

1.146 Use of concurrent top down approaches to assess emissions inventories for the central Mexico cities belt.

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Abstract:

The Mexico national emissions inventory 2008 (INEM-2008), the latest available for nationwide air quality modeling, was evaluated for the central Mexico city belt (CMCB). Two, complementary top-down approaches were used to assess the high resolution emissions inventory model fed to WRF-Chem.

First, one month observations between February 6 to March 8 2011, made in three peri-urban monitoring sites: Tenango del Aire, Amecameca and Ozumba, municipalities in the State of Mexico, southeast of Mexico City Metropolitan Area (MCMA), at the Tenango del Aire Mountain Pass, were used to evaluate WRF-Chem. Two exclusive kinds of episodes, when the sites are down or up wind from MCMA used.

Prior to any air quality modeling, several land use data-bases were assessed to find the one that best reproduces temperature and wind fields for the region using WRF. We found that the USCS NALCMS2005 data base gave the best results. Then, slow-reacting CO output from WRF-Chem was used to test several grid-nesting choices. We settled for an inner domain made of a $3 \times 3 \text{ km}^2$ grid with 89×89 containing the central region of Mexico. The external domain was a $90 \times 90 \text{ km}^2$ grid covering most of the country. At this stage CO is severely underestimated, for more than a factor of 10 when under local emissions influence and by a factor of 5 under regional influence.

The second top-down approach is comparison with satellite observations. February to June 2011 output from WRF-Chem, using the above model configuration, is compared against the IASI CO sensor on board of Metop A. Preliminary comparisons indicate CO columns from the model above MCMA are 0.7 lower than observations, but overall in the region they are underestimated by a factor of 3. Work is underway to improve on these comparisons and to complement results from both methods.