Daily Weather Briefing

Veracruz Operations Center Forecasting Team:
Jerome Fast, Louisa Emmons, Bill Skamarock, Benjamin de Foy, Marcelo Mena, Danny McKenna, Greg Carmichael, and Federico Acevedo

Weather forecast around Veracruz

Today: Cloudy to Partly cloudy with a chance of scattered light and rain this morning. Mostly clear afternoon. Maximum temperatures between 29-31°C. Winds N-NE 20-30 km/h. RH 60-70% midday.

Thursday (Meteorology Day): "Norte" with gale conditions of 55-65 (up to ~18 m/s) km/h gusts 85-95 km/h (~26 m/s) during the afternoon into the night. Good probability of strong convection with rain >75 mm in 24 h in parts of Veracruz state with decreasing temperatures. (~27-29°C midday). Strong convection with high RH during the evening.

Friday: "Norte" with gale conditions of 50-60 km/h gusts 75-85 km/h decreasing tonight. Wet (probability strong convection for rain >75 mm in 24 hours in parts of Veracruz state) continued decreasing temperatures.

Long Range (Sat+): Partly cloudy, weak chance of rain from end of Norte, Winds N-NE, shifting to E.

Weather forecast around Mexico City

Today: Clear morning, becoming partly to mostly cloudy by the afternoon with a small chance of afternoon showers. Maximum temperatures between 27-29°C. Winds E-SE ~10-20 km/h.

Thursday-Friday: Mostly cloudy with a chance of afternoon showers and thunderstorms Thursday afternoon into Friday morning.
Yesterday’s Norte

00 UTC 21 March WRF 850 mb forecast

18 UTC 21 March

Gust max 59 km/h (~17 m/s) at Veracruz

Timing well predicted

MODIS/Terra
Mar 21 10:30am LT
Current and Forecasted Regional Meteorological Conditions
Current Winds Aloft

- SE winds ~6-10 m/s
- SW winds aloft
- light E near-surface winds
WRF forecast for Mexico City region PBL heights

Wednesday 22 March 2006
3 pm, 21h fcst
~ 1100 m  10 am (local time)
~ 2000 m  12 noon
~ 3200 m  3 pm

Thursday 23 March 2006
3 pm, 45h fcst
~ 1300 m  10 am (local time)
~ 1800 m  12 noon
~ 2900 m  3 pm
WRF 22 Mar 06, 3 pm Wed LST

Integrated cloud water
Blue Yellow Purple Gray (high->low)

700 mb winds

WRF 23 Mar 06, 3 pm Thu LST

Integrated cloud water
Blue Yellow Purple Gray (high->low)

700 mb winds
Predicted Norte Arrival, WRF 850 mb winds

15 UTC (09 LT) 23 March

18 UTC (12 LT) 23 March

21 UTC (15 LT) 23 March

00 UTC (21) 24 March
WRF 24 Mar 06, 3 pm Fri LST

700 mb winds

Integrated cloud water
Blue Yellow Purple Gray (high->low)

WRF 25 Mar 06, 3 pm Sat LST

700 mb winds

Integrated cloud water
Blue Yellow Purple Gray (high->low)

Rain in Veracruz
WRF short-range precipitation forecast

18 UTC 22 March, Wednesday

15 UTC radar

18 UTC 23 March, Thursday

12 UTC 23 March, Thursday

00 UTC 24 March, Friday
Based on 00 UTC 22 March Forecast

00 UTC 28 March Tue, 500 mb

00 UTC 29 March Wed, 500 mb

Supports W to E transport, but 700 mb winds weak so local thermally-driven winds will be important
Movie
Regional outlook CO, Wed March 22

NE outflow, with lower level flow more southerly than higher level flow which tends to be more westerly.
Regional outlook CO, Thursday March 23

Westerly shift during day makes older emissions and newer emissions influence head E, with lower level emissions to the SE. Older emissions and newer emissions stratified on Gulf.
Regional outlook CO, Friday March 24

High pressure system makes flow more complex, stagnated. Low level with most pollution to SW and W of MC.

MEXICO CITY

Biomass Burning
Pollution persists on SW and W of domain with persistent BB signature south of Mexico.
Local-Regional Plume Forecast Side-by-Side Model Comparisons
Wednesday March 22, 21 UTC (15 LT)
Thursday March 23, 21 UTC (15 LT)

STEM - 1 km AGL

MM5-Flexpart

Norte Tres
Pushes Plume South

WRF - C1 Tracer 0-4 km

Gap Flow
Followed by Over-rim flow
Friday March 24, 21 UTC (15 LT)

STEM - 1 km AGL

MM5-Flexpart

Convergence line NE of MCMA

T1

T2
Saturday and Sunday 21 UTC (15 LT)

MM5-Flexpart

MM5-Flexpart

MM5-Flexpart Sunday March 26

Sunday Plume includes Gap Flow
Regional-Scale Plume Forecast Side-by-Side Model Comparisons
Wed March 22, 18 UTC (12 pm LT)

STEM 3 km CO

WRF - C5 Tracer 0-4 km

MOZART CO 700 mb

GMAO MC 790 mb

FLEXPART column tracer (21Z)

N/A
Thursday March 23, 18 UTC (12 pm LT)

STEM 3 km CO

WRF - C5 Tracer 0-4 km

MOZART CO 750 mb

GMAO MC 790 mb

N/A
Friday March 24, 18 UTC (12 pm LT)

STEM 3 km CO

MOZART CO 700 mb

N/A

WRF - C5 Tracer 0-4 km

GMAO MC 790mb

FLEXPART column tracer (21Z)
Saturday - Sunday, 21 UTC

WRF - C5 Tracer 0-4 km
Sat Mar 25 (18Z)

FLEXPART column tracer
Sat Mar 25 (21Z)

STEM Sat Mar 25 (18Z)

FLEXPART column tracer
Sun Mar 26 (21Z)
Sample Cross Sections of Tracer and Chemistry
12,000 ft
18,000 ft

Tuesday emissions

21 h WRF forecast C5 tracer, 3 pm Wed CST 22 Mar
0-4 km MSL average

45 h WRF forecast C5 tracer, 3 pm Thursday CST 23 Mar
0-4 km MSL average

Wednesday emissions

Tuesday emissions

SW
NE
S
N

Wednesday emissions

Tuesday emissions

18,000 ft
12,000 ft
45 h WRF forecast C5 tracer
3 pm Thursday CST 23 Mar
0-4 km MSL average

45 h WRF forecast C5 tracer
3 pm Thursday CST 23 Mar
4-6 km MSL average
69 h WRF forecast C5 tracer,
3 pm Thu CST 23 Mar
0-4 km MSL average

69 h WRF forecast C5 tracer,
3 pm Fri CST 24 Mar
0-4 km MSL average

69 h WRF forecast C5 tracer,
3 pm Sat CST 25 Mar
0-4 km MSL average

basin outflow S early, W/NW/N late

basin outflow S and E

4-6 km MSL average

4-6 km MSL average

upper level flow to the east
CO concentration in PPBV 0-4KM

CO cross section, heights (3000 ft incr)

CO

NOy cross section, heights (3000 ft incr)

NOy

THC cross section, heights (3000 ft incr)

THC

Ozone cross section, heights (3000 ft incr)

O3

H2O2 cross section, heights (3000 ft incr)

H2O2

PM2.5 cross section, heights (3000 ft incr)

PM2.5

WRF-Chem Today WED 03/22 15:00 LST
Outlook Carbon Monoxide

**Wednesday**
Tuesday emissions wrap around high to North, LL emissions flow N, higher flow to NE

**Thursday**
Westerly flow transports older and newer emissions to east, exposing different plume ages.

**Friday**
Complex makes LL pollution drift W and S, SW for upper levels
Saturday March 25 18 Z Carbon Monoxide

CO 3km

VOC Age
Biomass Burning
MOPITT shows increase in CO over Yucatan in past 2 days.

Strongest fires appear on the Yucatan.
Wednesday (March 22): Models are showing new Mexico City emissions transported to the NE with the plume hitting T1/T2. Tuesdays emissions located in the vicinity of Tampico.

Thursday (March 23): The next Norte event arrives along the coast during mid-day, bringing very strong winds and precipitation and transporting Tuesdays and Wednesdays emissions to the SE. Possibility of afternoon thunderstorms over Mexico City. Pollution in Mexico City is expected to stagnate with highest concentrations over the southern valley.

Friday (March 24): Continued clouds and precipitation along the coast with showers possible over the plateau in the morning. Northward transport of pollution from Mexico City will converge with Norte winds north of the city and lofted to high altitudes.

Saturday and Sunday: Scattered clouds and precipitation diminishing from the Norte, with transport of the Mexico City plume towards the east resulting from zonal flow aloft.