

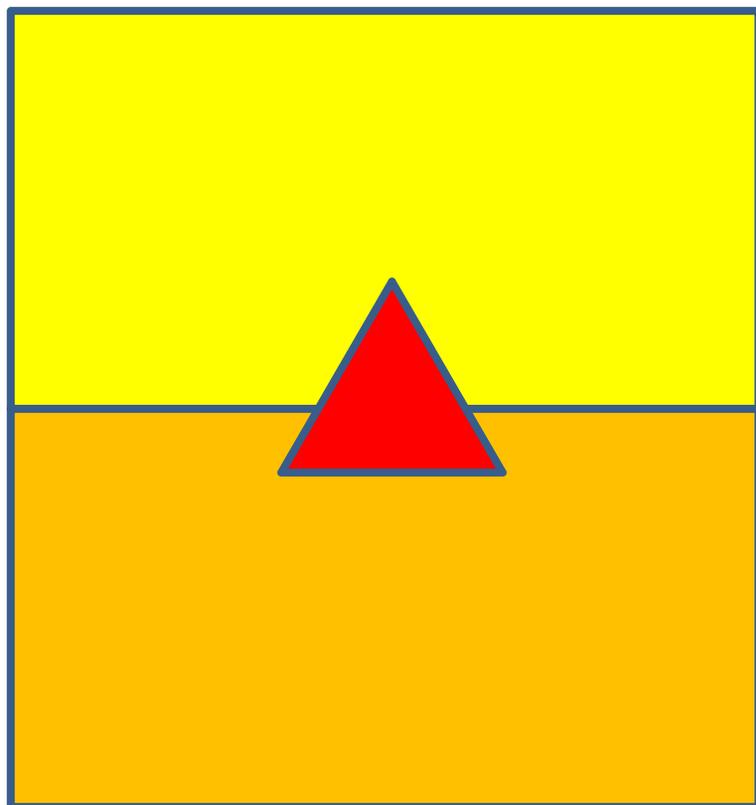
Blending SMOKE-MOVES Files Among RPOs

Experiences with OTC and SESARM

VADEQ, NYSDEC, GADEP, and UNC

RPO Inventory Merge

Simplified Modeling Domain



 **OTC/MARAMA**

 **Virginia**

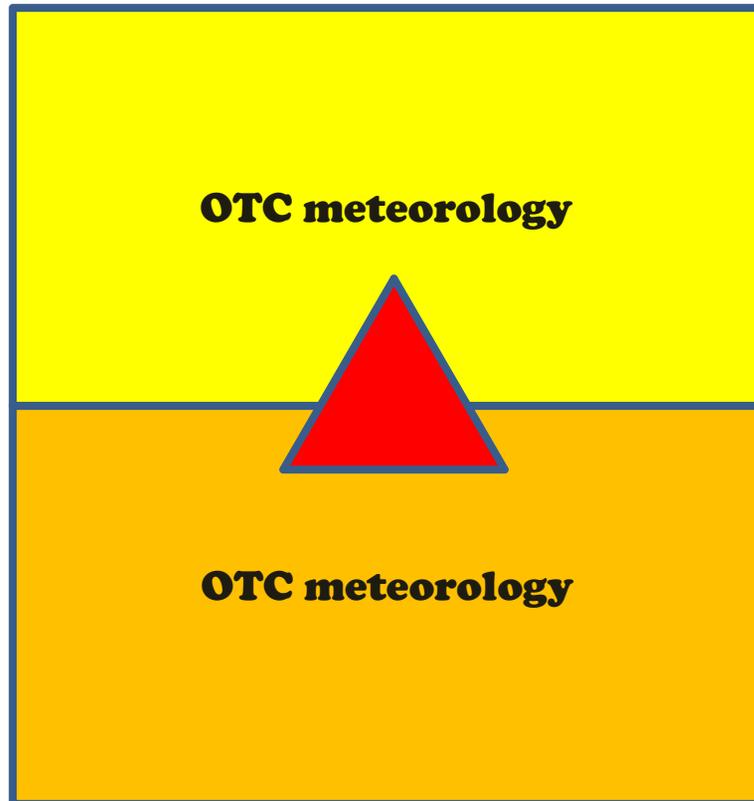
 **SESARM**

- (1) Virginia is part of both OTC and SESARM;
- (2) Mobile emissions must be generated for all three regions for air quality modeling;
- (3) In reality, emissions also include LADCO, CENRAP and MRPO.

RPO Inventory Merge (cont.)

Ideal Inventory - Option Four

consistent meteorology



From OTC's perspective:



Done



Done



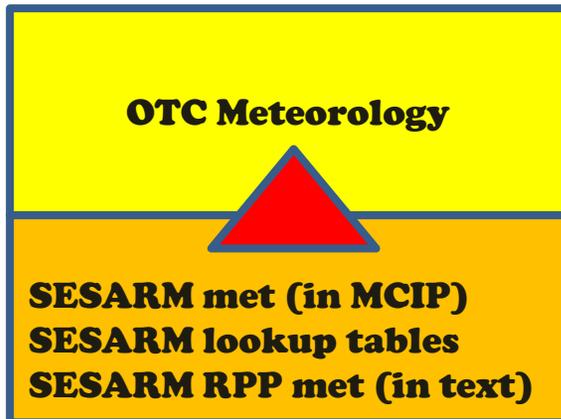
To be generated

- (1) Ideally, OTC would conduct MOVES runs using its own meteorology to generate emissions for SESARM region (in orange);
- (2) Difficulty: No MOVES inputs;
Prohibitive in time/resources;
- (3) Ideal inventory is what has been done in the past with MOBILE6 (and other source sectors). It is the option 4 listed in the proposal by Zac Adelman of UNC.

RPO Inventory Merge –Alternative Options

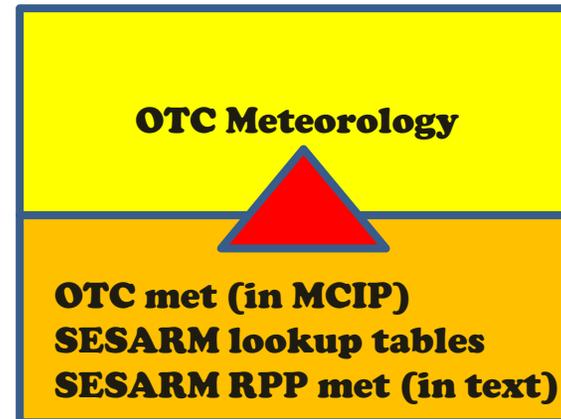
data exchange (OTC's perspective)

Option One



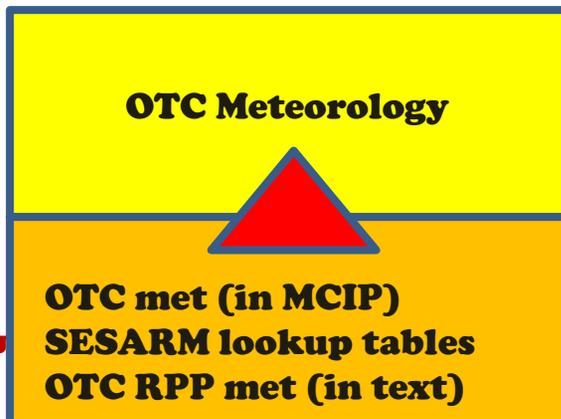
Use **SESARM**
result directly

Option Two



**SMOKE (but not
MOVES) modeling
needed**

Option Three



**SMOKE (but not
MOVES) modeling
needed**

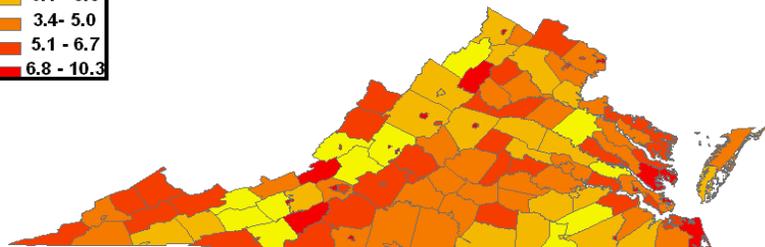
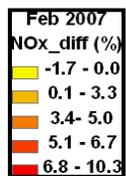
Option four

**Ideal Inventory
(previous page)**

- Alternatives involve exchanging lookup tables (and met data) between two RPOs to avoid time-consuming MOVES runs;
- None of these options (even for option three) maintains meteorological consistency;
- Option three looks to be - but is not - the ideal inventory because of inherent RH in the lookup tables received, although it is the closest;
- OTC and SESARM domains have different regional coverage. Option one therefore needs domain transformation;
- If viewed from SESARM's perspective, everything should be reversed.

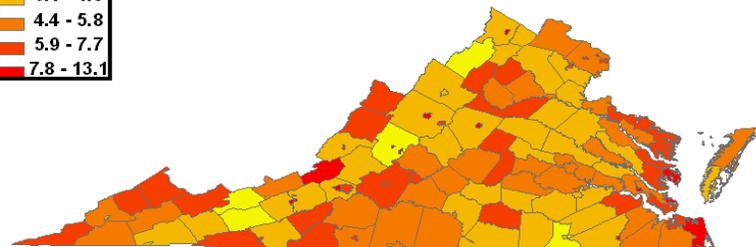
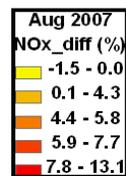
Percentage Differences of NO_x and VOC mobile emissions

same activities
same meproc
OTC: TEMPG
SESARM: TEMP2



NO_x in Feb 2007

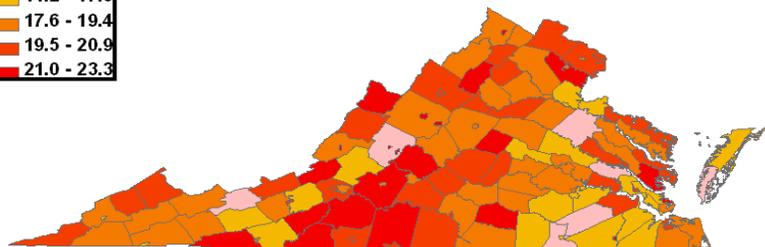
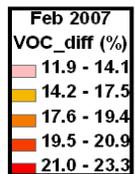
$$\% = (\text{OTC} - \text{SESARM}) * 100 / \text{SESARM}$$



NO_x in Aug 2007

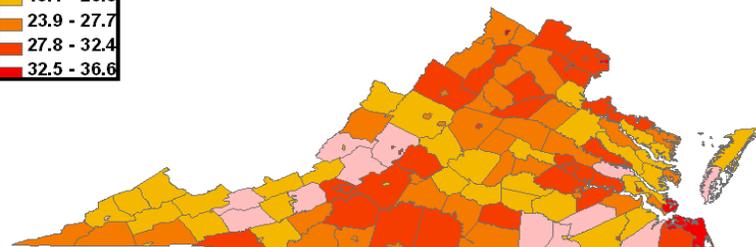
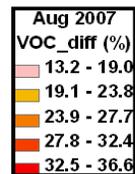
$$\% = (\text{OTC} - \text{SESARM}) * 100 / \text{SESARM}$$

VOC: OTC > SESARM; but NO_x show spatial variations



VOCs in Feb 2007

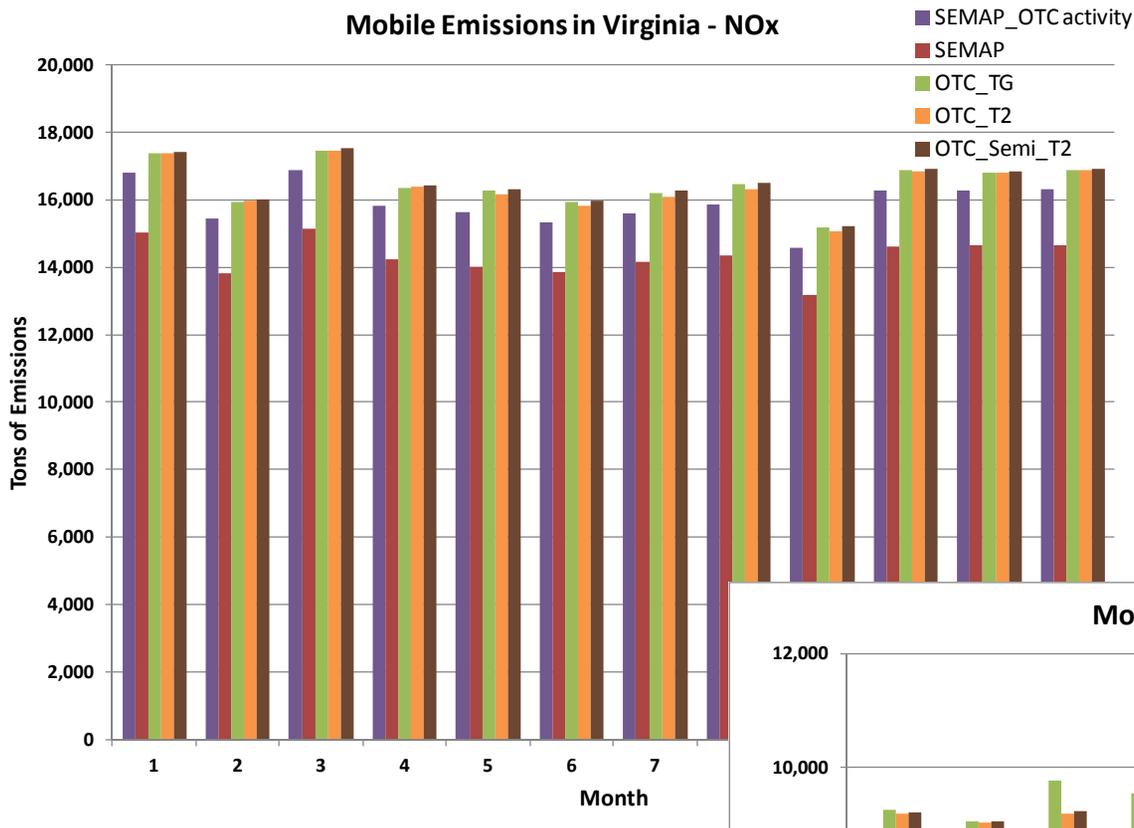
$$\% = (\text{OTC} - \text{SESARM}) * 100 / \text{SESARM}$$



VOCs in Aug 2007

$$\% = (\text{OTC} - \text{SESARM}) * 100 / \text{SESARM}$$

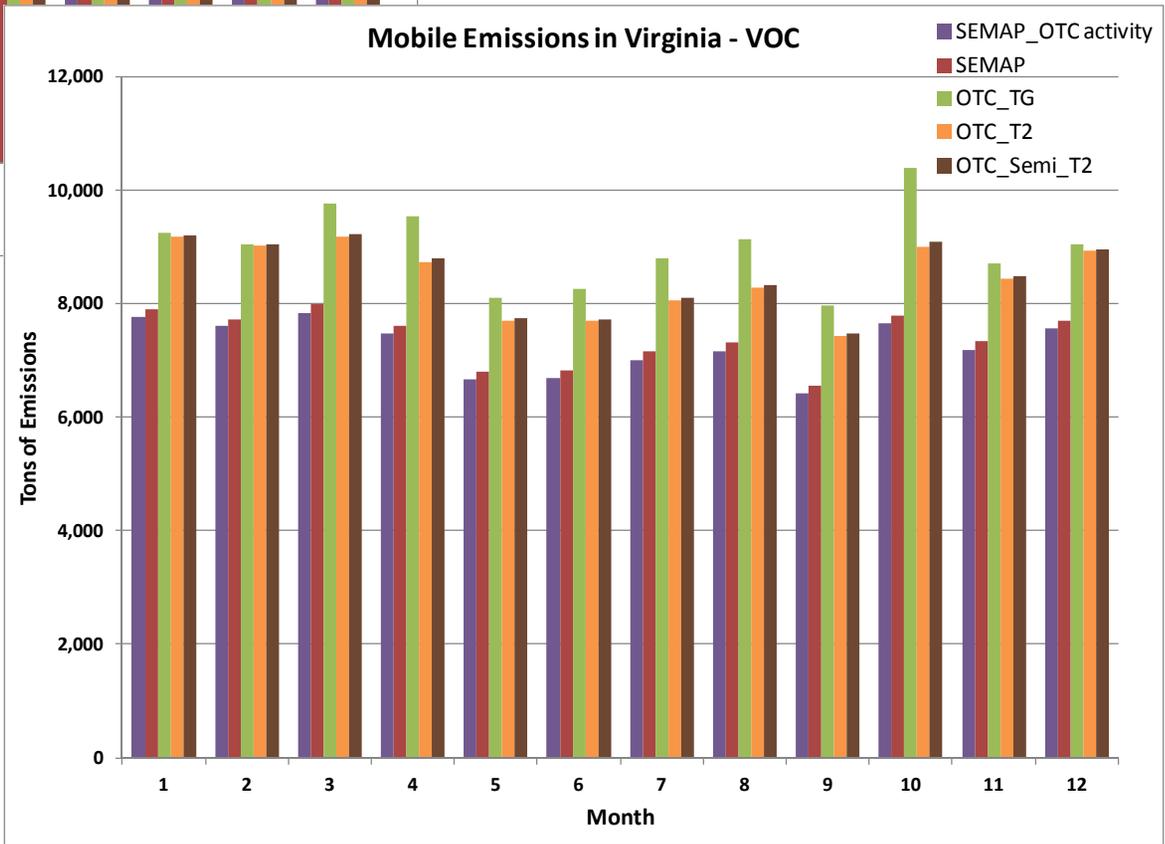
Mobile Emissions in Virginia - NOx



NOx emissions are more sensitive to activity data than changes in the temperature selection (TEMPG vs. TEMP2)

VOC emissions are more sensitive to changes in the temperature selection (TEMPG vs. TEMP2) than changes in activity data

Mobile Emissions in Virginia - VOC



Preliminary Comparisons

- **The two RPOs were found to have used different types of temperature in SMOKE-MOVES: OTC used TEMPG, whereas SESARM used TEMP2**
- **Due to diurnal temperature lapse rates, TEMPG have wider ranges than TEMP2, resulting higher CO and VOCs in OTC modeling**
- **For consistency with SESARM, OTC could resort to a simplified approach of re-running just SMOKE to mimic TEMP2 using already generated lookup tables with TEMPG, avoiding costly re-runs of MOVES and SMOKE-MOVES with TEMP2**
- **The simplified approach differs from full TEMP2 by less than 1% for most pollutants. It also brings emissions a little closer to SESARM**
- **Consequence:** OTC emissions used in air quality modeling will be based on “semi-TEMP2” and its reports will not be the same as before, which were based on TEMPG
- **Recommendation:** RPOs should start with the same selection of temperature types in the beginning for consistent merging later on