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In depth analysis of the role of the mountain gap south of the Valley of Mexico on the air quality in Mexico City.

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38 days of air quality observations in Tenango del Aire (TENAI), south of Mexico City during MILAGRO were analyzed. That site was managed by FQA-CCA-UNAM's team with a mobile laboratory equipped with standard air quality monitors: O3, NOx, NOy, CO, SO2 and surface meteorological parameters. Hosted additional instruments were: CH2O, column NO2 (DOAS), backscatter (Lidar) and pilot balloons. Also, an ultra light plane from IMK-IFU, equipped with O3, PM10, CN, Dew Point monitors flew around the Popocatepetl and Iztaccihuatl volcanoes and above of TENAI some days during MILAGRO. Atop of TENAI, the ultra light descended in spiral until near ground and ascended to resume its path.

In addition to these measurements, UNAM team ran air quality numerical simulations using the Mesoscale Climate and Chemistry Model (MCCM) and an online coupled Wind Erosion Processor to MCCM we call WEPS-MCCM.

The combined observations on the ground, the ultra light plane and the models results enabled us to carry out an in depth analysis of air quality in such important region south of Mexico City.

Comparison were made with the episodes classification proposed by De Foy; Ozone North and South, Convection North and South, Cold Surge and South Venting to characterize dynamics in the Valley of Mexico. The aim was to define how well connected is TENAI with the air quality network in the MCMA. The influence of the mountain gap on ozone and PM10 levels in Mexico City is analyzed by episode type. Also, the impact of the mega city of Mexico on the nearby region to the south can be understood by observations in TENAI. More polluted episode types in TENAI are those called: Cold Surge, Ozone South and South Venting due to a wind shift occurring in early afternoon that brings back polluted air that was drained south during the morning and returns back to TENAI rich in aged air parcels.

March 17 was chosen to show the integrated analysis of all variables observed and modeled (MCCM) in TENAI. In that day, evidence of emissions from Tula point sources (refinery and or thermoelectric power plant) was observed very early in the day. Later in the day, plumes coming from biomass burning activities were detected by instruments at TENAI.

The role of the crop lands in the mountain gap as a source of PM10 by wind erosion is highlighted both, by the ultra light plane and the coupled models WEPS-MCCM.

Note: The Tenango Team members are; L. G. Ruiz-Suárez (1) , R. Torres-Jardón (1), Henry Woehrnschimmel (2), R. Steinbrecher (3), W. Junkerman (3), E. Ningenda (1), A. García-Reynoso (1), M. Melamed (1), A. Jazcilevich (1), B. E. Mar-Morales (1), M. Grutter (1) and L. Molina (4,5)