Brief Overview of Current Research Activities in the Detroit-Windsor Border Area

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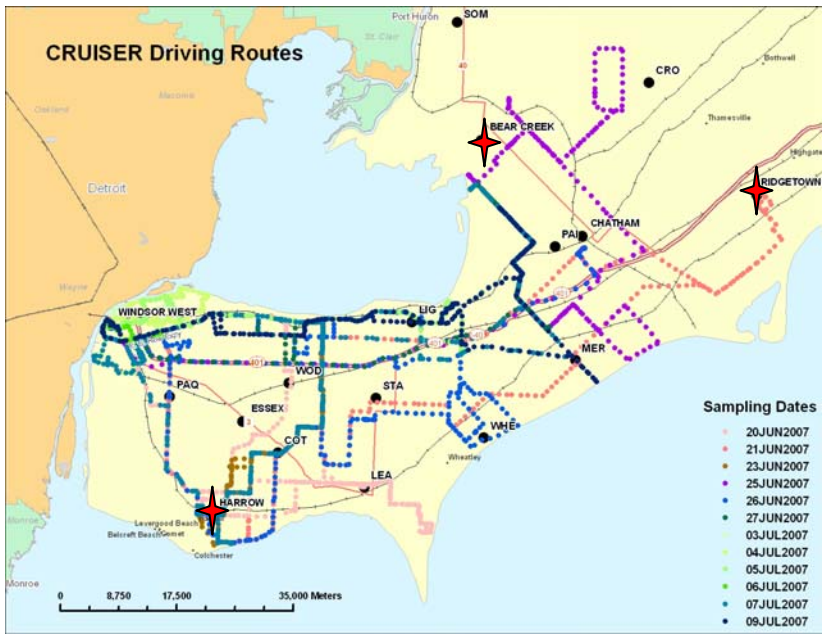
Oct. 2008

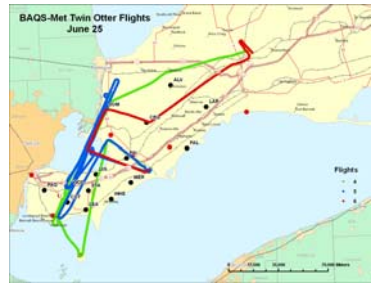
Overall Objectives of Recent Research

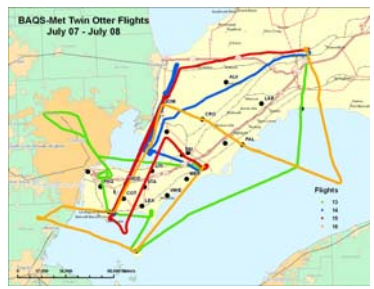
- Continued development of methods to analyze and apply CRUISER measurements
  - Characterization of urban and neighborhood scale spatial patterns for multiple pollutants
- Higher resolution (2.5 km) AQ modeling using AURAMs
  - Improve applicability at urban scale
    - A building block for personal and population exposure assessment
    - Future, more-detailed policy scenario analysis related to transportation and local sources/activities
  - Study regional secondary pollutant formation and the role of the Great Lakes
  - Research occurring under the BAQS-Met field study and Program on Energy Research and Development

2007 BAQS-Met Field Study - Overview

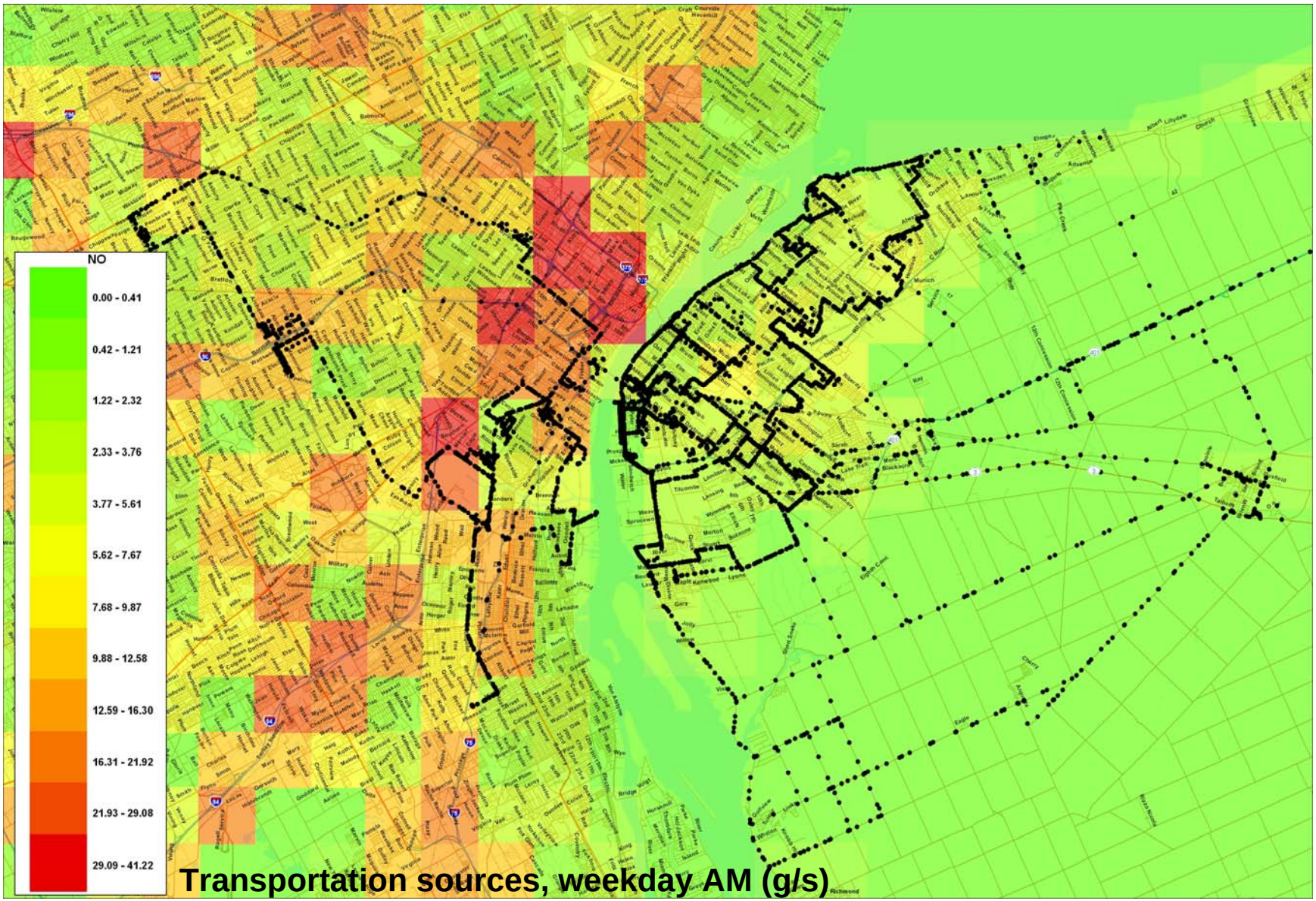
- 3 supersites, provincial network plus Lake Erie measurements (Pelee Is. and ferry), 10 site O_3 "mesonet", 16 site regional passive NO_2, O_3, NH_3
- Federal and provincial government, 4 universities
- Process studies, model development and application



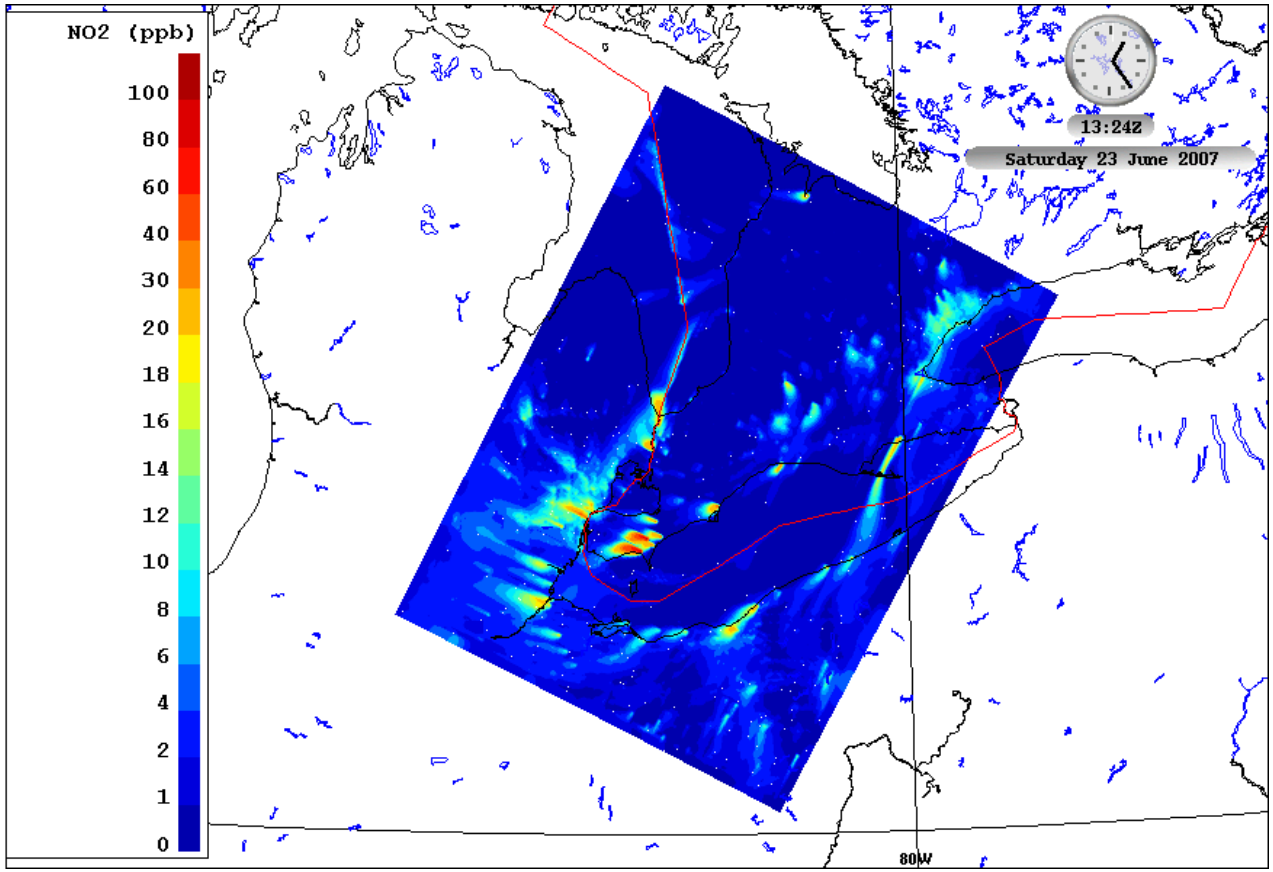




Nitric Oxide Emissions (2.5 km) and All CRUISER routes

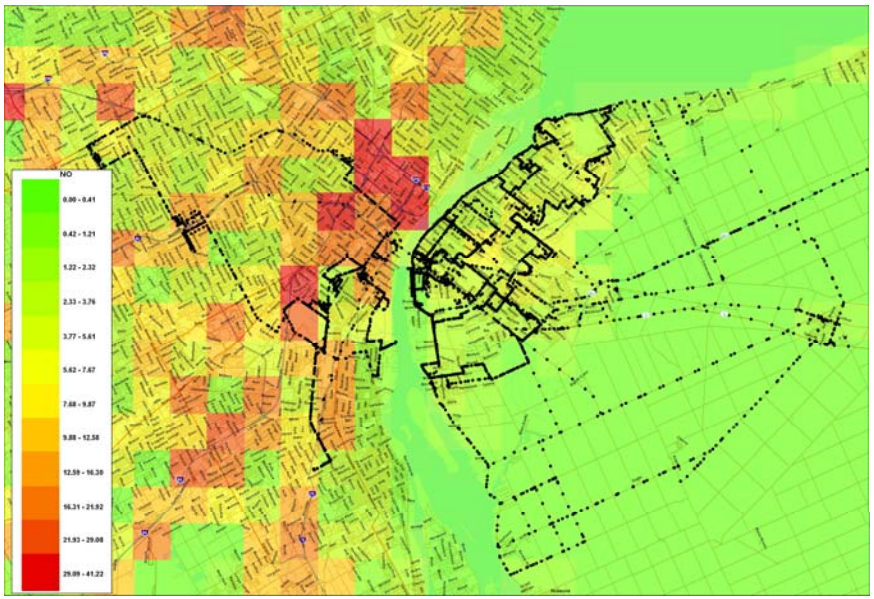


Surface NO_2 from Preliminary AURAMS 2.5km nested simulation, BAQS-met



- Note size of the domain (includes Toronto area)
- Current simulation period is 3 weeks (June 20-July 11, 2007)
- Annual simulations are planned
  - GEM-MACH (15 km)
  - 2.5km is hoped for but cpu and wall clock time are equal (!)

Possible Model Applications for Exposure Assessment



*** Candidate for coupling with SHEDS**

**** Need to build in an evaluation component**

- Shows our ‘best’ resolution relative to urban scale features
- Level one exposure assumption: exposure is higher where emissions are greater
- Level two: AURAMS adds regional sources and meteorology
- Level three: develop models for sub-grid variability
- Level four: consider infiltration

Next Steps

- Publication of CRUISER results
  - Receptor modeling with U of T and EPA (G. Norris)
  - Characterization of urban and neighborhood/sub-grid scale variability
- Link CRUISER observations to stationary measurements and source impact assessments within “DEARS Areas”
- Presentation and publication of BAQS-Met results
- Evaluate and improve AURAMS and build framework for exposure assessment