Meteorological modeling for two selected high SO2 episodes in Tula-Tepeji Industrial Corridor

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Results of meteorological modeling using Regional Atmospheric Modeling System (RAMS) for two selected episodes of high sulfur dioxide (SO2) surface concentrations observed in the Tula-Tepeji Industrial Corridor are presented. SO2 surface data collected during March 25 to April 22 of 2006 in Tepeji, Hgo. were used to select the high SO2 episodes. We selected the days were higher mean daily levels of SO2 surface concentrations were observed, these corresponded to March 31 and April 6. Since the primary use of meteorological modeling results at Instituto Mexicano del Petroleo (Mexican Petroleum Institute, IMP) are for air quality modeling, the interest here was focused on the modeled variables required as input to the air quality model. Simulated and observed values of profiles of horizontal wind components, potential temperature, specific humidity and surface meteorological variables were compared for 1 site with upper meteorology and 3 sites with surface data. RAMS mixing heights were overestimated at late morning (8 LST), but during the afternoon were found to be in good agreement with observations. Simulated potential temperature and specific humidity profiles showed good agreement with the corresponding observed profiles. RAMS surface temperatures were undervalue, meanwhile the surface relative humidity was overestimated. Simulated wind profiles and surface winds presented similar behavior that observations, but wind speed was overestimated at late morning (7-8 LST) and underestimated at the early evening (19-21 LST) .