HGB OSAT and APCA

2018 Eight-Hour Results

SETPMTC Meeting
June 23, 2009
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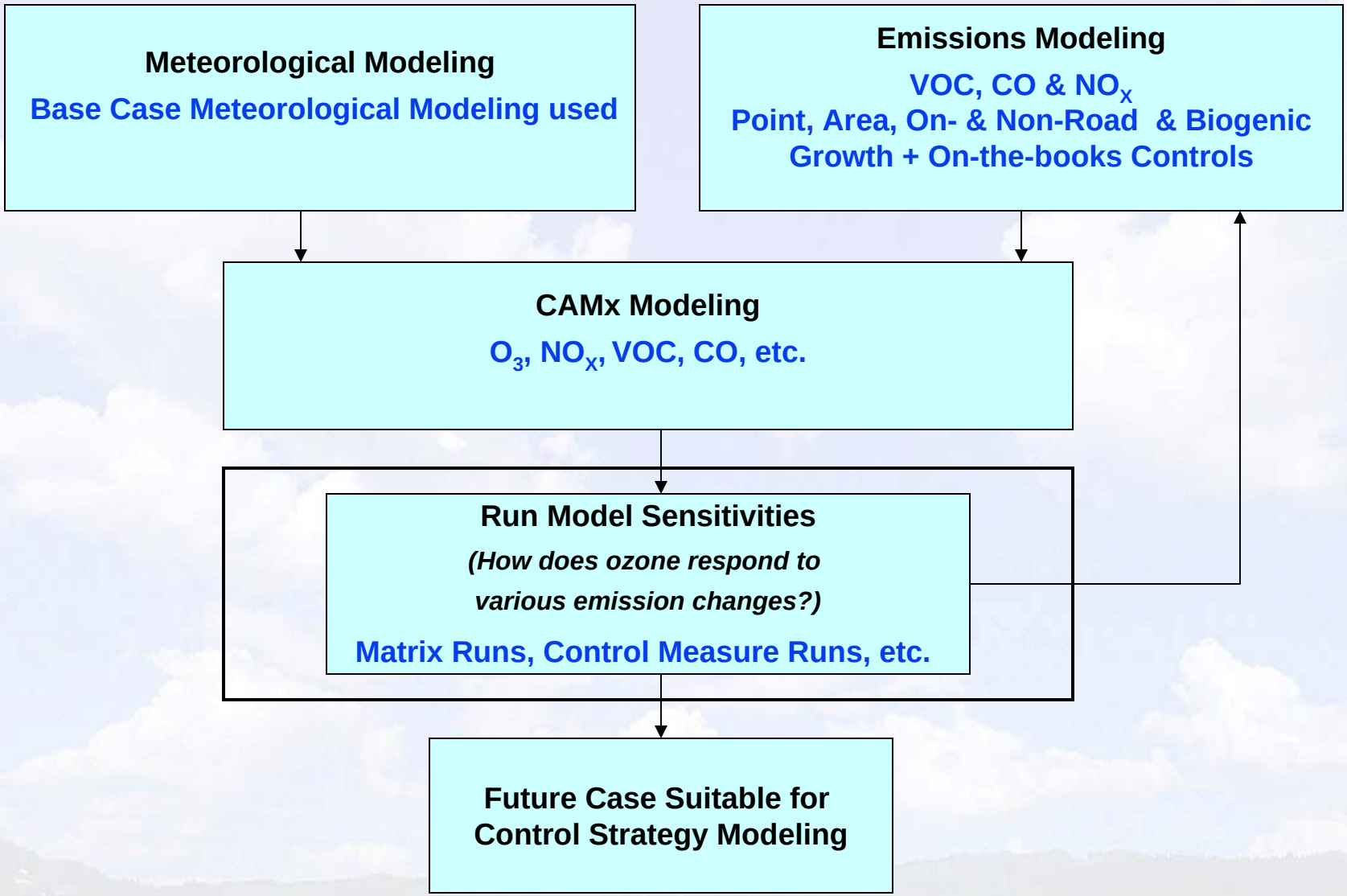
CAMx Ozone Modeling in SIP Development

The Big Picture

Base Case	Day-specific meteorology and emissions; replicate what actually happened
Baseline Case	Day-specific meteorology and Typical emissions; used in RRF to predict future design values
Future Base Case	Apply future growth + on-the-books controls to estimate future ozone
Control Strategy Testing	Determine control strategies that will effectively reduce ozone
SIP	Document modeling procedures

CAMx Ozone Modeling in SIP Development

Future Case – Future Baseline Emissions



What is OSAT?

- OSAT = Ozone Source Apportionment Tool
- OSAT keeps track of the origin of the NOx and VOC precursors creating the ozone
- Ozone can then be “apportioned” to specific sources
- Source groups and source regions are defined
- Emission source groups include, for example:
  - Initial and boundary conditions
  - Biogenics
  - MECT and HECT
  - On-road mobile and non-/off-road mobile
  - Area
- Source regions include:
  - HGB, non-HGB

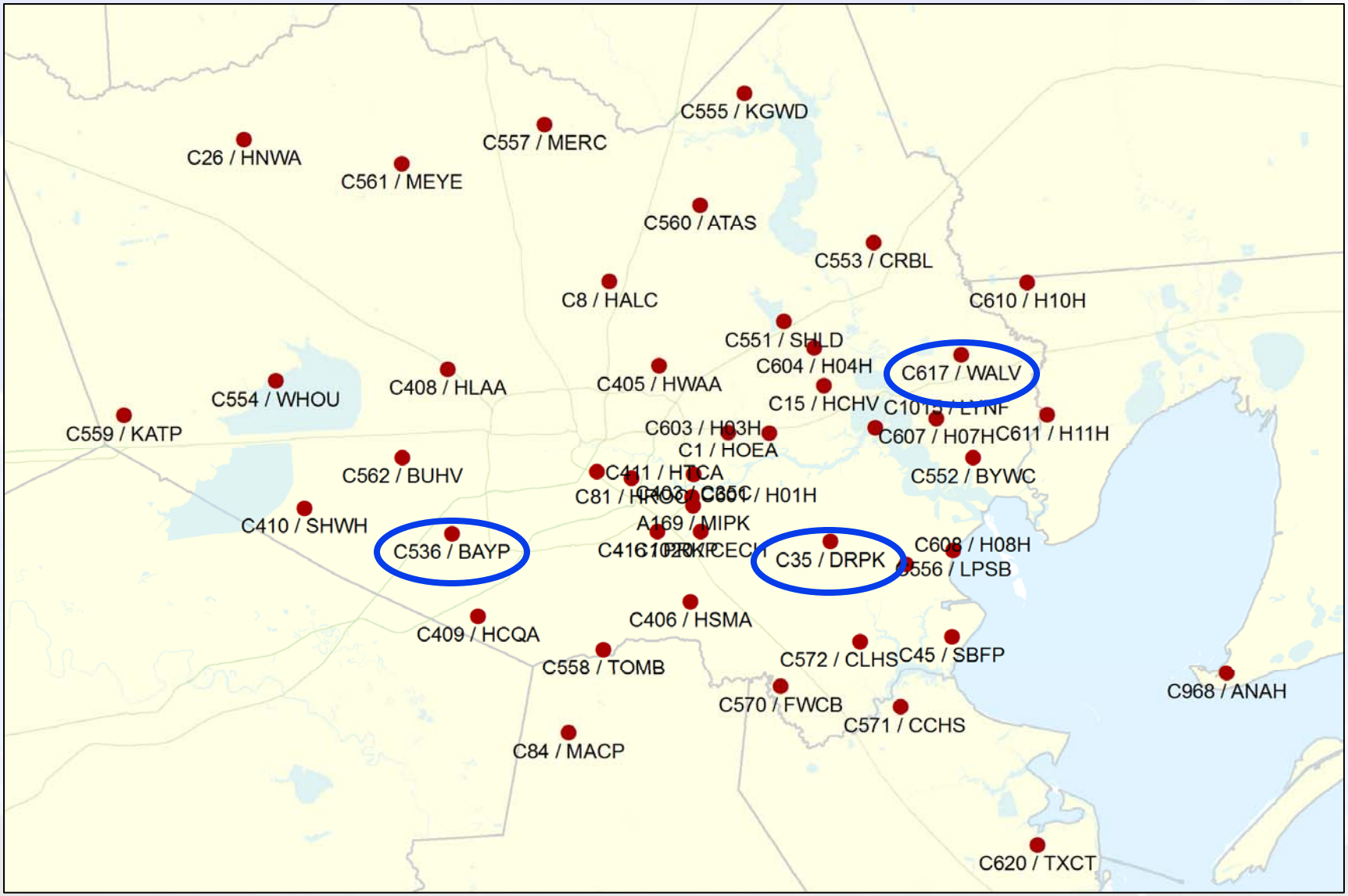
What is APCA?

- APCA = Anthropogenic Precursor Culpability Assessment
- APCA is similar to OSAT, but it recognizes certain source groups (biogenic emissions) are not controllable
- Where OSAT would attribute ozone production to biogenic emissions, APCA reallocates that ozone production to the controllable (anthropogenic) portion of emissions that created the ozone

Results: Orientation

- Results have been plotted as layered area plots for every rolling eight-hour average of every episode for:
  - Bayland Park (BAYP)
  - Deer Park (DRPK)
  - Wallisville (WALV)
- One episode of six, June 2006, is presented here as an example; plots of all episodes for all three monitors are available on AMDA web, and will be included in the SIP as an appendix

Air Quality Monitoring Sites in the HGB Area

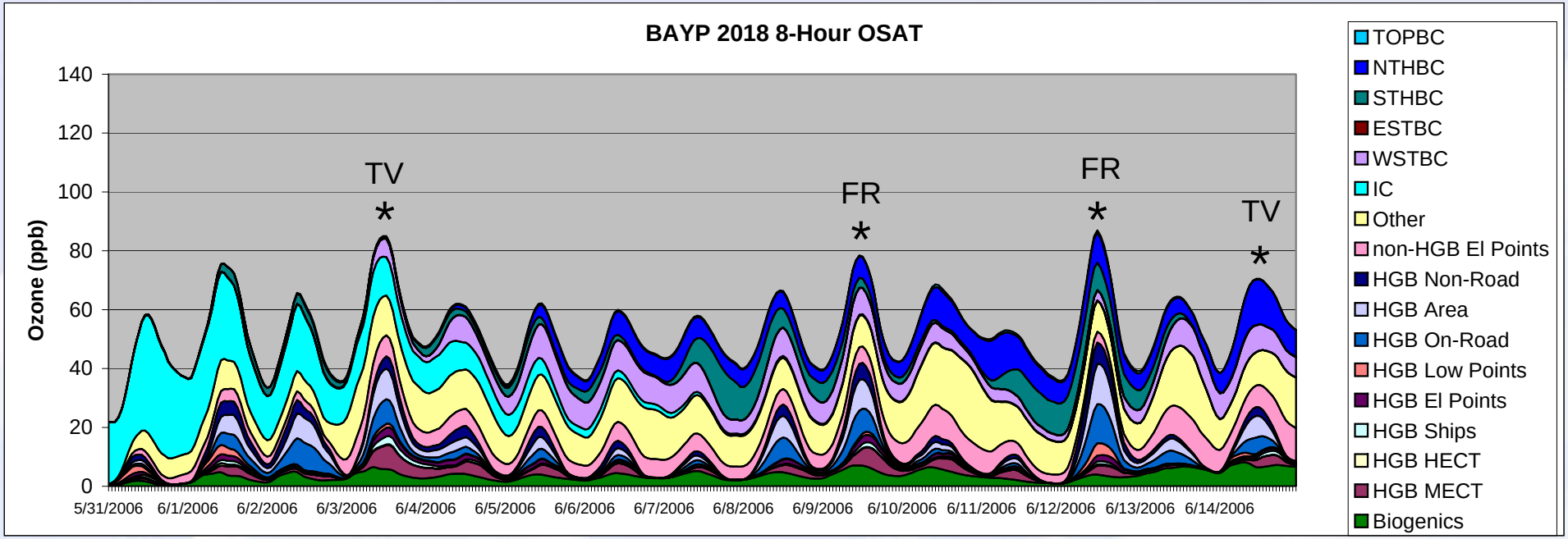


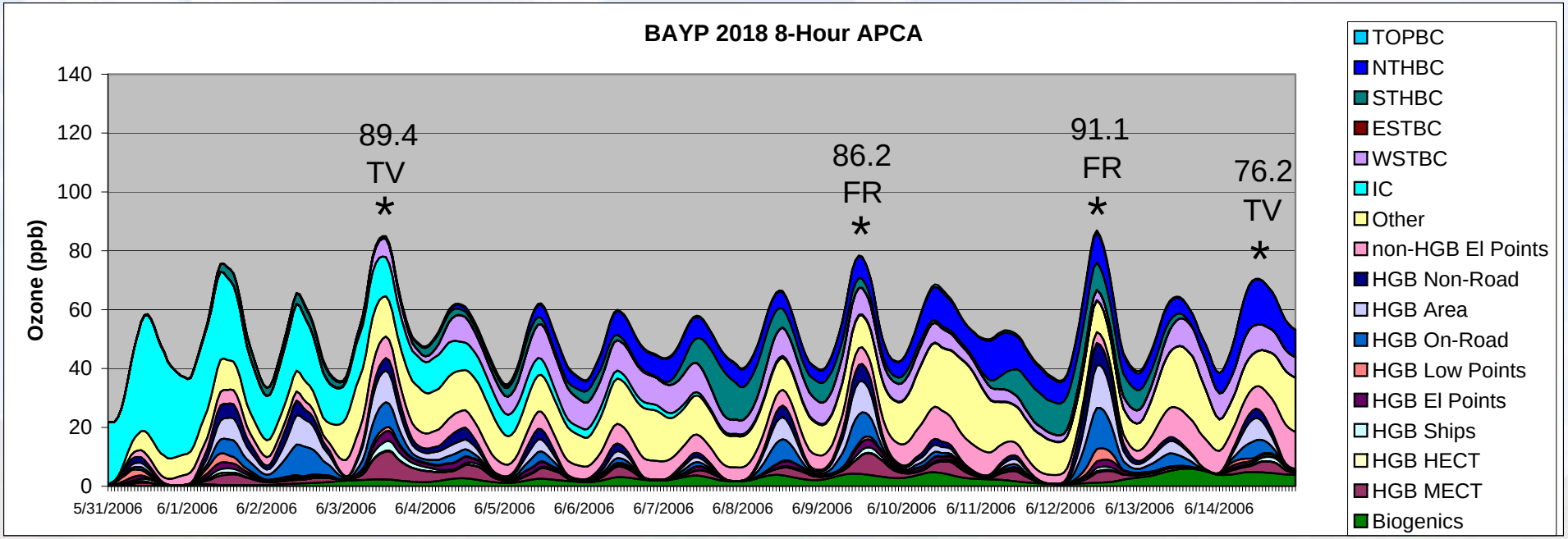
What to Watch For in Plots

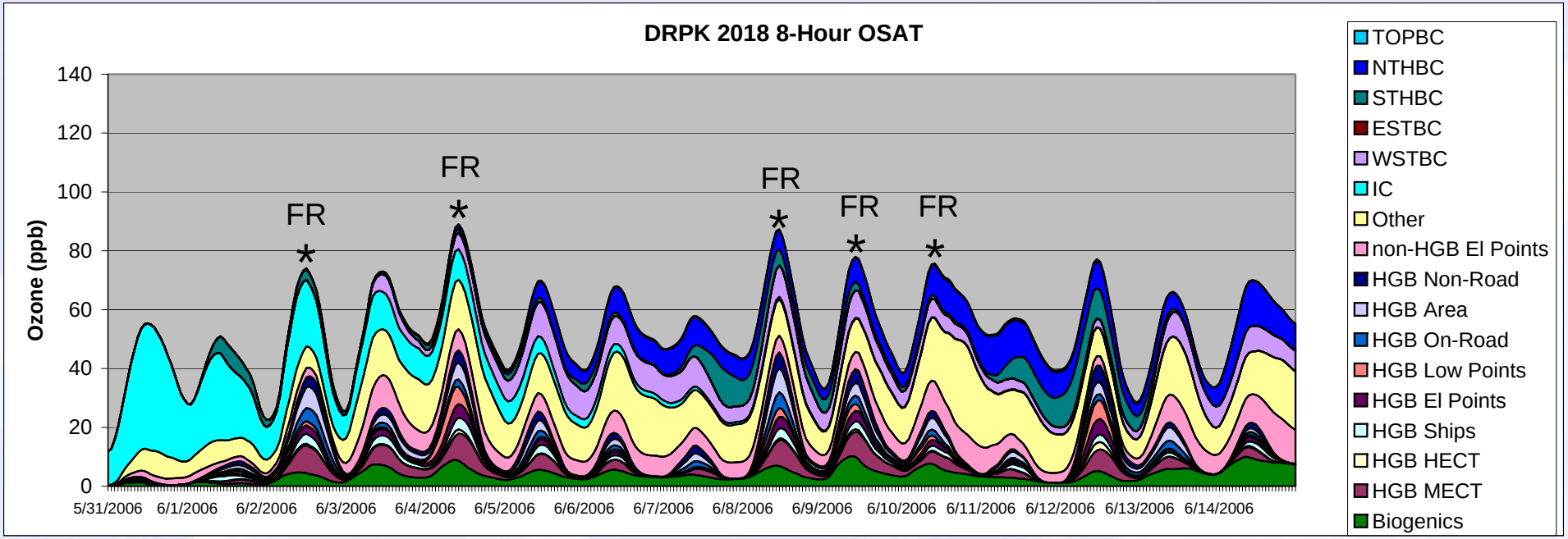
- The first 6 identified layers are boundary and initial conditions
  - For example, “NTHBC” = North Boundary Condition
- “Other” = All emission sources outside of HGB with the exception of elevated points
  - Non-HGB El Points are tracked separately
- “El Points” = Elevated point sources
- Asterisks (*) indicate days included in the Relative Response Factor calculations
- “FR” and “TV” indicate predominant meteorological condition
  - FR = Flow reversal; TV = Typical veering
- To focus attention, look at June 9-10, 2006, for example
- Initial conditions disappear after a few days
- Boundary conditions give an indication of wind direction and background concentration attributable to that boundary

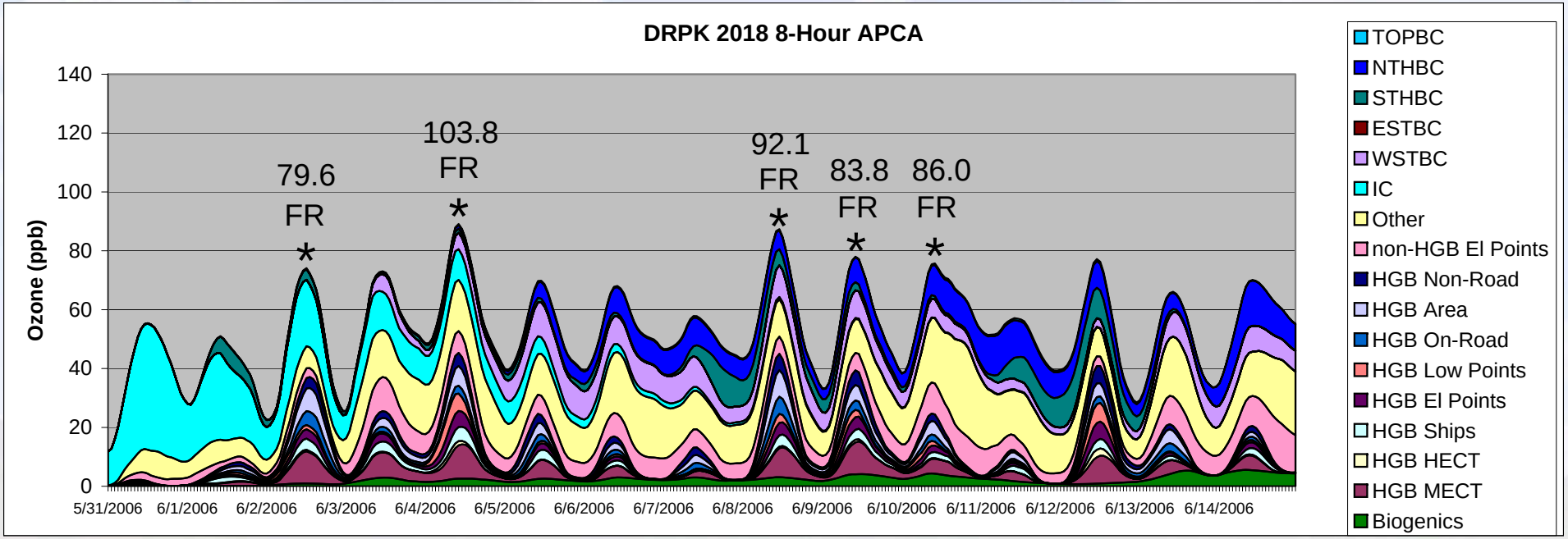
More Things to Watch For

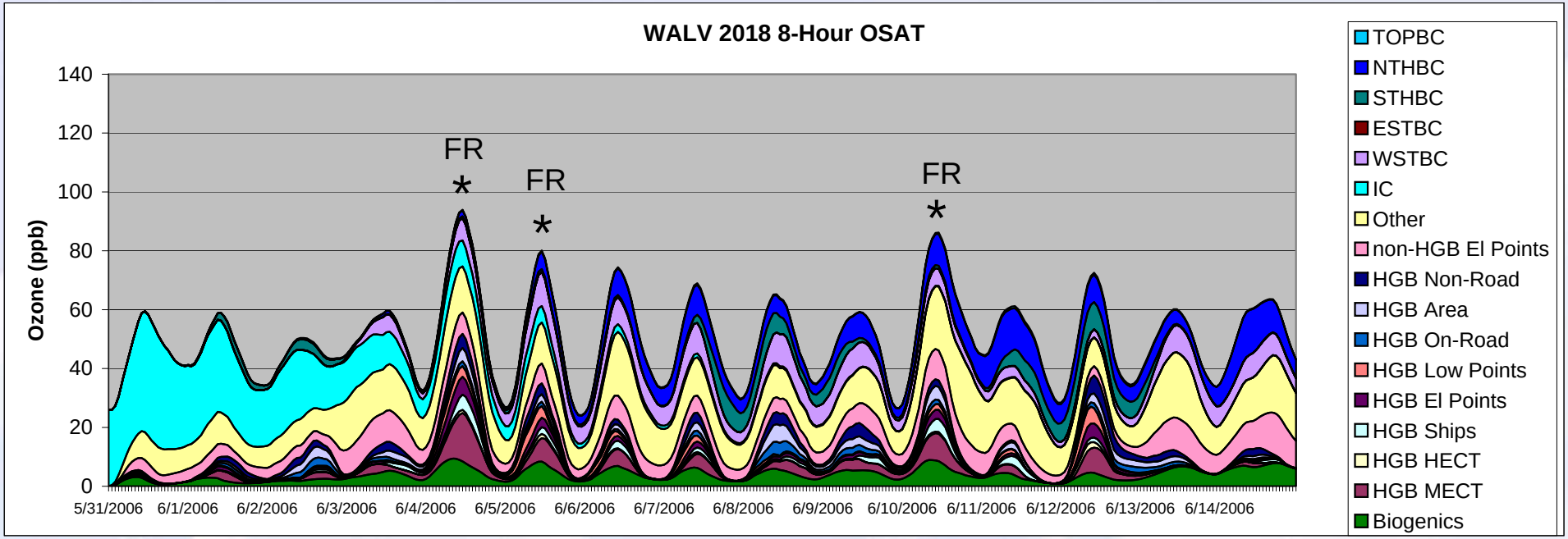
- HGB “layers” indicate HGB contribution to ozone at the three monitors
- The other layers indicate non-HGB contribution to ozone
  - Initial, boundary conditions; Other; non-HGB El Points – down through the “pink” layer – plus biogenics
- Differences in depth of layers between the OSAT and APCA plots indicate how ozone of biogenic origin is reallocated to anthropogenic sources in APCA
- Lower-level emission sources make a greater contribution to ozone at BAYP than DRPK
  - HGB low points, on-road, area, non-road
- Elevated emission sources make a greater contribution to ozone at DRPK than BAYP
  - HGB MECT, ships, elevated points
- The WALV pattern of low-level/elevated origins of ozone is between BAYP and DRPK

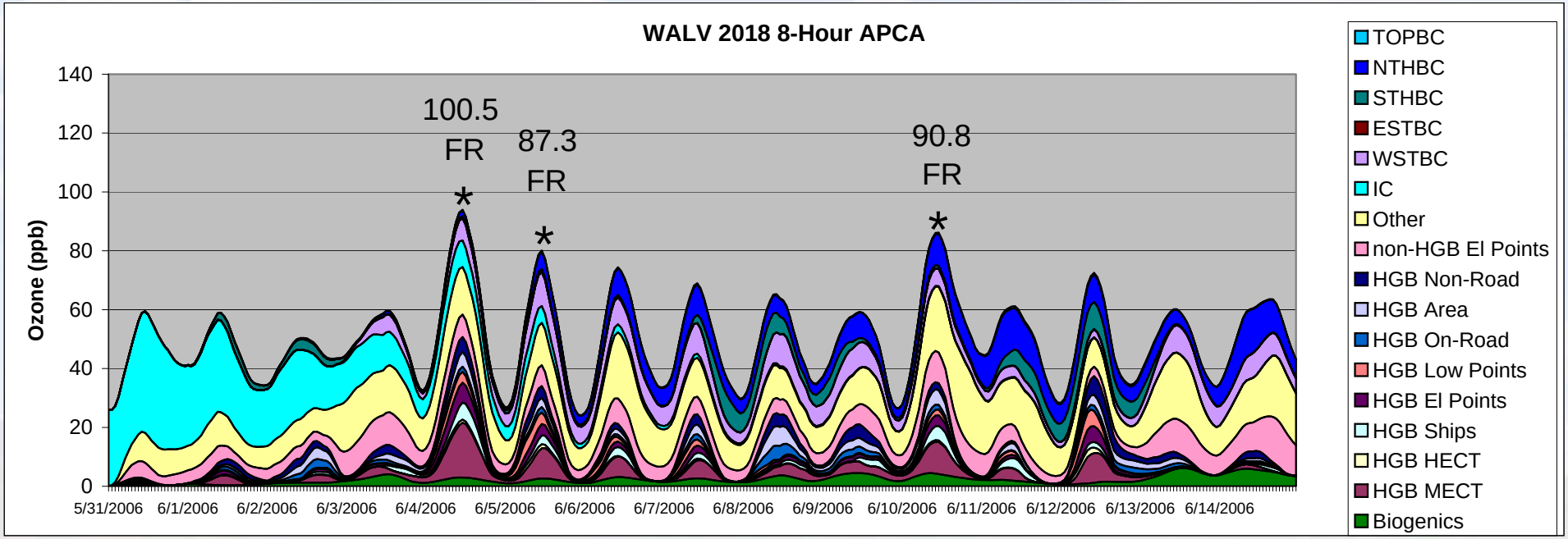

BAYP 2018 8-Hour OSAT
Ozone (ppb)
140
120
100
80
60
40
20
0
TV
*
FR
*
FR
*
TV
*
5/31/2006
6/1/2006
6/2/2006
6/3/2006
6/4/2006
6/5/2006
6/6/2006
6/7/2006
6/8/2006
6/9/2006
6/10/2006
6/11/2006
6/12/2006
6/13/2006
6/14/2006
TOPBC
NTHBC
STHBC
ESTBC
WSTBC
IC
Other
non-HGB El Points
HGB Non-Road
HGB Area
HGB On-Road
HGB Low Points
HGB El Points
HGB Ships
HGB HECT
HGB MECT
Biogenics


BAYP 2018 8-Hour APCA
Ozone (ppb)
140
120
100
80
60
40
20
0
89.4
TV
*
86.2
FR
*
91.1
FR
*
76.2
TV
*
5/31/2006
6/1/2006
6/2/2006
6/3/2006
6/4/2006
6/5/2006
6/6/2006
6/7/2006
6/8/2006
6/9/2006
6/10/2006
6/11/2006
6/12/2006
6/13/2006
6/14/2006
TOPBC
NTHBC
STHBC
ESTBC
WSTBC
IC
Other
non-HGB El Points
HGB Non-Road
HGB Area
HGB On-Road
HGB Low Points
HGB El Points
HGB Ships
HGB HECT
HGB MECT
Biogenics


DRPK 2018 8-Hour OSAT
Ozone (ppb)
0
20
40
60
80
100
120
140
FR
FR
FR
FR
FR
5/31/2006
6/1/2006
6/2/2006
6/3/2006
6/4/2006
6/5/2006
6/6/2006
6/7/2006
6/8/2006
6/9/2006
6/10/2006
6/11/2006
6/12/2006
6/13/2006
6/14/2006
TOPBC
NTHBC
STHBC
ESTBC
WSTBC
IC
Other
non-HGB El Points
HGB Non-Road
HGB Area
HGB On-Road
HGB Low Points
HGB El Points
HGB Ships
HGB HECT
HGB MECT
Biogenics


DRPK 2018 8-Hour APCA
Ozone (ppb)
0
20
40
60
80
100
120
140
79.6
FR
103.8
FR
92.1
FR
83.8
FR
86.0
FR
5/31/2006
6/1/2006
6/2/2006
6/3/2006
6/4/2006
6/5/2006
6/6/2006
6/7/2006
6/8/2006
6/9/2006
6/10/2006
6/11/2006
6/12/2006
6/13/2006
6/14/2006
TOPBC
NTHBC
STHBC
ESTBC
WSTBC
IC
Other
non-HGB El Points
HGB Non-Road
HGB Area
HGB On-Road
HGB Low Points
HGB El Points
HGB Ships
HGB HECT
HGB MECT
Biogenics


WALV 2018 8-Hour OSAT
Ozone (ppb)
140
120
100
80
60
40
20
0
FR
*
FR
*
FR
*
5/31/2006
6/1/2006
6/2/2006
6/3/2006
6/4/2006
6/5/2006
6/6/2006
6/7/2006
6/8/2006
6/9/2006
6/10/2006
6/11/2006
6/12/2006
6/13/2006
6/14/2006
TOPBC
NTHBC
STHBC
ESTBC
WSTBC
IC
Other
non-HGB El Points
HGB Non-Road
HGB Area
HGB On-Road
HGB Low Points
HGB El Points
HGB Ships
HGB HECT
HGB MECT
Biogenics


WALV 2018 8-Hour APCA
Ozone (ppb)
140
120
100
80
60
40
20
0
100.5
FR
*
87.3
FR
*
90.8
FR
*
5/31/2006
6/1/2006
6/2/2006
6/3/2006
6/4/2006
6/5/2006
6/6/2006
6/7/2006
6/8/2006
6/9/2006
6/10/2006
6/11/2006
6/12/2006
6/13/2006
6/14/2006
TOPBC
NTHBC
STHBC
ESTBC
WSTBC
IC
Other
non-HGB El Points
HGB Non-Road
HGB Area
HGB On-Road
HGB Low Points
HGB El Points
HGB Ships
HGB HECT
HGB MECT
Biogenics

Summary

- The OSAT and APCA results support the results of the matrix runs, which identified different contributions of low-level vs. elevated sources to ozone at different monitors
- Contribution of non-HGB sources to ozone on high ozone days is significant, ~50 percent, and on some days, even greater – see June 10 at WALV
- Conversely, HGB contribution to ozone on high ozone days is approximately 50 percent, but sometimes less
- PiG'ed sources account for 5-10 ppb ozone, depending on the site – this ozone was not apportioned/allocated