Daily Weather Briefing

**Veracruz Center of Operations Forecasting Team:**
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**Forecast for the vicinity of Veracruz**

- Rest of March 10: Partly cloudy at high altitudes with haze. High temperatures of 32-34. S and SE winds 25-35 km/h with afternoon gusts up to 40 km/h. RH 45-55% at midday.


- Long Range: Similar conditions on Sunday and Monday. GFS shows weakening of cold air mass entering the Gulf of Mexico on Tuesday. It will move faster to the east, causing possibly weaker northerly winds, estimated 35-45 km/h with gusts up to 60. Forecast shows increasing clouds and probability for rain for Tue & Wed in parts of Veracruz state.
Current and Forecasted Regional Meteorological Conditions
SIMAT Max Surface Ozone for Wed & Thu

Max O3 (SIMAT) for Wed 08-Mar-2006
Range: 89 - 143 ppb

Max O3 (SIMAT) for Thu 09-Mar-2006
Range: 67 - 143 ppb
SIMAT Max Surface PM10 and PM2.5 for Thu

Max PM10 (SIMAT) for Thu 09-Mar-2006
Range: 137 - 835 ug/m³

Max PM2.5 (SIMAT) for Thu 09-Mar-2006
Range: 51 - 345 ug/m³
Radar Wind Profiler data from T1 (PNNL & ANL / DOE)

S-SW winds 4 and 8 m/s reduce nighttime accumulation of pollutants over the city?

Up-valley flow …
Sounding and Lidar data from T1 (PNNL & ANL / DOE)

Yesterday, 9 March

WRF PBL forecast of 2900 m AGL at 3 PM
Observed ~3700 m AGL
WRF forecast for Mexico City region PBL heights

Friday 10 March 2006 (3 pm, 21h fcst)
- ~ 800 m 10 am (local time)
- ~ 1800 m 12 noon
- ~ 3100 m 3 pm

Saturday 11 March 2006 (3 pm, 45h fcst)
- ~ 700 m 10 am (local time)
- ~ 1100 m 12 noon
- ~ 2500 m 3 pm
WRF 21 h forecast
3 pm Friday
10 March 2006 (local time)

Integrated cloud water
Blue (high level cloud)
Yellow (mid – high level cloud)
Purple (low-mid level cloud)
Grey (low level cloud)

700 mb winds
500 mb winds
WRF 45 h forecast
3 pm Saturday
11 March 2006 (local time)

Integrated cloud water
Blue (high level cloud)
Yellow (mid – high level cloud)
Purple (low-mid level cloud)
Grey (low level cloud)

700 mb winds
500 mb winds
WRF forecast 3 pm CST Sunday 12 Mar

WRF forecast 3 pm CST Monday 13 Mar

700 mb winds

500 mb winds
Based on 06 UTC
10 March Forecast
Based on 06 UTC 10 March Forecast
HYPPLIT Forward Trajectories

Based on 06 UTC 10 March GFS forecast

Start 12 UTC 14 March Tue
Norte event transports material to the S, but upper-level flow to the N

Start 12 UTC 15 March Wed
Start period of transport to the S and W

12 UTC 21 March Tue
shift to transport to the E not forecasted for another week (highly uncertain however)
Model Evaluation of Plume Location
Comparison of GOES AOD 18 UTC March 9
Movies
Regional outlook for CO, March 10-13

Lower level drifts North.

3km

Higher level plume diverts, more to East.

5.4km
Regional-Scale Plume Forecast Side-by-Side Model Comparisons
Friday March 10, 18 UTC (12 pm LT)

STEM 3 km CO

WRF - C5 Tracer 0-4 km

newer material starting to move over the Gulf

Mozart 700 mb CO

GMAO MC 600 mb
Saturday March 11, 18 UTC (12 pm LT)

STEM 3 km CO

WRF - C5 Tracer 0-4 km

Mozart 700 mb CO

GMAO MC 600 mb

FLEXPART column tracer
Sunday March 12, 18 UTC (12 pm LT)

push to the SW at lower altitudes

push to the SW of Mexico City

Do not see push to SW in global models
Monday March 13, 18 UTC (12 pm LT)

**STEM 3 km CO**

- Push to the SW at lower altitudes

**WRF - C5 Tracer 0-4 km**

- Push to the SW of Mexico City

**FLEXPART column tracer**

- Monday March 13
- Tuesday March 14
Local-Regional Plume Forecast Side-by-Side Model Comparisons
Friday March 10, 18 UTC (12 pm LT)
Saturday March 11, 18 UTC (12 pm LT)

STEM 3 km CO

MM5-Flexpart

weaker transport to NE

WRF - C1 Tracer
In contrast with other models, southerly transport in STEM may result from an earlier initialization time using the GFS.
Monday March 13, 18 UTC (12 pm LT)

STEM 3 km CO

MM5-Flexpart

WRF - C1 Tracer
Tuesday March 14, 18 UTC (12 pm LT)

STEM CO

MM5-Flexpart

Norte

SW basin

WRF - C1 Tracer
CMET Balloon Scenarios and Trajectories for T1 and T2
Modeled CMET Trajectory
Constant Height above Ground, 1000-5000m every 500m
NB: Trajectories more variable than previous forecasts

Sat 16:00

Sat 18:00
Lagrangian Experiment
Back-Trajectories for Sat 11 March

T1 Back-Trajectories at 14:00-15:00  T2 Back-Trajectories at 18:00-19:00
Variable conditions on Sunday?
Back-Trajectories for Sun 12 March

T1 Back-Trajectories at 14:00-15:00  T2 Back-Trajectories at 18:00-19:00
Sample Cross Sections of Tracer and Chemistry for Wednesday - Saturday
Mexico City region tracer transport forecast (CO emissions)

Surface CO tracer, 21 h fcst, 3 pm Friday 10 Mar (LST)

0-4 km avg. CO tracer

Surface CO tracer, 45 h fcst, 3 pm Saturday 11 Mar (LST)

0-4 km avg. CO tracer
21 h WRF forecast, 3 pm Friday CST
0-4 km MSL average

3 pm Friday 10 March CST

18,000 ft
12,000 ft
45 h WRF forecast, 3 pm Saturday CST
0-4 km MSL average

3 pm Saturday 11 March CST

18,000 ft

12,000 ft
WRF-Chem (6 km) T+21:
Cross Sections  Valid for 15:00 LST Friday 03/10

- Ozone cross section, heights (3000 ft incr)
- NOx cross section, heights (3000 ft incr)
- H2O2 cross section, heights (3000 ft incr)
- PM2.5 cross section, heights (3000 ft incr)
WRF-Chem (6 km) T+45:
Cross Sections Valid for 15:00 LST Saturday 03/11
Sunday March 12 18 Z Carbon Monoxide

Very thin plume drifting offshore, then straight North.
Monday shows broader Gulf influence, lofted sharply.
New emissions drift north for Saturday and Sunday. T1 and T2 under influence.
Regional ozone shifts to north in the near future, with T1 and T2 under influence.
Biomass Burning
Fires in Southern Mexico seem to be increasing - plume N across Gulf

Fire plumes follow same path as MC tracers over Gulf Today
Summary

Veracruz Center of Operations

- **March 10 (Friday):** Mexico City plume transported to the NE with moderate winds of 2 m/s increasing to 5 m/s in the afternoon. Conditions good T1/T2 measurement and Lagrangian sampling scenarios.

- **March 11 (Saturday):** Continued transport to the NE over the central plateau. Latest model forecasts still indicate that at lower altitudes (~700 mb) the maximum concentrations will be over the western Gulf and at higher altitudes (~500 mb) the maximum concentrations will be located over the central Gulf.

- **Long-Range Outlook:** Wind speeds decreasing and becoming more variable on Sunday. Yesterdays pollutants located NE of Mexico City over the central plateau with older material still located over the Gulf of Mexico. But same-day emissions moving to the SW side of the basin. Continued transport to the SW for the next several days.