

Meteorological Classification and Basin-Scale Lagrangian Transport during MILAGRO

Benjamin de Foy, Saint Louis University
2nd MILAGRO Science Meeting
15-18 May 2007, Mexico DF



Meteorological Classification and Basin-Scale Lagrangian Transport during MILAGRO

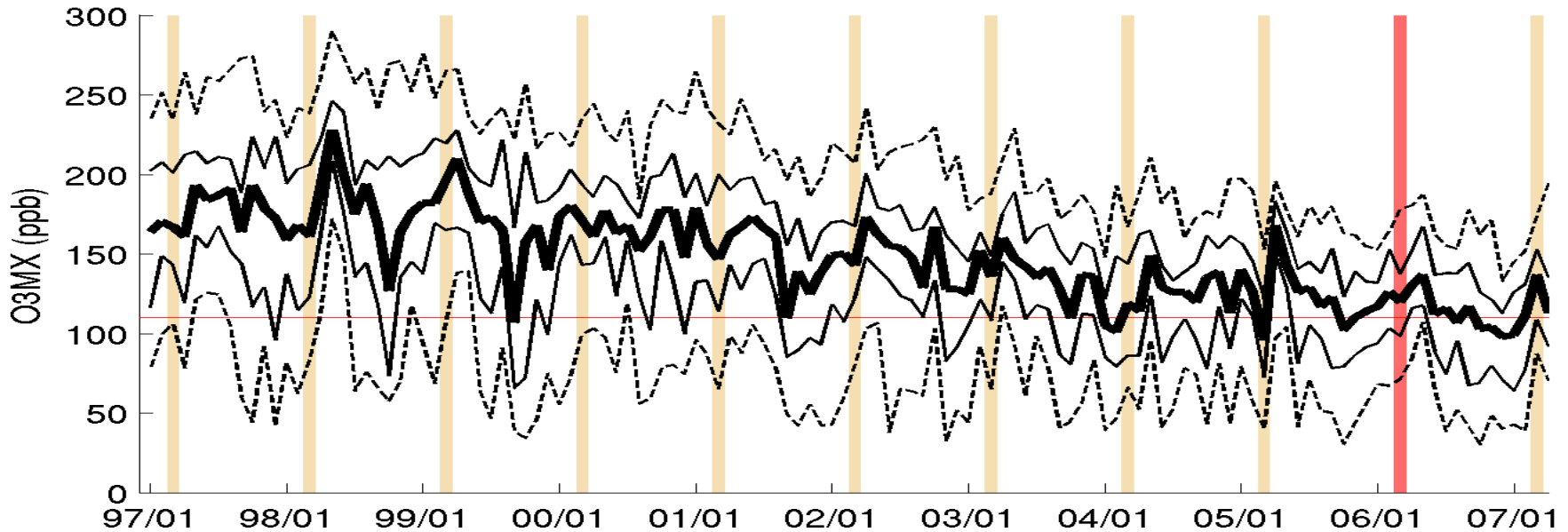
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1. Was March 2006 typical?
2. Was pollution representative?
3. What were the transport episodes?

Poster:

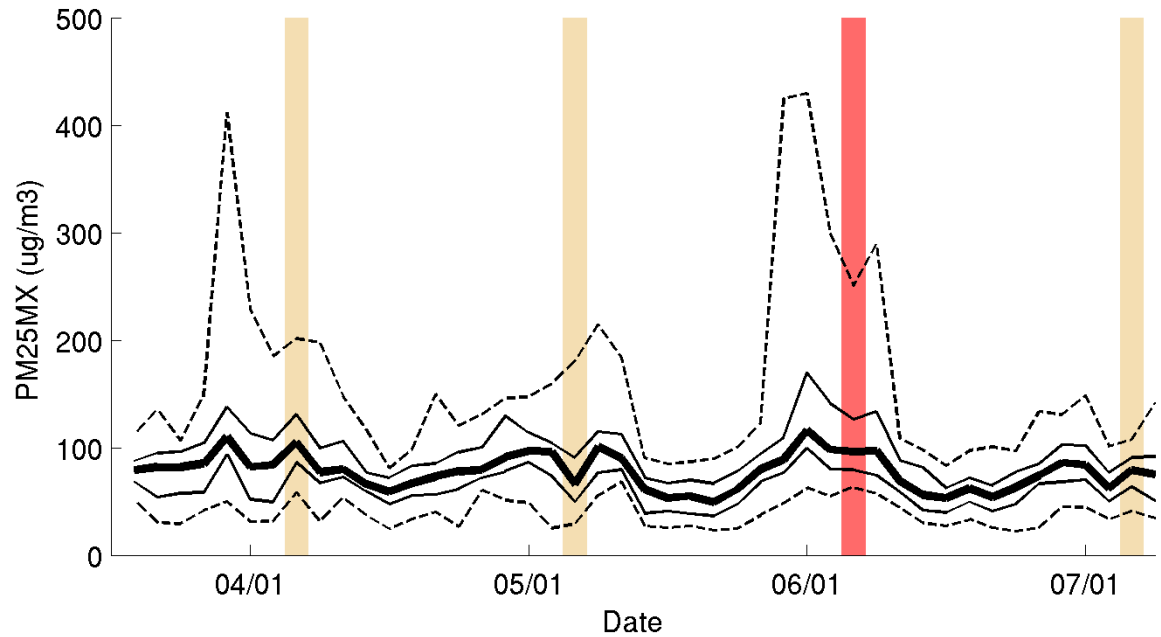
Basin winds: WRF – MM5 comparisons
Transport times and basin recirculation - Flexpart
Basin convergence patterns
Concentration field analysis

Historical Trends in RAMA Ozone and PM2.5

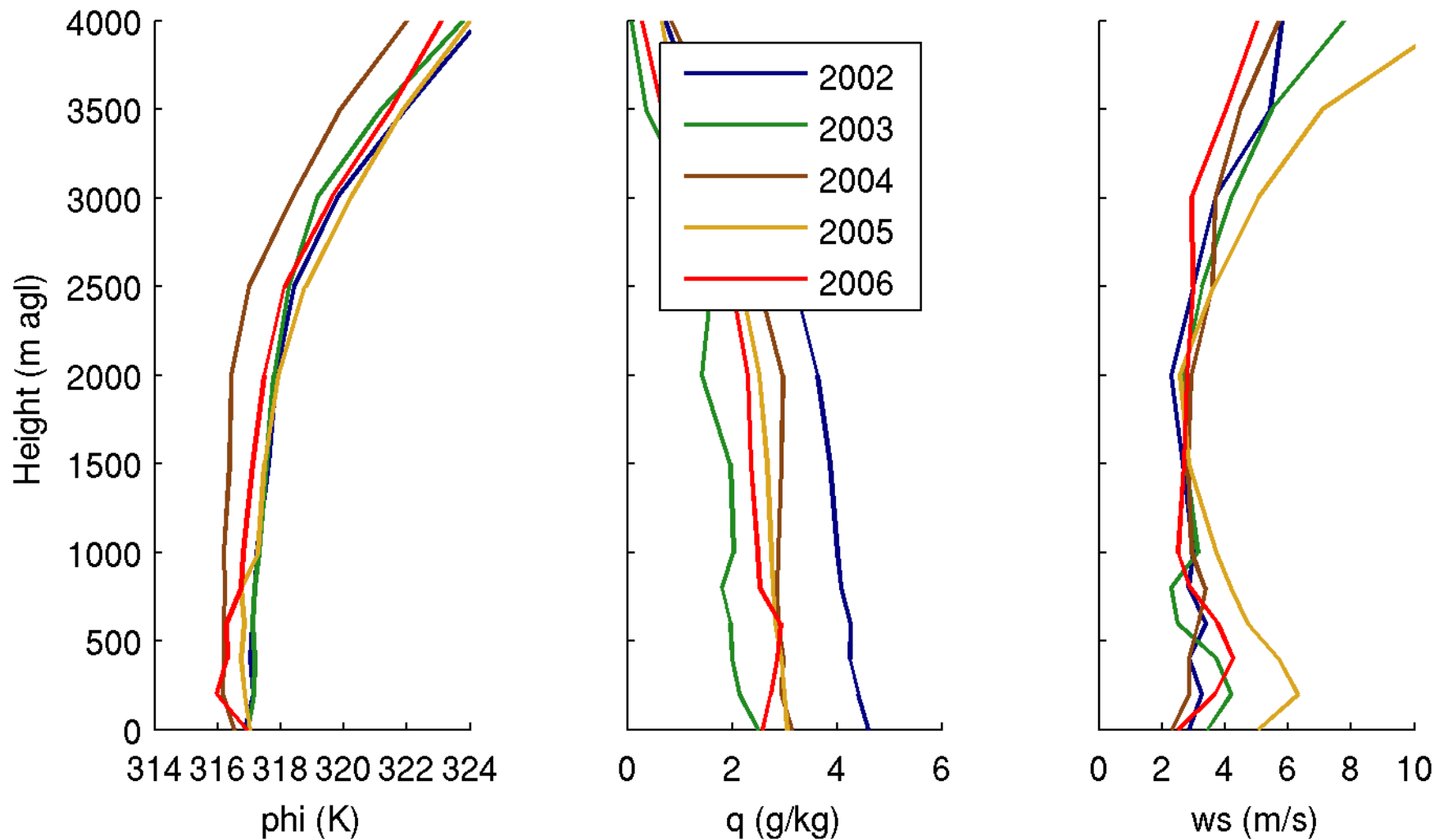


Data: domain-wide daily maximum

Dash: minimum and maximum by month
Bold: monthly mean
Thin: IQR of domain-wide daily maximum by month

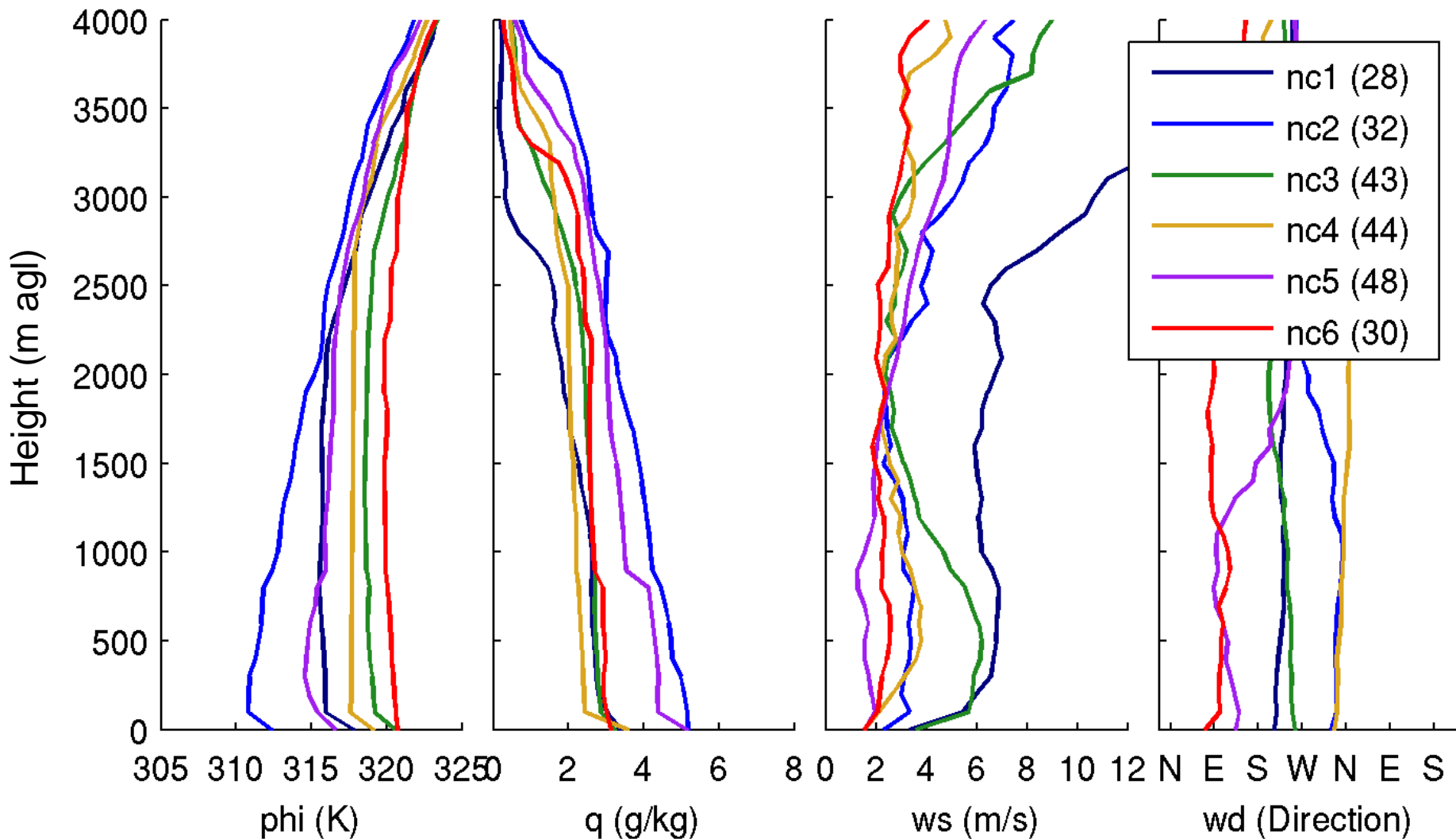


Median March 00Z (18:00) Radiosonde Profiles at GSMN

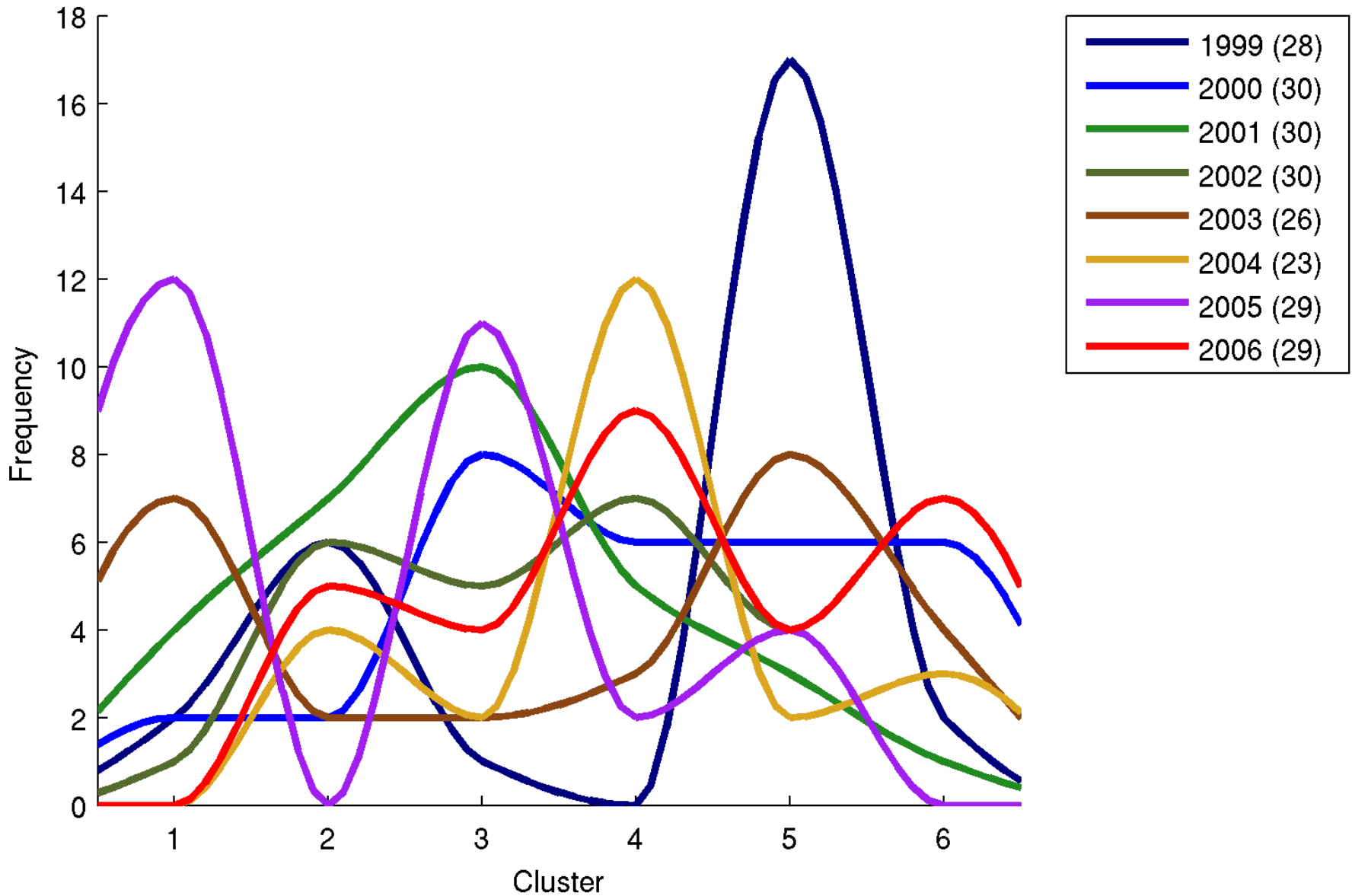


Clusters of March 18:00 Profiles for 1999-2006

Median measurements for each cluster (Number of profiles per cluster)

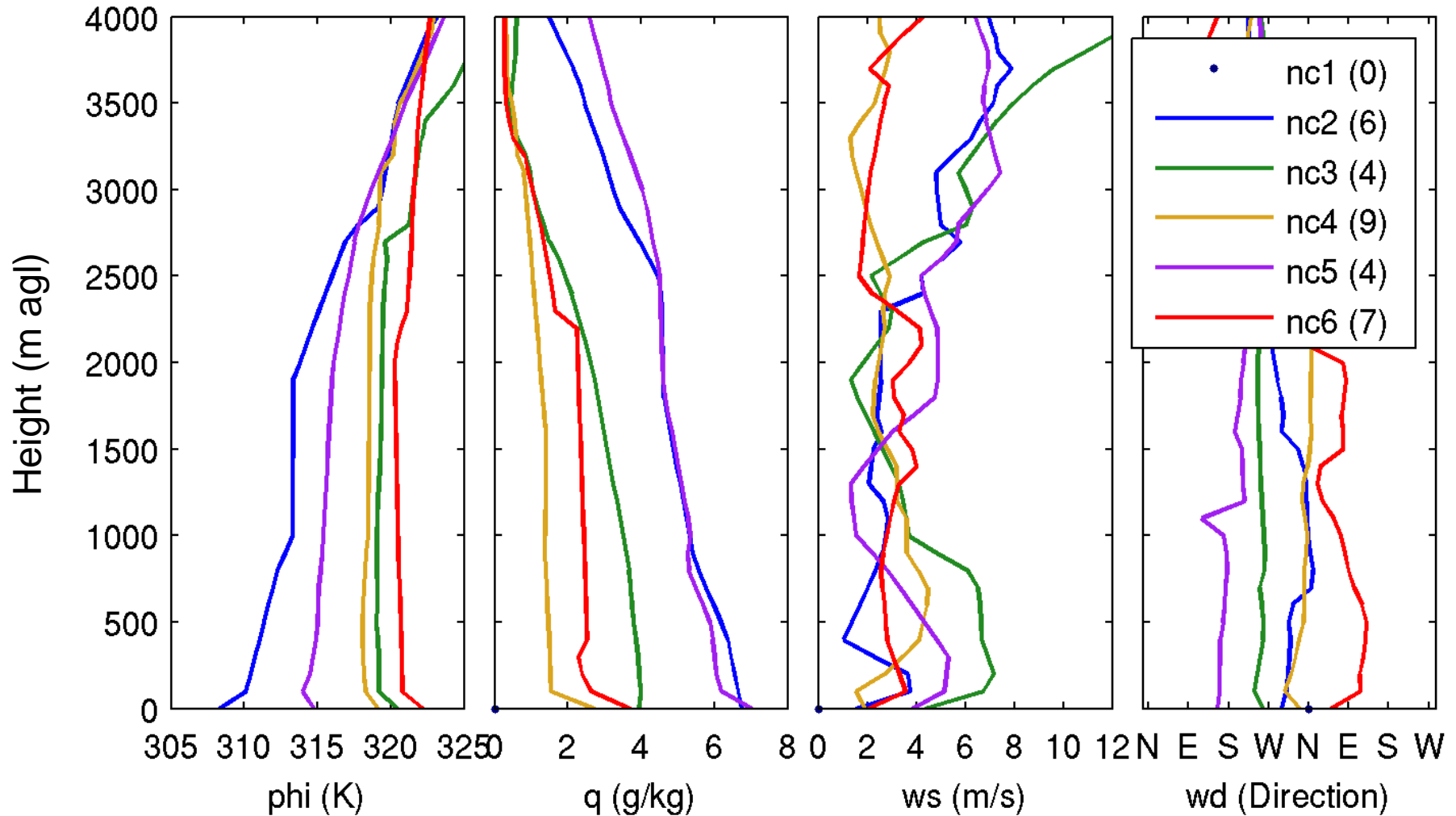


Distribution of Clusters by Year



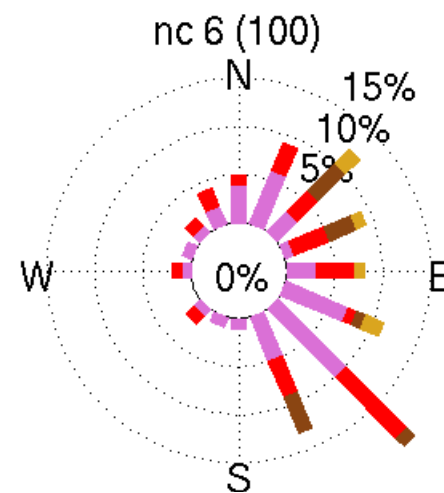
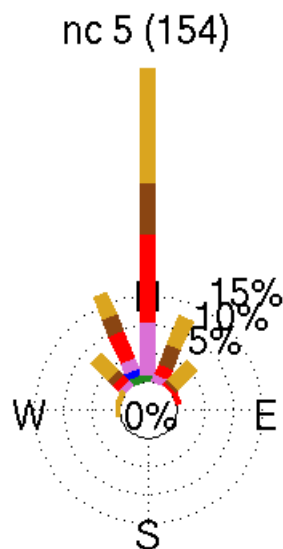
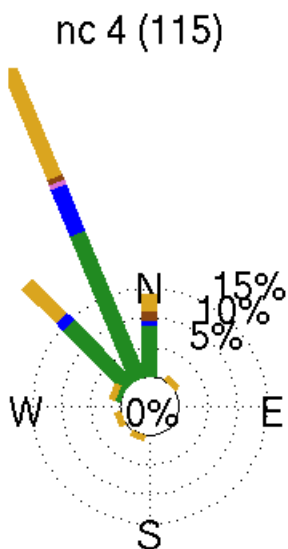
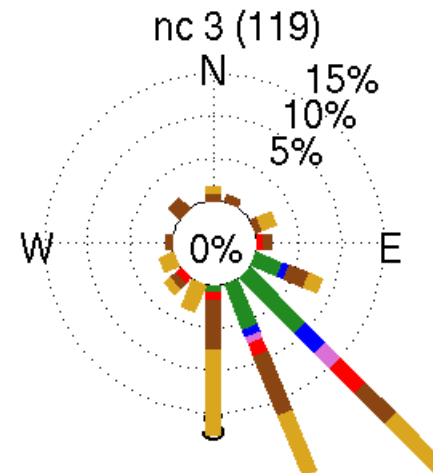
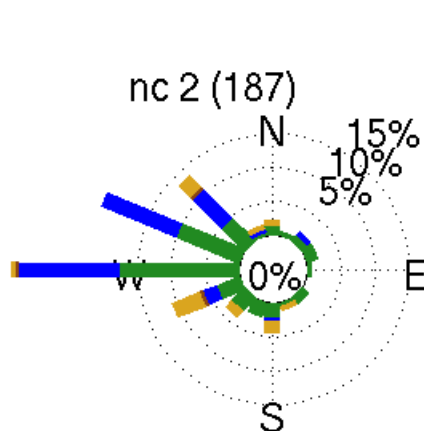
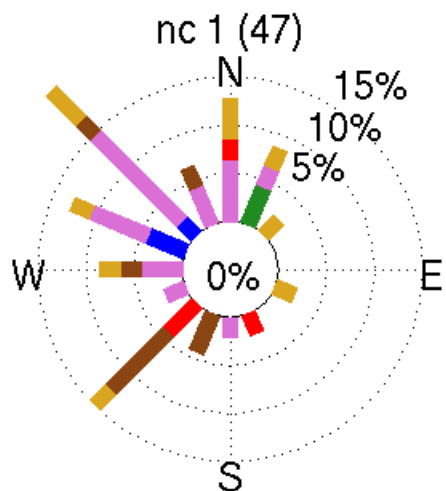
Clusters of March 18:00 Profiles for March 2006

Median measurements for each cluster (Number of profiles per cluster)



Clusters RAMA Surface Winds for March 2006

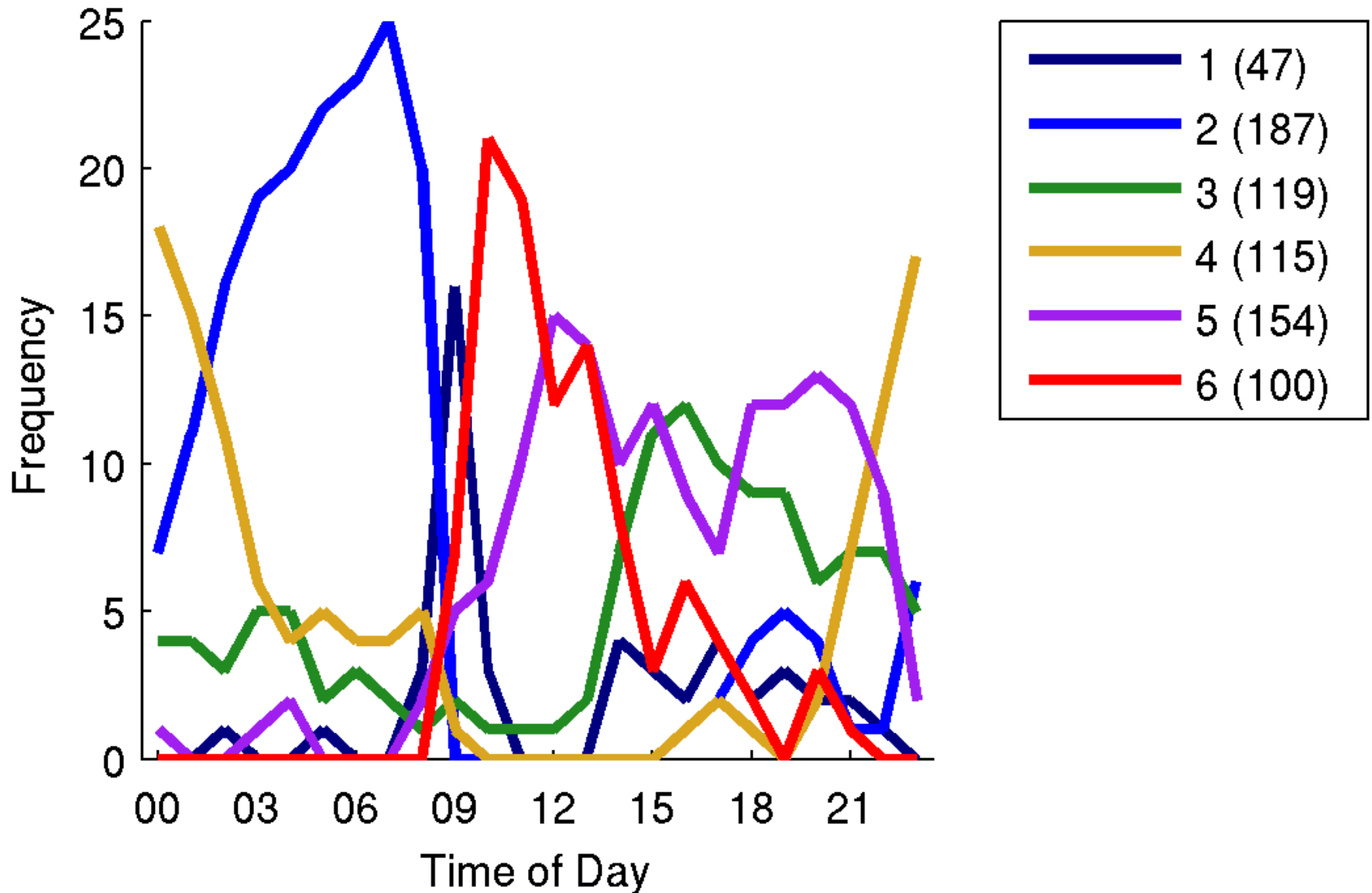
Observations from 8 Stations, Wind Roses for Tlalnepantla (~5km NW of IMP)



Time of Day: 0 6 9 12 15 18

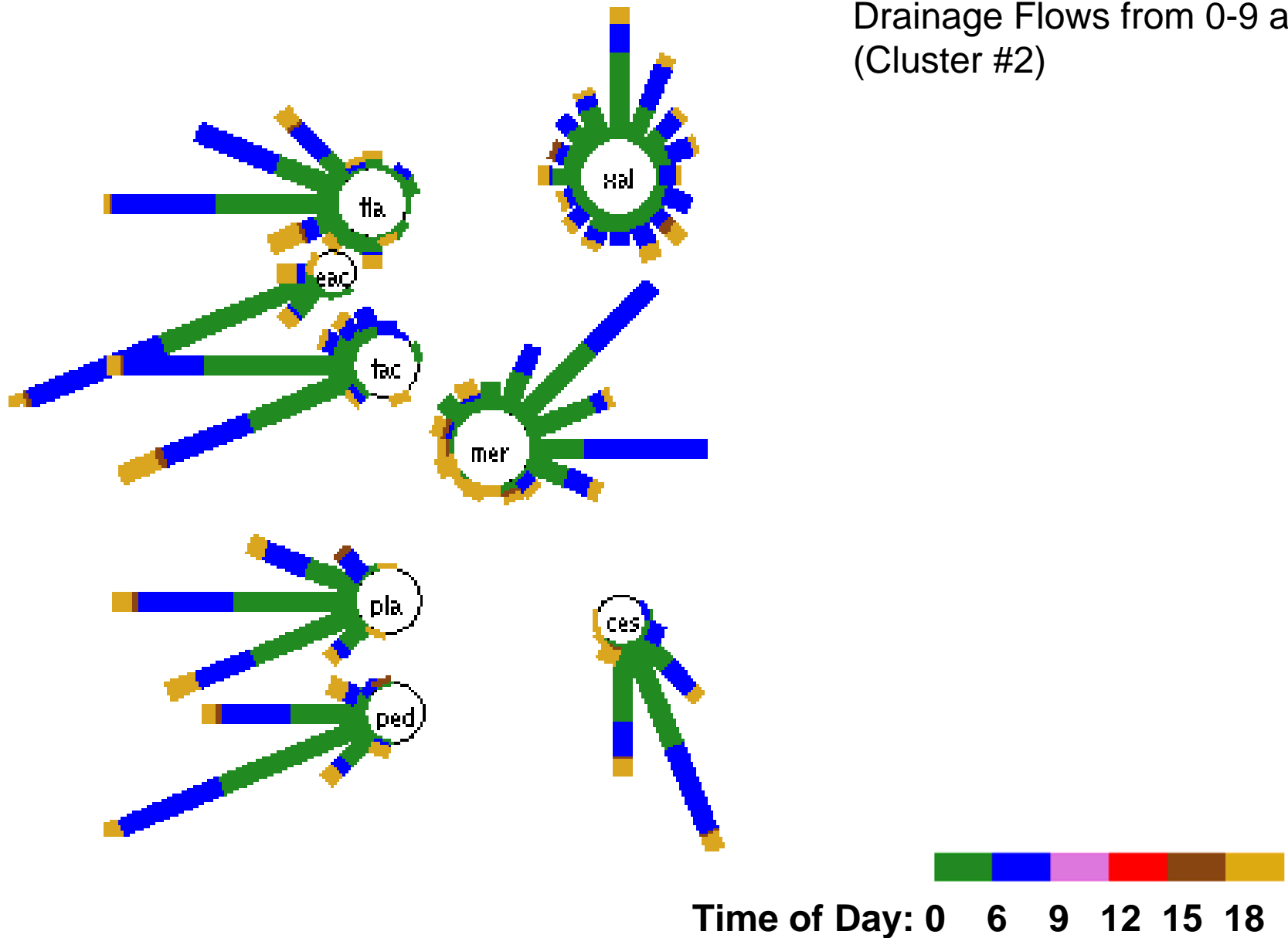
Diurnal Evolution of RAMA Clusters

Surface Winds, March 2006, 8 Stations

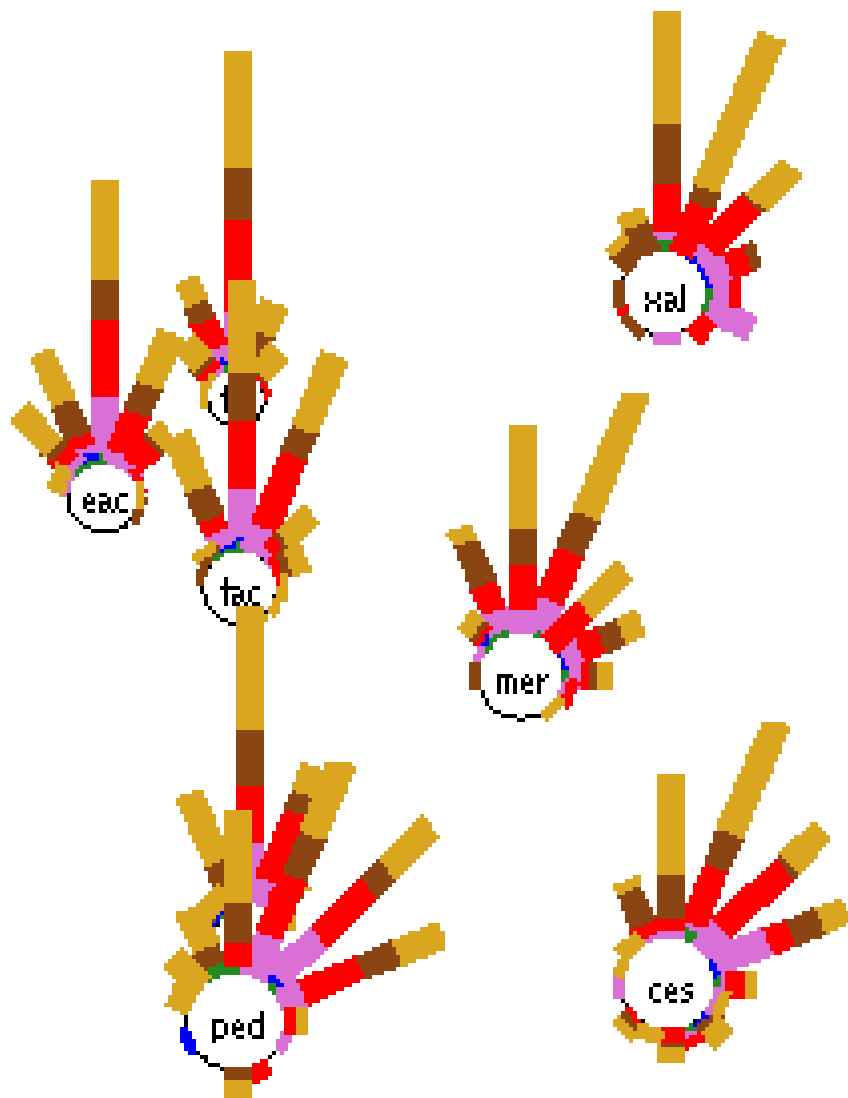


Wind rose of RAMA Cluster “Early Morning”

Drainage Flows from 0-9 am
(Cluster #2)



Wind rose of RAMA Cluster “Northerly”

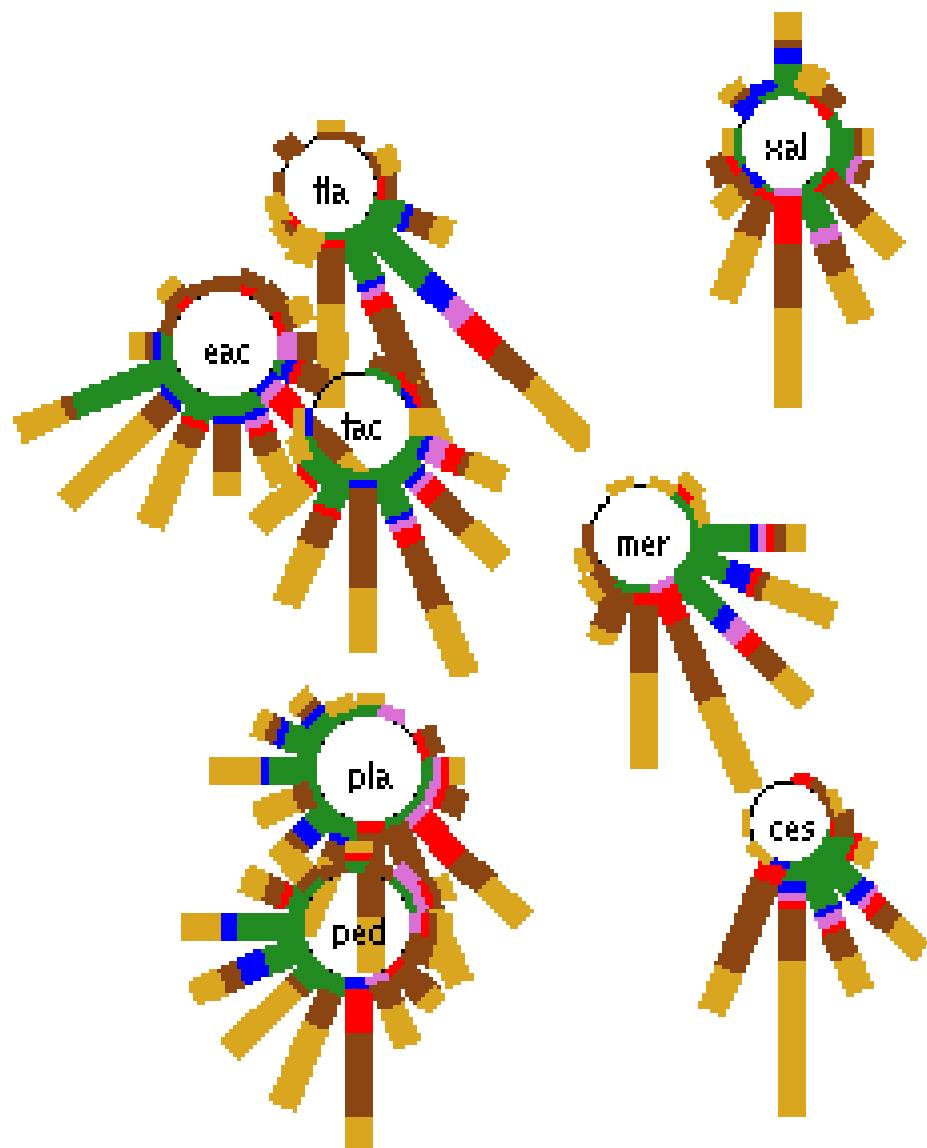


Northerly flows
Late Morning to Afternoon
(Cluster #5)



Time of Day: 0 6 9 12 15 18

Wind rose of RAMA Cluster “Southerly”

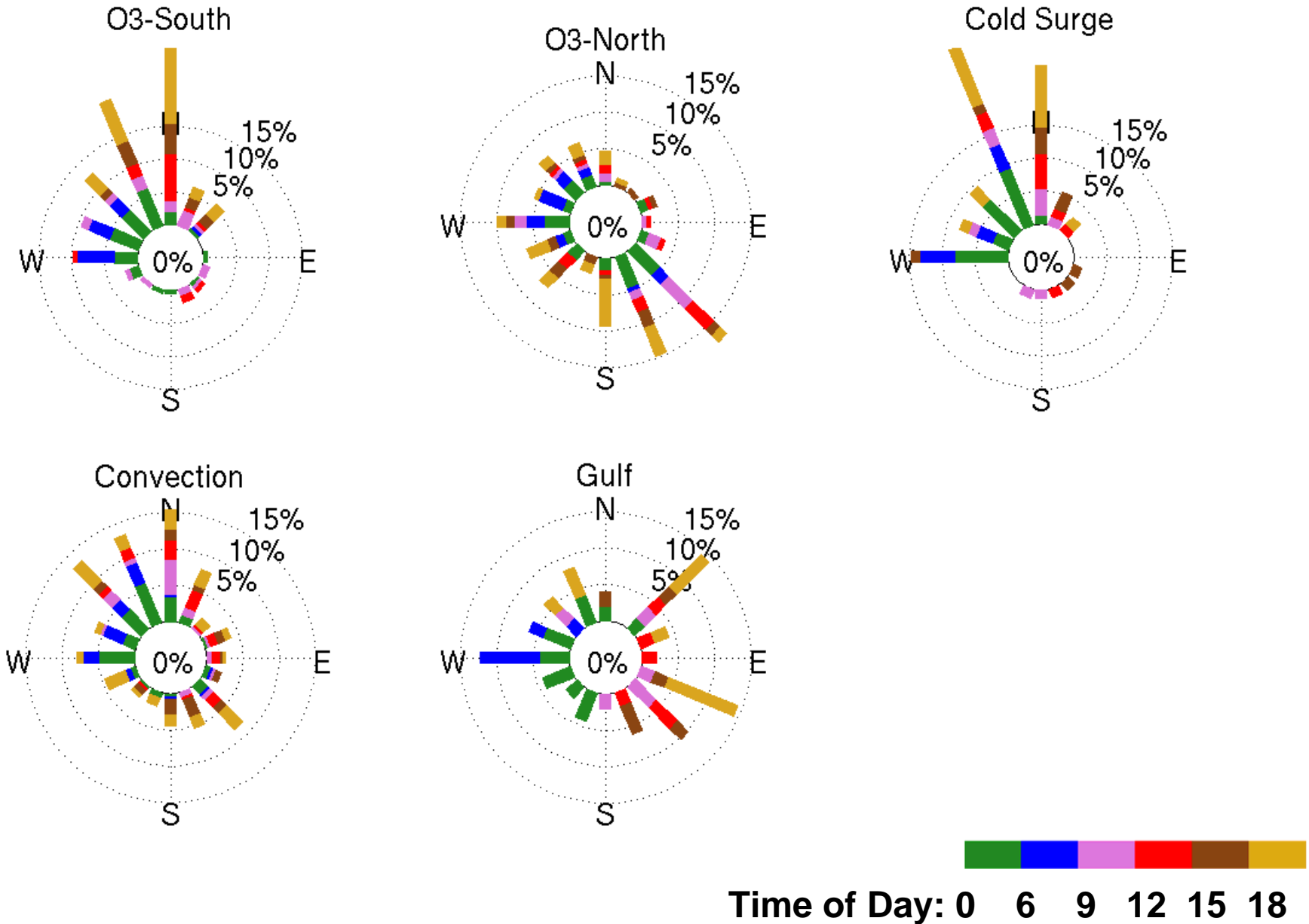


Southerly flows
Early Morning /
Late Afternoon
(Cluster #3)



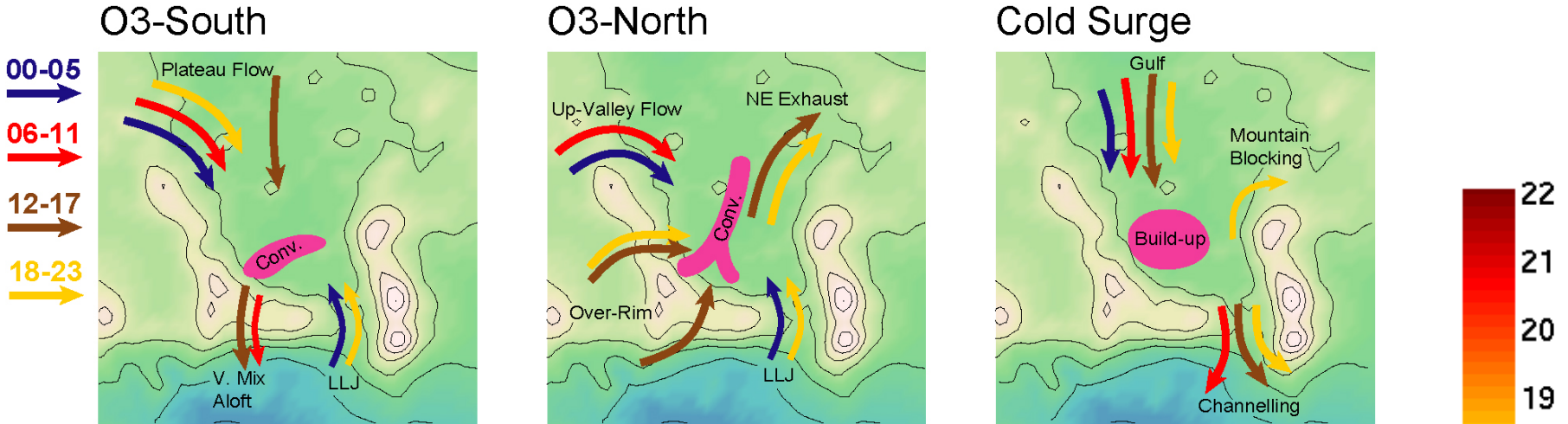
Time of Day: 0 6 9 12 15 18

Wind Roses at TLA by Episode Type

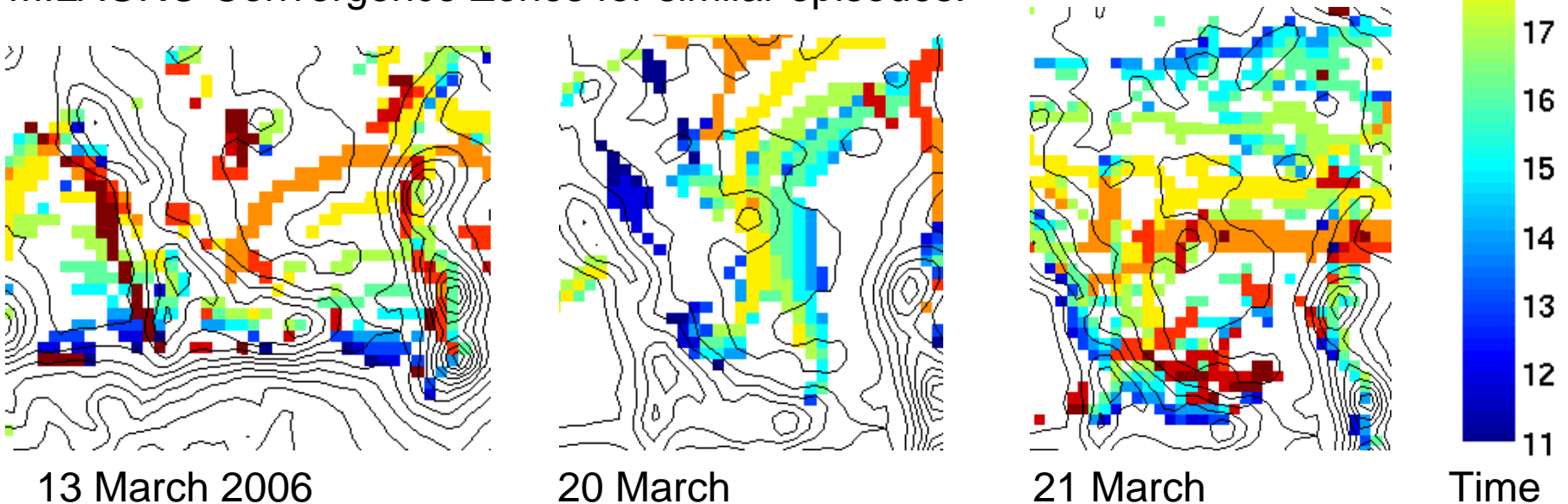


Basin Convergence Zones

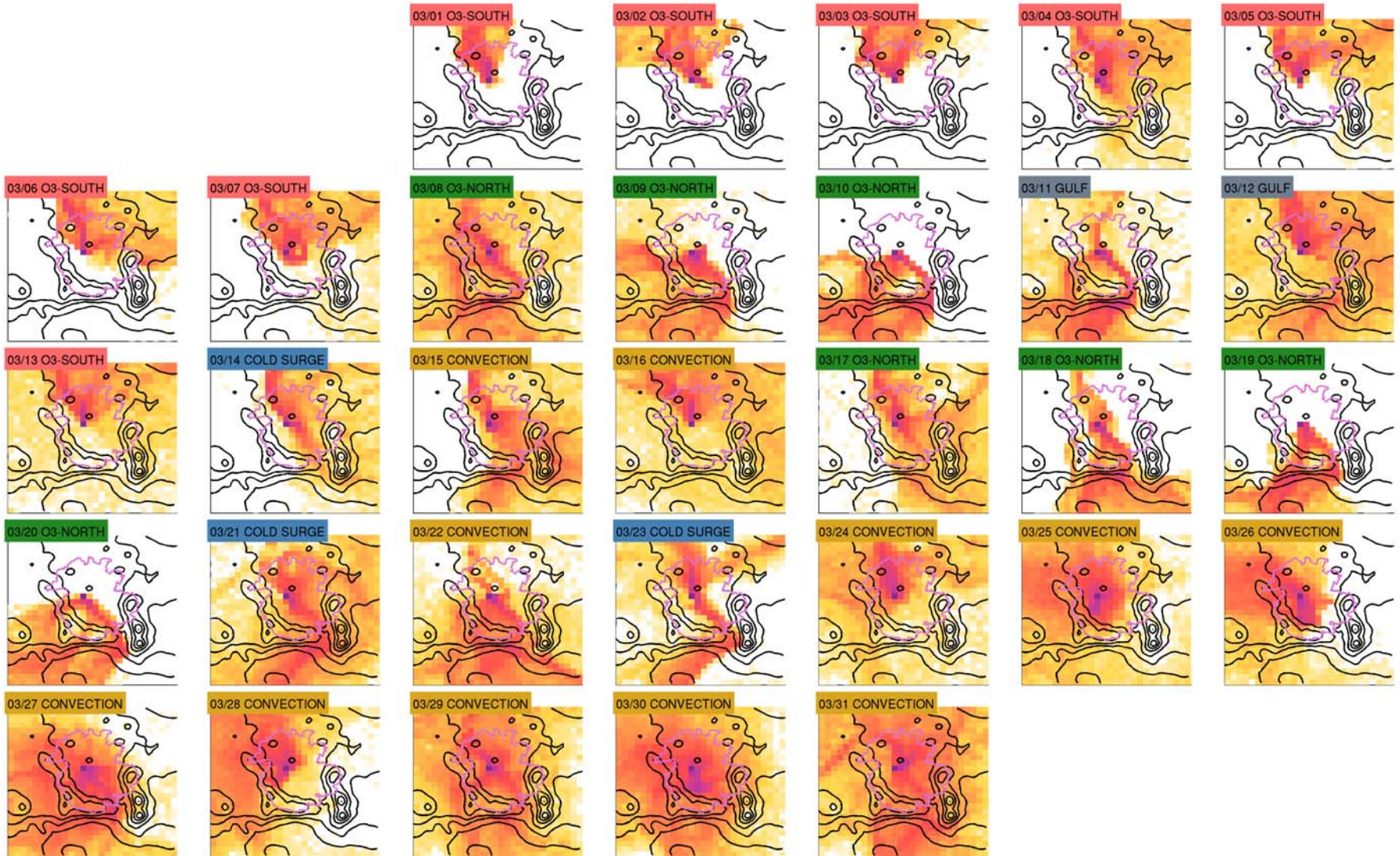
MCMA-2003 Conceptual Wind Circulation Model:



MILAGRO Convergence Zones for similar episodes:



Back-trajectories at T0 (WRF-FLEXPART)



MCMA Plume
Re-analysis
[< -6 -2 06:00 CST (Tue) +2 +6 >]
[< -7 -1 14 Mar 2006 +1 +7 >]



Info
Forecasts
Summaries
Res Time
File Browser
Home

MCMA : MCMA-Basin : MCMA-MX : MCMA-3D-Basin : 3DXB : MCMA-3D-MX : 3DXMX
T0 : FT0z : FT0 : RT0 : T1 : FT1z : FT1 : RT1 : T2 : FT2z : FT2 : RT2 : TM1 : FTM1z : FTM1 : RTM1 : A1 : FA1z : FA1 : RA1

Conclusions:

Representative episodes can be used to understand basin-scale flow

Poster:

Basin winds: WRF – MM5 comparisons

Transport times and basin recirculation - FLEXPART

Basin convergence patterns

Concentration field analysis

<http://mce2.org/reanalysis> will soon have new WRF runs

