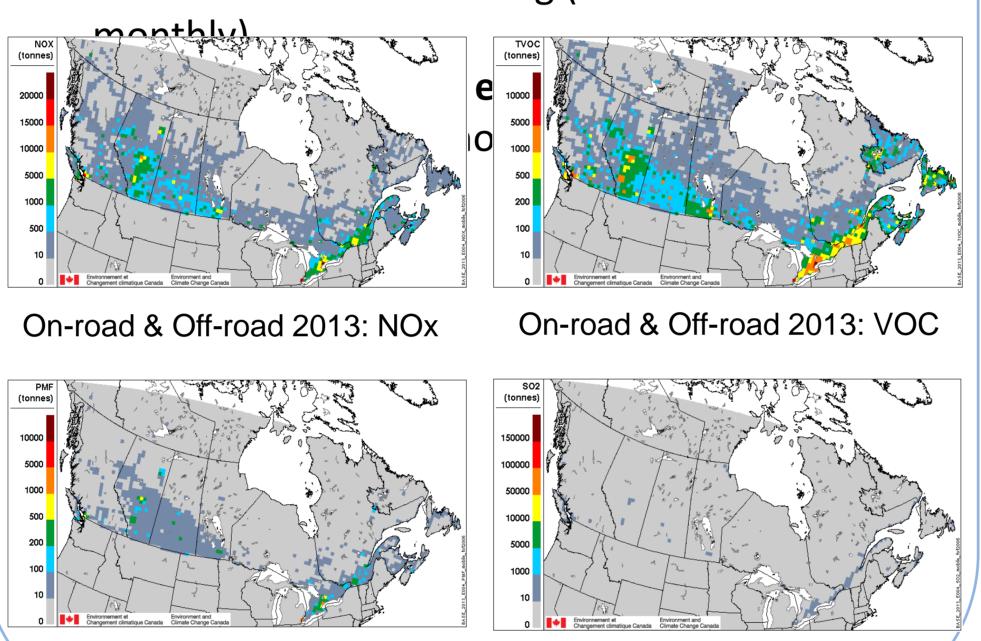
2013 Emission Inventory

This 2013 modelling platform includes three consistent emission sets: the 2013 base case and two future *business as usual* (BAU) projections 2025 and 2035. The BAU projections are based on the 2013 emission inventory and the 2015 economic forecast. They incorporate the current federal and provincial regulations without the controls.

2013 NPRI Point Source emissions	2013 Upstream Oil &Gas v2 emissions	2013 Area Source emissions
2013 MOVES on-road emissions	2013 off-road transportation (train, a/c, etc.)	2013 off-road v6.7 (engines, equipment)
2013 Wildfire emissions (daily)	2013 Area dust (construction, roads)	2013 Agriculture NH3 NAESI

2013 emissions inventory components

All sources 2013: NOx

All sources 2013: SO$_2$

All sources 2013: PM$_{2.5}$

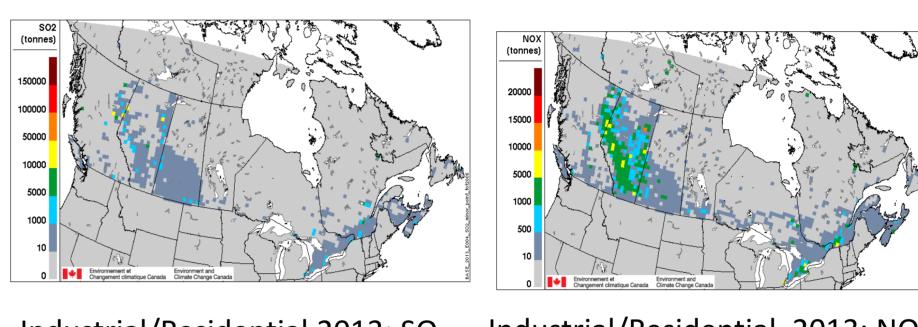All sources 2013: VOC

Transportation

- **On-road Emissions**: Estimated using MOVES model, integrate the latest measurements conducted in Canada to account for recent vehicle technology and fuels. 13 road types were also used to improve the spatial allocation.
- **Marine Emissions**: Commercial Marine Vessel class 1,2,3 emissions sources. Annual emissions.
- **Rail**: Diesel locomotives. Annual emissions.
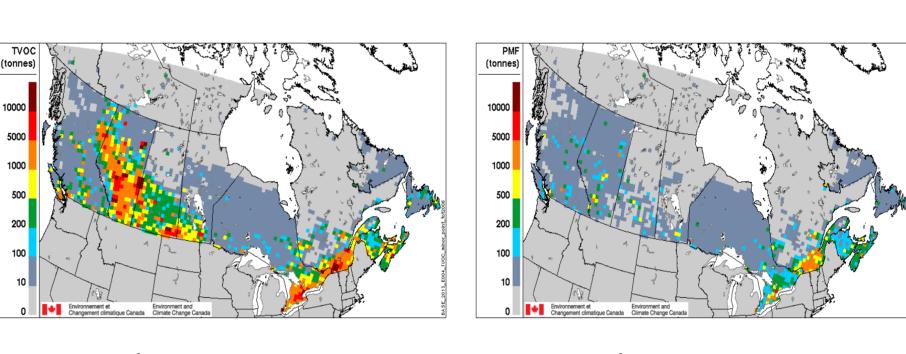- **Aircraft**: Takeoff & Landing (Points and monthly).

On-road & Off-road 2013: NOx

On-road & Off-road 2013: VOC

On-road & Off-road 2013: PM2.5

On-road & Off-road 2013: SO2

Future Projections

- The emissions projections baseline scenario is designed to incorporate the best estimation available about economic growth as well as energy demand and supply.
- The projections capture the impacts of future production of goods, and services in Canada.

Difference between 2013 and 2025 for all sources: VOC

Difference between 2013 and 2025 for all sources: PM$_{2.5}$

Difference between 2013 and 2025 for all sources: NOx

Difference between 2013 and 2025 for all sources: SO$_2$

Industrial and Residential

- NPRI point sources (Industrial Sector)
- Upstream Oil & Gas sector.
- Electric Power Generation (Utilities)
- Area sources :
  - Incineration Sources
  - Industrial/non Industrial Sources
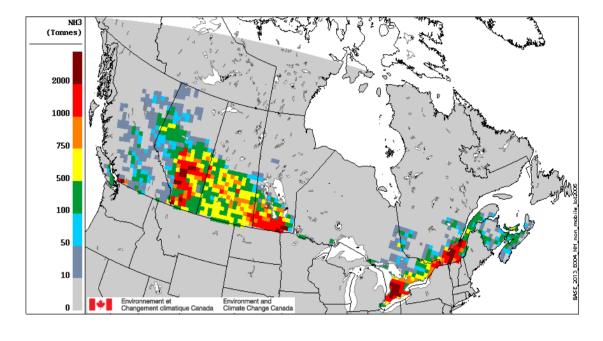 - Commercial and Residential Fuel Combustion
  - General Solvent Use

Industrial/Residential 2013: SO$_2$

Industrial/Residential 2013: NOx

Industrial/Residential 2013: VOC

Industrial/Residential 2013: PM$_{2.5}$

Wildfires

- Used hotspots from the Canadian Wildland Fire Information System (CWFIS).
- Data contains daily fire location by lat/lon and CWFIS estimated fuel type/consumption.
- BlueSky is used to estimate total emissions using the FEPS module.

Wildfire Primary Organic Carbon in PM Coarse mode (PMC). Emissions valid on 2013-07-02.
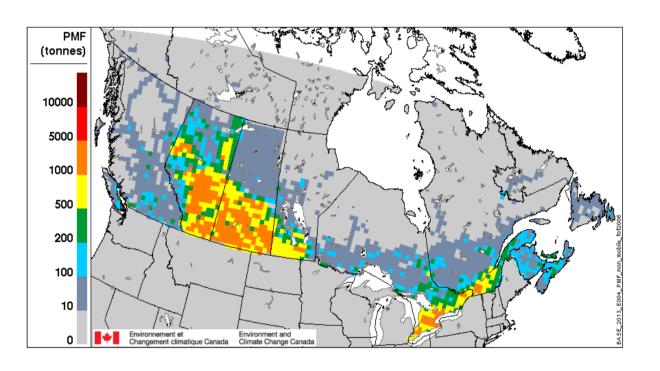
Open Sources

Agricultural Emission Inventory: NH$_3$ emissions for livestock and fertilizer application from NAESI, Spatially allocated using 54 surrogates. Monthly emissions.
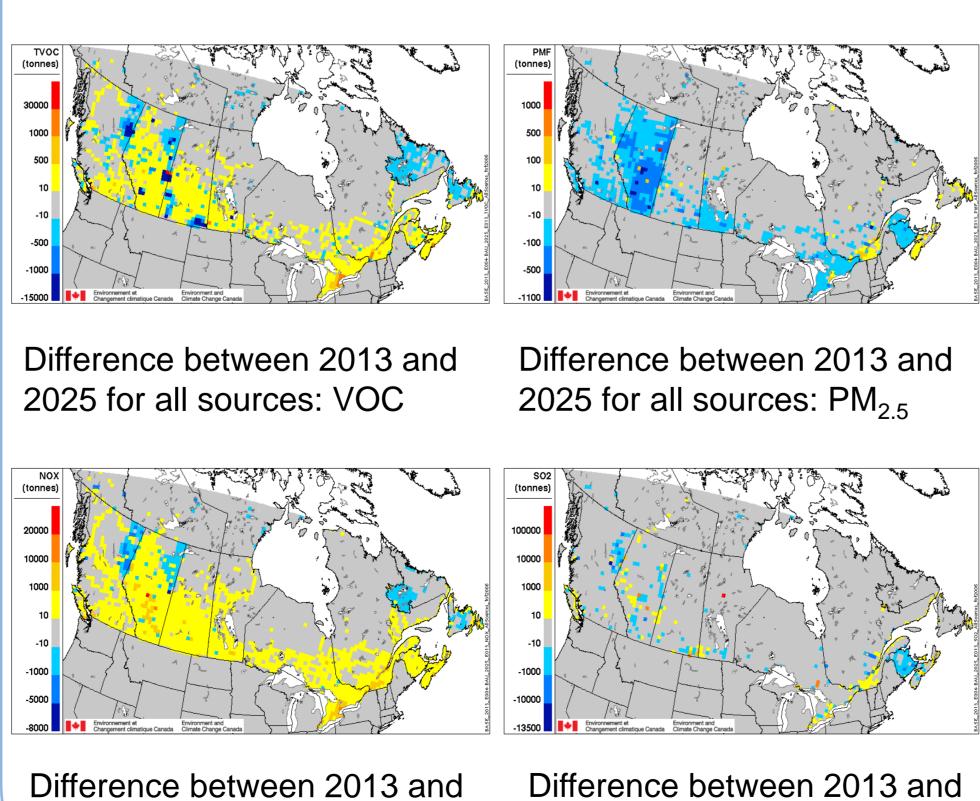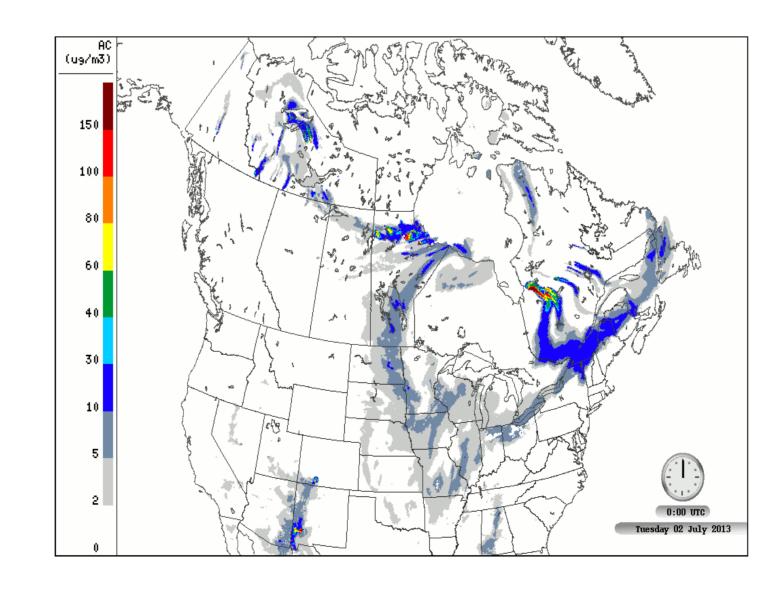

Agricultural Emissions 2013: NH$_3$

Fugitive dust inventory includes buildings & road construction, paved and unpaved roads, agricultural dust and mine tailing. This sector is processed separately to allow for the application of a land use based transport fraction.

Fugitive dust 2013: PM$_{2.5}$

Conclusion

We have developed a new 2013 Canadian emissions inventory platform for air quality model applications.
A transition from 2010 to 2013 includes several updates.
These improvements in the generation of Canadian emissions modelling files allow greater flexibility in the design of air quality modelling scenarios

2013 Canadian platform packages

The 2013, 2025 and 2035 inventories will be available on ECCC ftp site.

It includes:
- Inventory files,
- SMOKE ancillary files and scripts,
- Canadian surrogates package,
- Documentation.

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