**Background & Objectives**

**Inventory Analysis**

- KORUS-AQ and MAPS-Seoul aircraft field campaigns have been deployed to study the air quality of the regions, the campaigns were comprised of comprehensive on-site measurements including chemical emission inventory, transboundary pollutant contributions, and satellite imaging.

- The CREATE (Comprehensive Regional Emissions Inventory for Atmospheric Environment) emissions inventory and SMOKE-Asia (Woo et al., 2012) emission processing system were used to support KORUS/AQ-MAPS-Seoul chemical transport forecasting and to serve as a prior for evaluation.

**Objectives**

- To achieve a better understanding of particulate matter pollution through improvements in estimation of VOC and potential SOA production in South Korea.

**Overall Workflow**

- *SOA formation and CTM Performance Improvement*
  - Secondary organic material produced by the oxidation of VOCs is a major global contributor to the mass concentration of organic particles.

- *Chemical Speciation*
  - For NMVOCs, output VOC chemical species depend on emission source characteristics.

- *Effect on Secondary pollutant*
  - Therefore, in order to improve the chemical speciation mechanism, it is necessary to accurately analyze the source categories of NMVOC emission.

- *Emissions by Chemical mechanism species*
  - In addition, the characteristics of each source should be analyzed to improve the Chemical speciation profile and Cross-reference file.

- *NMVOC speciation*
  - After the aforementioned steps were performed, effects of VOCs on secondary pollutants were analyzed.

**Conclusion**

- The KORUS-AQ/MAPS-Seoul field campaign observation and CTM modeling intercomparison showed, VOC emissions of KORUS Ver 1.0 inventory were underestimated, especially for aromatic species.

- Emission inventory showed improved match with surface concentration when the new nonroad and PRTR inventory were included.

- The more updated local chemical speciation profiles help improving specialized VOCs emissions inventory.

- A result of FAC method, toluene and xylene have the largest distribution in SOA production.

- The updated specialized VOCs inventory were tested with GEOS-Chem, which show better agreements with KORUS-AQ DC-8 measurements over Korea.

**Reference**

- Young-Kee Jang., Improvement of ozone forecasting and emissions inventory, 2016.


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