

Tula's air quality characterization during MILAGRO Field Campaign

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Tula is located 60 km Northeast from Mexico City Metropolitan Area emissions (MCMA) downtown. According to the latest reported information, 355,000 T/Y of SO₂ are released by the two major industries in this region; the Power Plant and Refinery. In addition to energy sector emissions, other industries such as Cement Plants and open-sky mines are responsible of important particle matter emissions and soil degradation.

In order to characterize local and regional air quality in this region, from March 18 to April 22, 2006 a one-month field campaign took place in Tula and its surroundings. The main purpose for the field campaign was to determine the influence of this heavily industrial area to the total MCMA emissions, and to better understand the processes of transport and transformation of these pollutants into the atmosphere.

Different measurements techniques and equipment was deployed on this area during the field campaign. A two fix sites (Subestación Jasso and Pemex_Tepeji) point measurements were carried out, where VOC, carbonyls, PM_{2.5} and PM₁₀ and criteria pollutants (CO, NO, NO₂, O₃ and SO₂) plus meteorology parameters were measured continuously, at the surface level. VOC and carbonyls were fully chemical characterized for each compounds in the laboratory, and particle matter by black and organic carbon, ions (Na⁺, NH₄⁺, K⁺, Mg²⁺, Ca²⁺, Cl⁻, NO₃⁻, SO₄⁻), and trace elements (Li, Na, Mg, Al, Si, S, K, Ca, Sc, V, Cr, Fe, Co, Ni, Cu, Zn, As, Rb, Y, Mo, Ag, Cd, In, Sn, Ba, Tb, Hg and Pb).

In addition to this measurements, at Subestación Jasso an aethalometer, nefelometer, SMPS and MOUDI were deployed to measure optical properties of the particles. Also, in the IMP facilities, next to the Tula's refinery, four rawinsondes were launched everyday to measure meteorological vertical profile, at 8, 12, 15 and 18 hs.

Mobile measurements were also performed during this field campaign. A MiniDOAS system was used to determine total SO₂ flux emissions from the major sources in the region. This system also was used to track the SO₂ plume to identify the transport pathways under different meteorological conditions. This experiment was intended to determine potential transport of this pollutant towards MCMA, as is claimed today by different governmental authorities.

Finally, long-term atmospheric deposition patterns of metals and PAHs were performed by biomonitoring techniques in this region. The "ball-moss" (*Tillandsia recurvata*) is

being used as biomonitor. These plants obtain nutrients mainly from airborne particulate matter deposited on their surfaces, they are been successfully used as biomonitor for metallic and PAHs deposition in different countries. The sampling area covered an area of 4000 km². At least 21 trace metals will be determined using this technique (Al, Ba, Ca, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sn, Sr, Ti, V and Zn).

Spatial and time variations, as well as full chemical composition will be presented in this work as a preliminary analysis of the data.