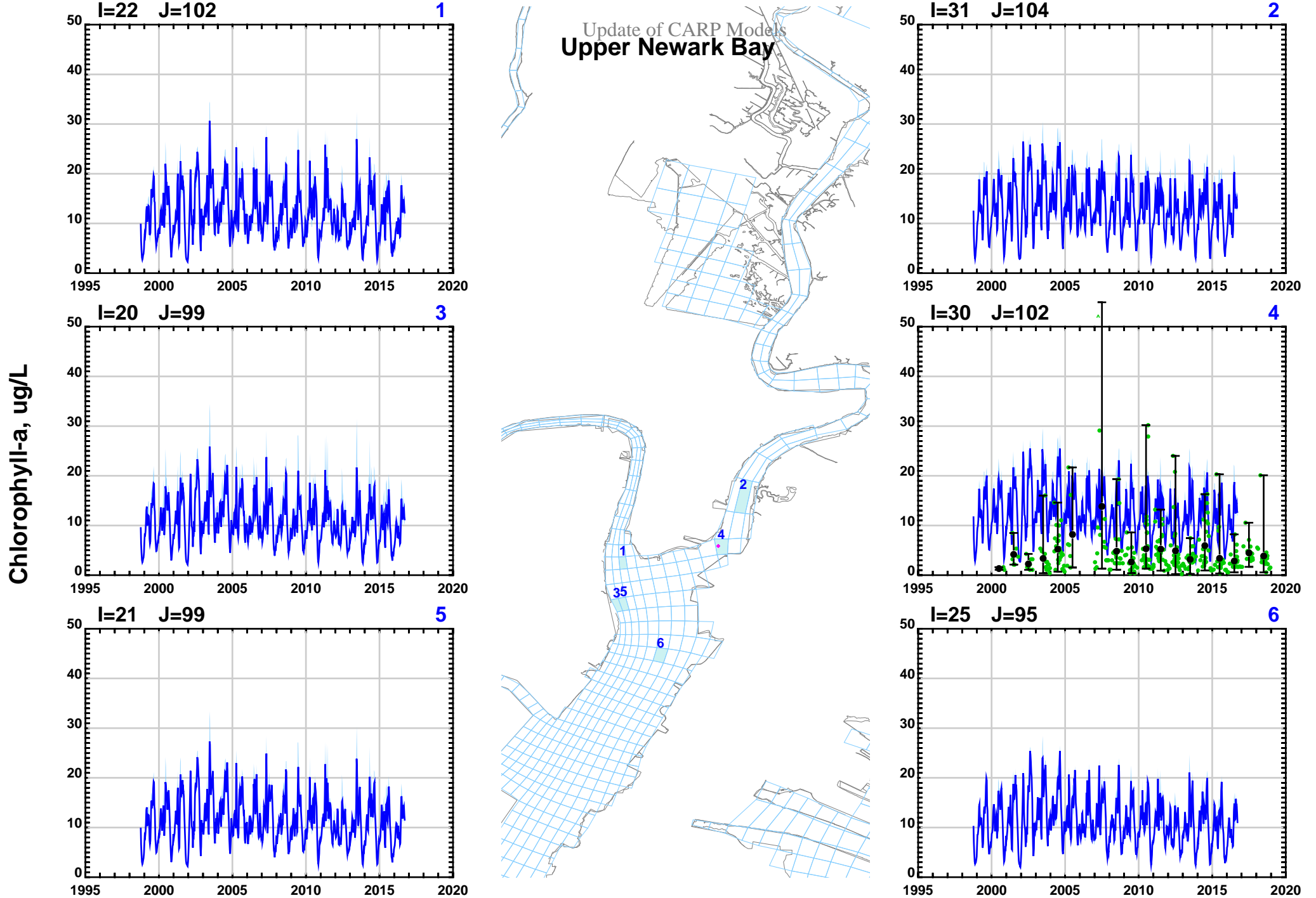


APPENDIX 12

Additional Parameters Related to Suspended Sediment and Organic Carbon Concentrations Model and Measurement Comparisons Results Cursory Check Diagrams, Various Measurement Programs, Eighty-Nine Locations throughout NY/NJ Harbor, 1998-2016 Water Years

- **chlorophyll**
- **dissolved oxygen**
- **ammonia nitrogen**
- **phosphate phosphorus**
- **secchi depth/light extinction**

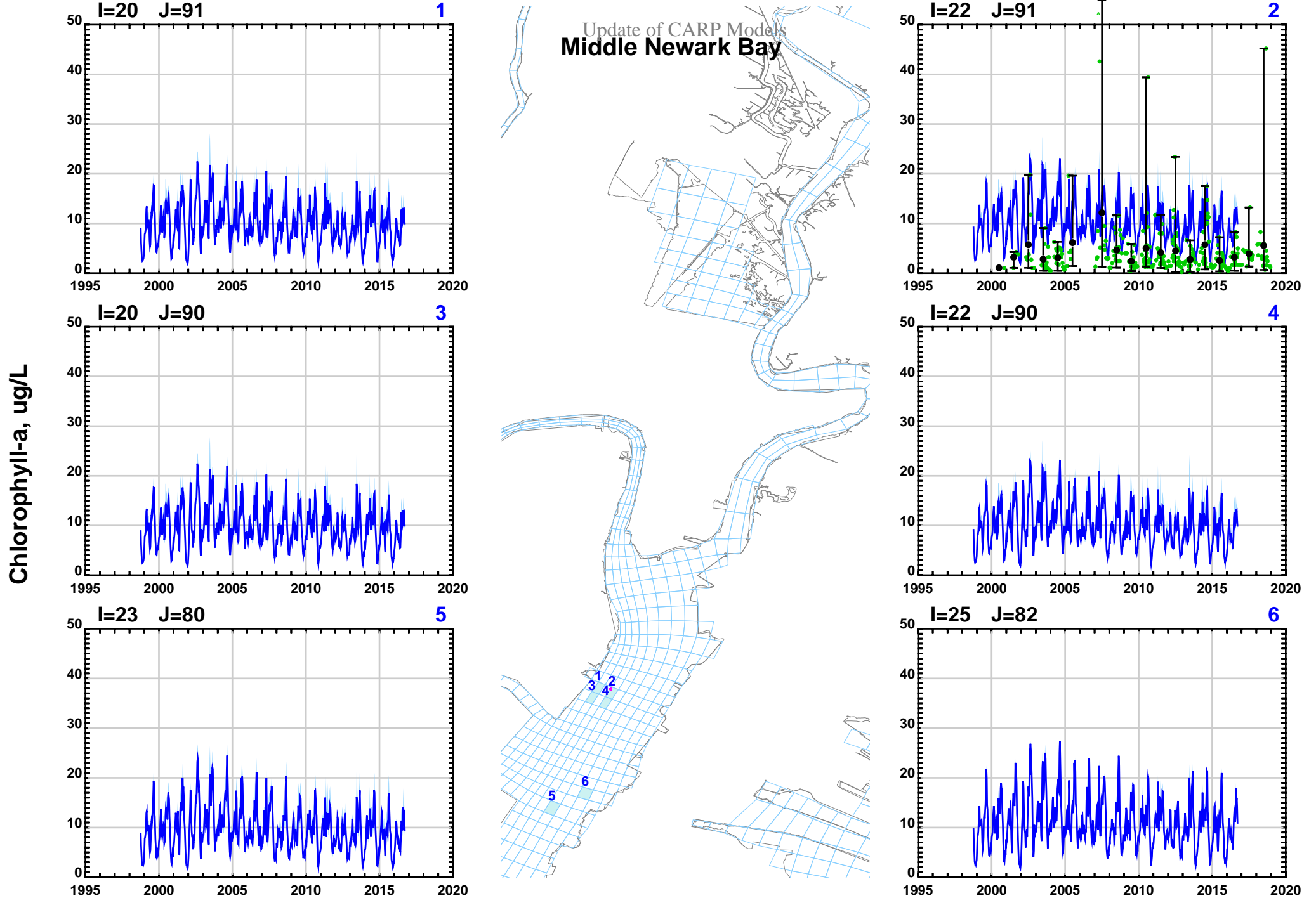
Water Column Data Comparison With Model All Water Column Layers



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 2 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- NJHDG Data
- Harbor Data

Water Column Data Comparison With Model All Water Column Layers

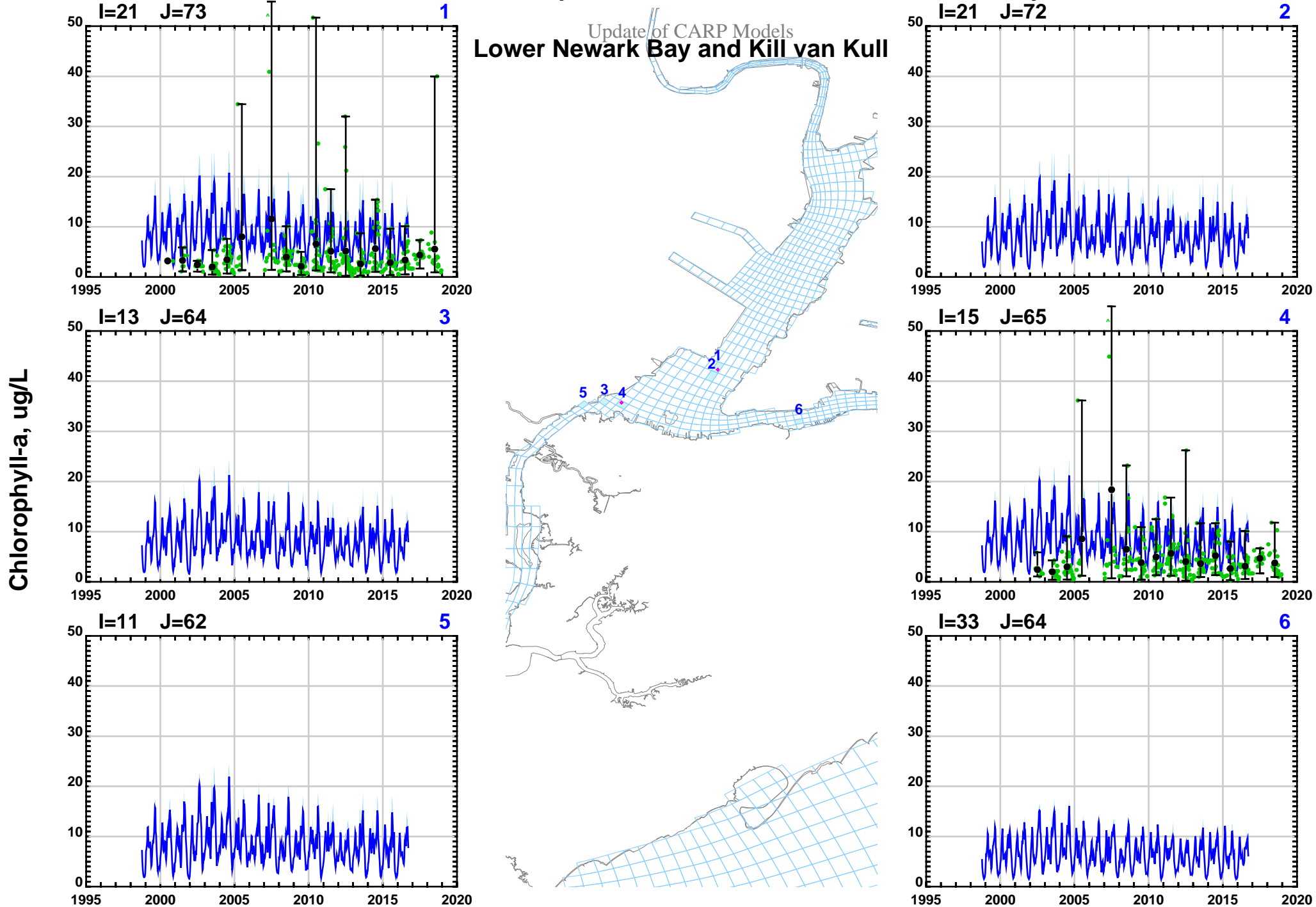


Detect Data

Model: mean and range of values in Water Column Appendix 12 Page 3 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- Harbor Data
- NJHDG Data

Water Column Data Comparison With Model All Water Column Layers



Update of CARP Models
Lower Newark Bay and Kill van Kull

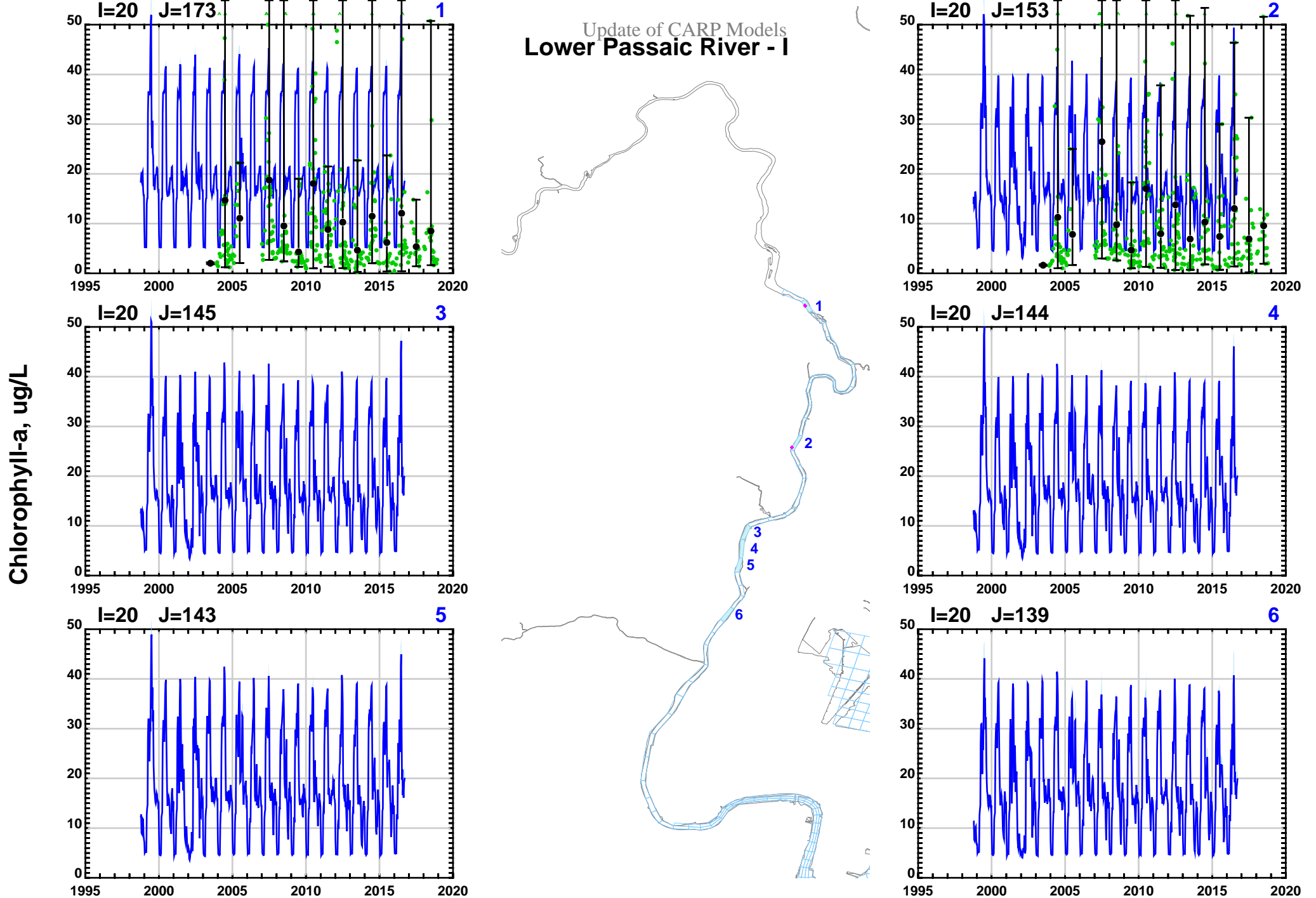
Chlorophyll-a, ug/L

Detect Data
Model: mean and range of values in Water Column

- Water Column Data: yearly mean and range
- CARP2 Data
- Harbor Data
- NJHDG Data

Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models Lower Passaic River - I

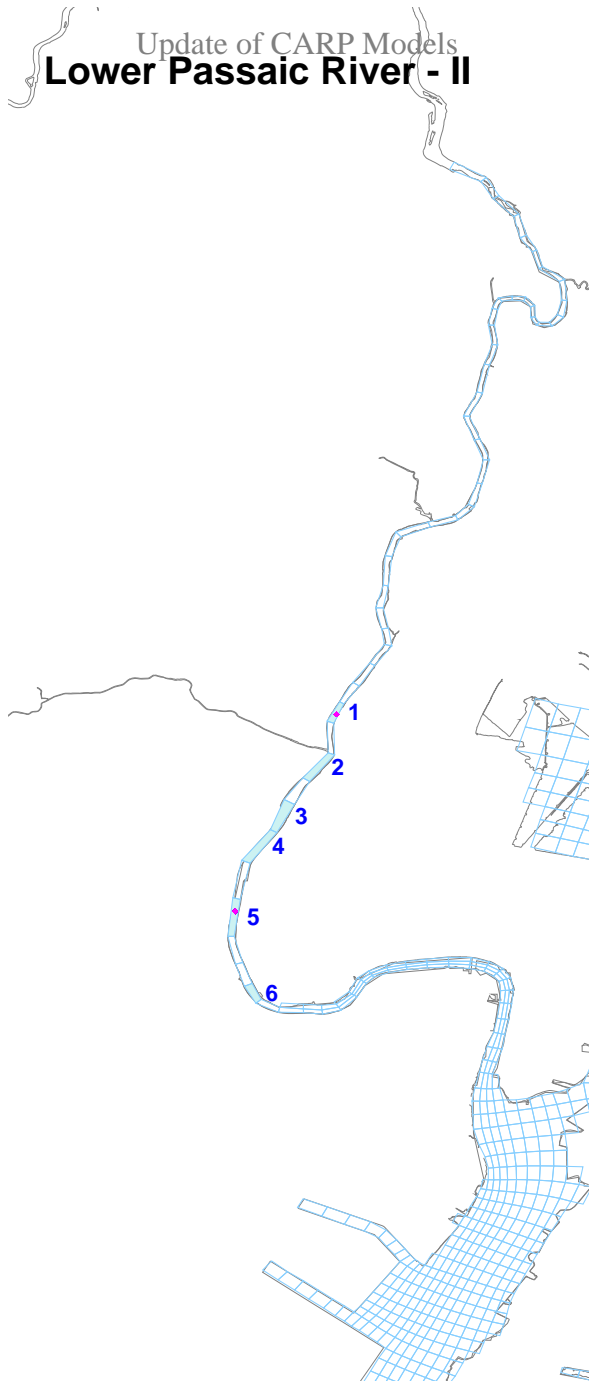


Chlorophyll-a, ug/L

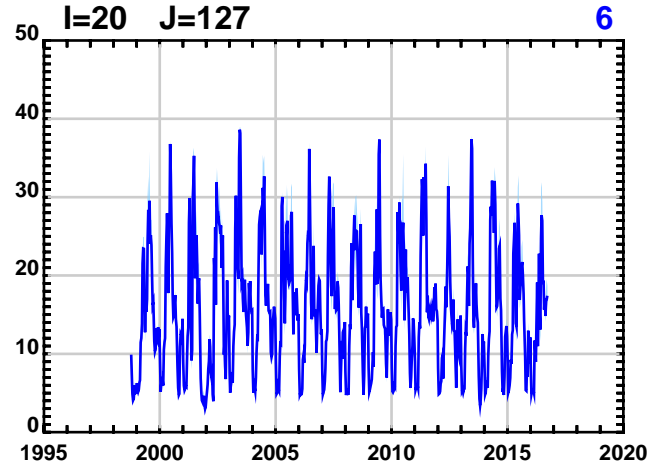
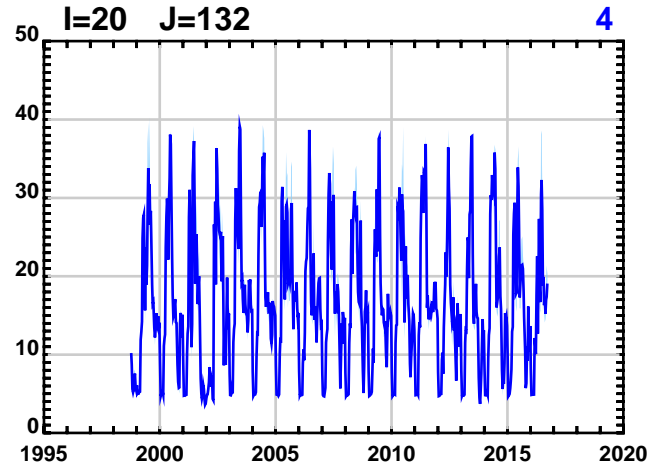
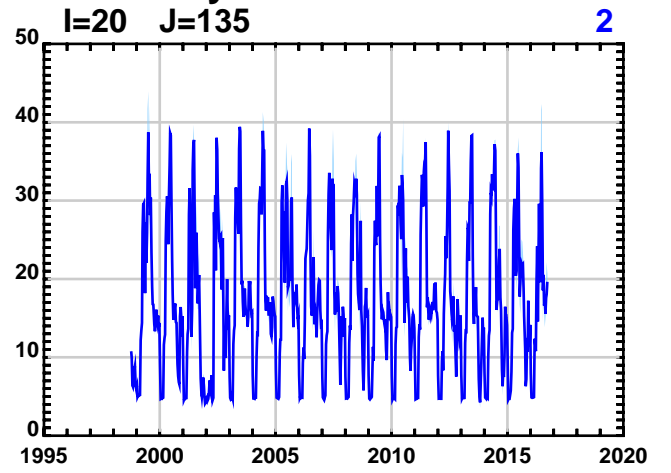
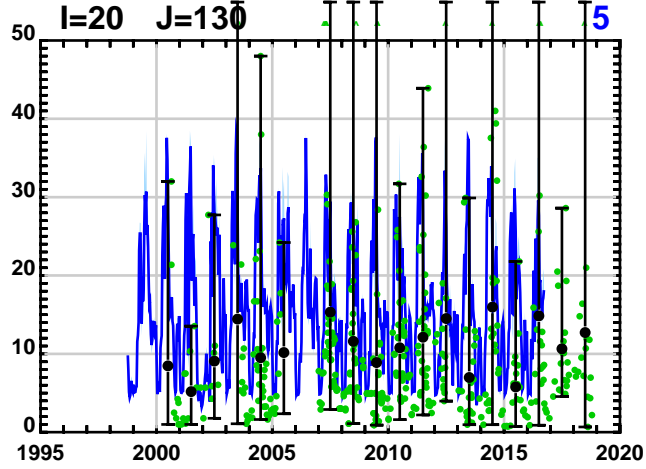
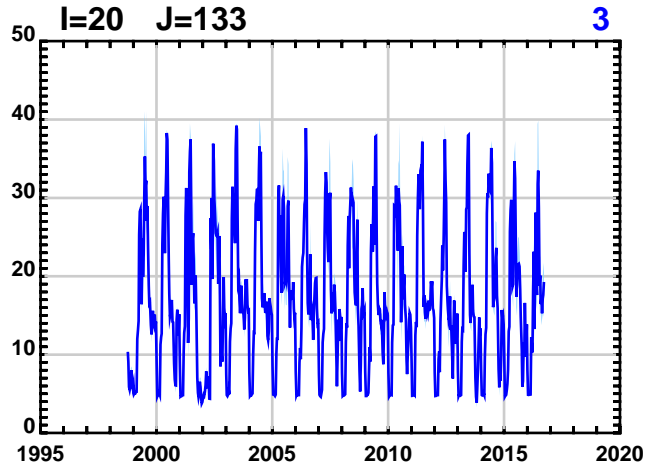
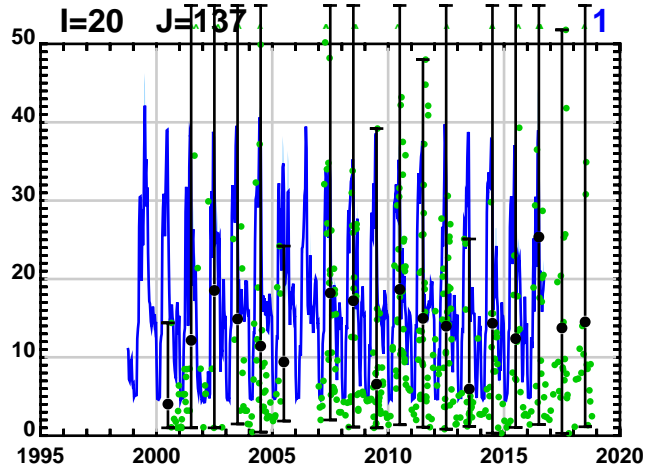
Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 5 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- Harbor Data
- NJHDG Data

Water Column Data Comparison With Model All Water Column Layers



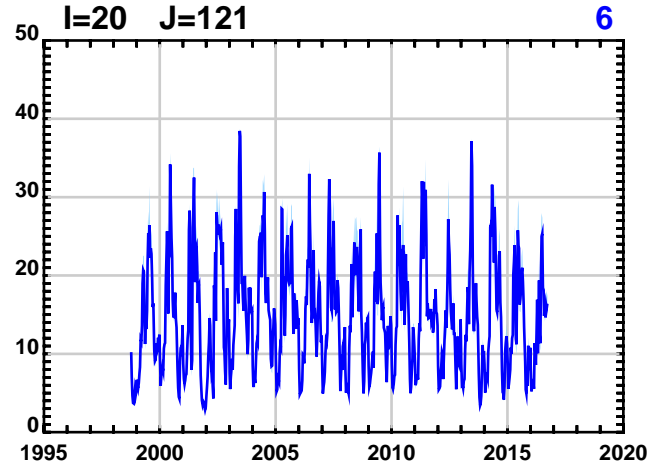
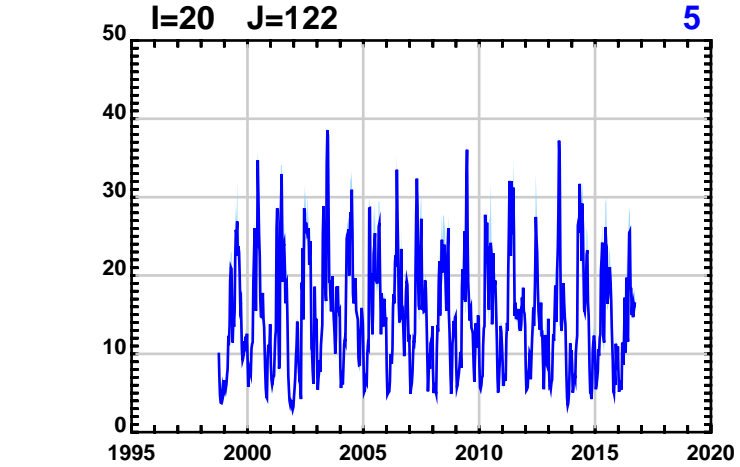
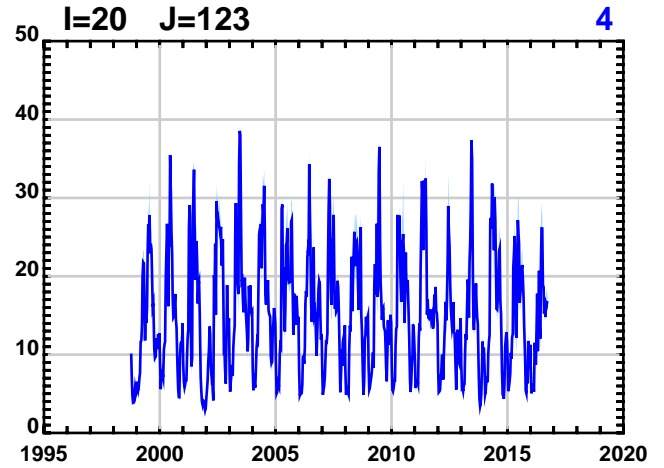
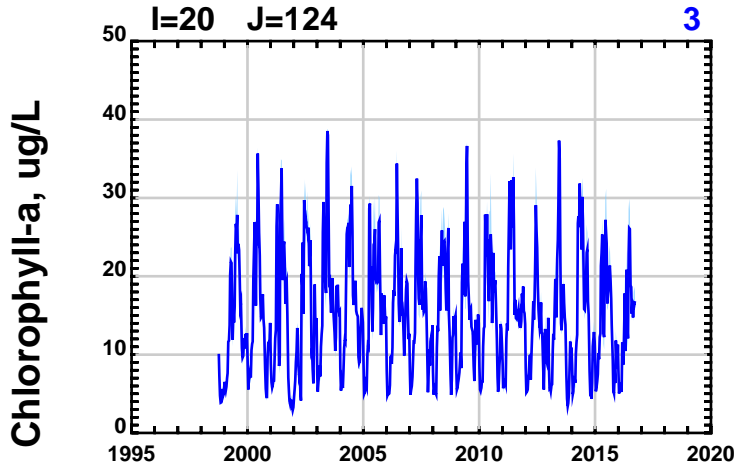
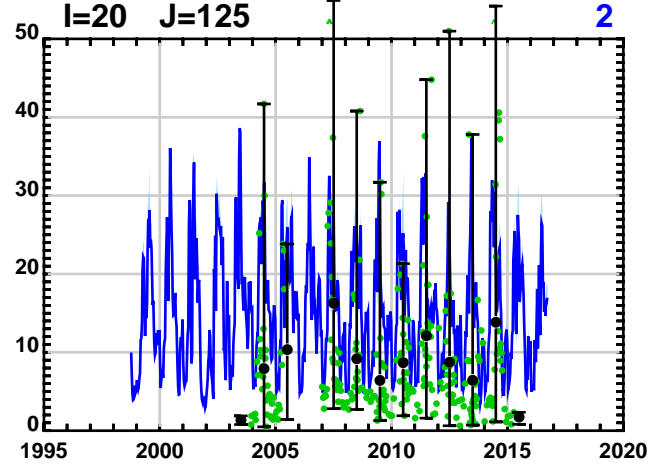
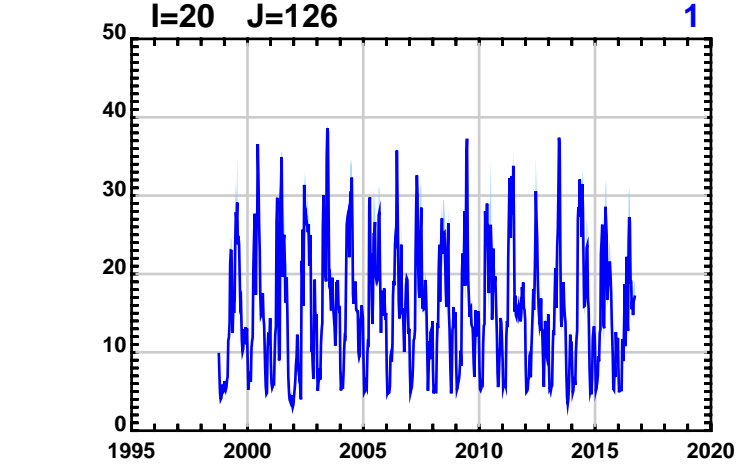
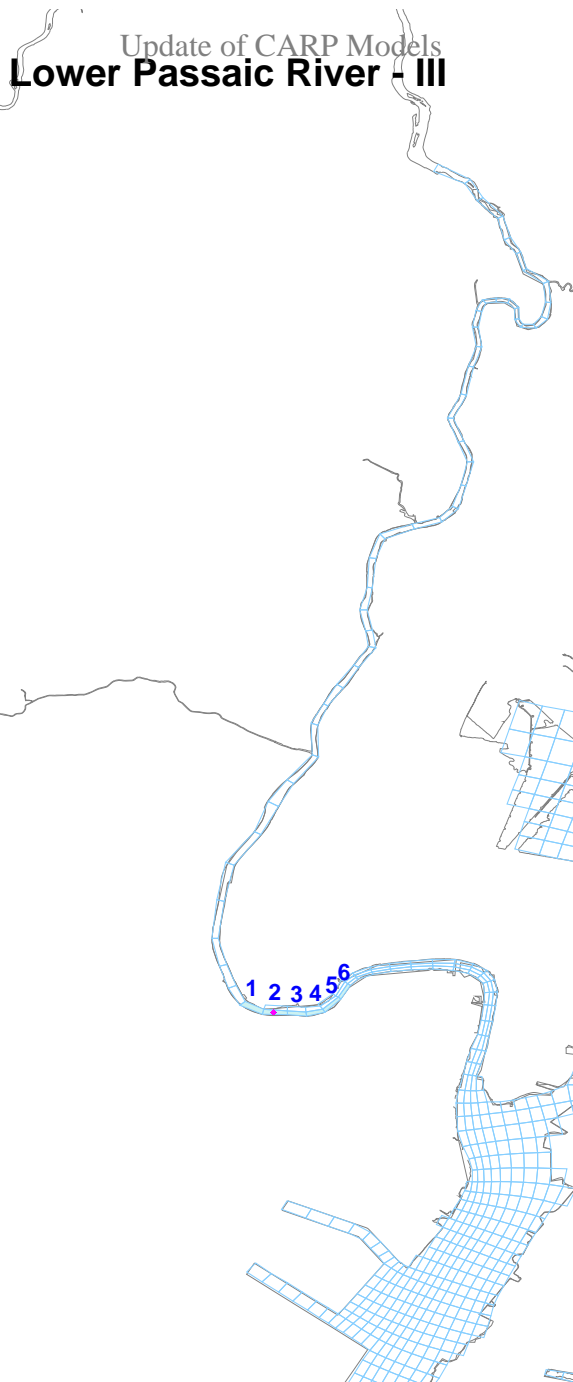
Chlorophyll-a, ug/L



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 6 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- Harbor Data
- NJHDG Data

Water Column Data Comparison With Model All Water Column Layers

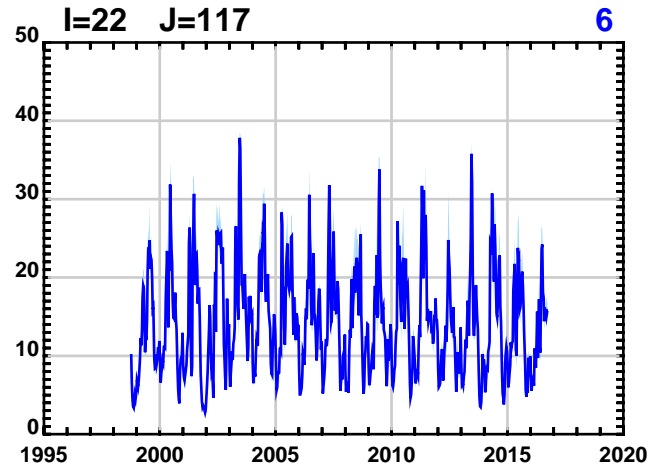
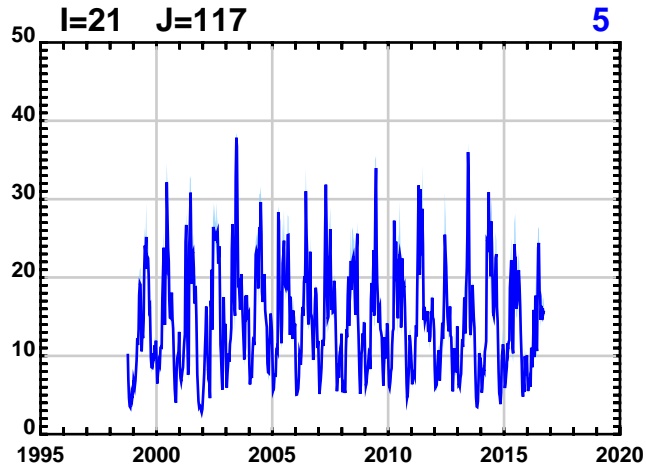
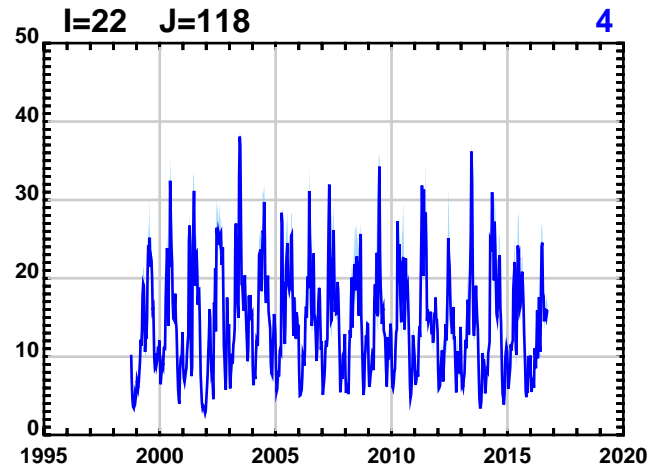
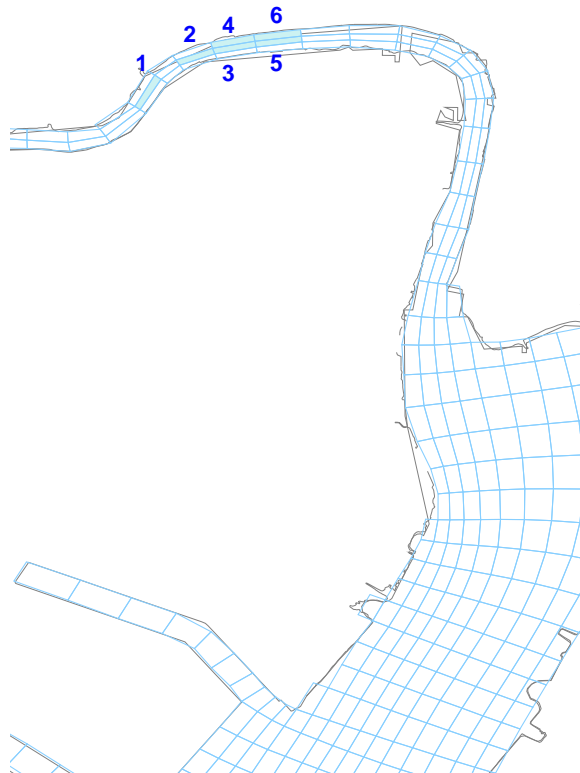
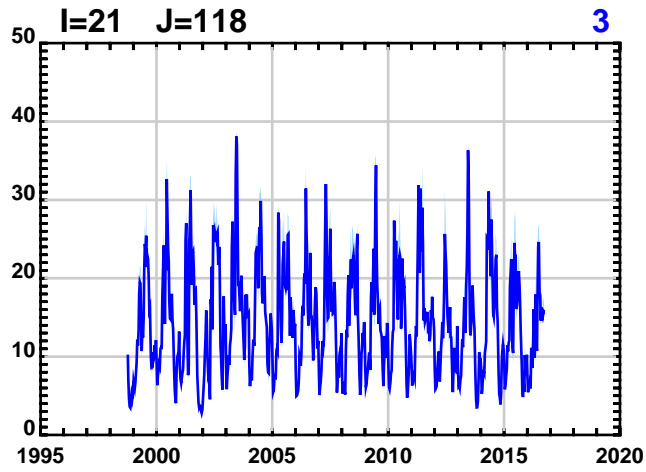
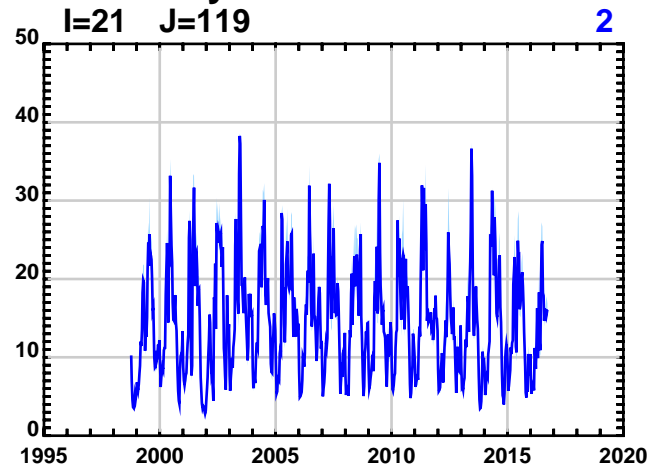
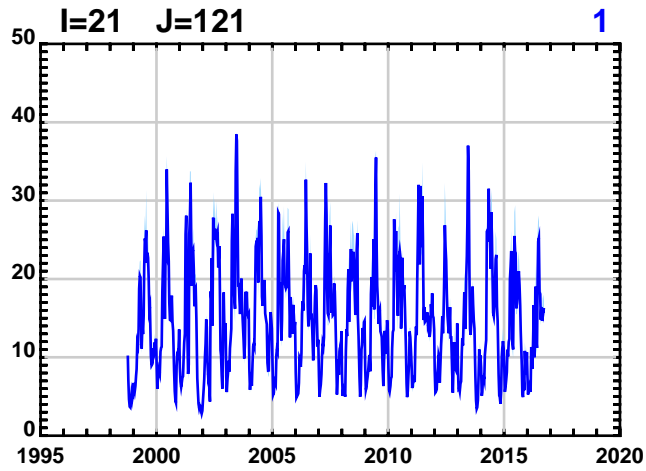
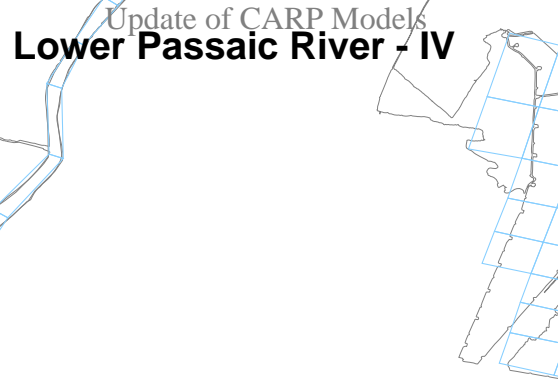


Chlorophyll-a, ug/L

Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 7 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- NJHDG Data
- Harbor Data

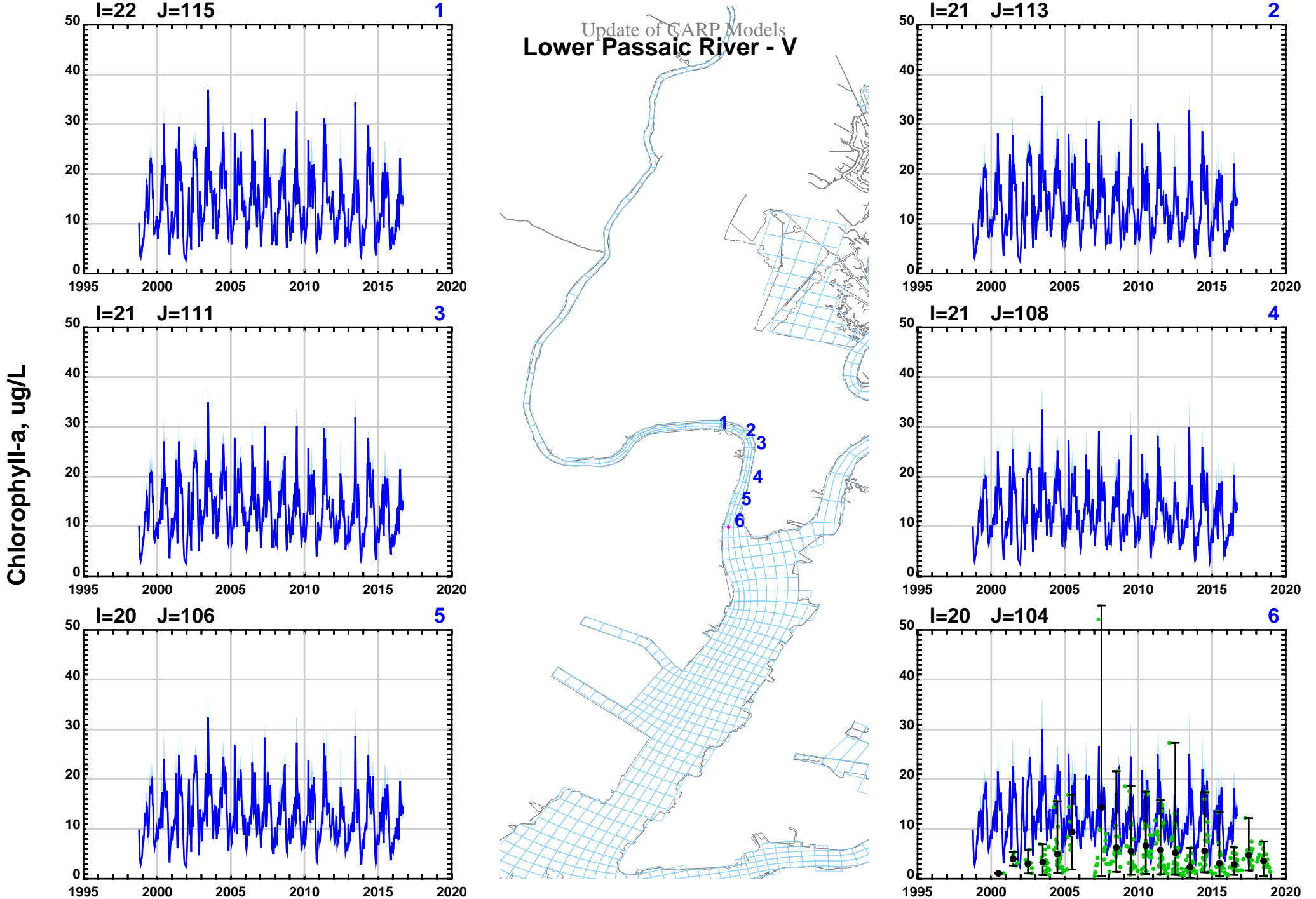
Water Column Data Comparison With Model All Water Column Layers



Chlorophyll-a, ug/L

Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models Lower Passaic River - V



Chlorophyll-a, ug/L

Detect Data

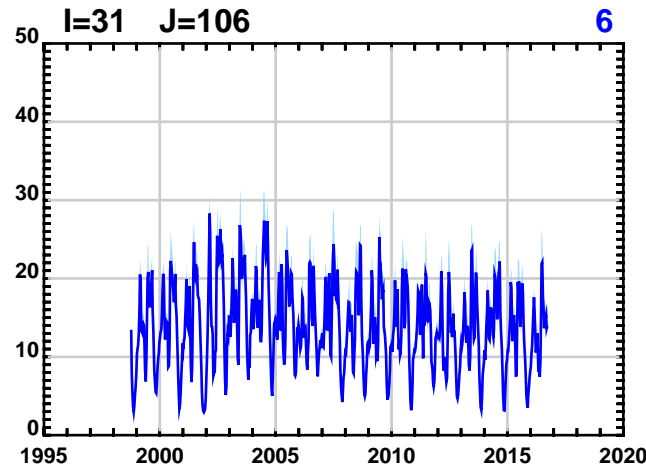
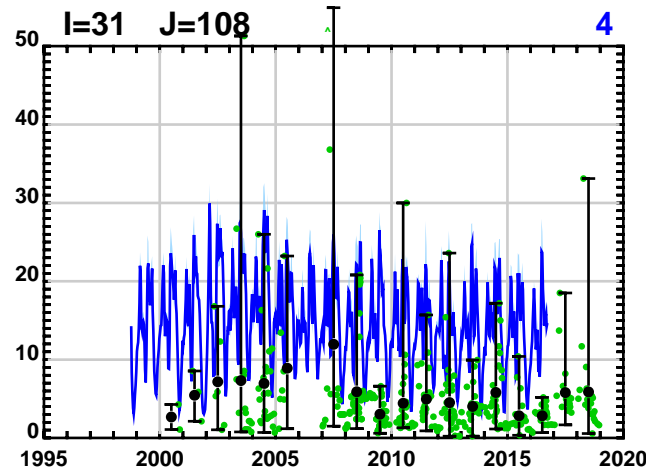
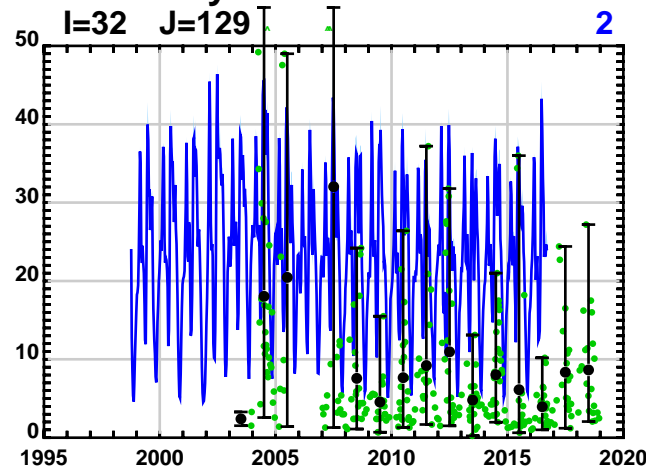
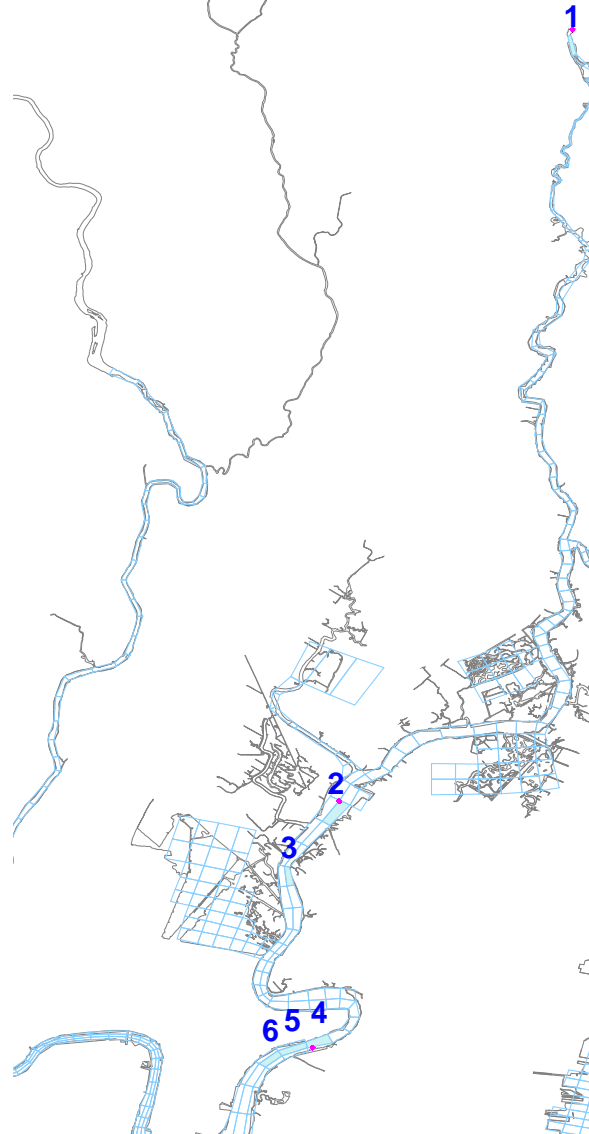
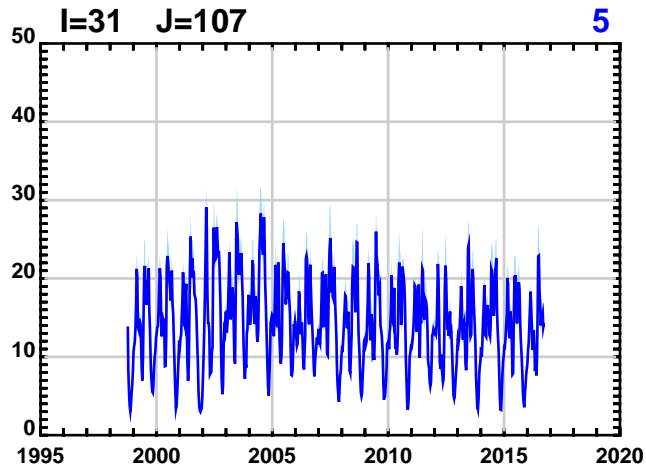
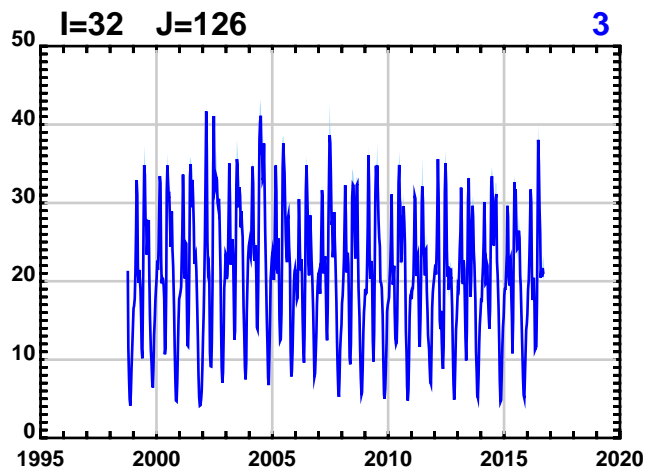
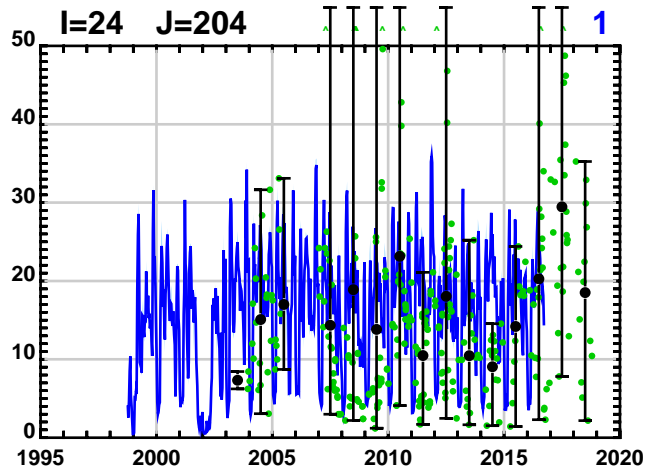
Model: mean and range of values in Water Column

- Water Column Data: yearly mean and range
- CARP2 Data
- Harbor Data
- NJHDG Data

Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models
Hackensack River

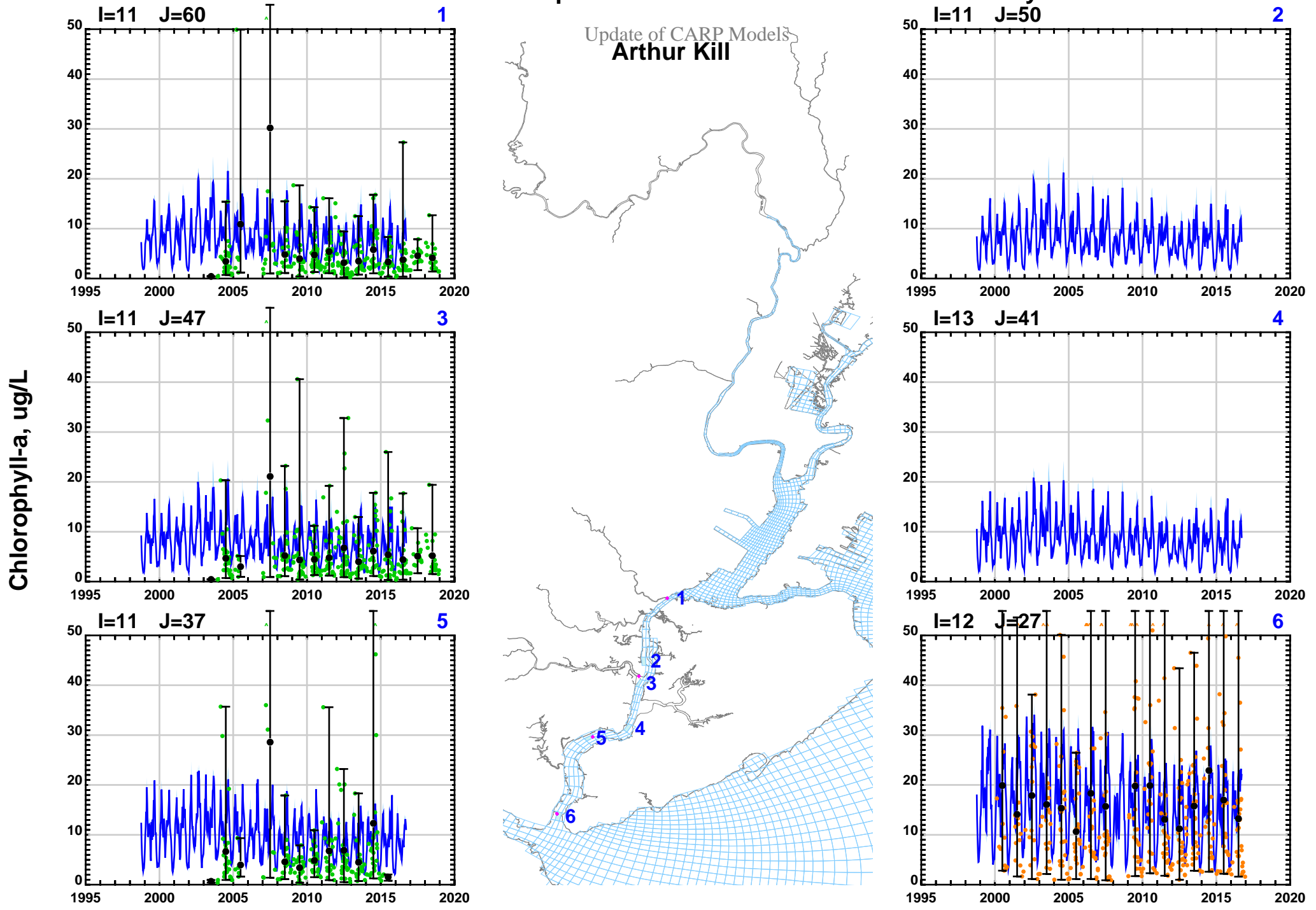
Chlorophyll-a, ug/L



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 10 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- NJHDG Data
- Harbor Data

Water Column Data Comparison With Model All Water Column Layers



Chlorophyll-a, ug/L

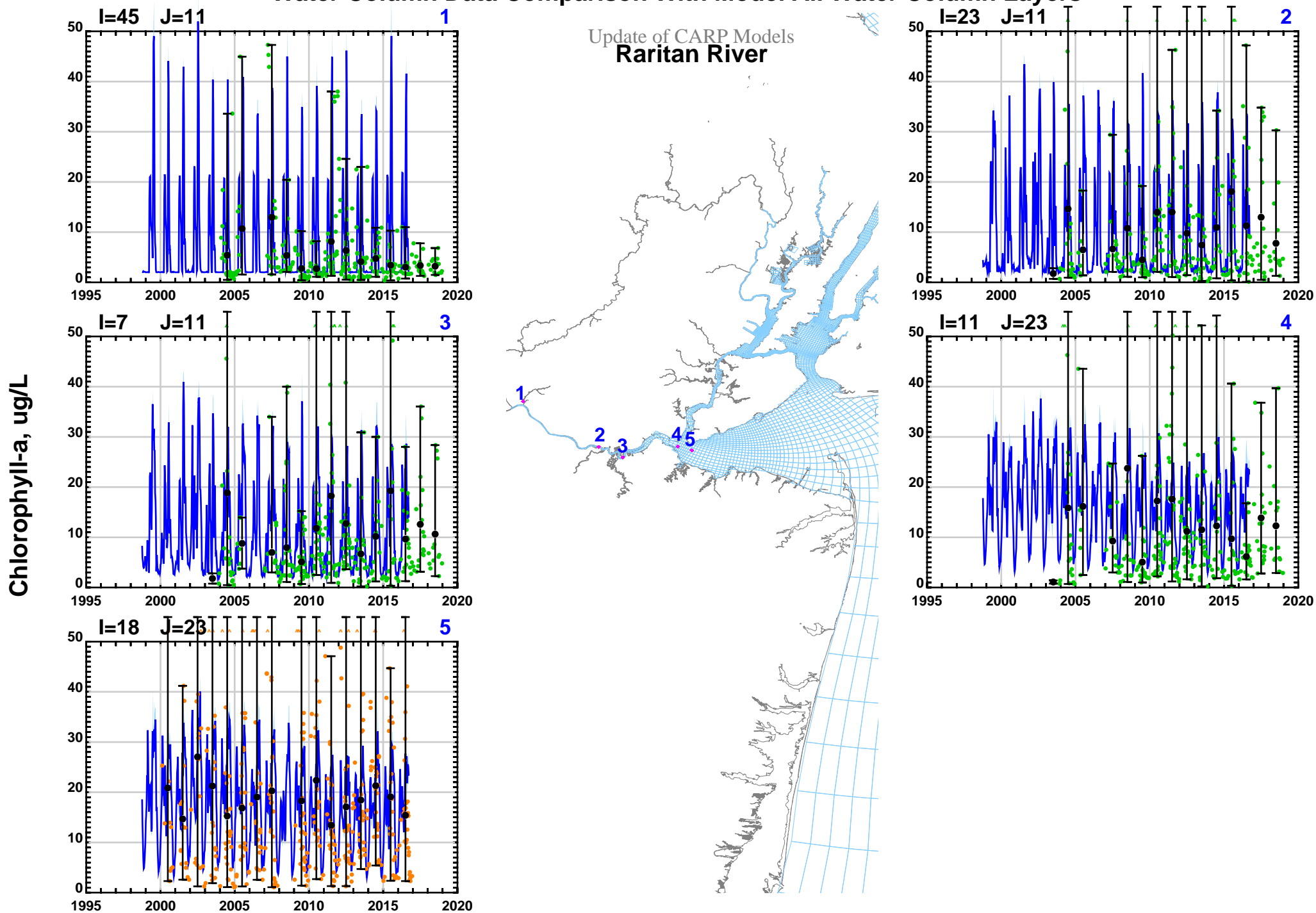
Update of CARP Models
Arthur Kill

Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 11 of 76

● Water Column Data: yearly mean and range
● CARP2 Data
● Harbor Data
● NJHDG Data

Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models
Raritan River

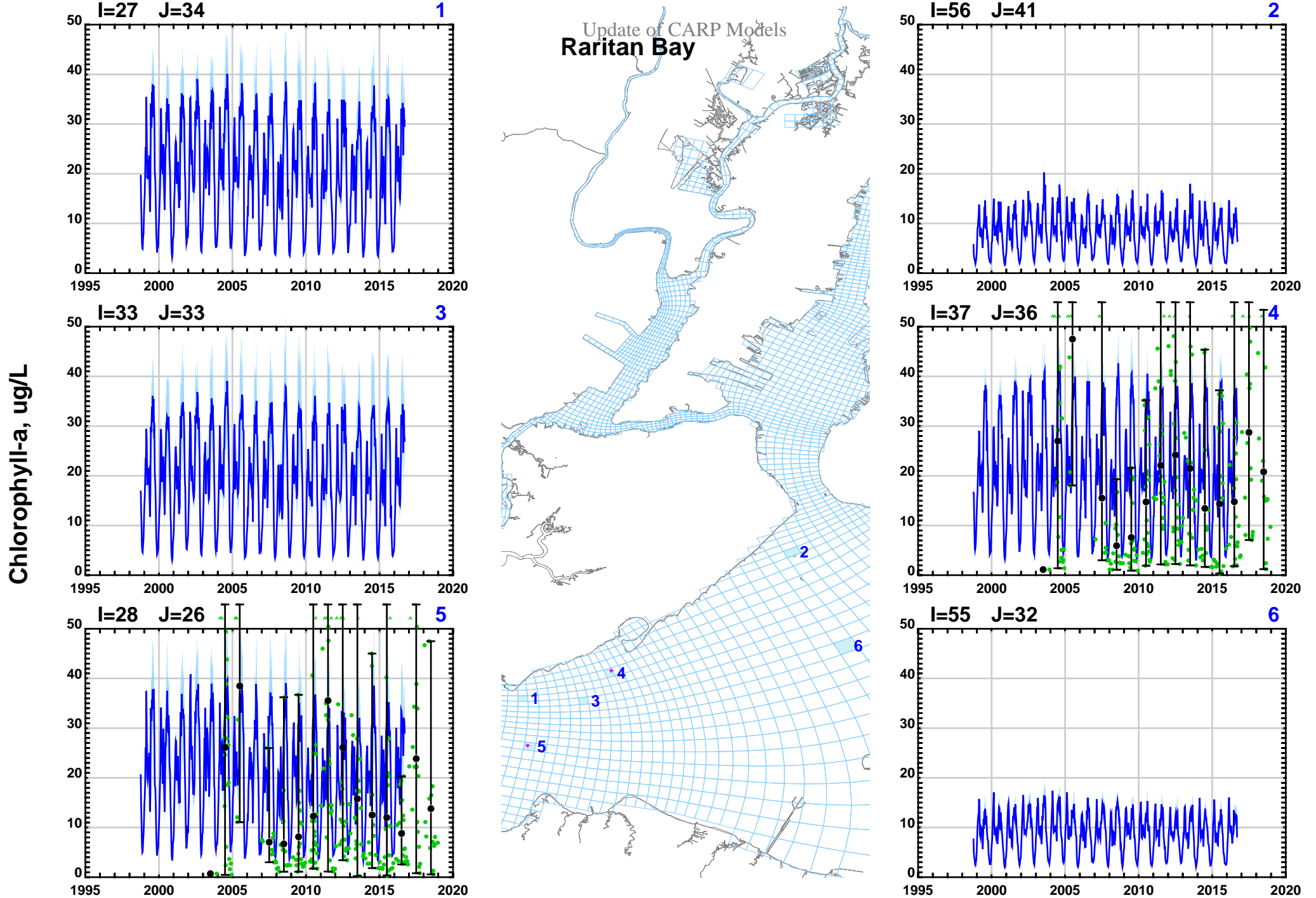


Detect Data

Model: mean and range of values in Water Column Appendix 12 Page 12 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- Harbor Data
- NJHDG Data

Water Column Data Comparison With Model All Water Column Layers

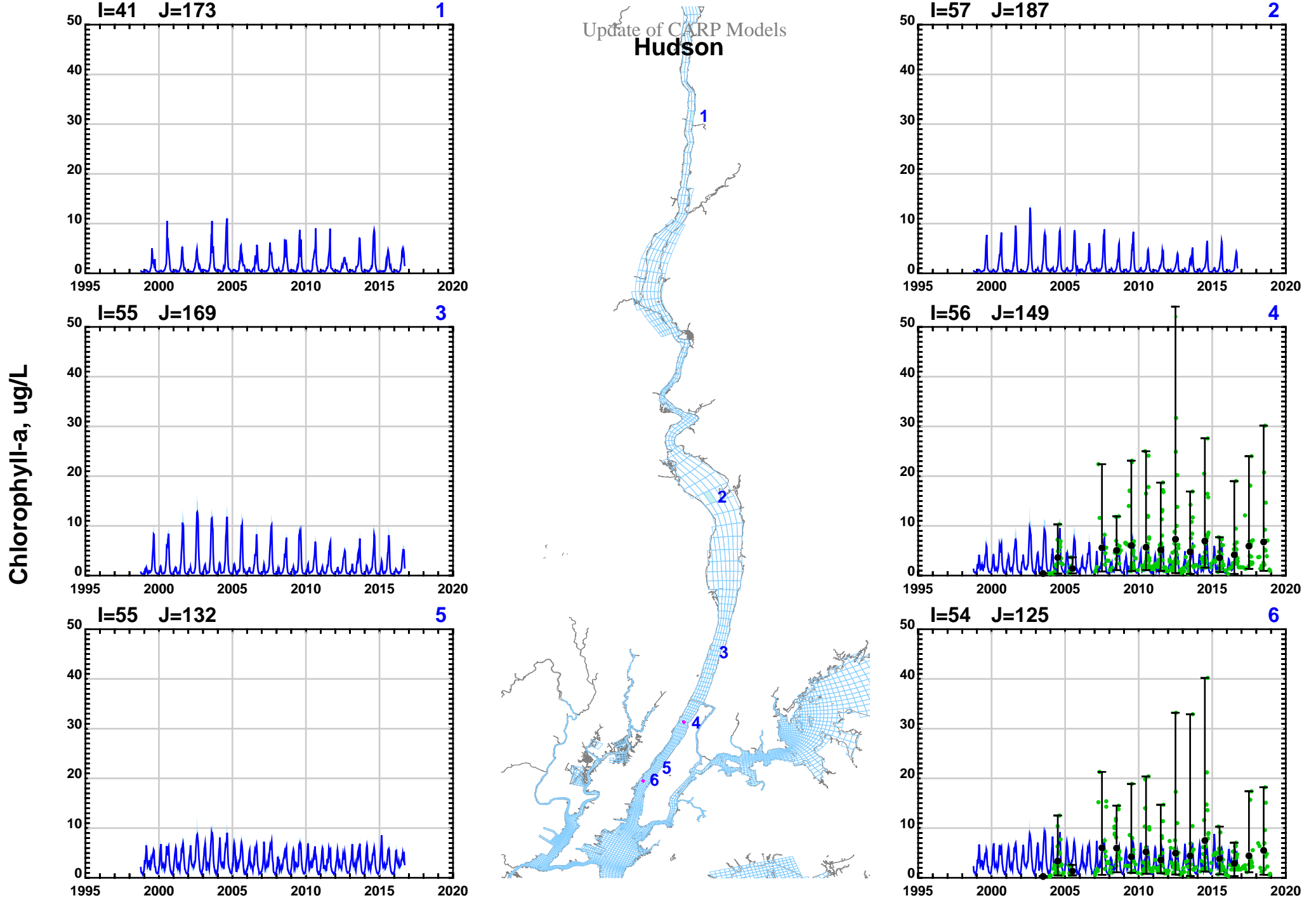


Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 13 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- NJHDG Data
- Harbor Data

Water Column Data Comparison With Model All Water Column Layers

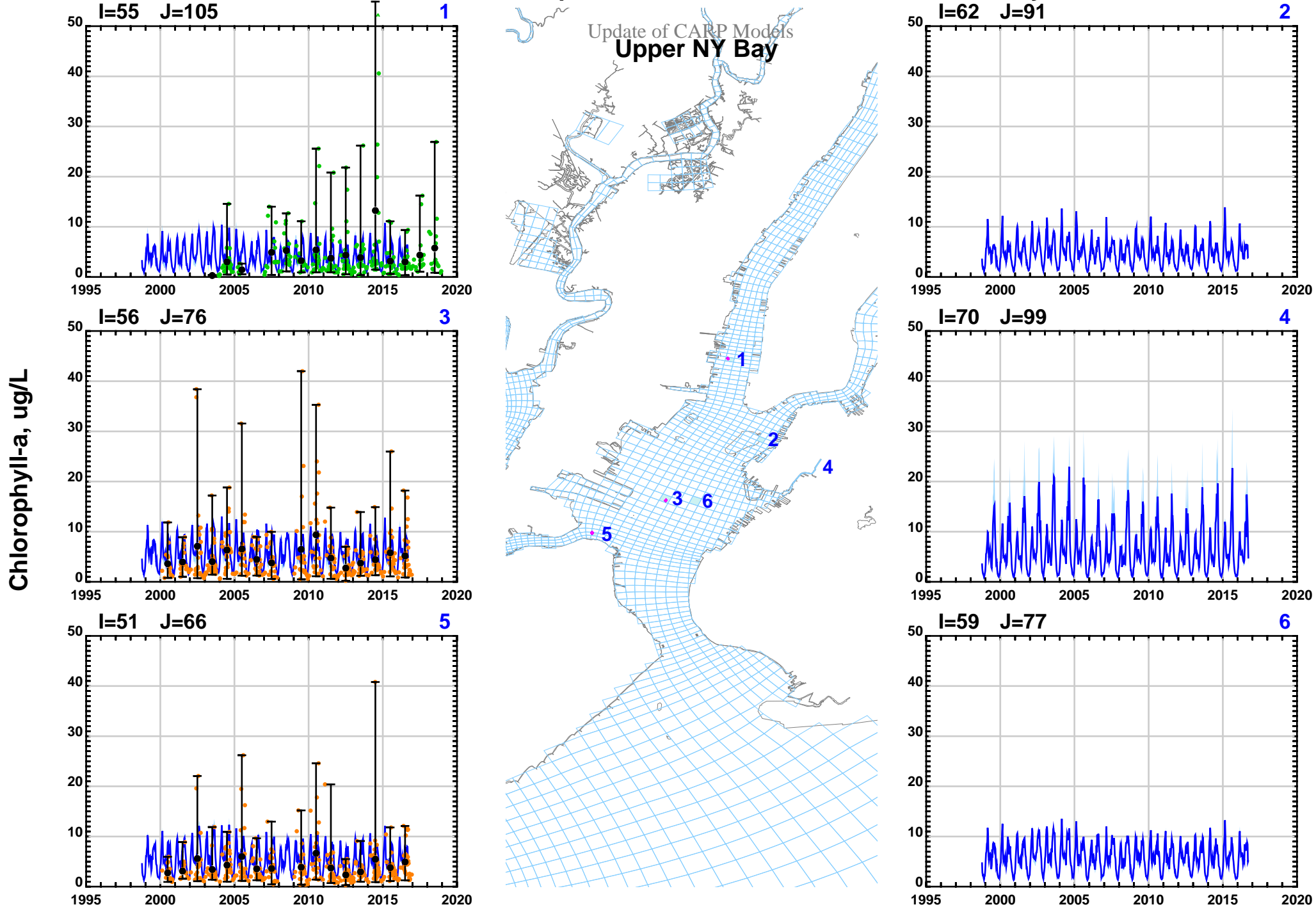
Update of CARP Models
Hudson



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 14 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- Harbor Data
- NJHDG Data

Water Column Data Comparison With Model All Water Column Layers

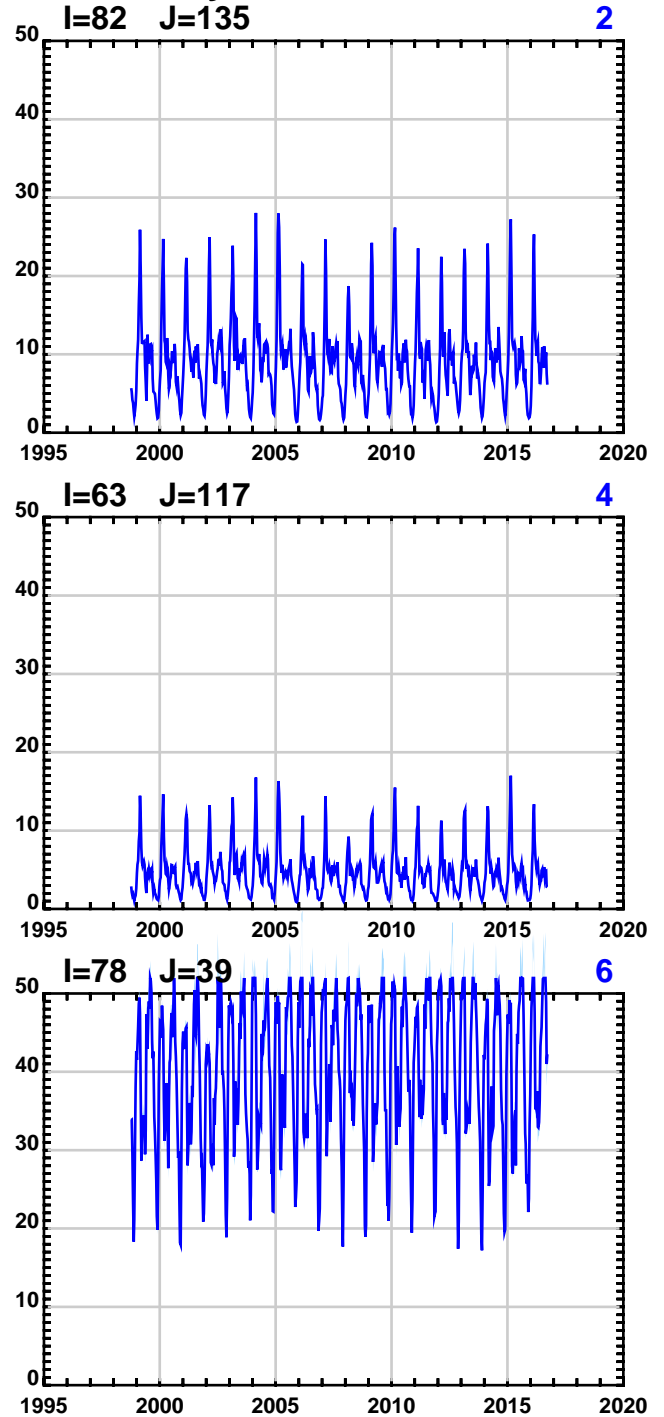
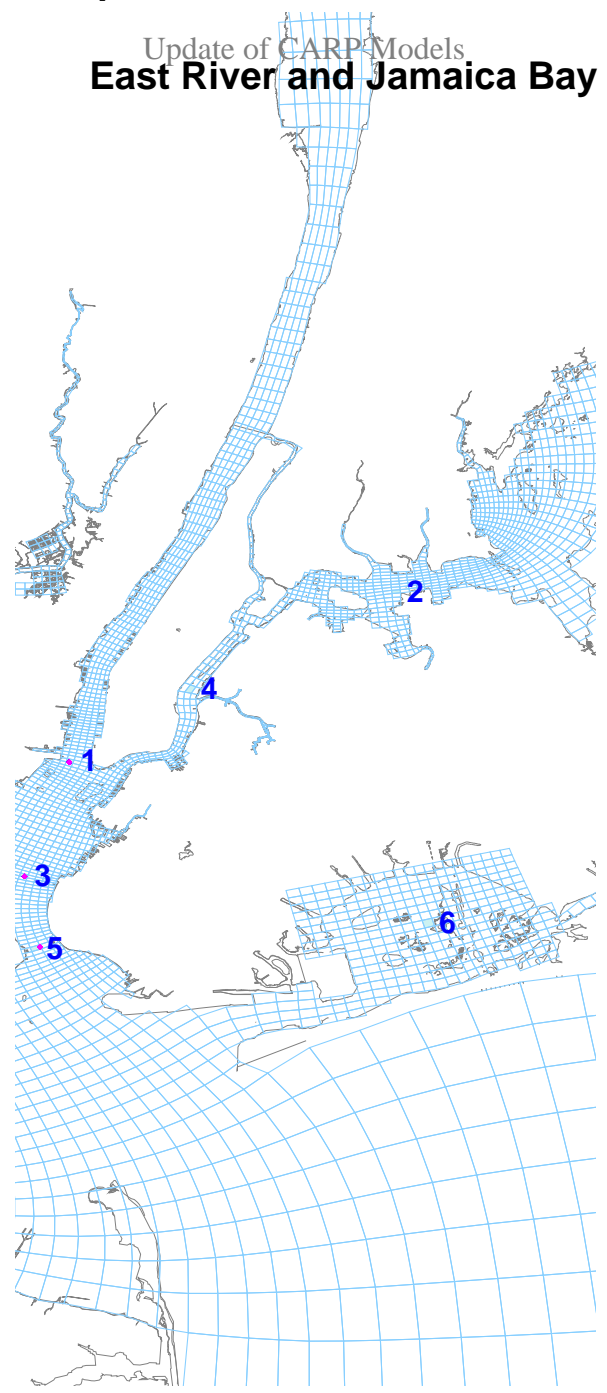
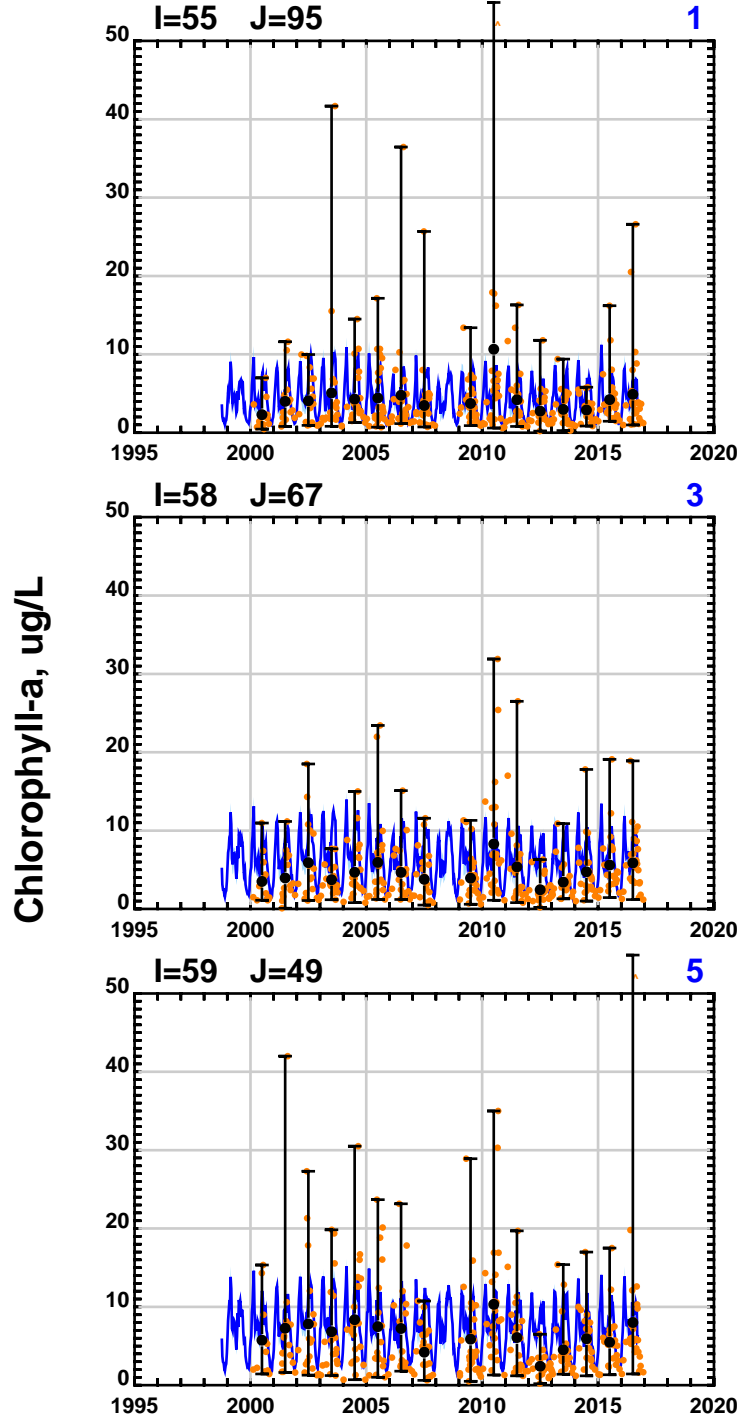


Chlorophyll-a, ug/L

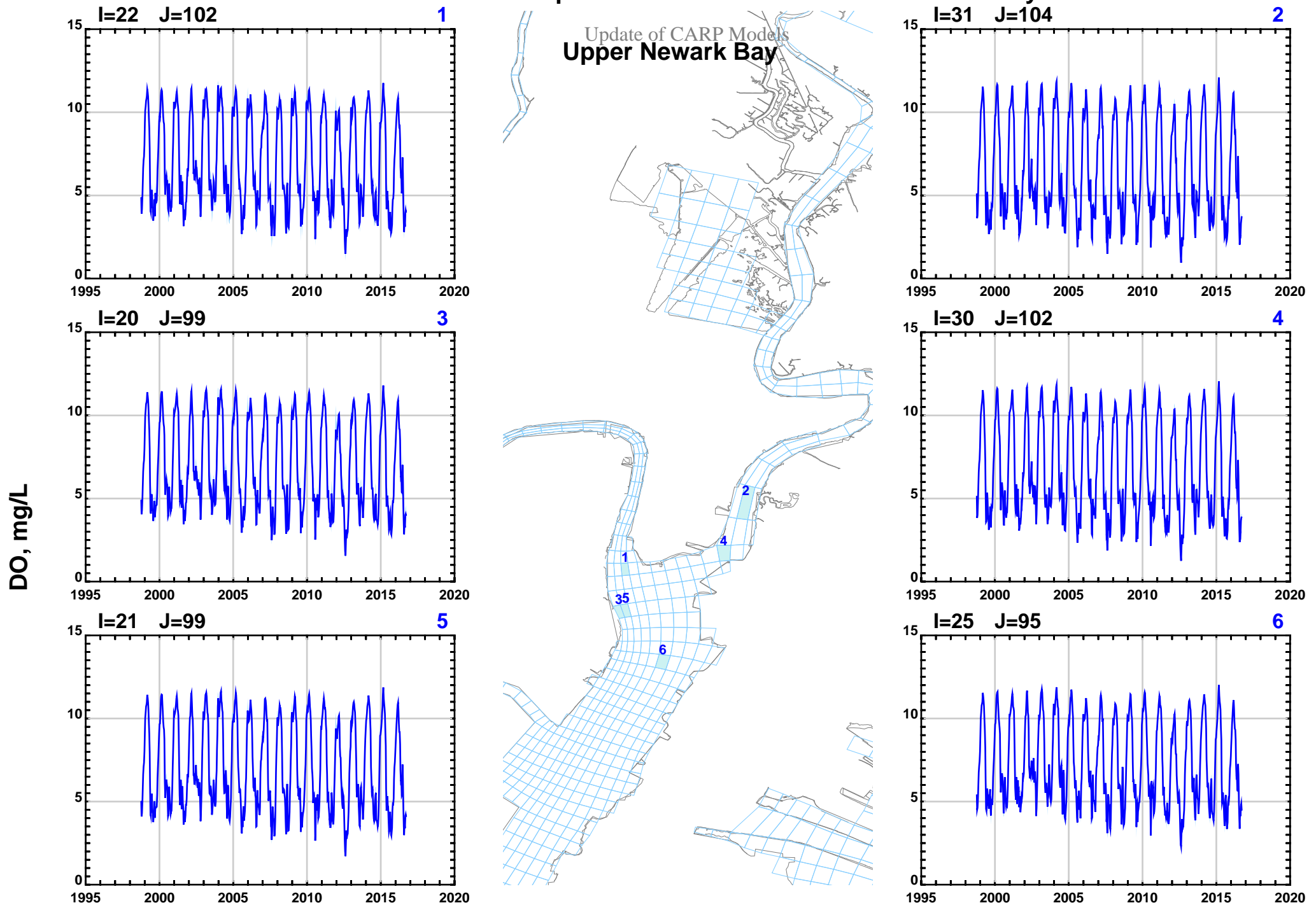
Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 15 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- Harbor Data
- NJHDG Data

Water Column Data Comparison With Model All Water Column Layers

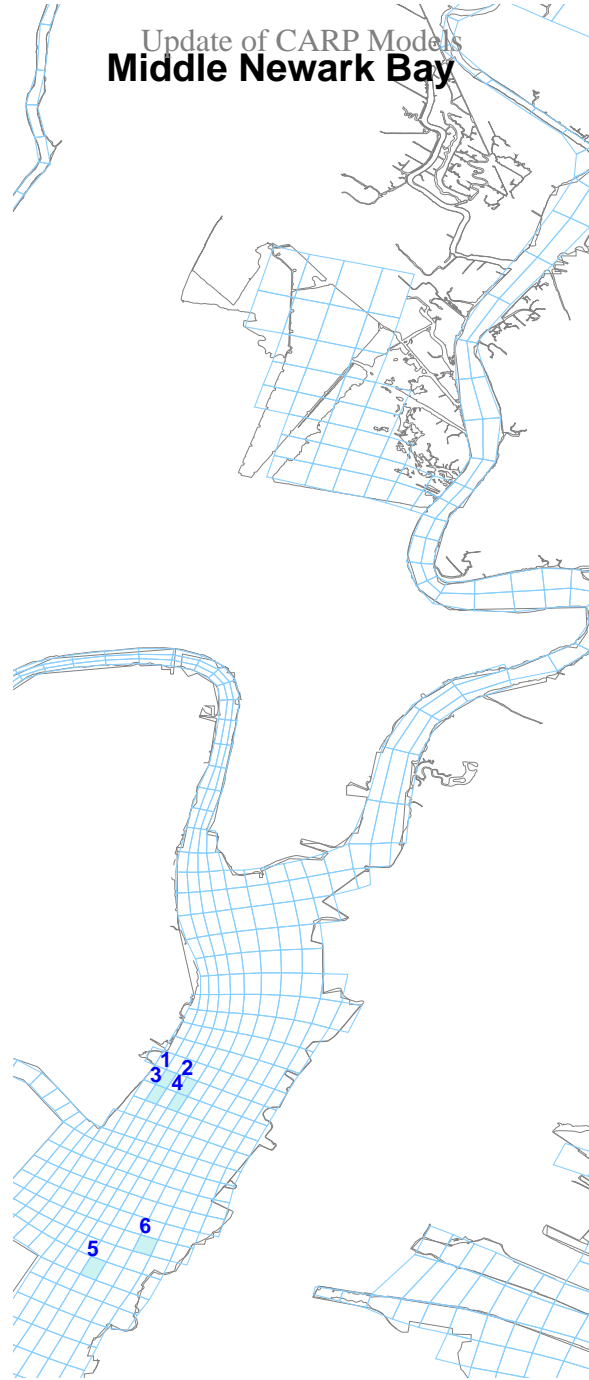
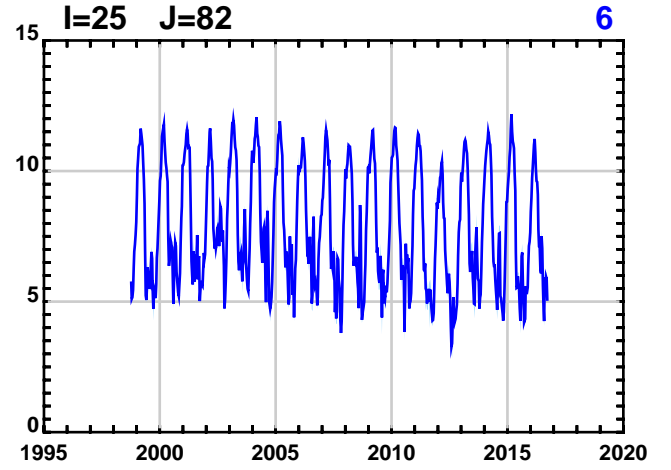
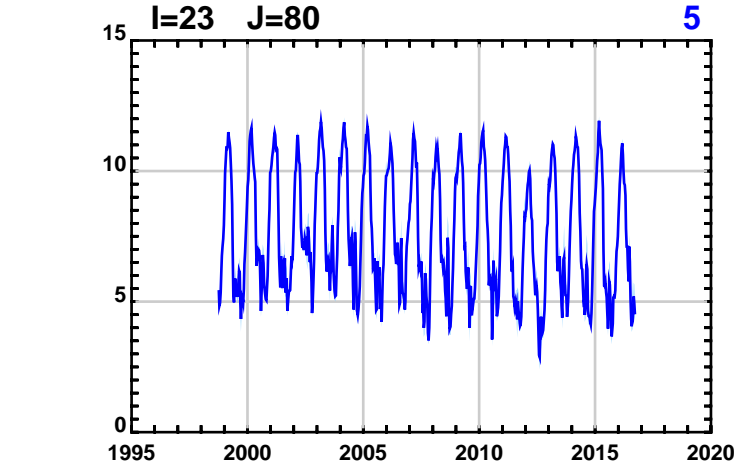
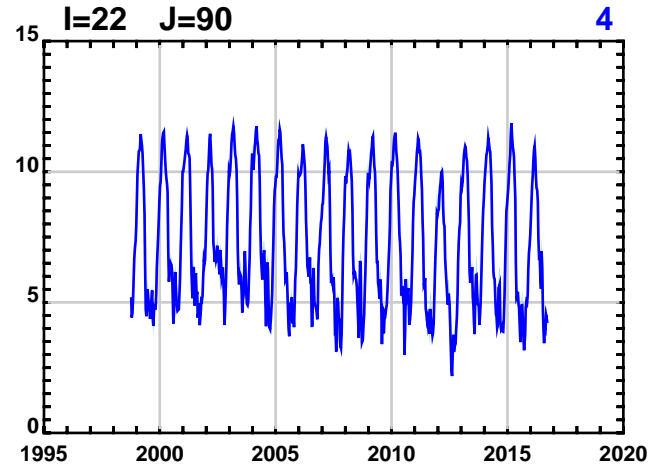
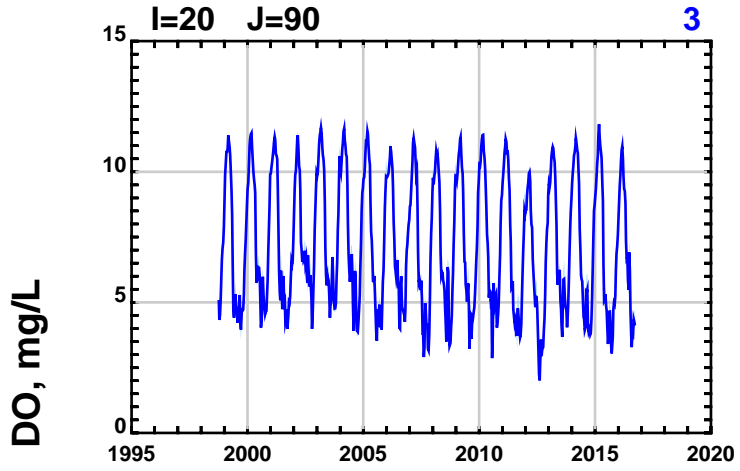
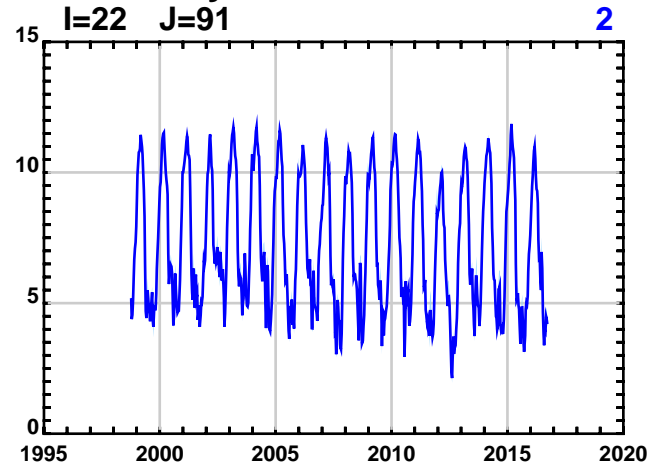
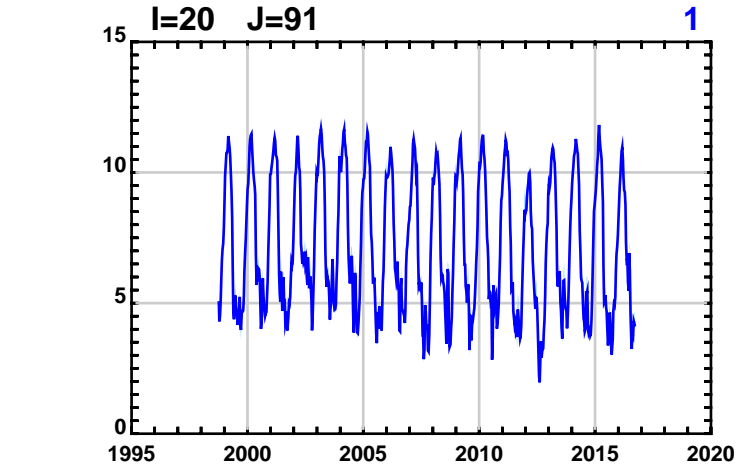


Water Column Data Comparison With Model All Water Column Layers



Water Column Data Comparison With Model All Water Column Layers

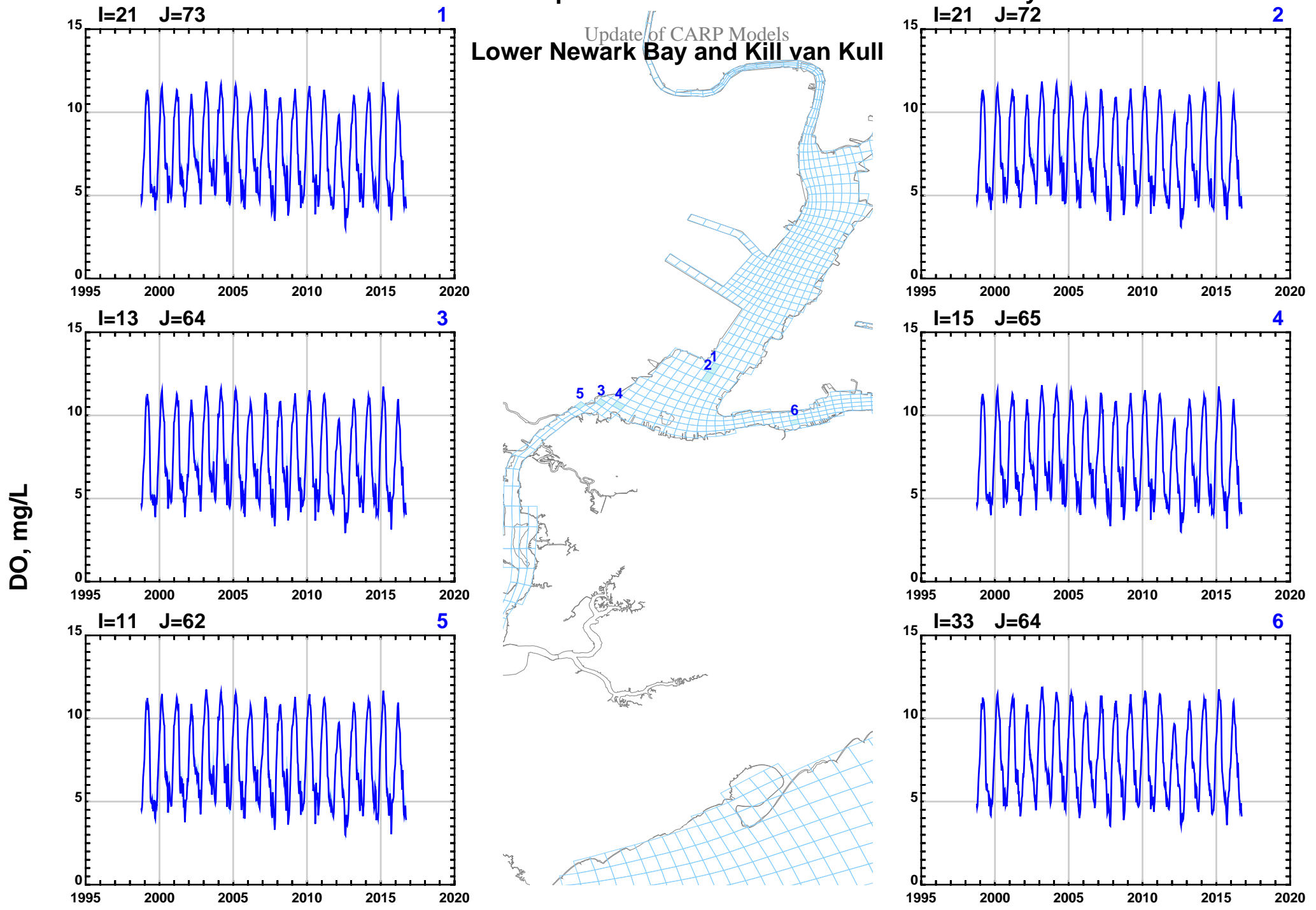
Update of CARP Models
Middle Newark Bay



DO, mg/L

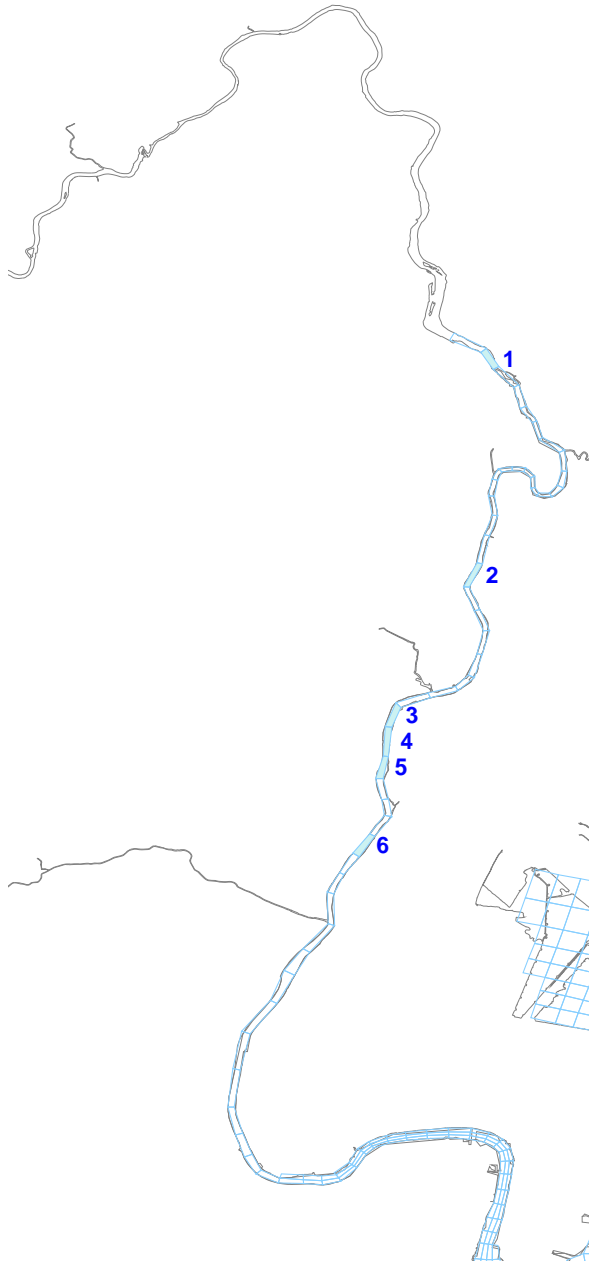
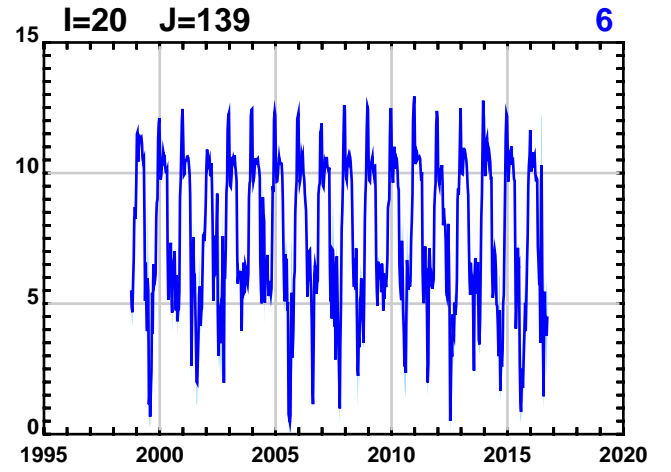
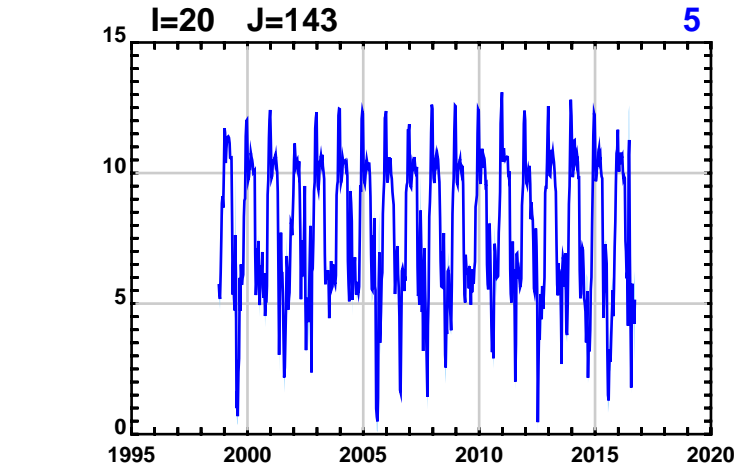
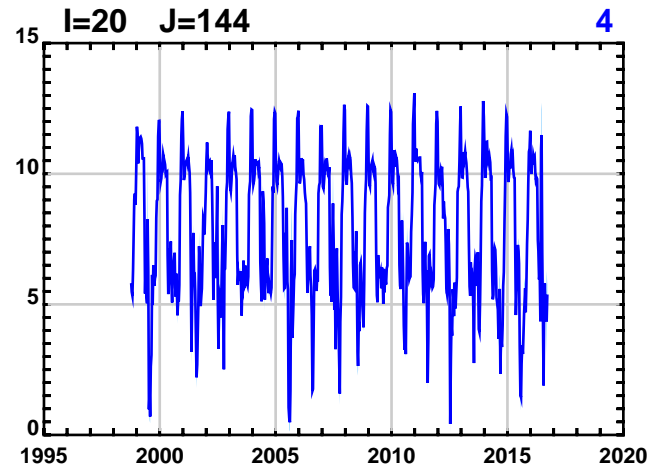
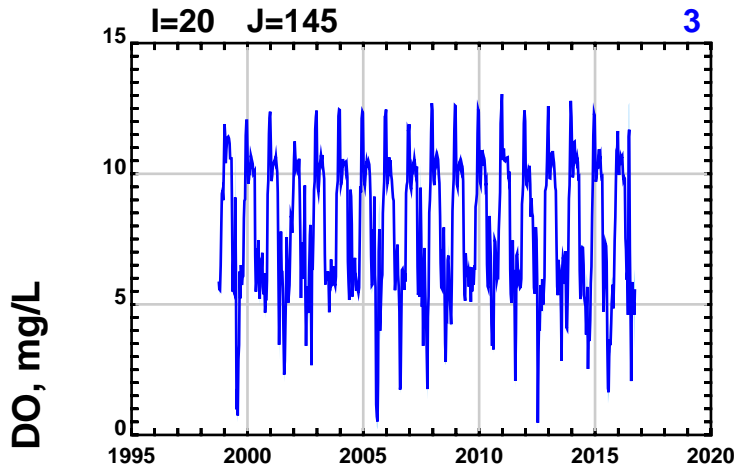
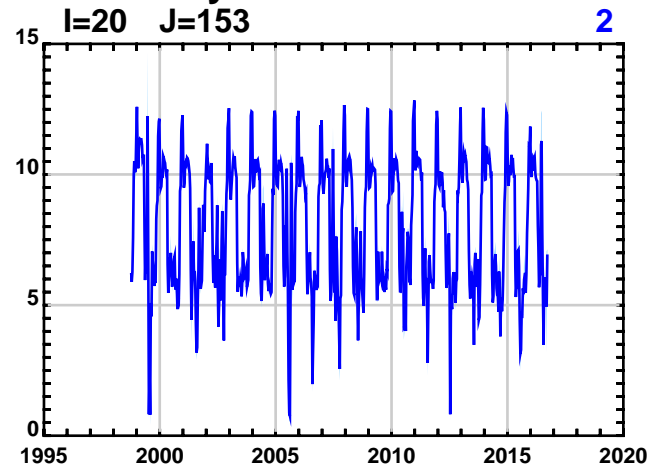
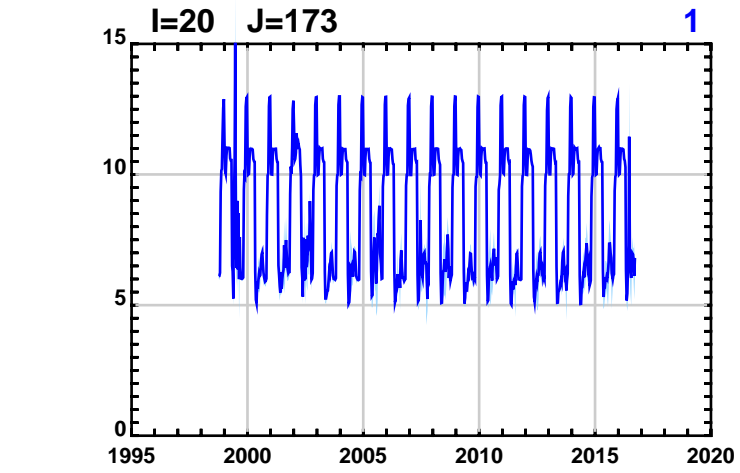
Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models Lower Newark Bay and Kill van Kull



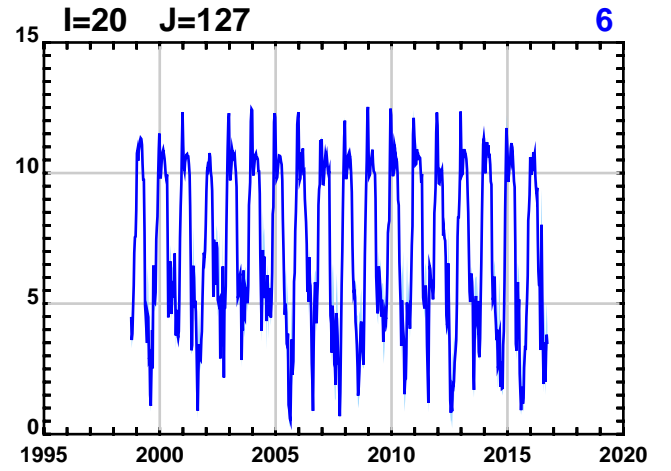
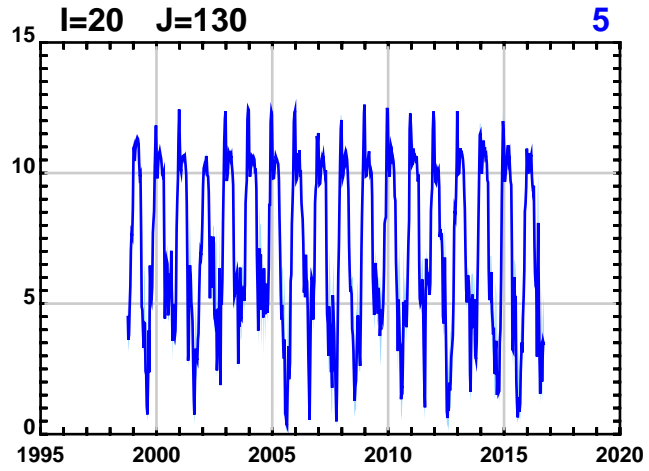
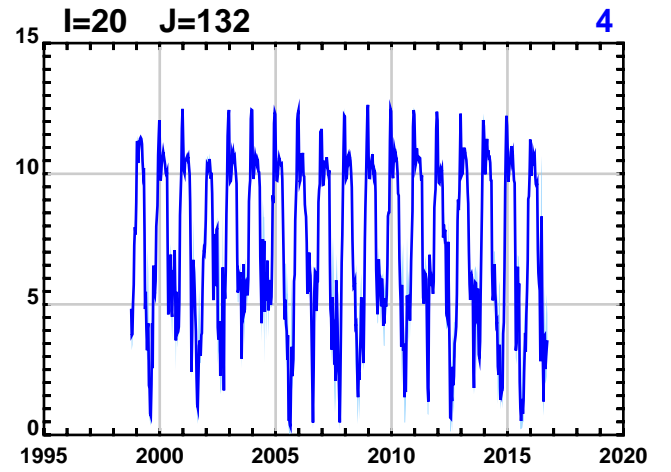
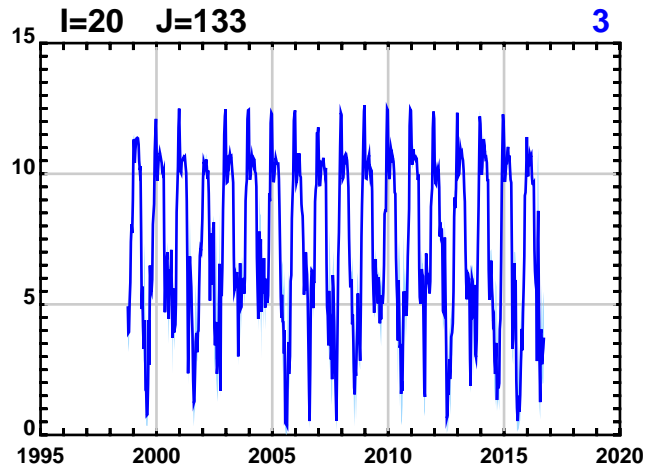
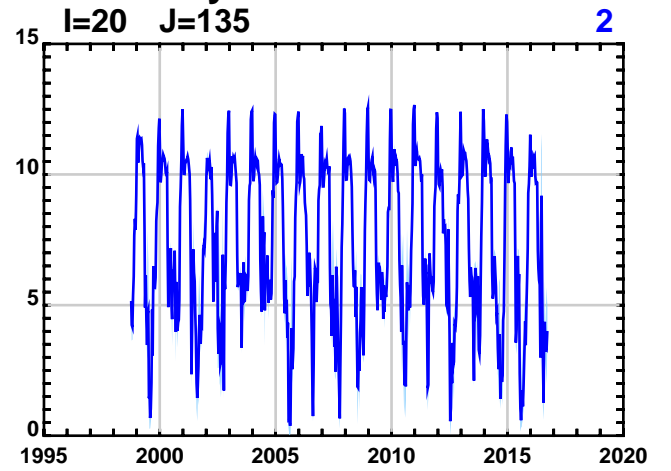
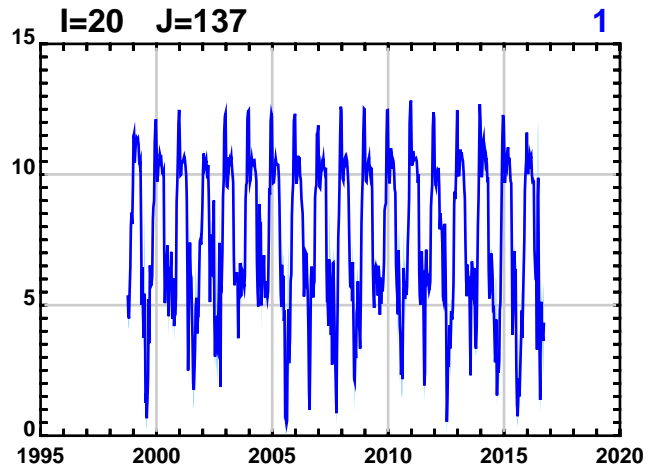
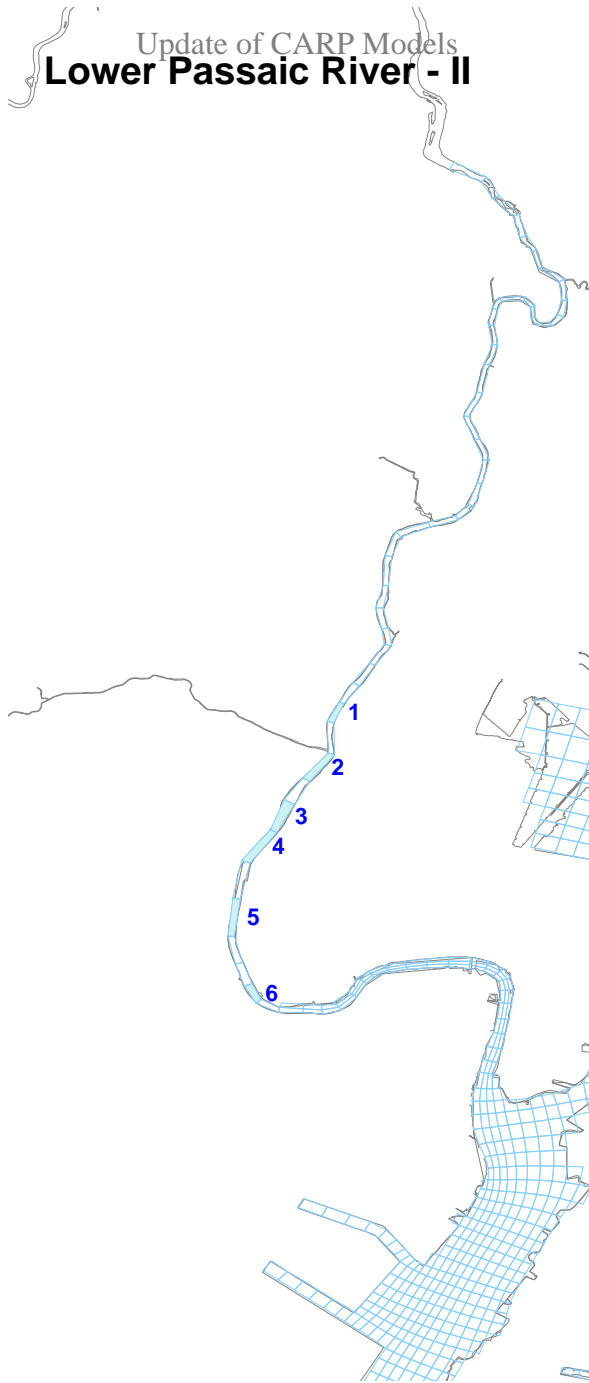
Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models Lower Passaic River - I



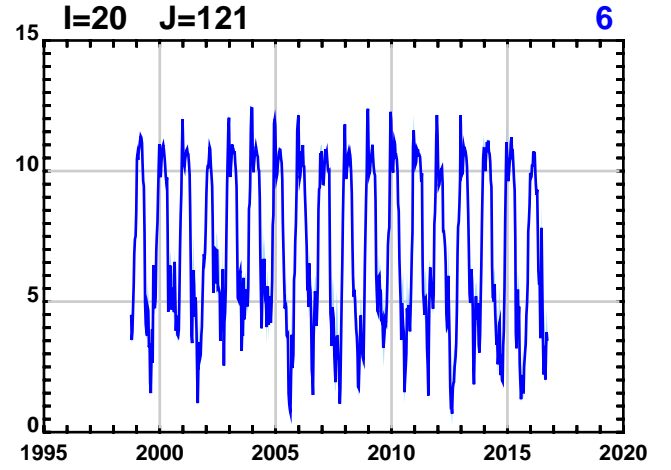
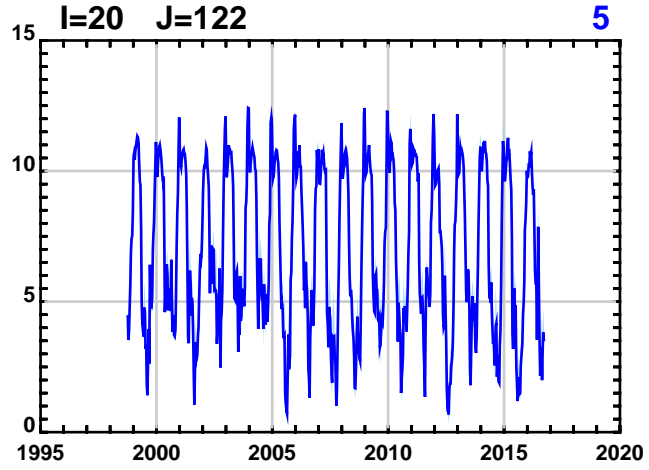
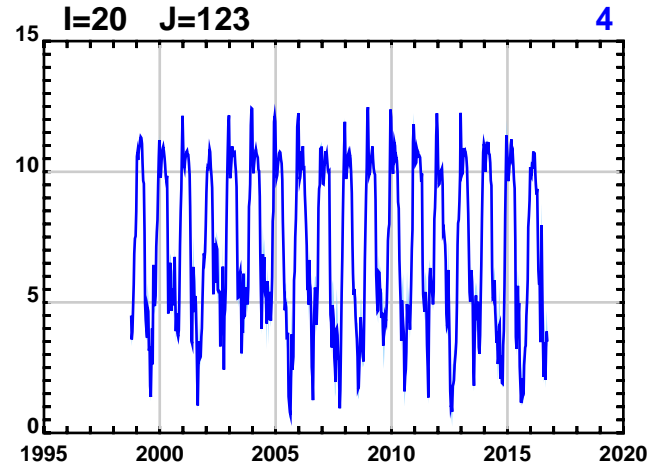
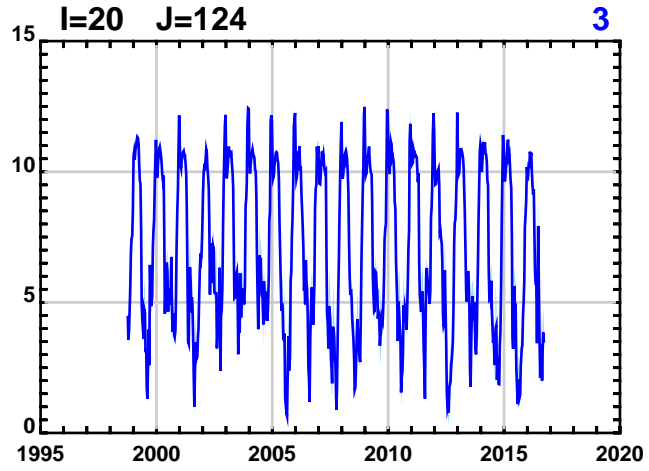
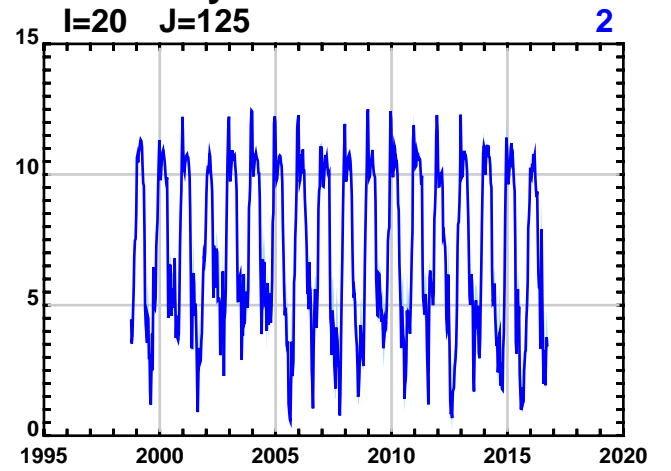
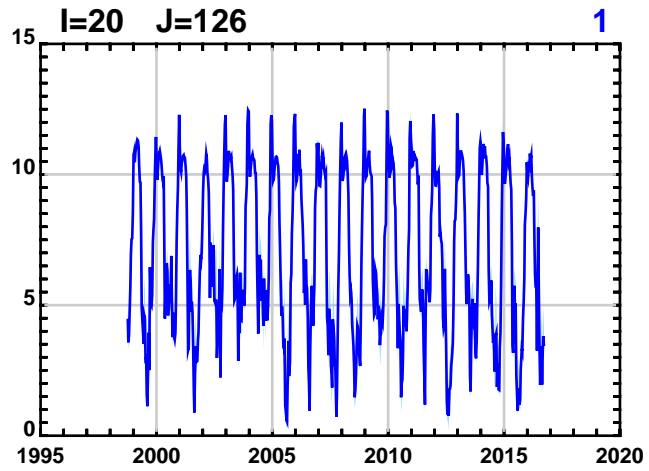
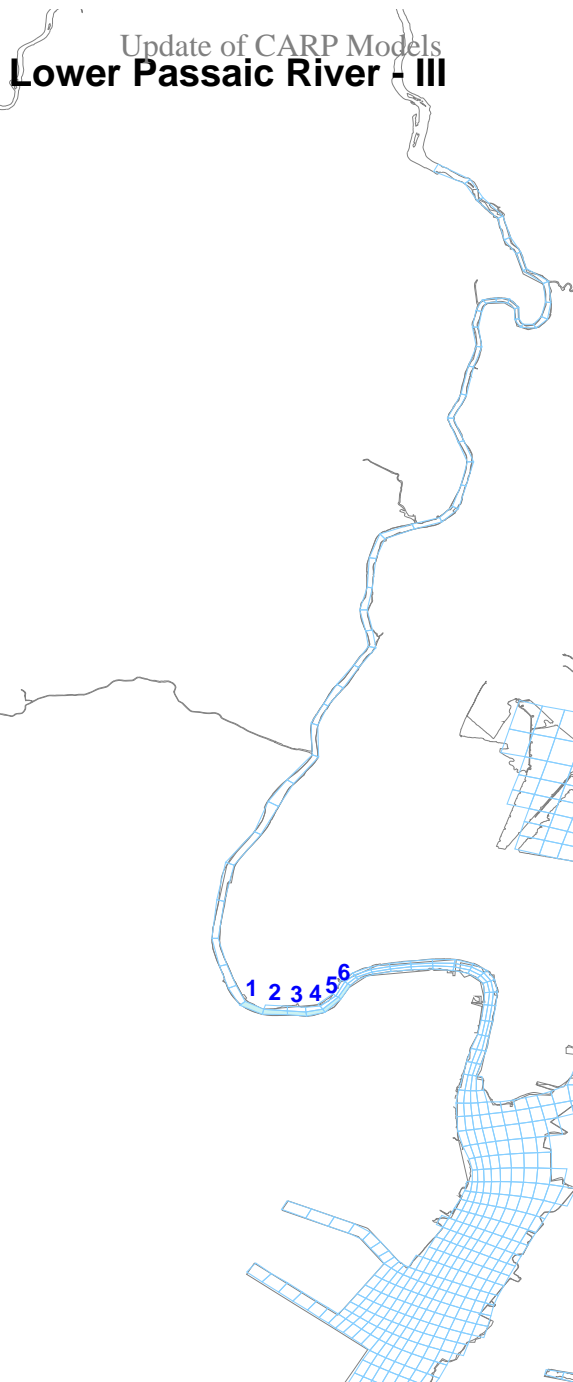
DO, mg/L

Water Column Data Comparison With Model All Water Column Layers



DO, mg/L

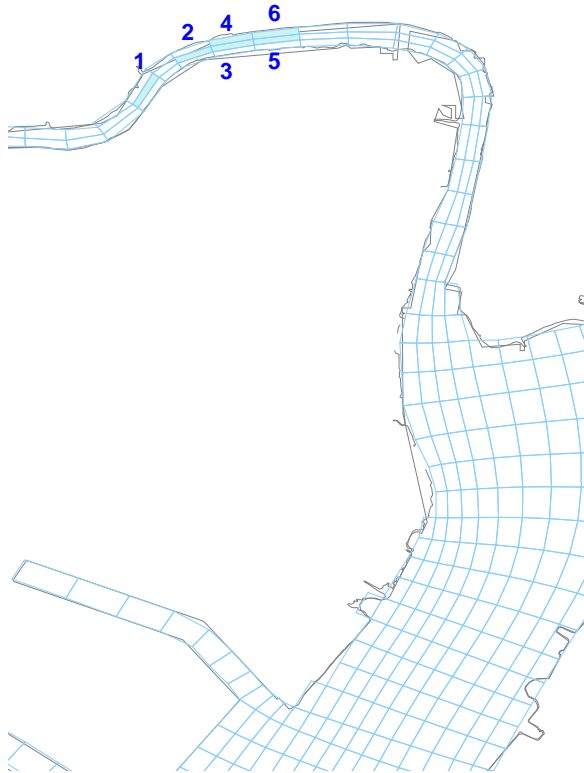
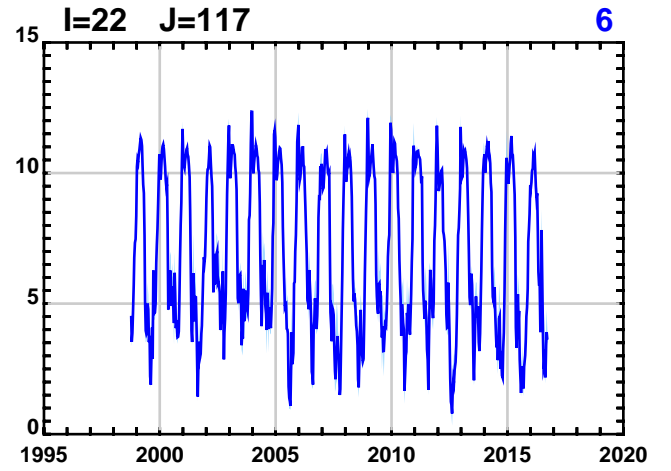
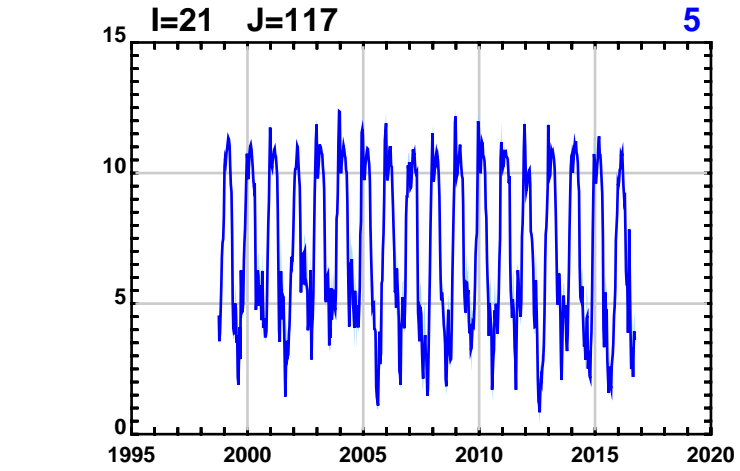
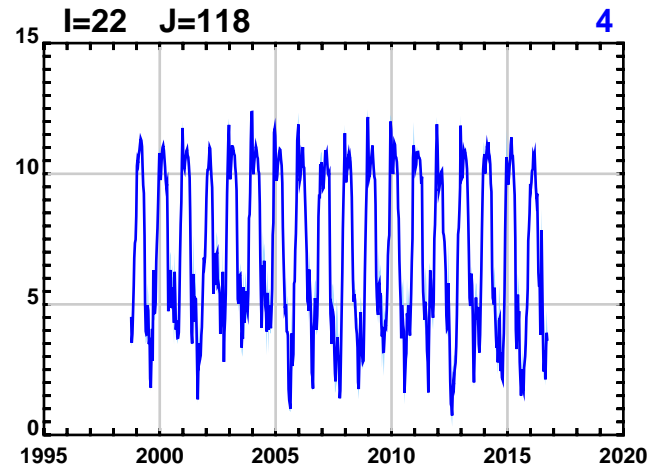
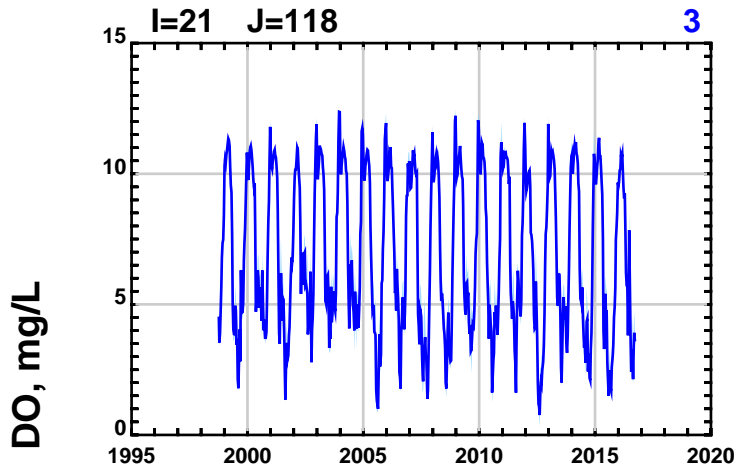
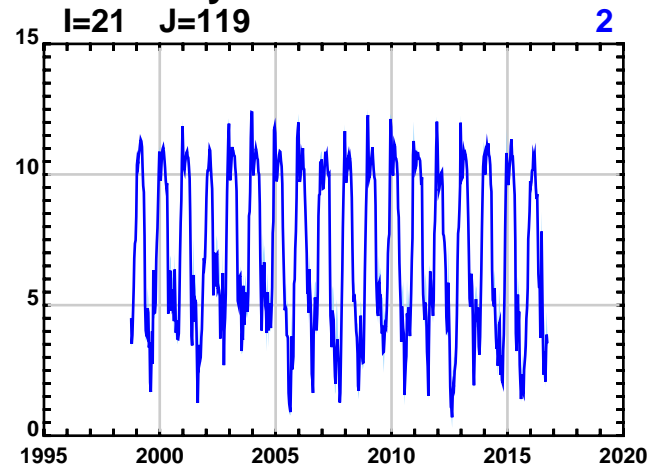
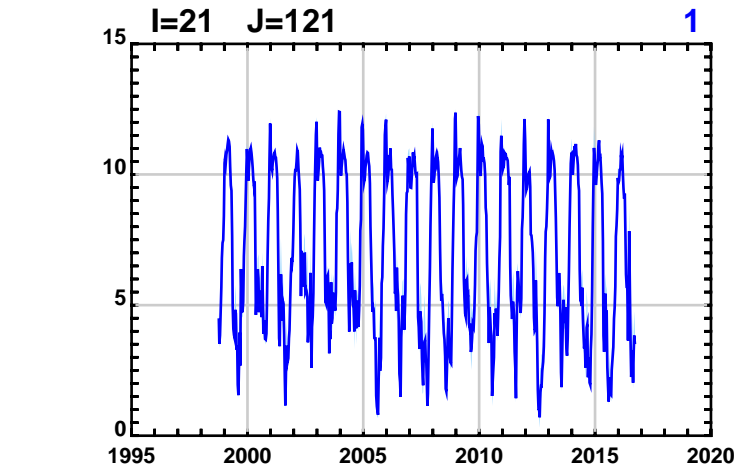
Water Column Data Comparison With Model All Water Column Layers



DO, mg/L

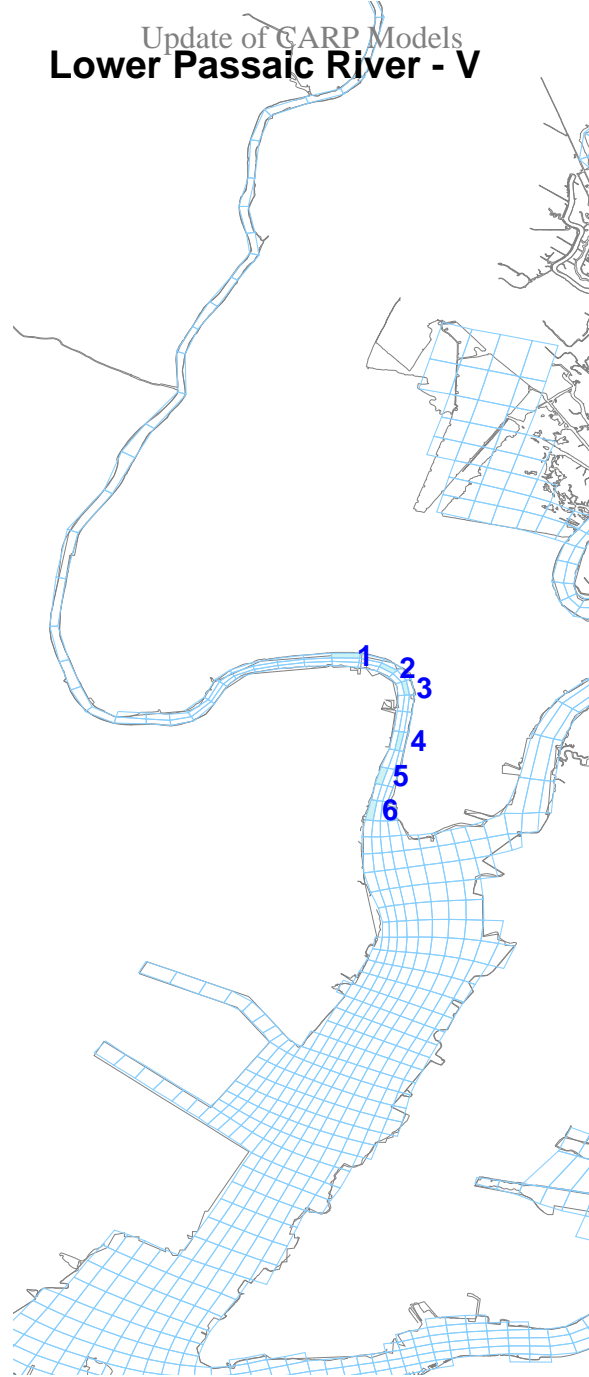
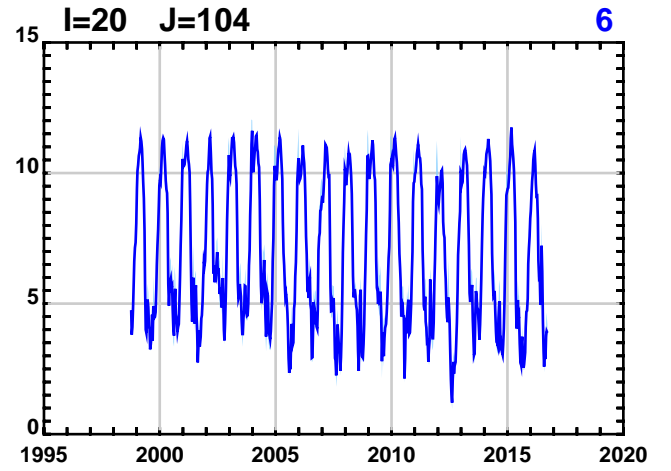
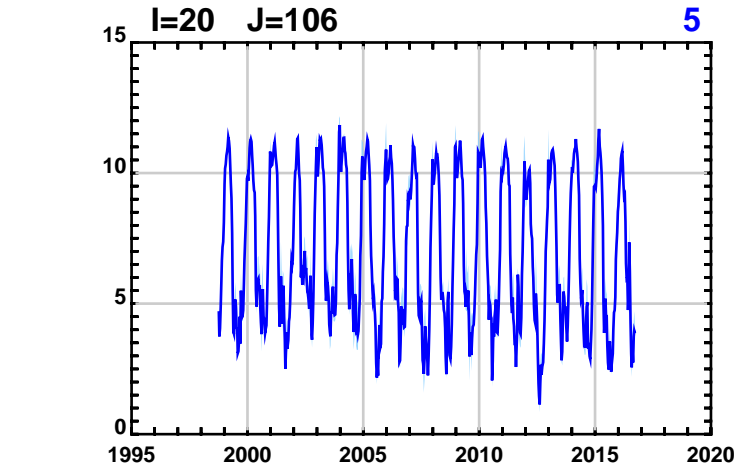
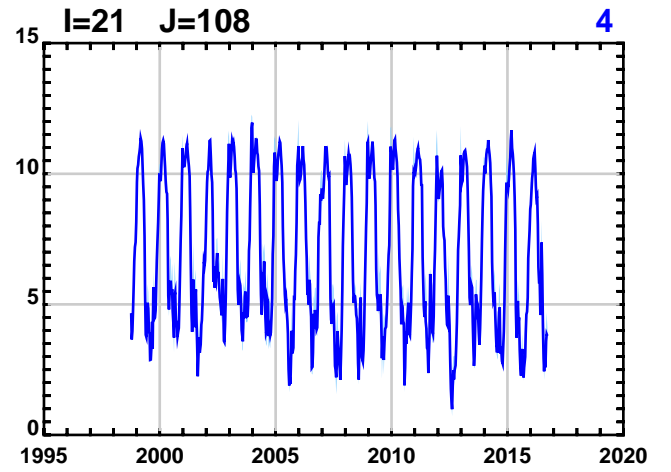
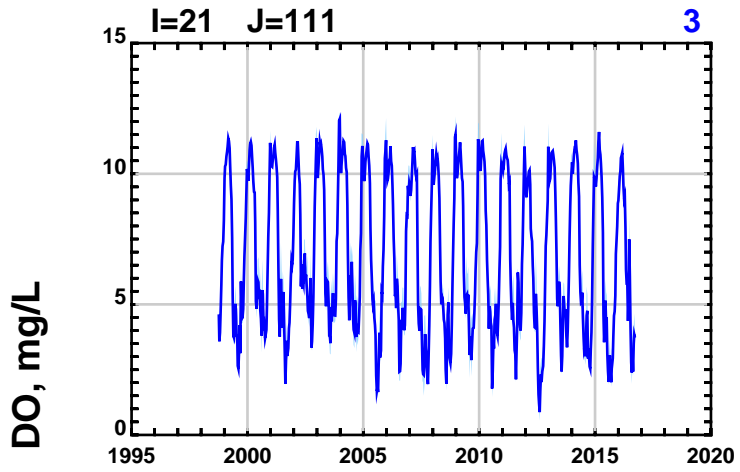
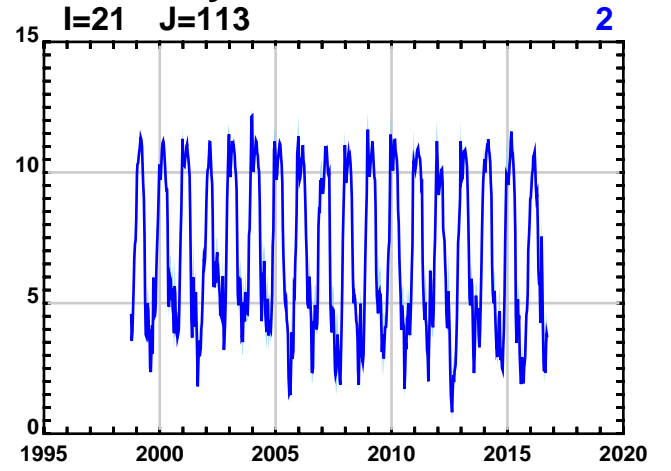
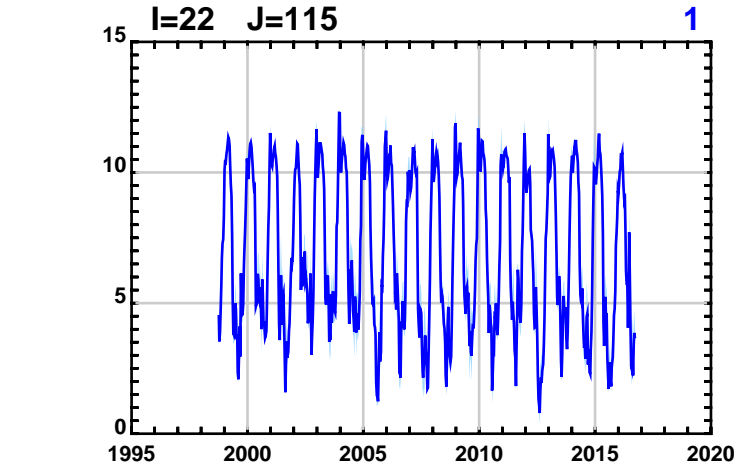
Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models Lower Passaic River - IV



Water Column Data Comparison With Model All Water Column Layers

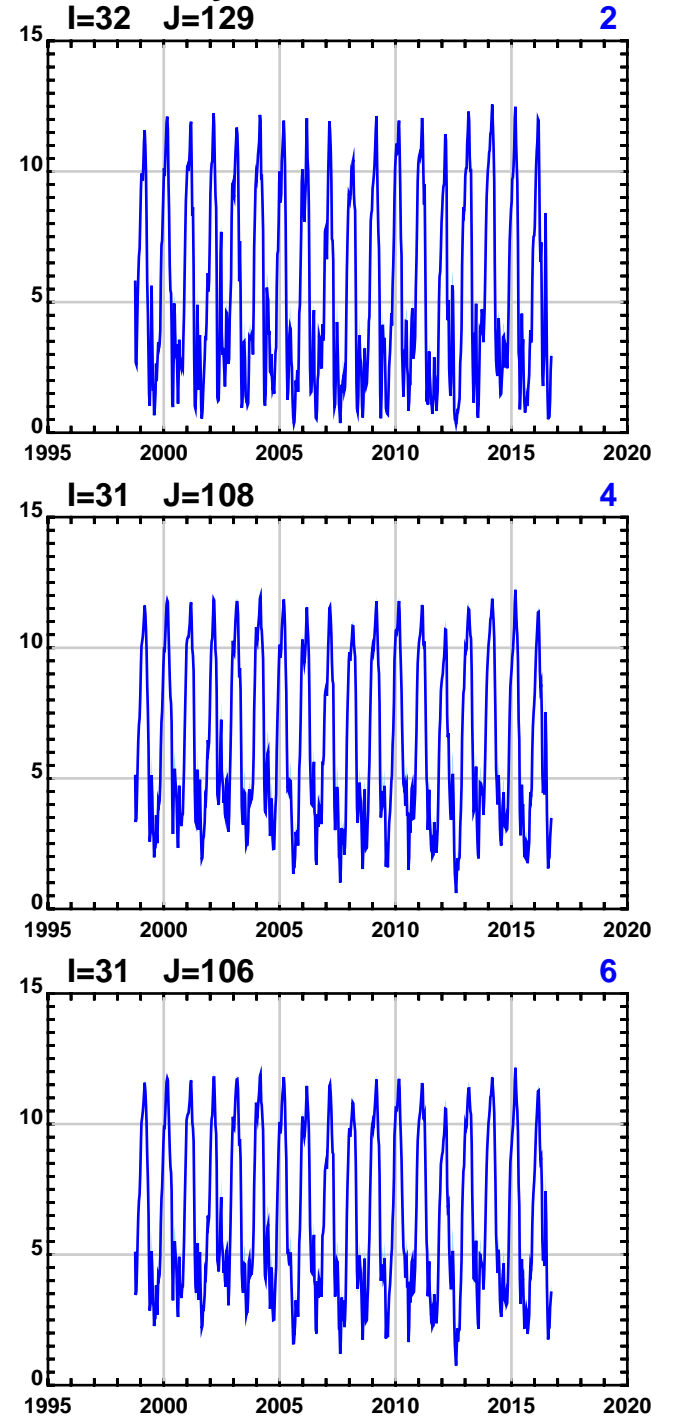
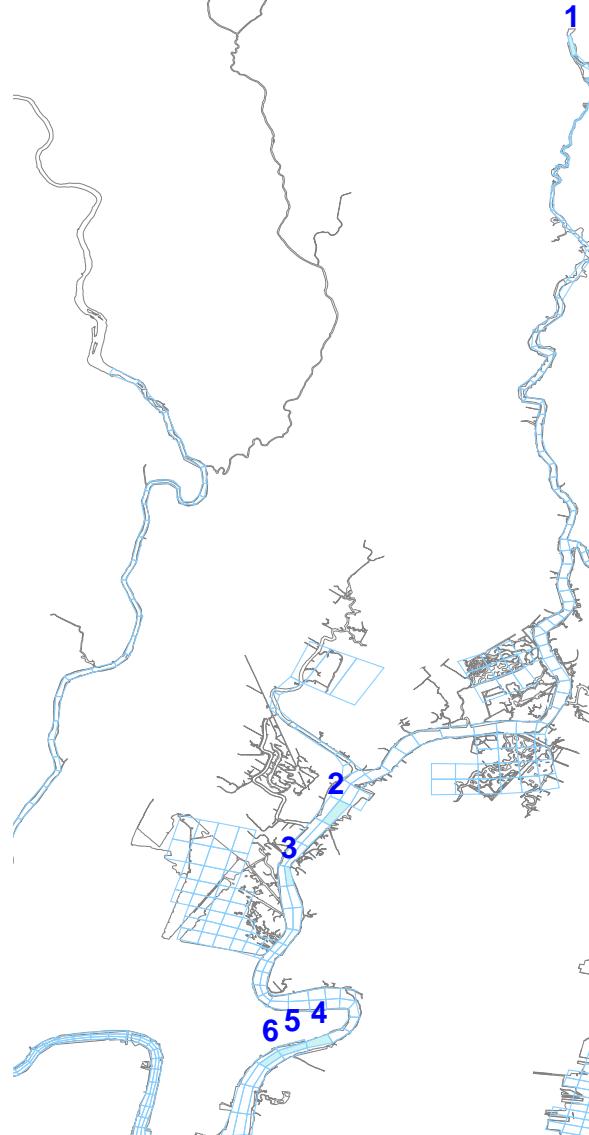
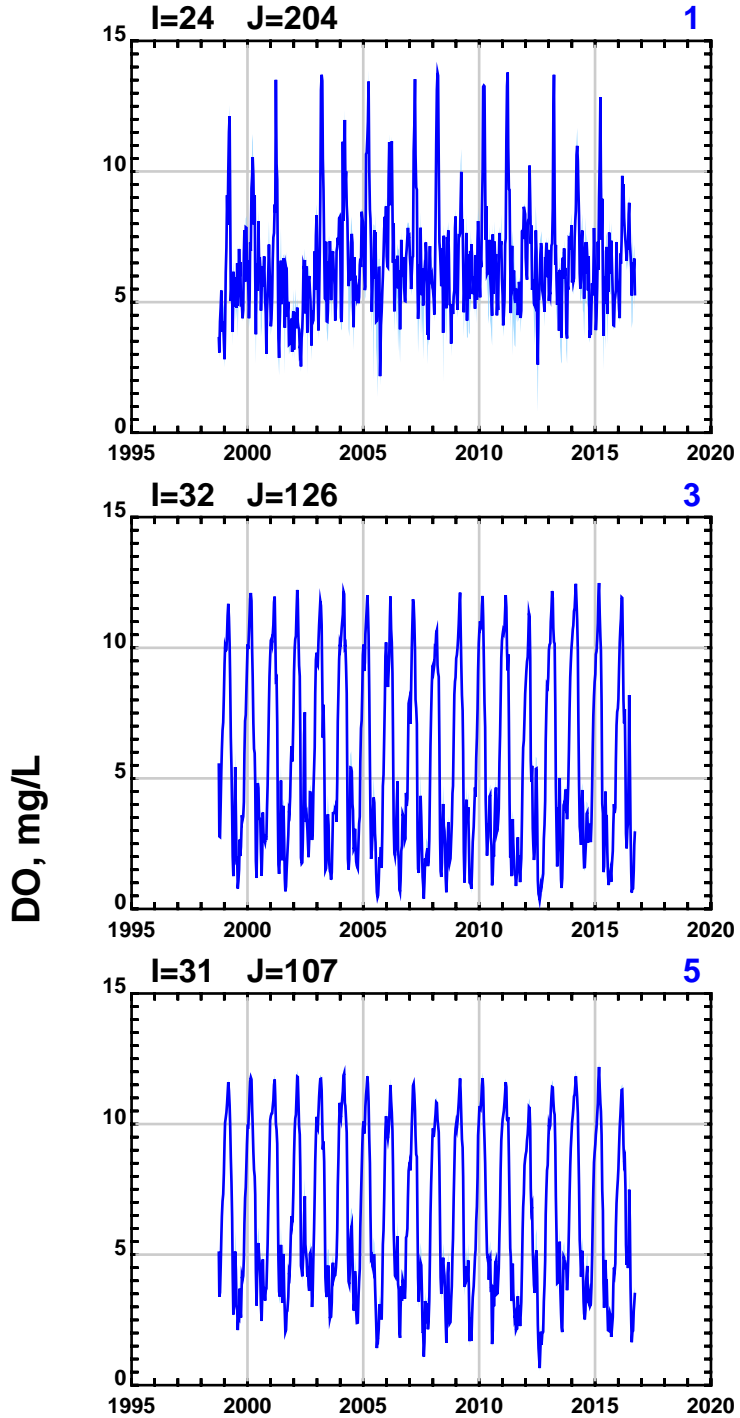
Update of CARP Models Lower Passaic River - V



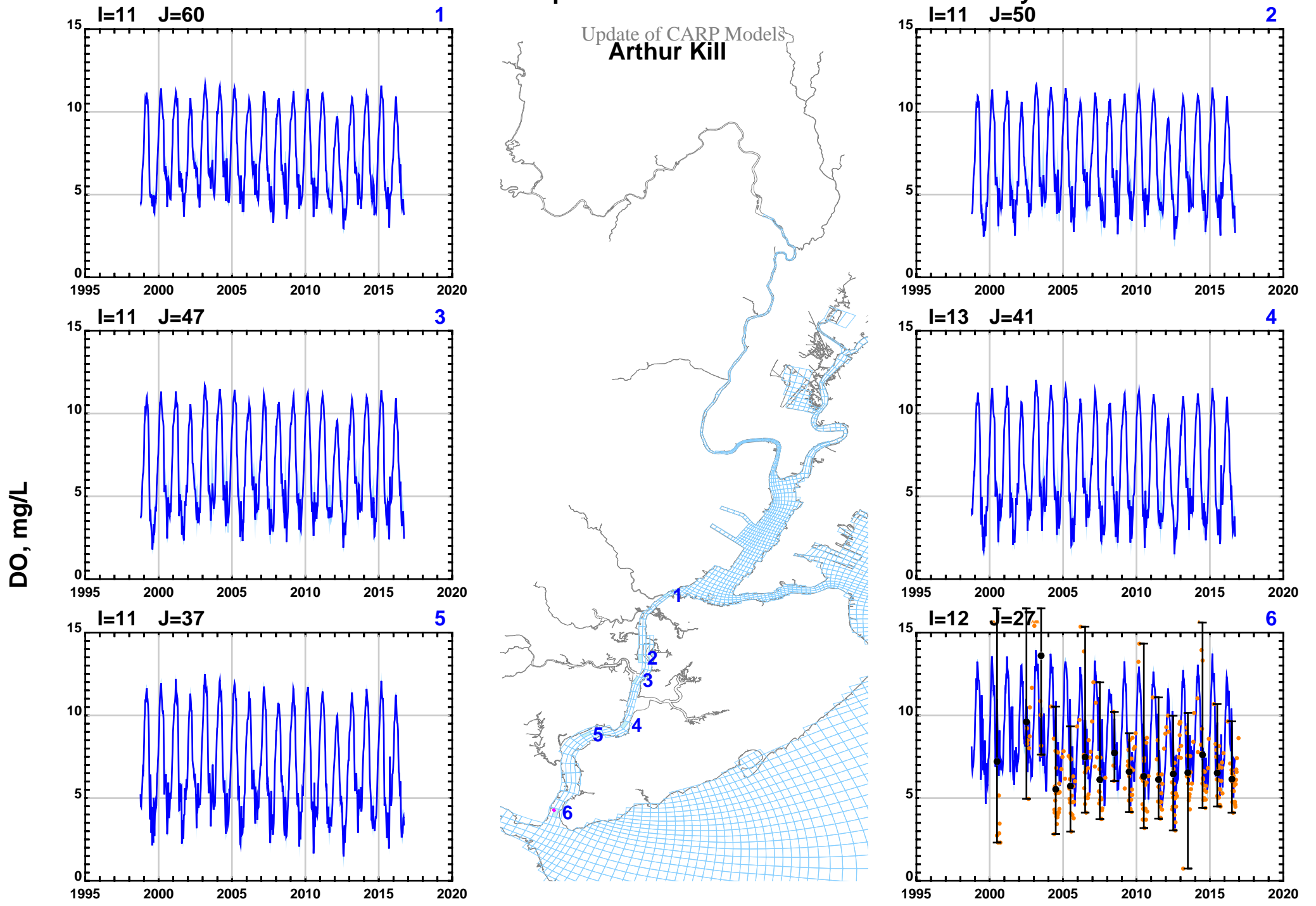
DO, mg/L

Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models
Hackensack River



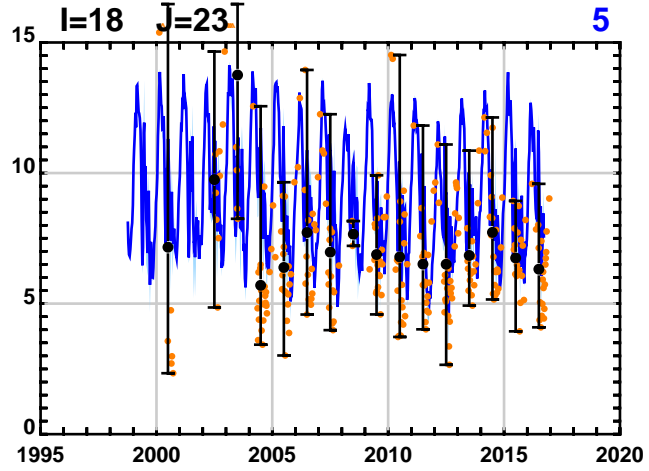
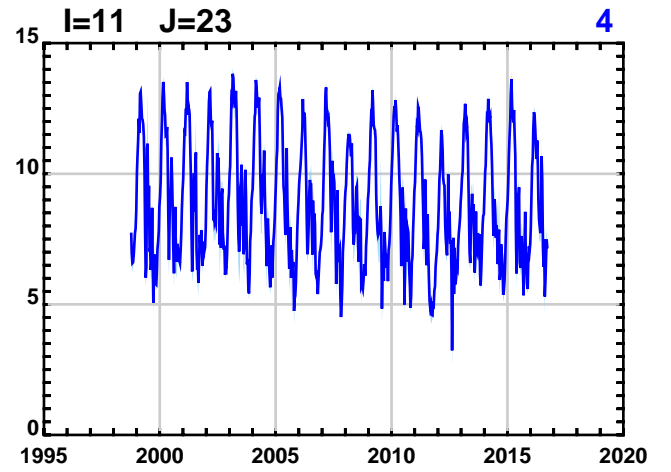
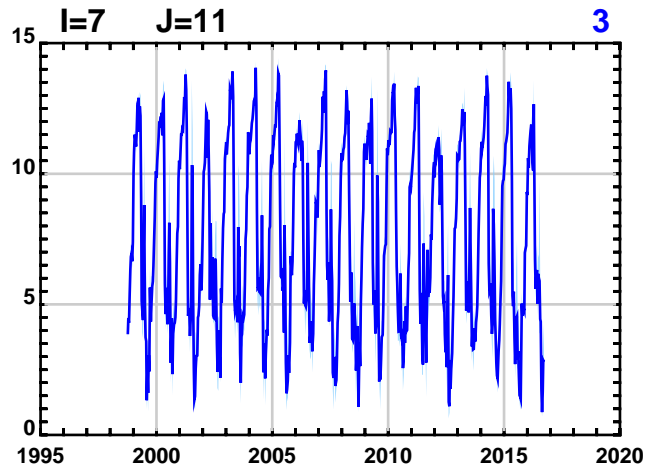
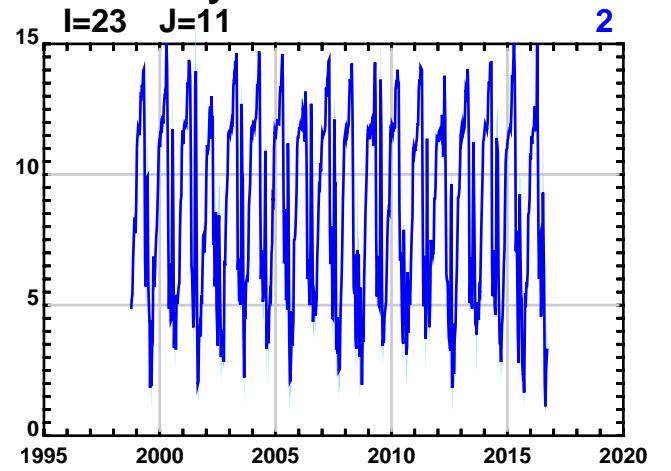
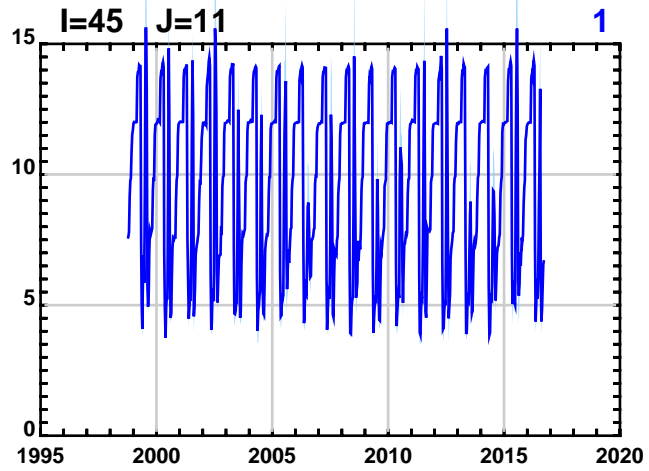
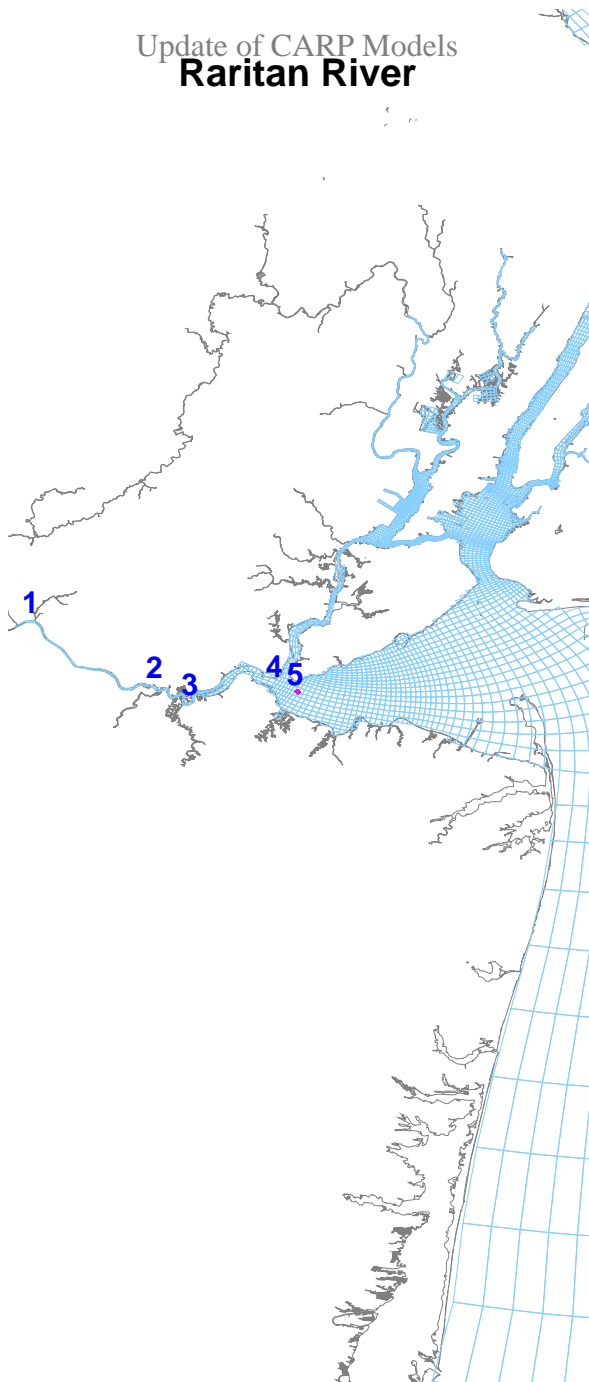
Water Column Data Comparison With Model All Water Column Layers



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 26 of 76

Water Column Data Comparison With Model All Water Column Layers

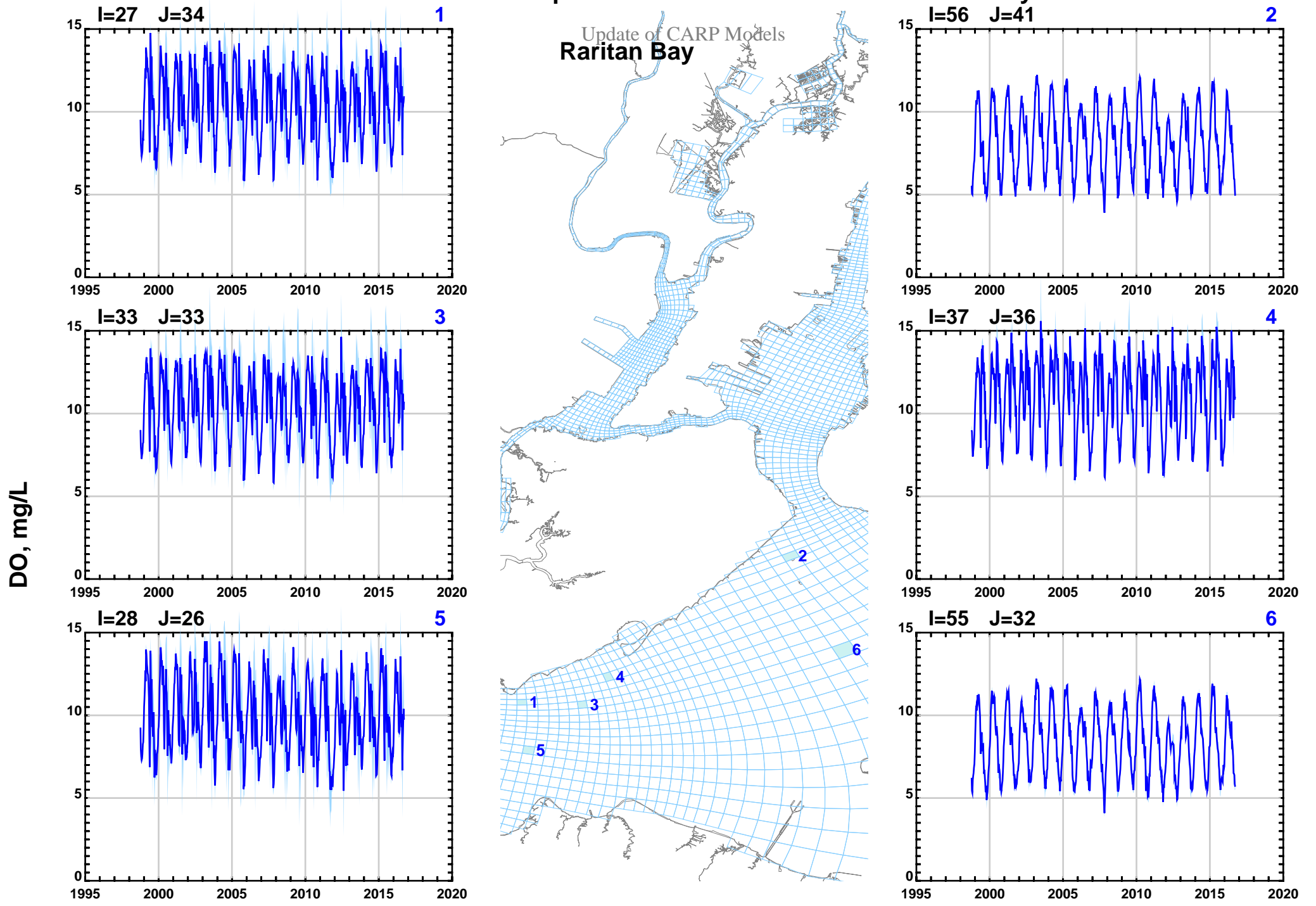
Update of CARP Models
Raritan River



Detect Data

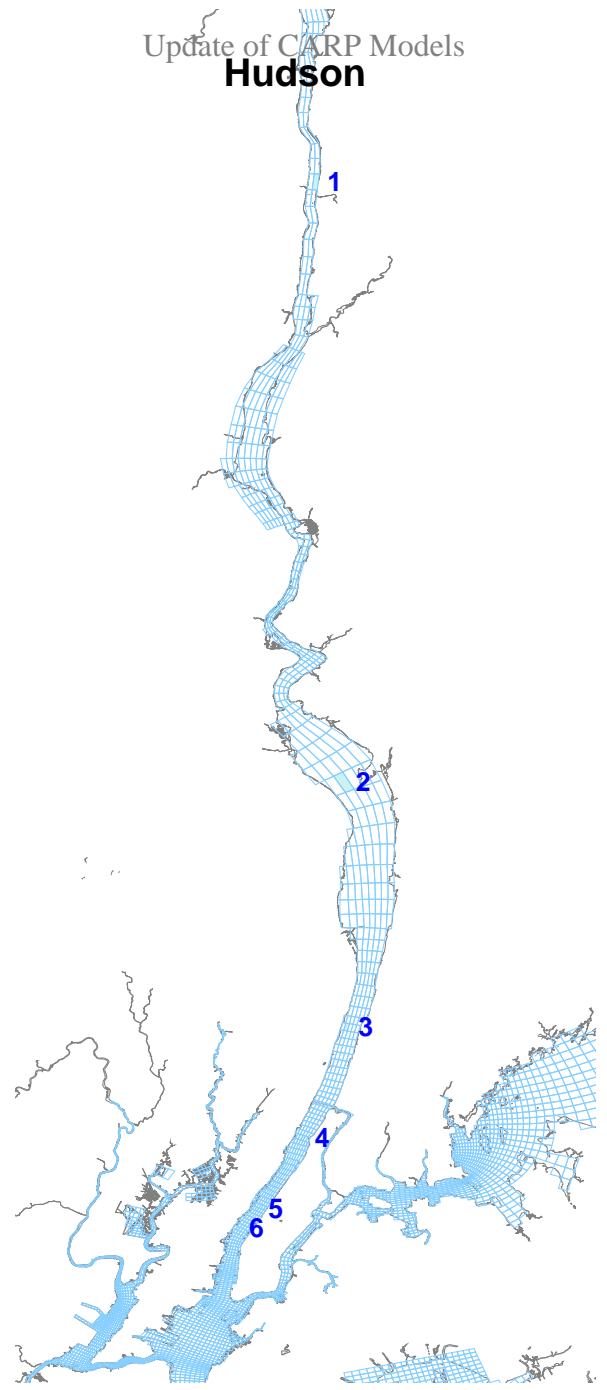
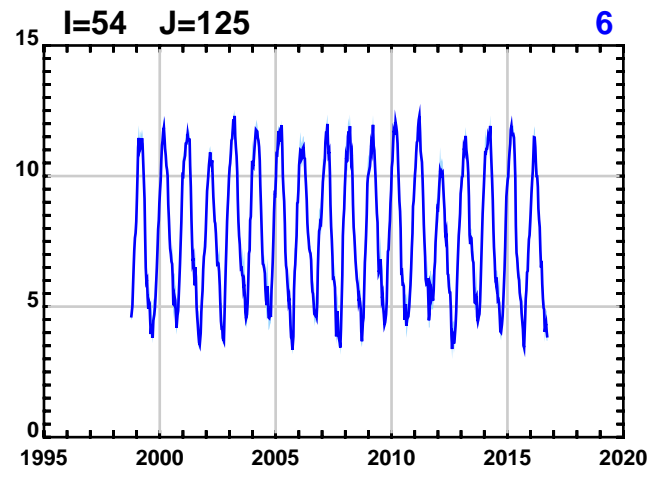
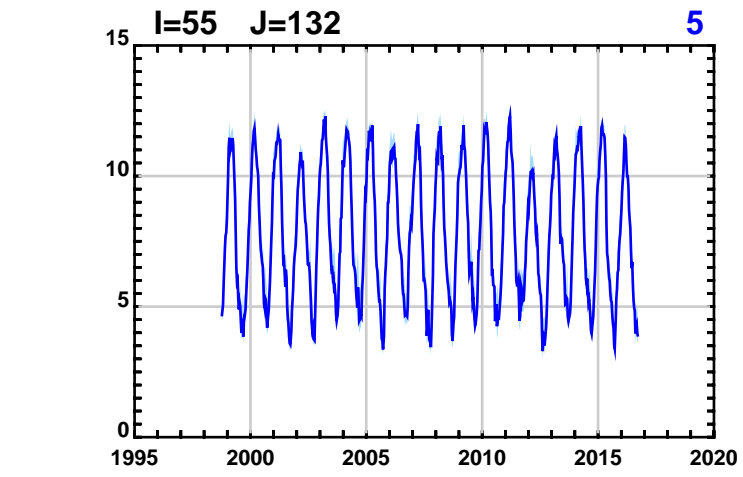
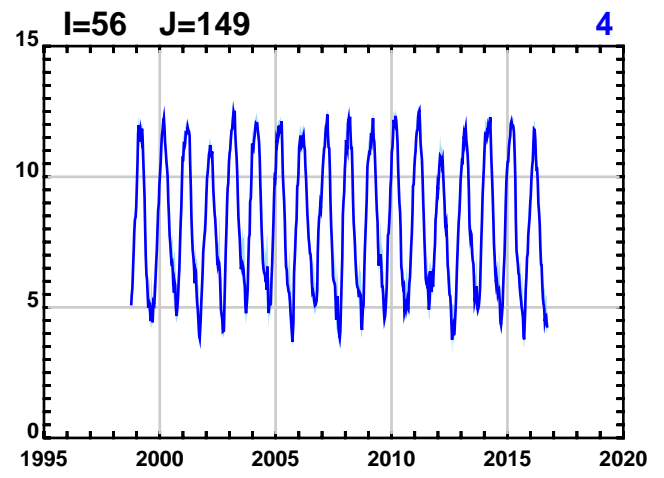
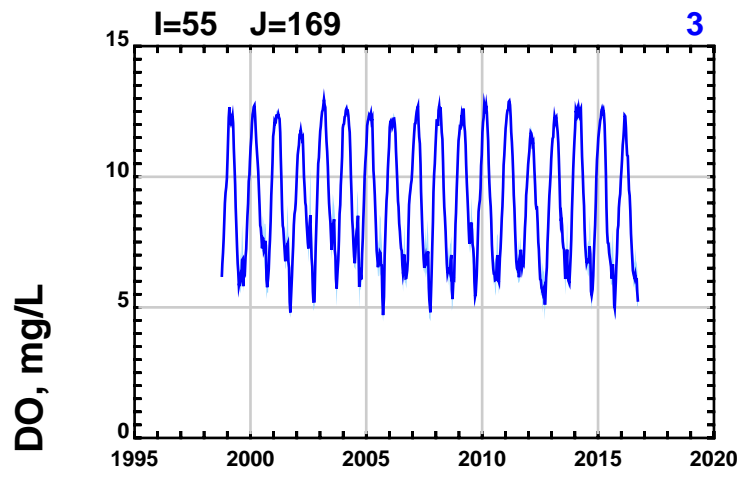
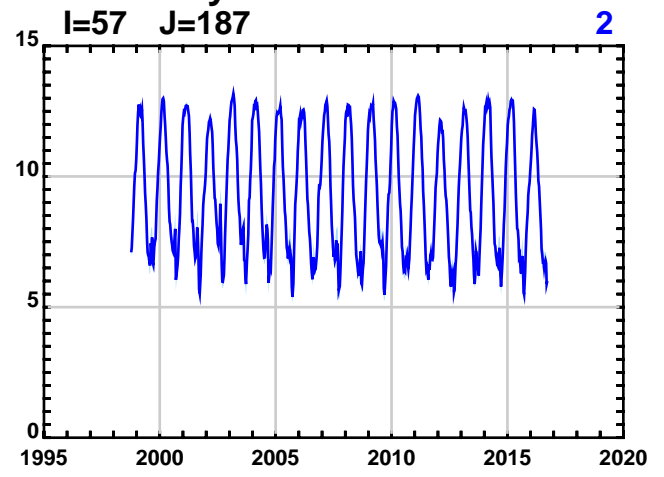
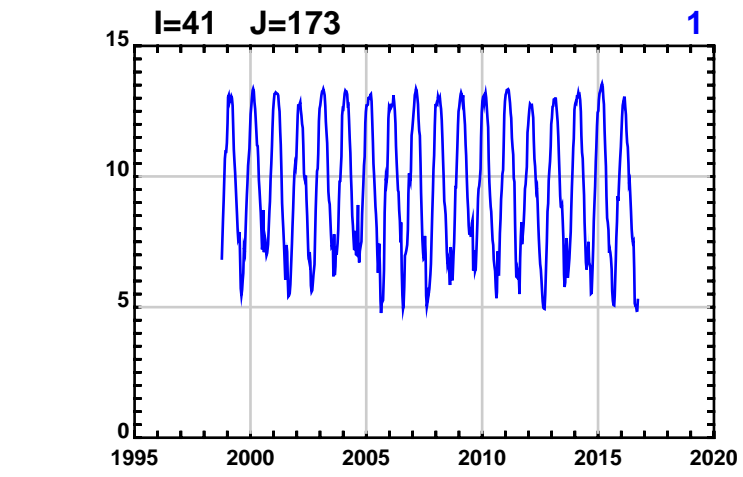
Model: mean and range of values in Water Column Appendix 12 Page 27 of 76

Water Column Data Comparison With Model All Water Column Layers

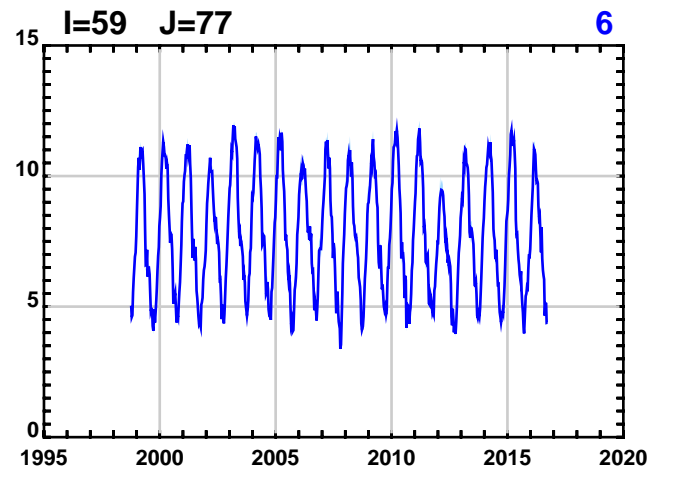
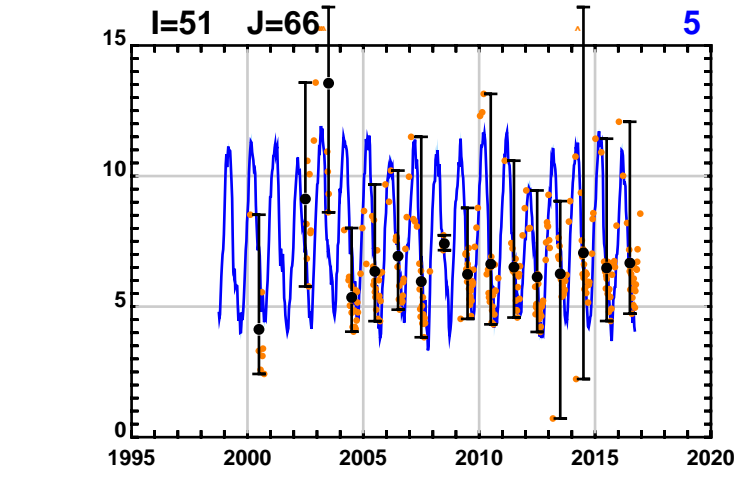
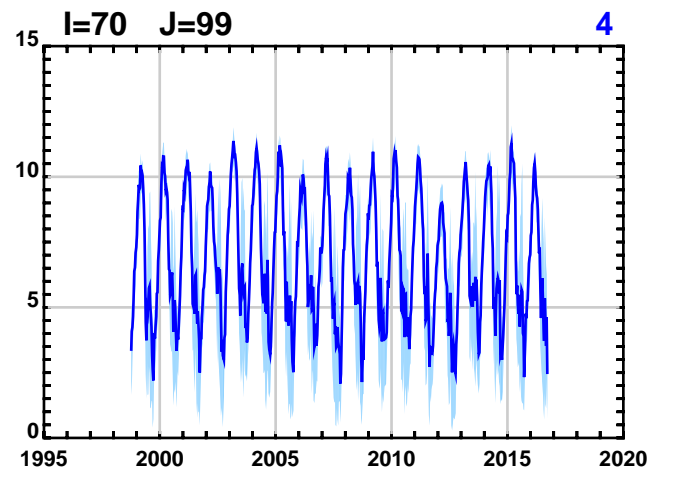
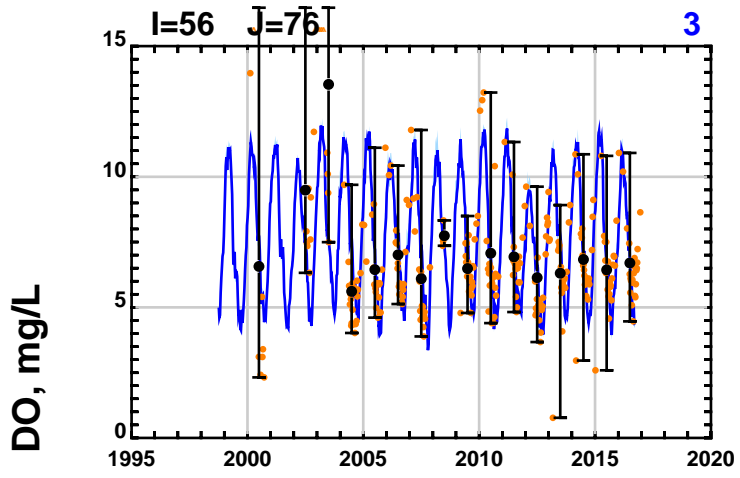
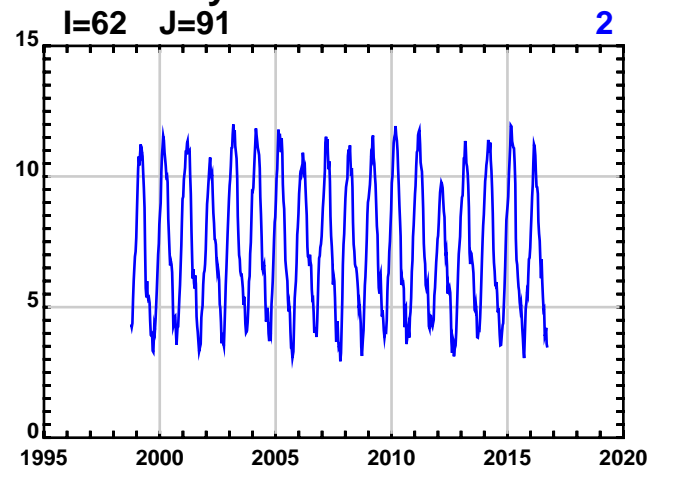
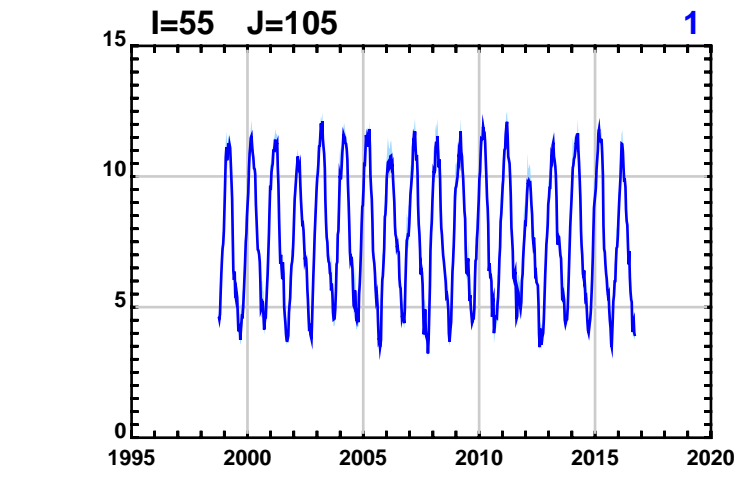
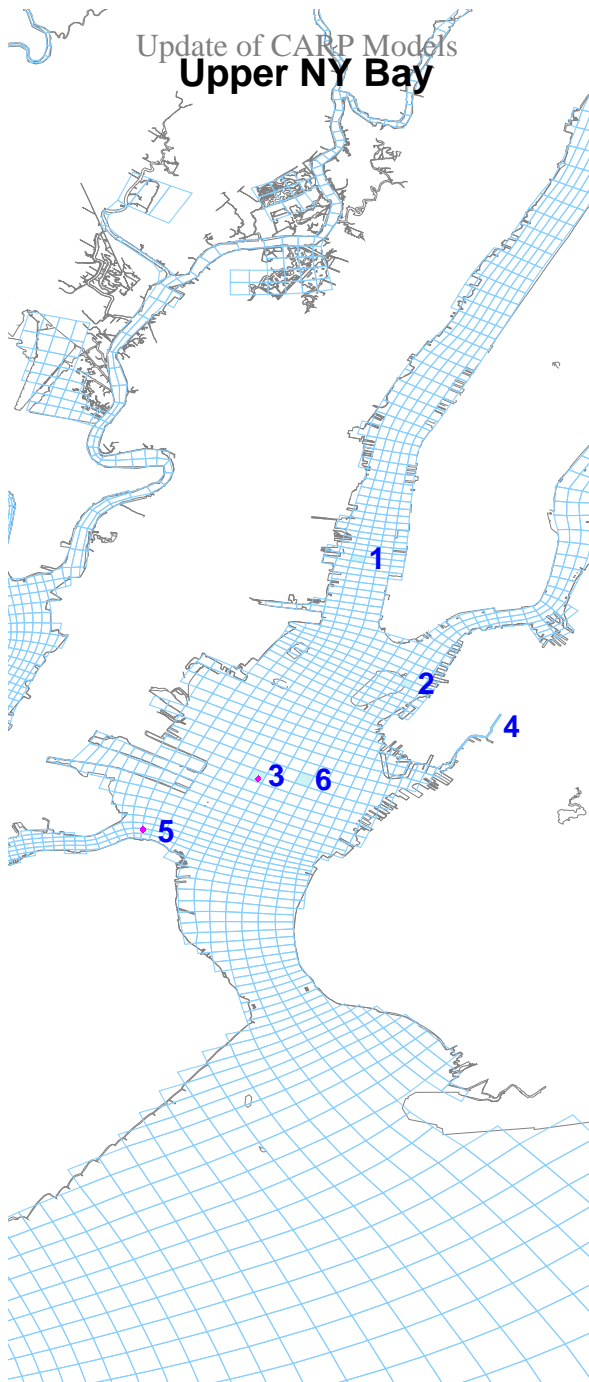


Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models
Hudson

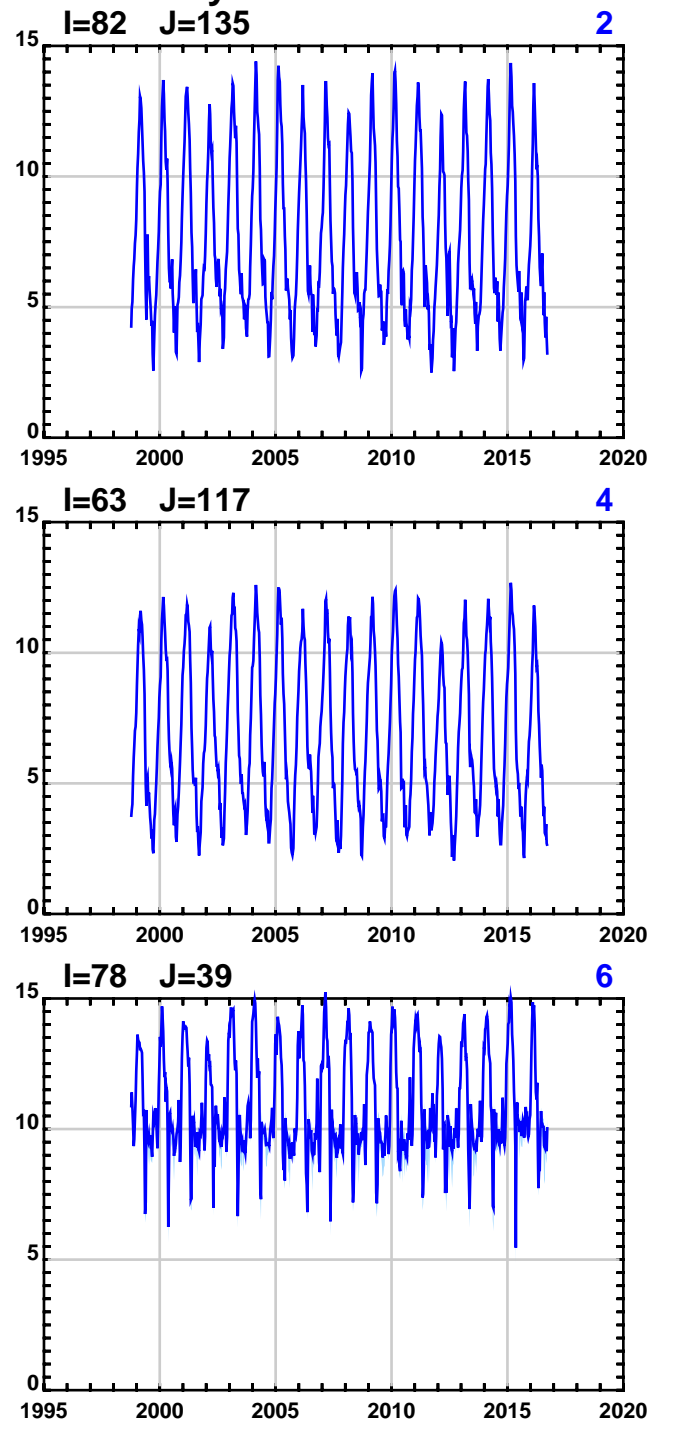
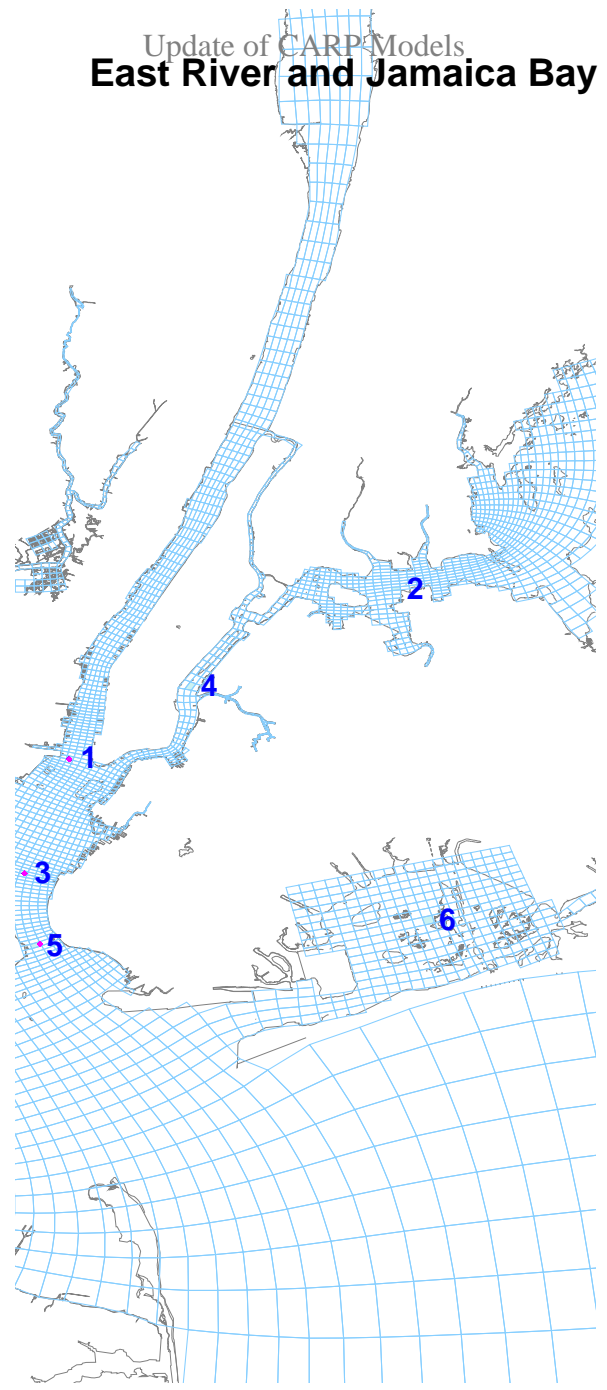
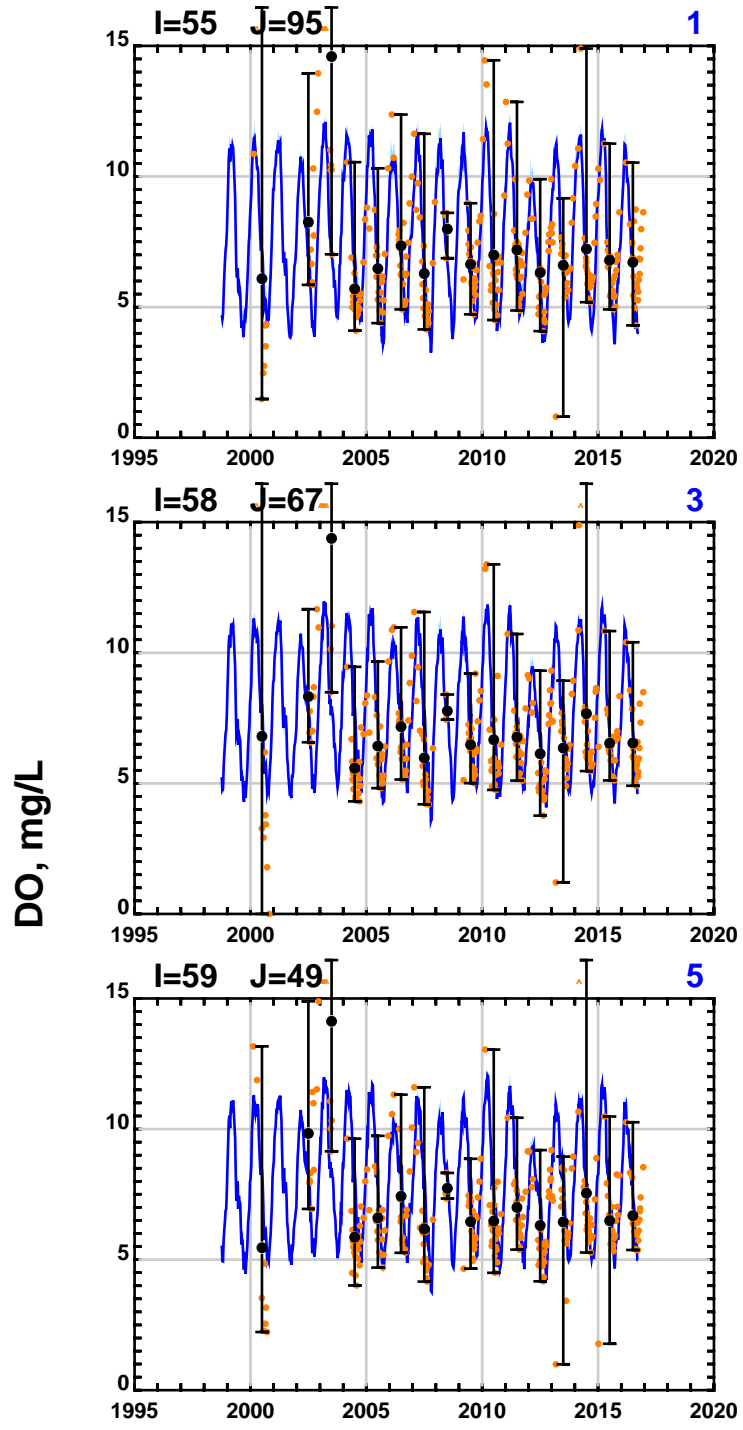


Water Column Data Comparison With Model All Water Column Layers



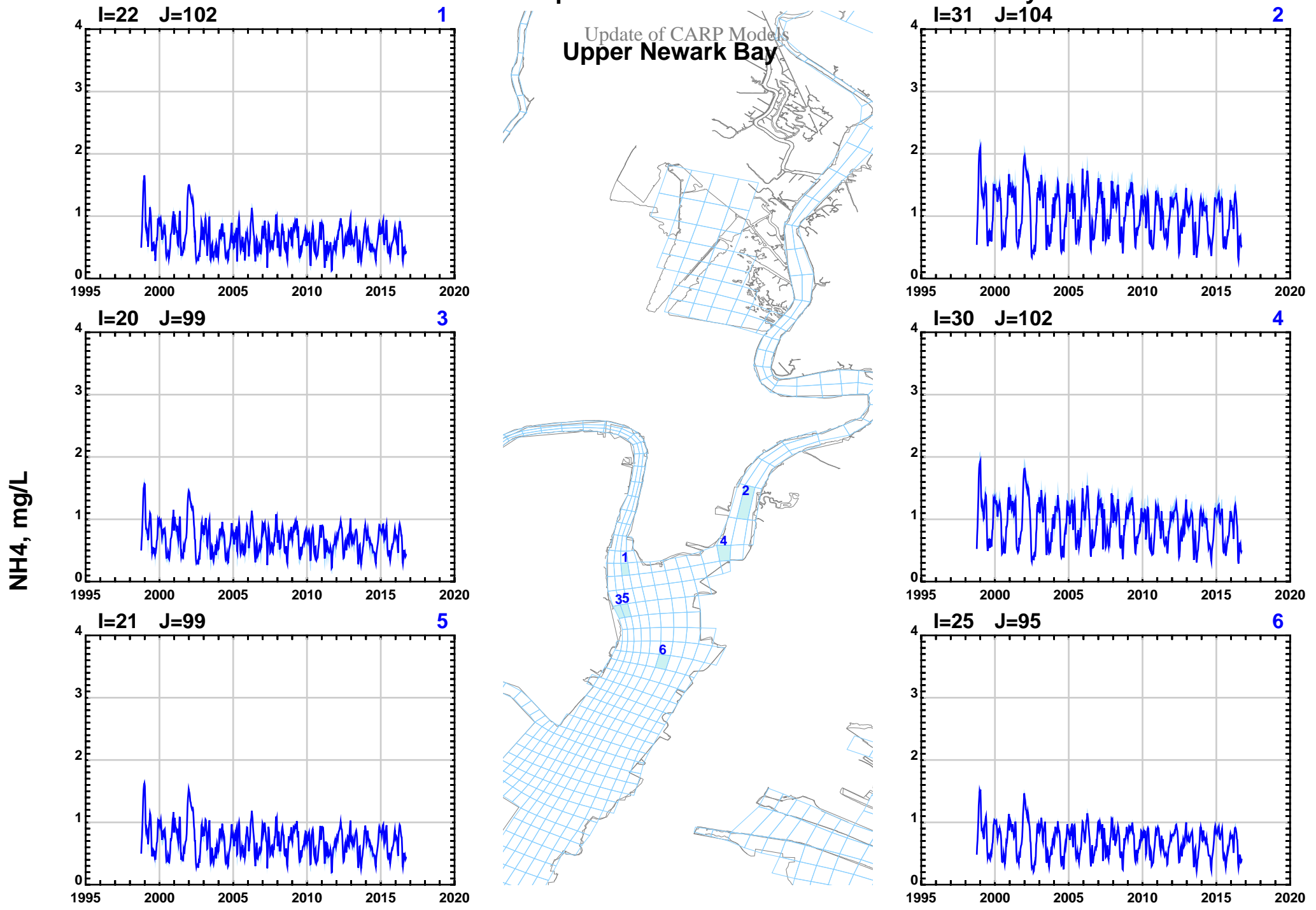
DO, mg/L

Water Column Data Comparison With Model All Water Column Layers



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 31 of 76

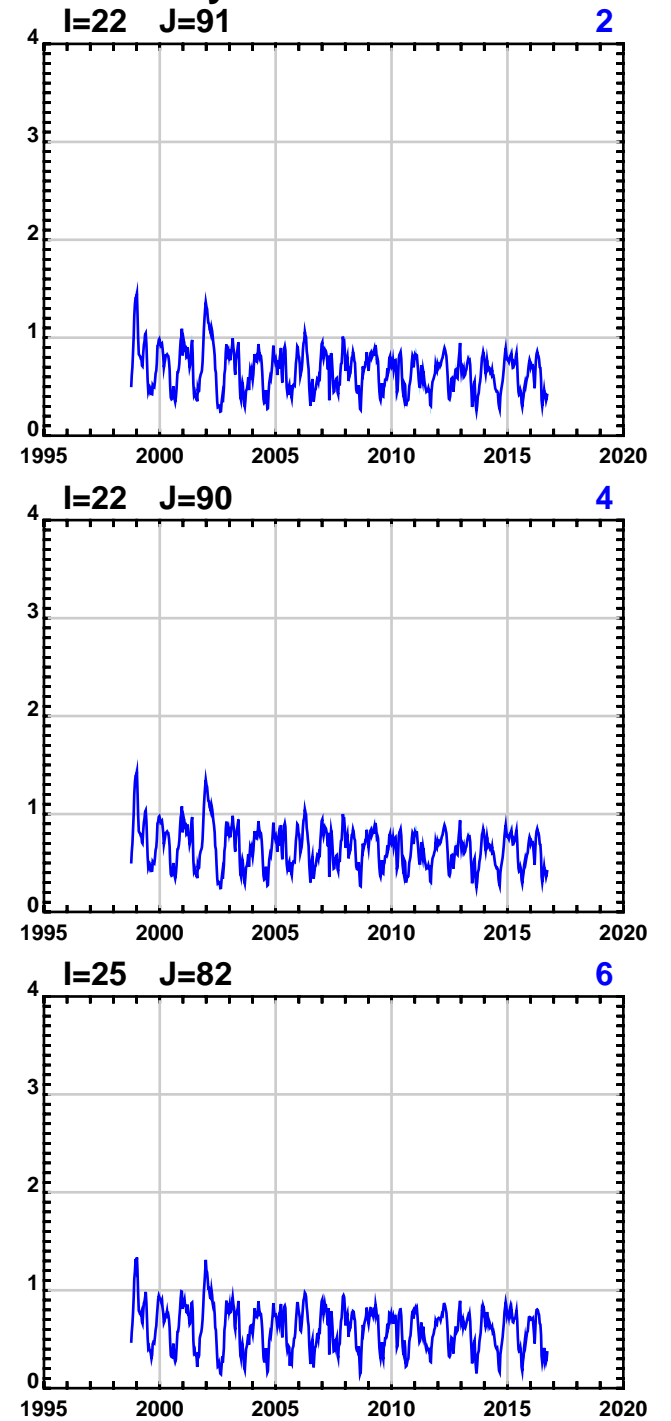
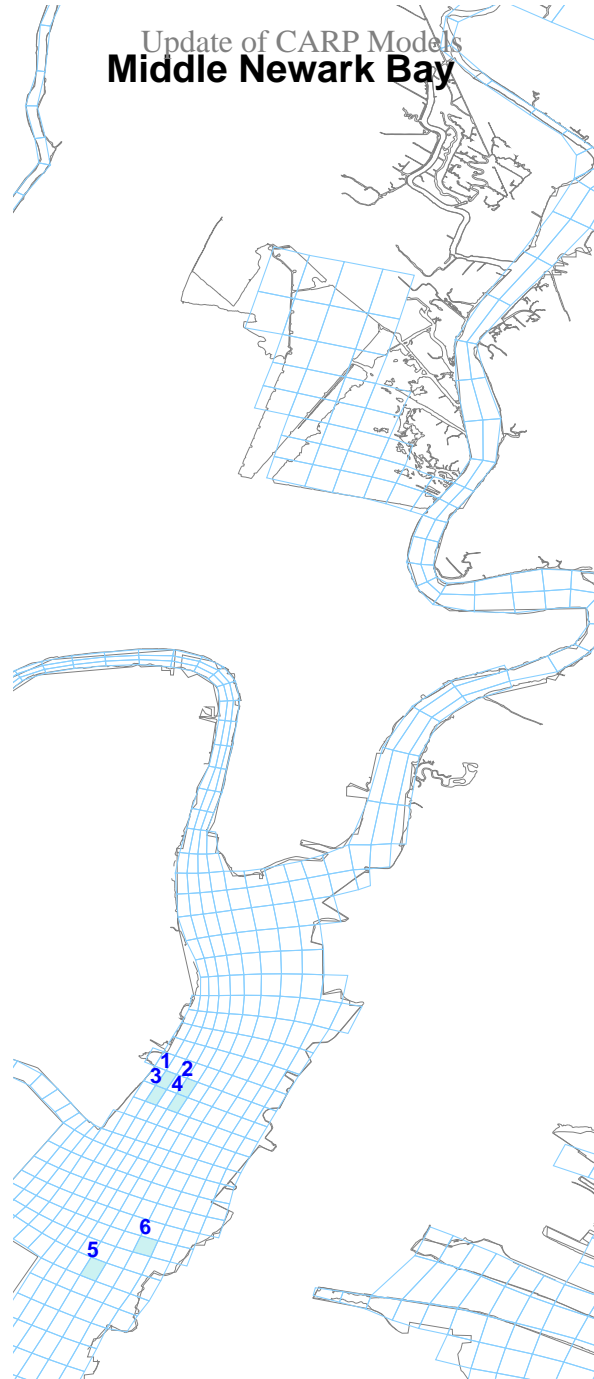
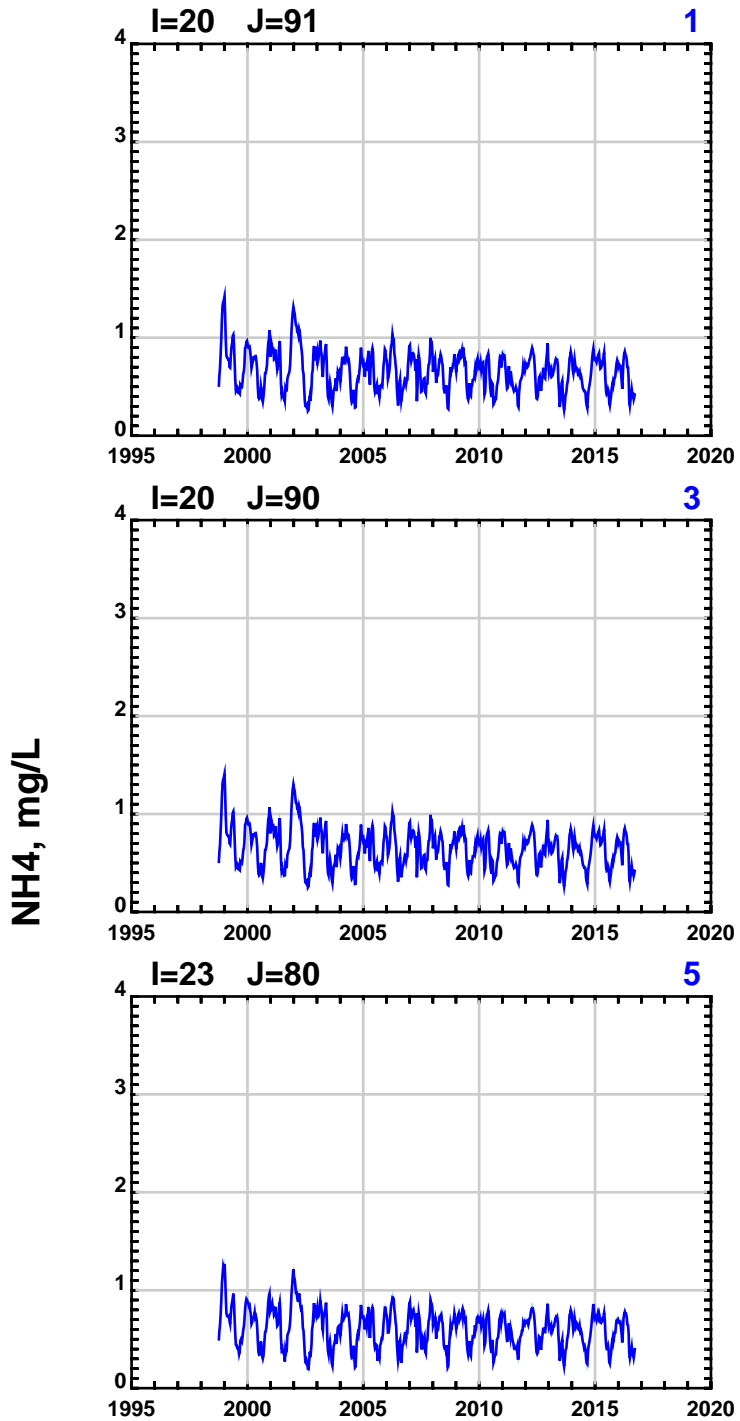
Water Column Data Comparison With Model All Water Column Layers



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 32 of 76

Water Column Data Comparison With Model All Water Column Layers

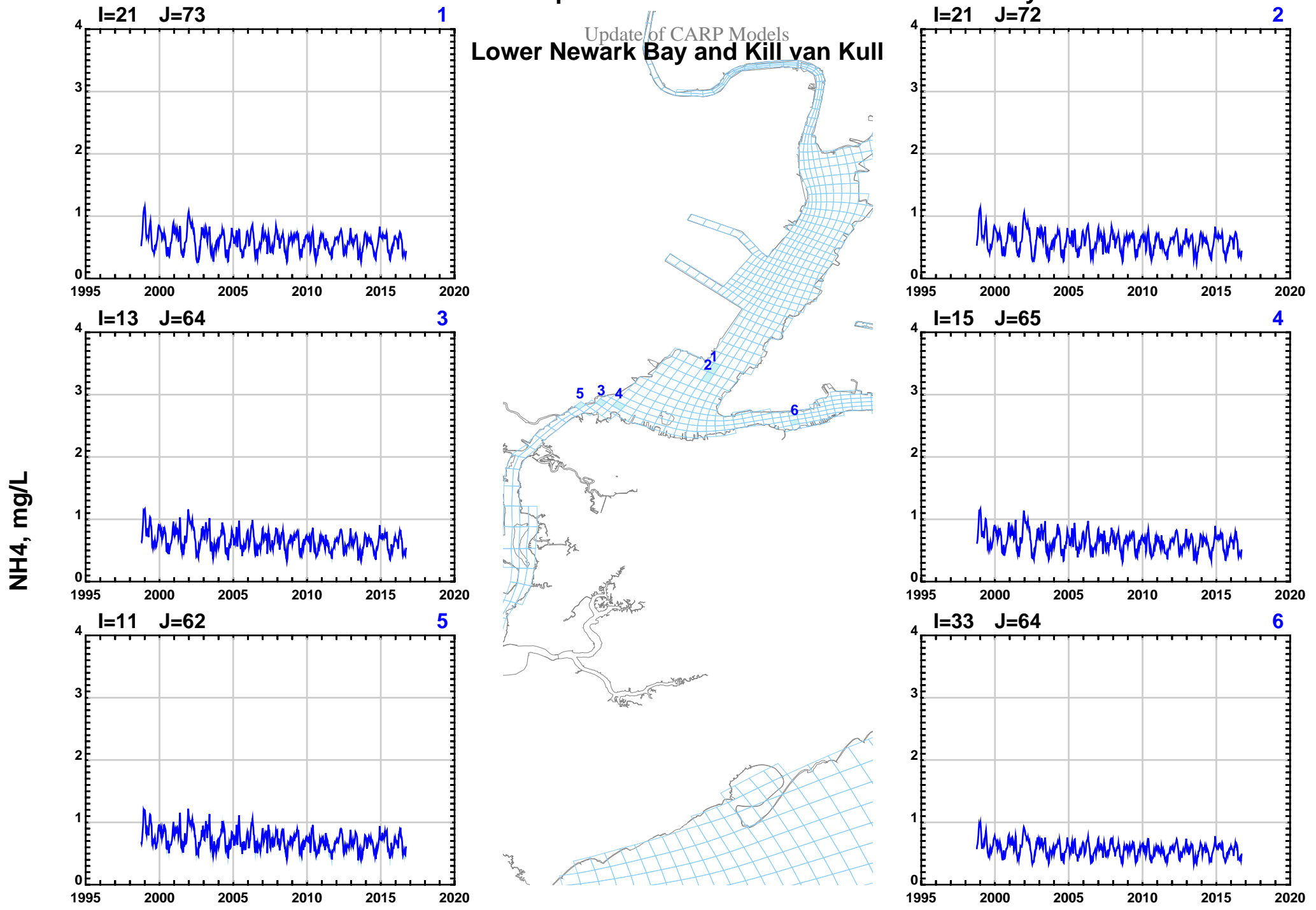
Update of CARP Models
Middle Newark Bay



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 33 of 76

Water Column Data Comparison With Model All Water Column Layers

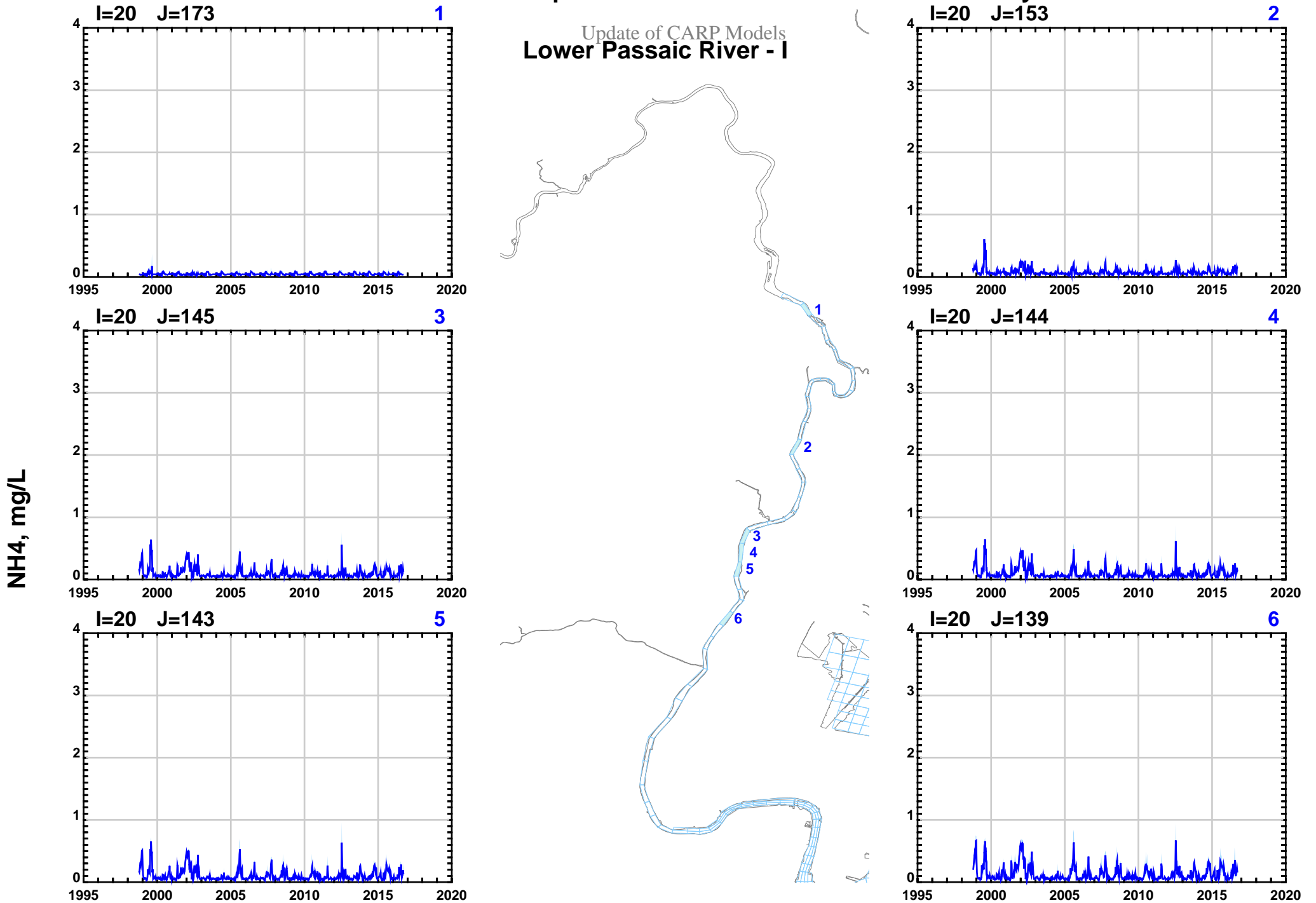
Update of CARP Models
Lower Newark Bay and Kill van Kull



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 34 of 76

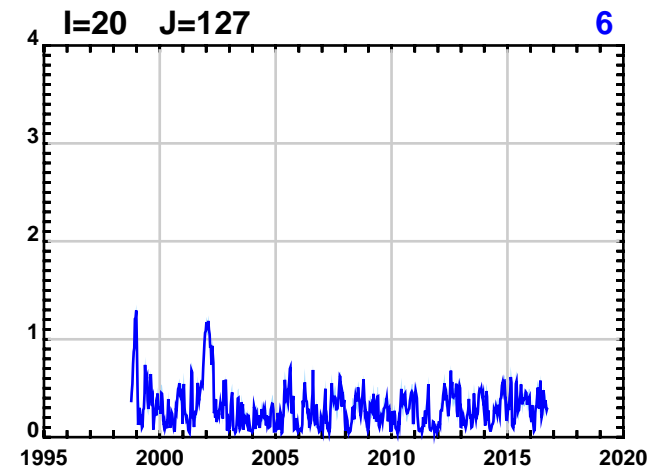
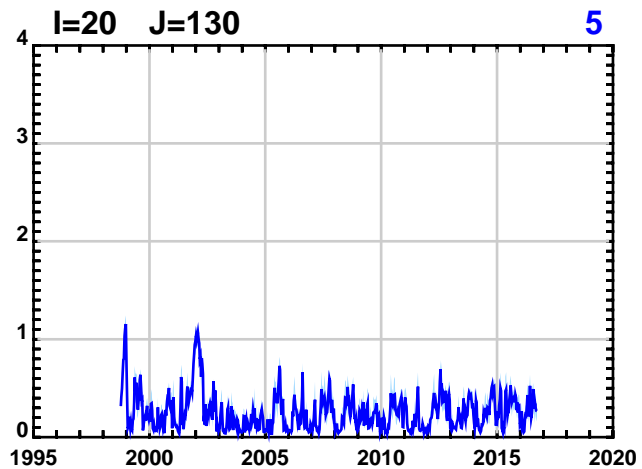
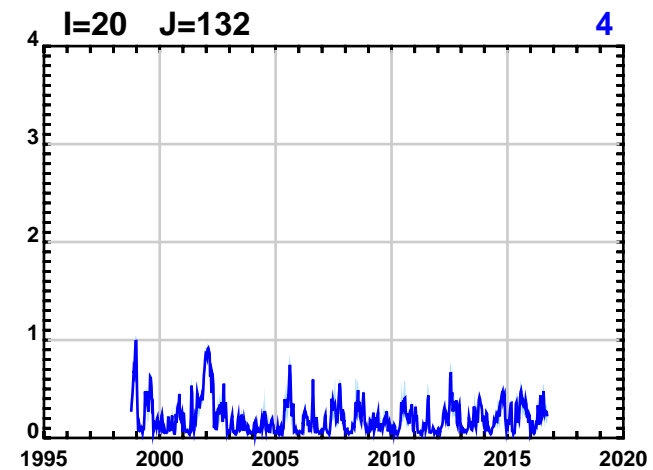
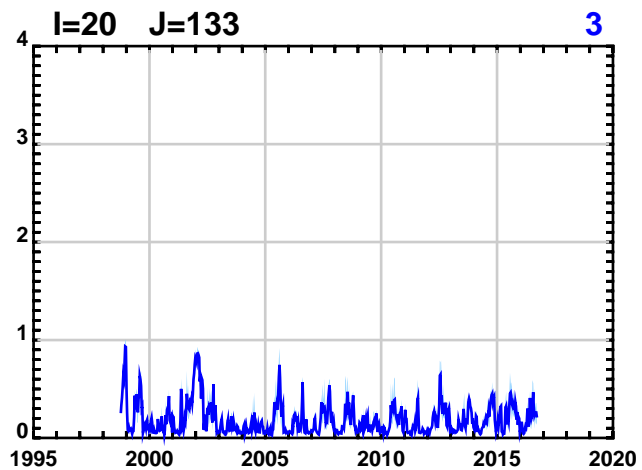
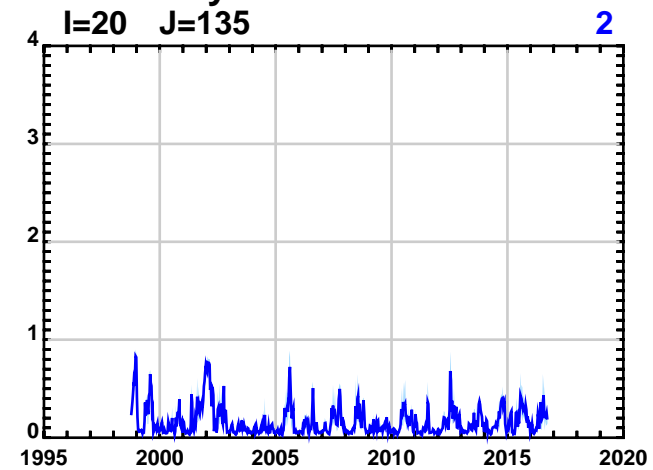
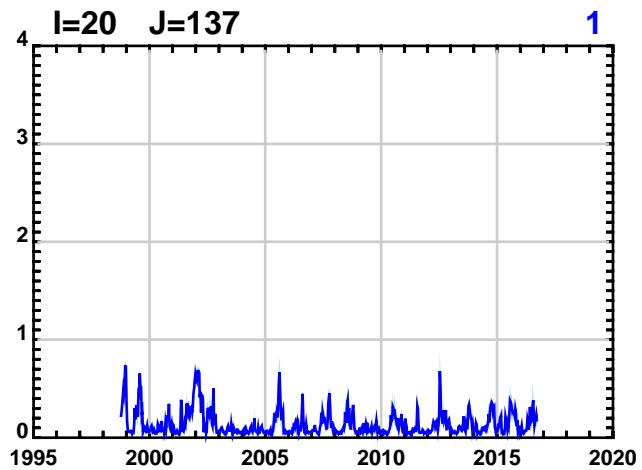
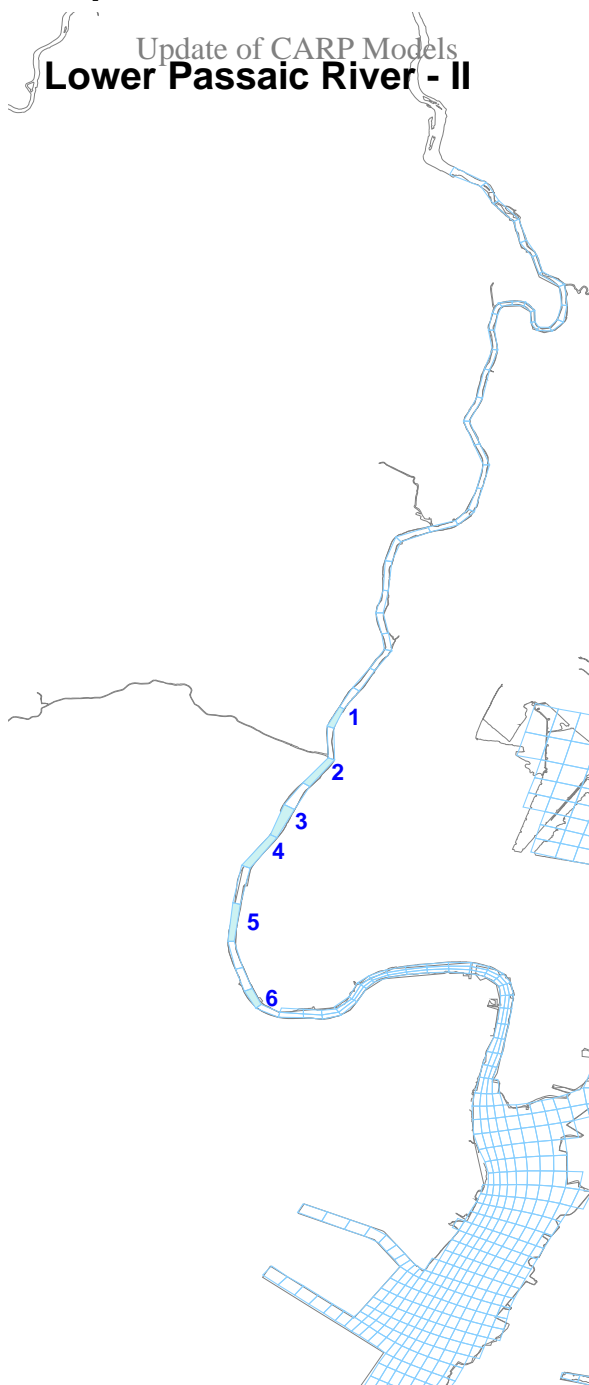
Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models Lower Passaic River - I



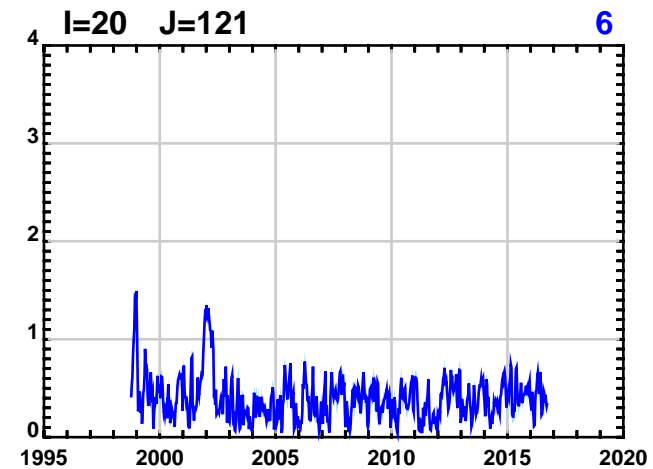
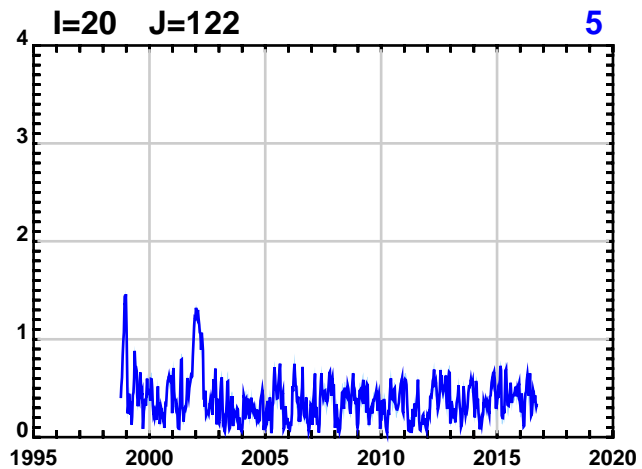
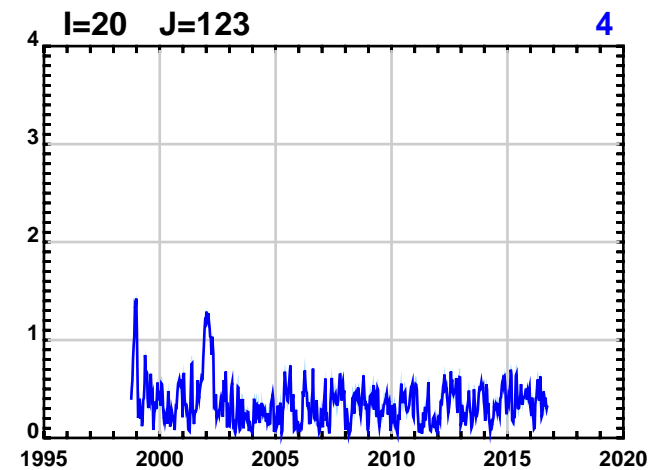
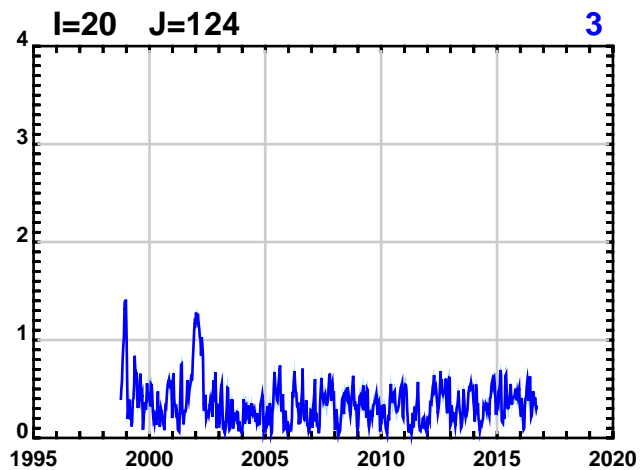
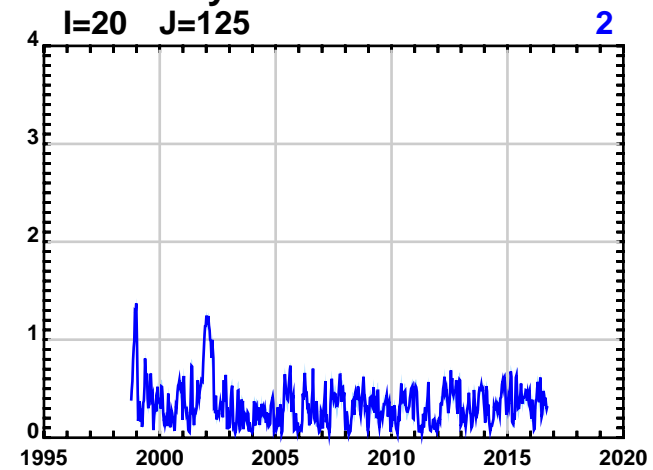
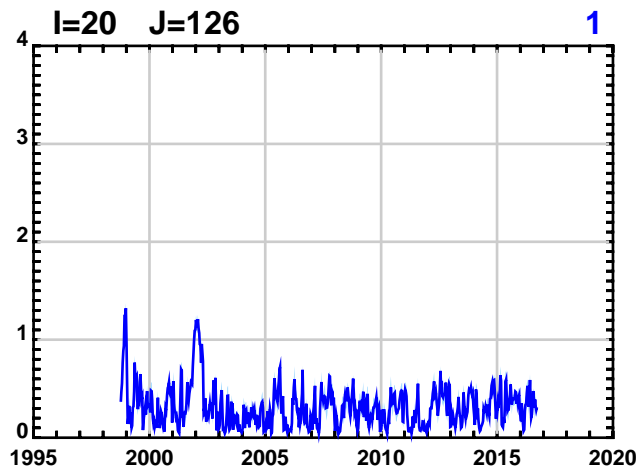
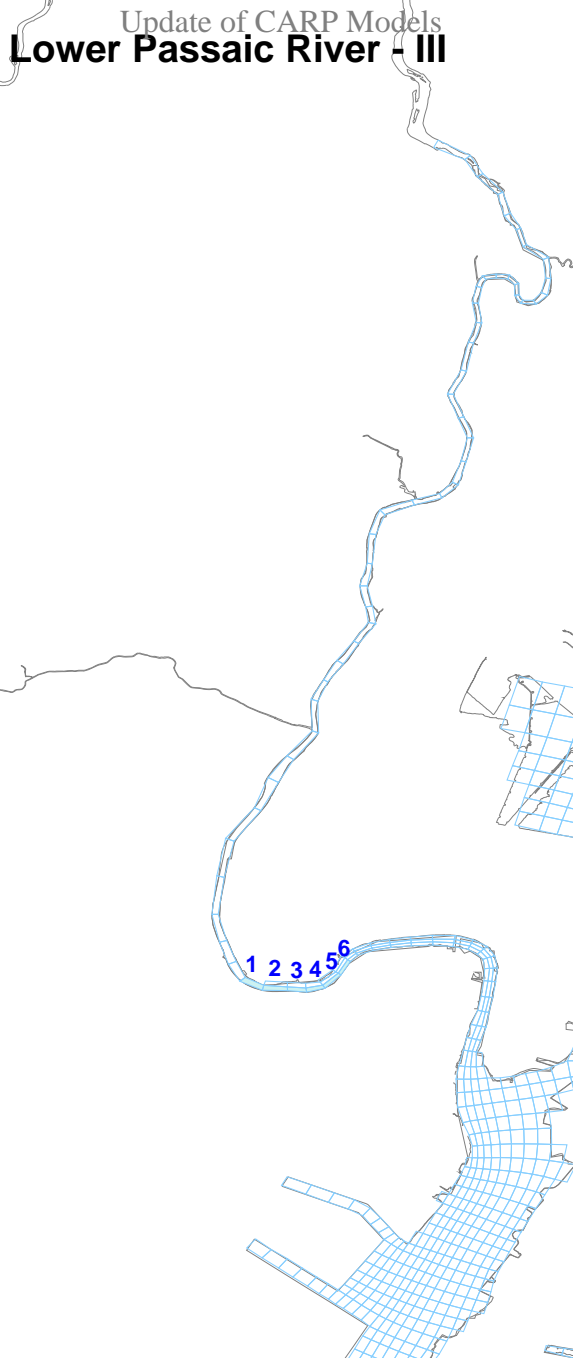
Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 35 of 76

Water Column Data Comparison With Model All Water Column Layers



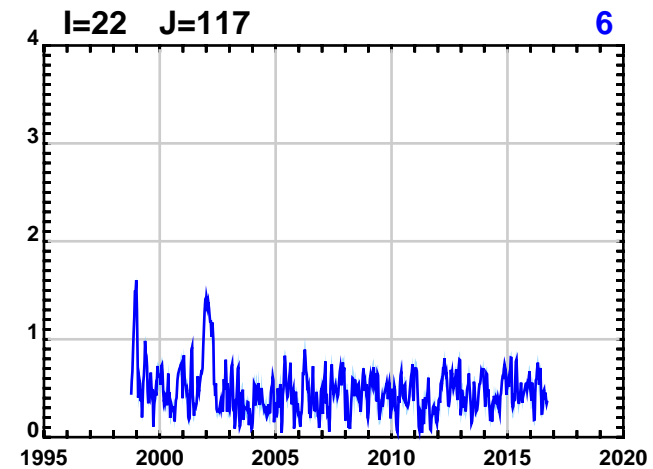
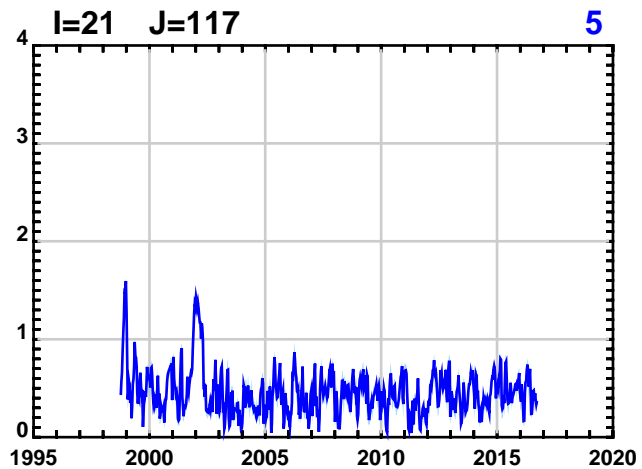
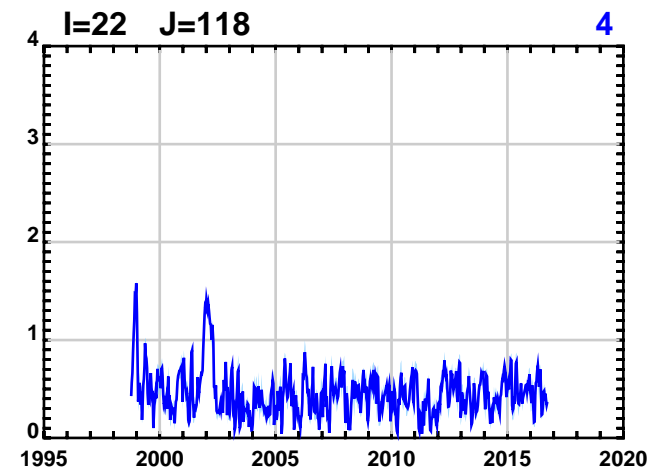
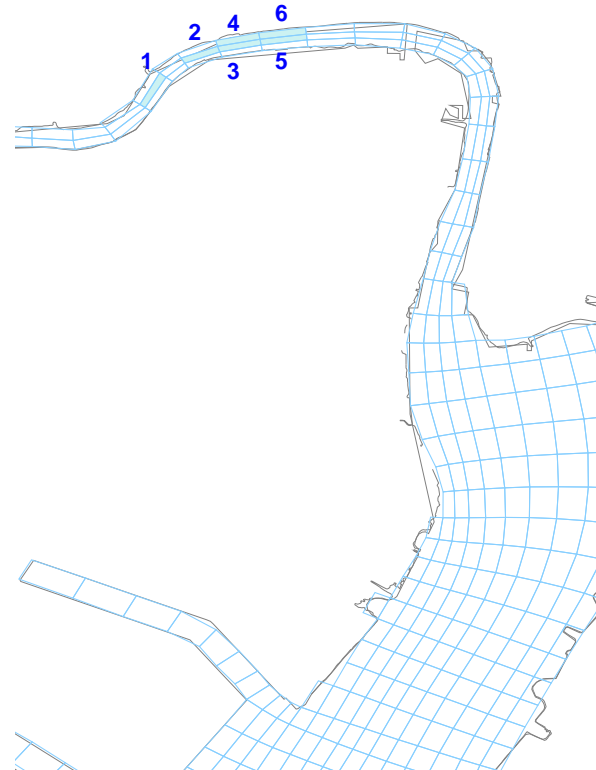
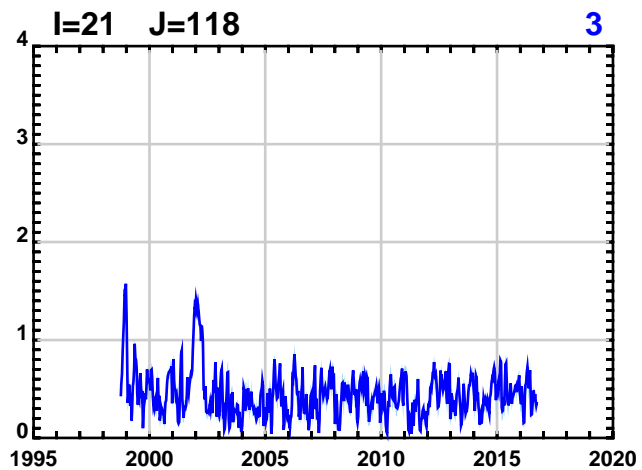
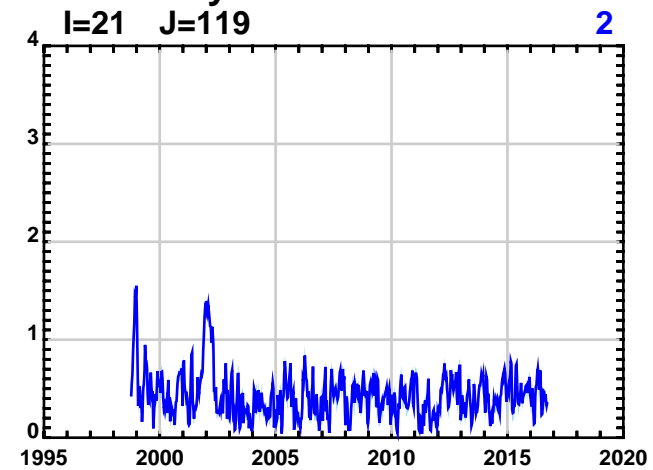
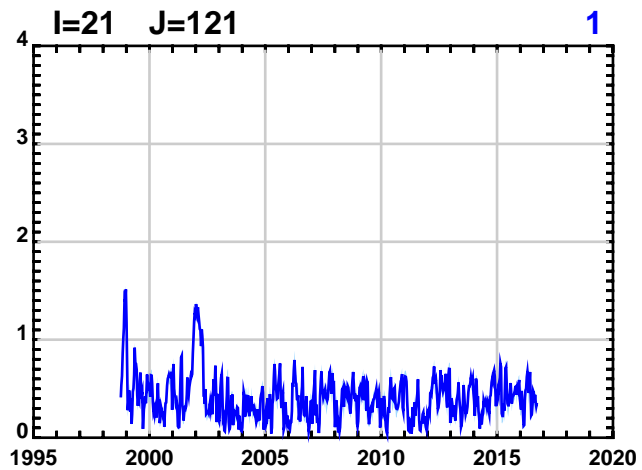
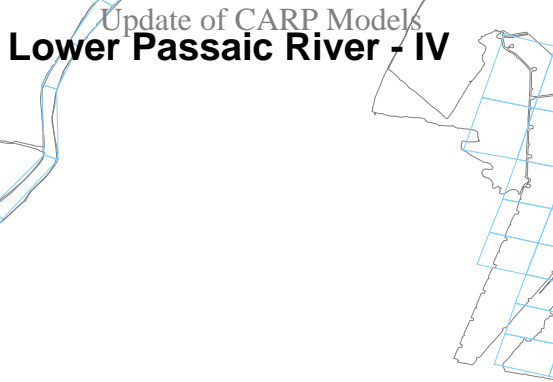
NH₄, mg/L

Water Column Data Comparison With Model All Water Column Layers



NH4, mg/L

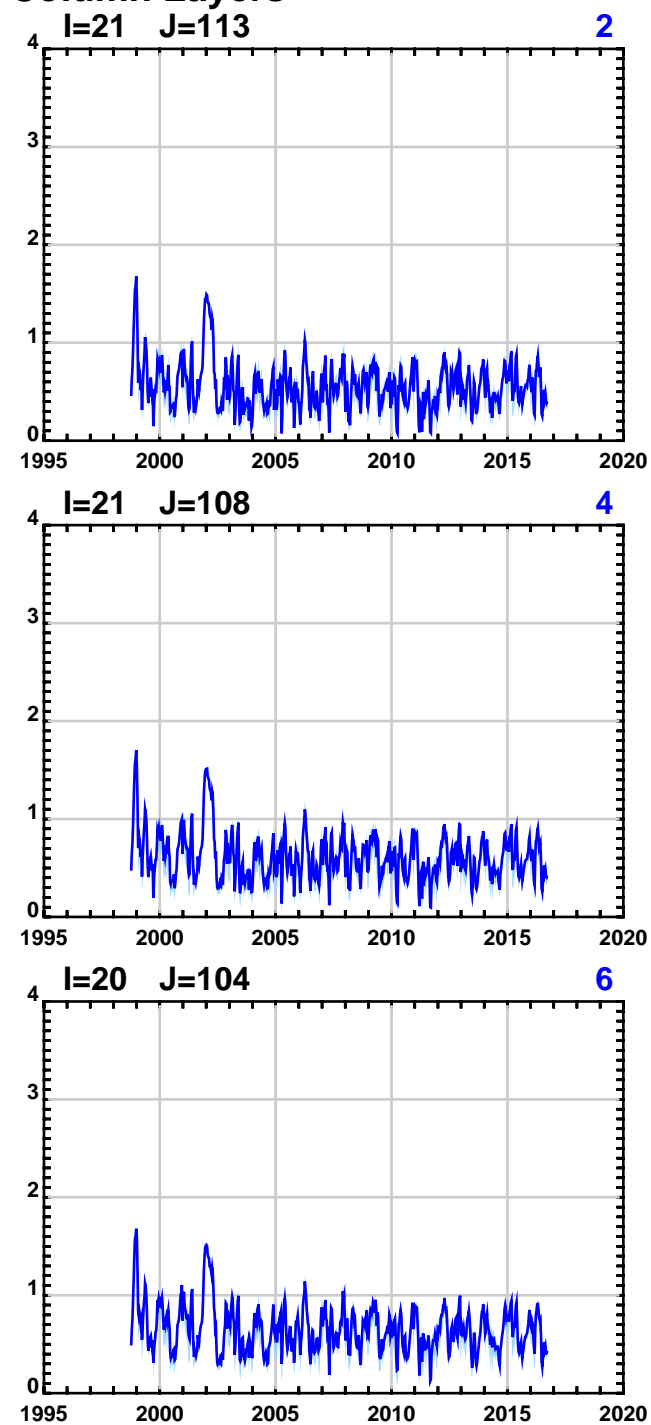
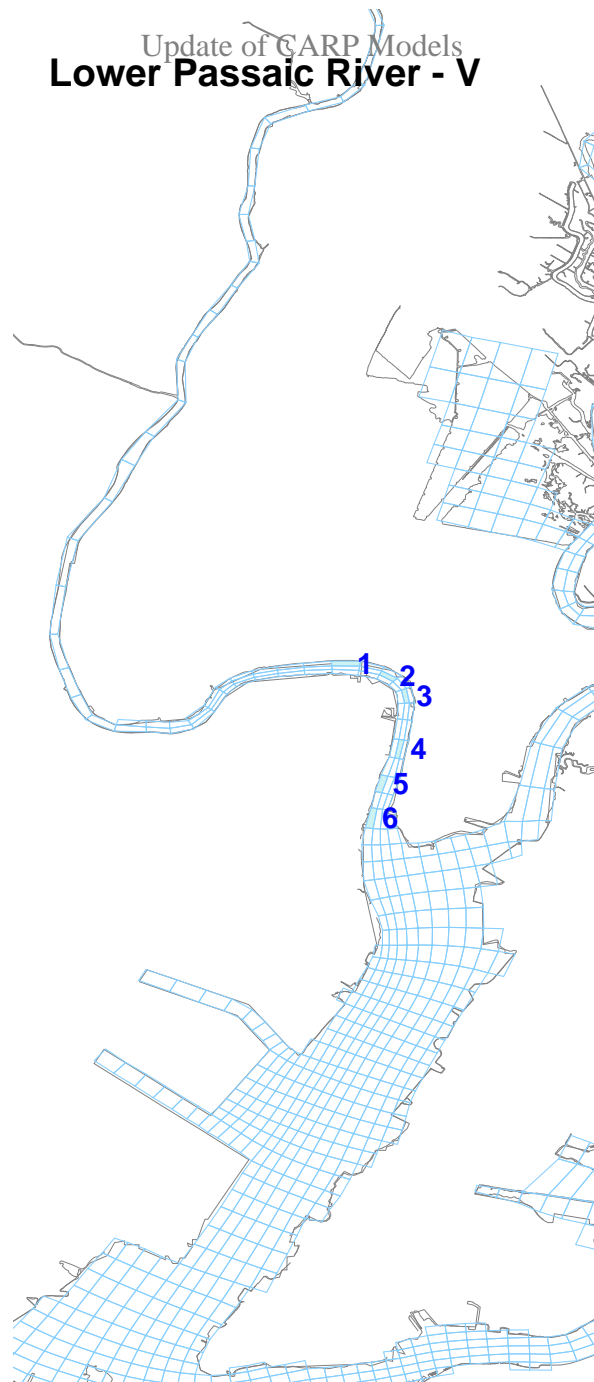
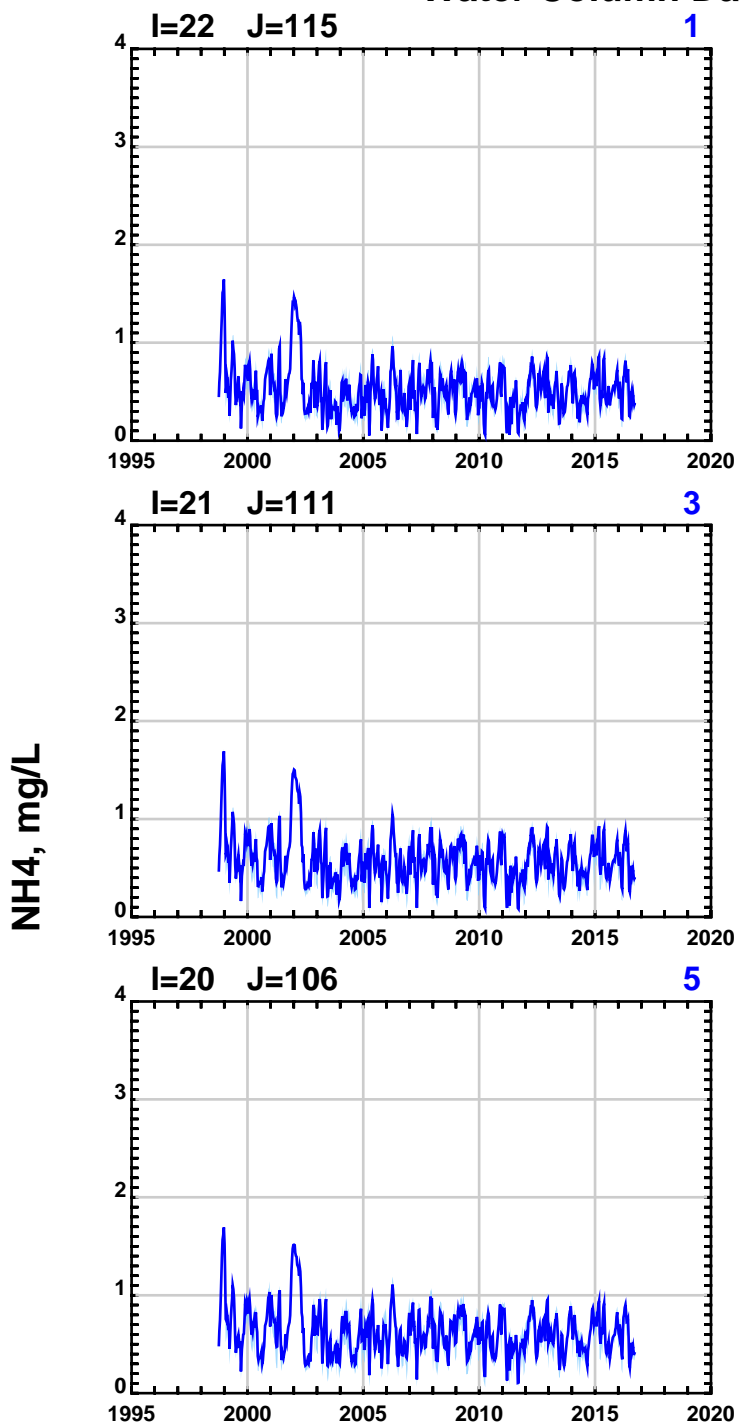
Water Column Data Comparison With Model All Water Column Layers



NH4, mg/L

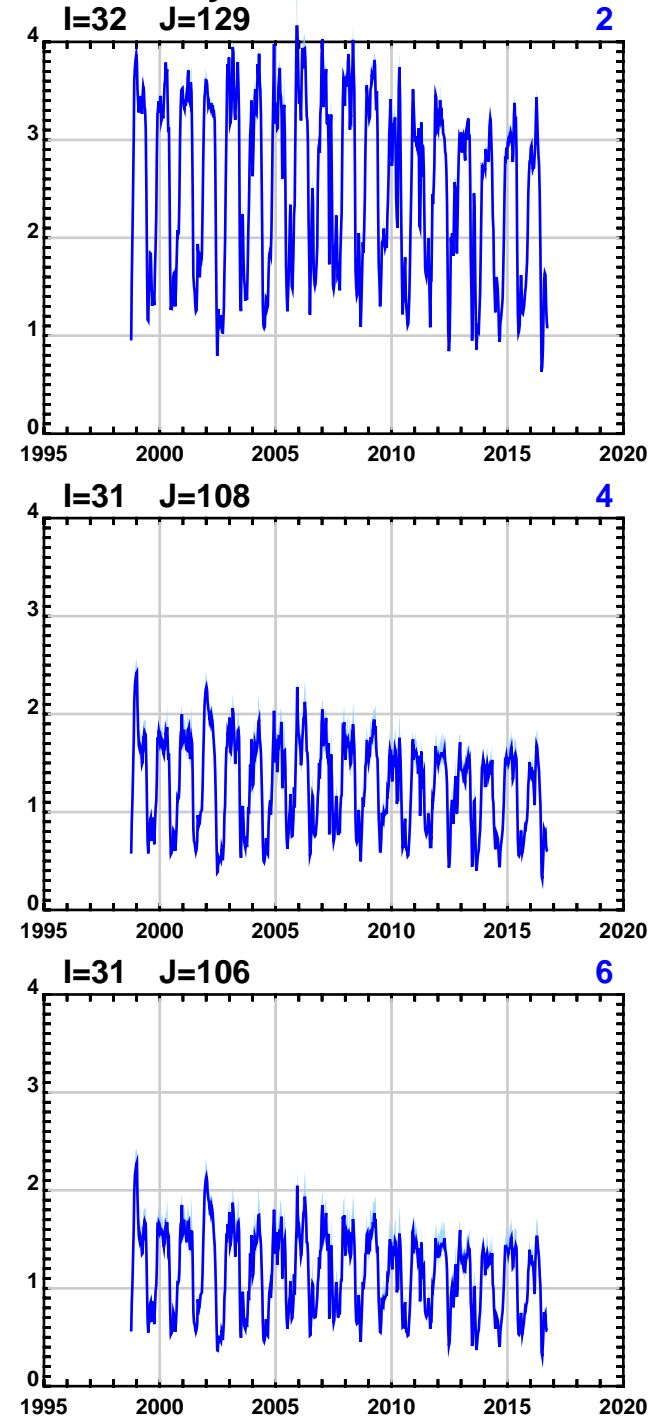
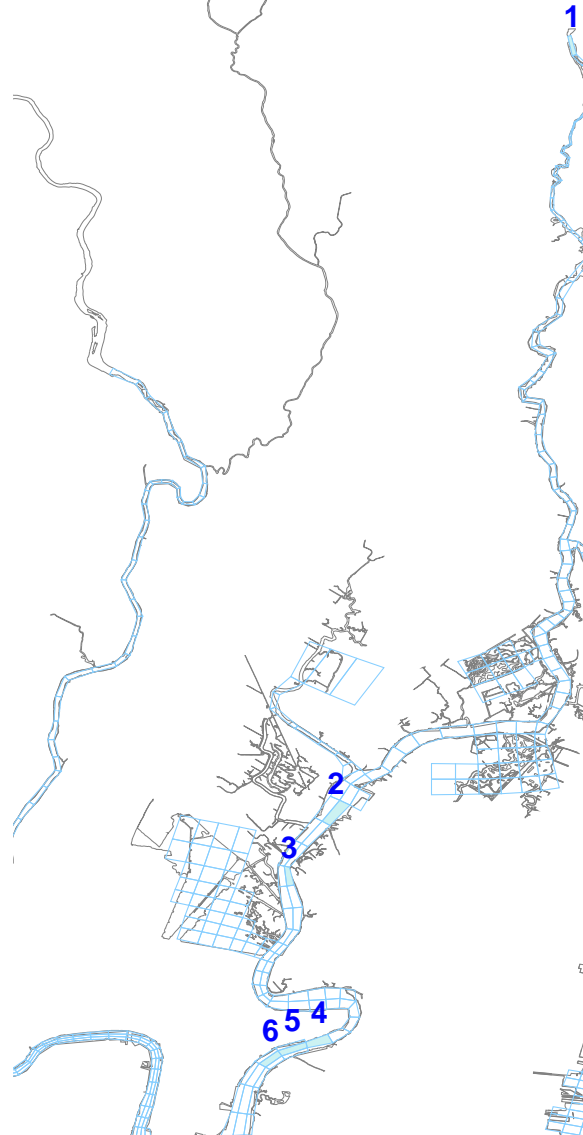
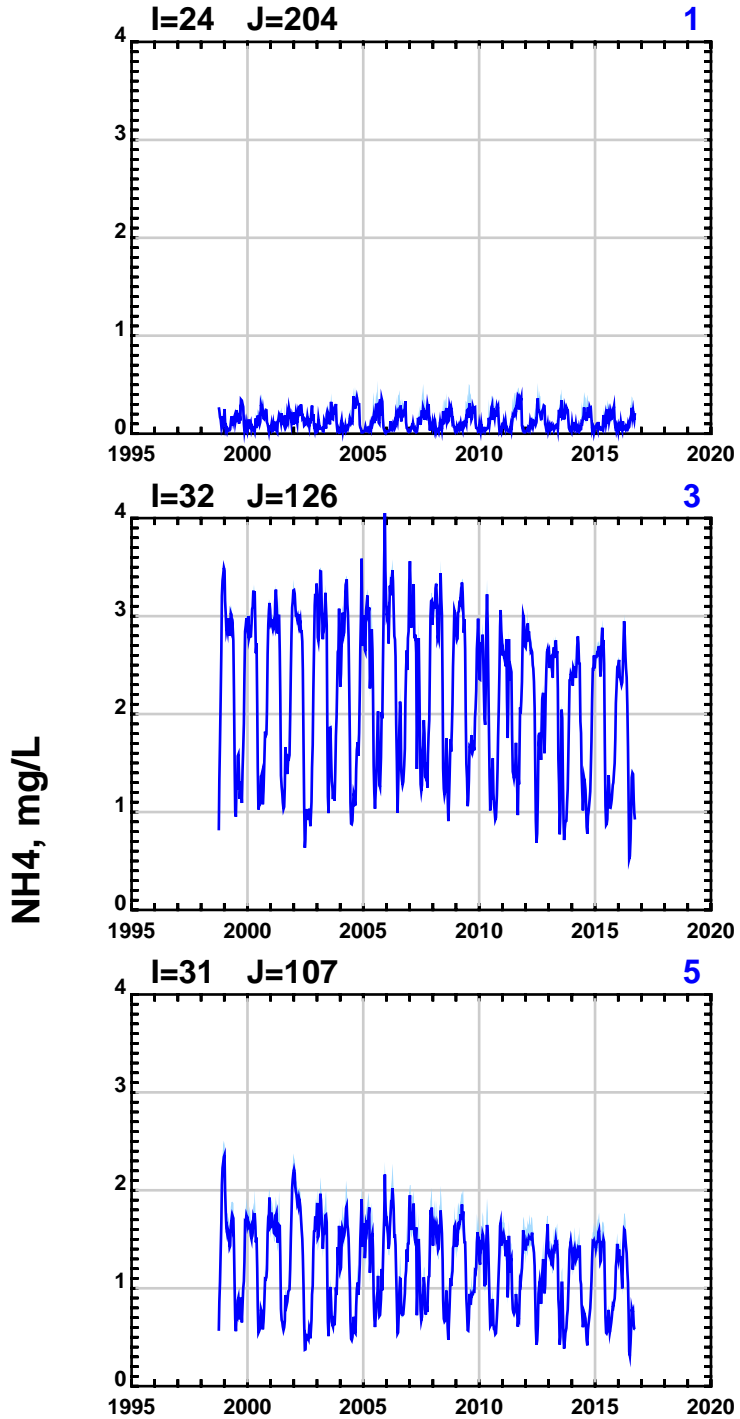
Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models Lower Passaic River - V

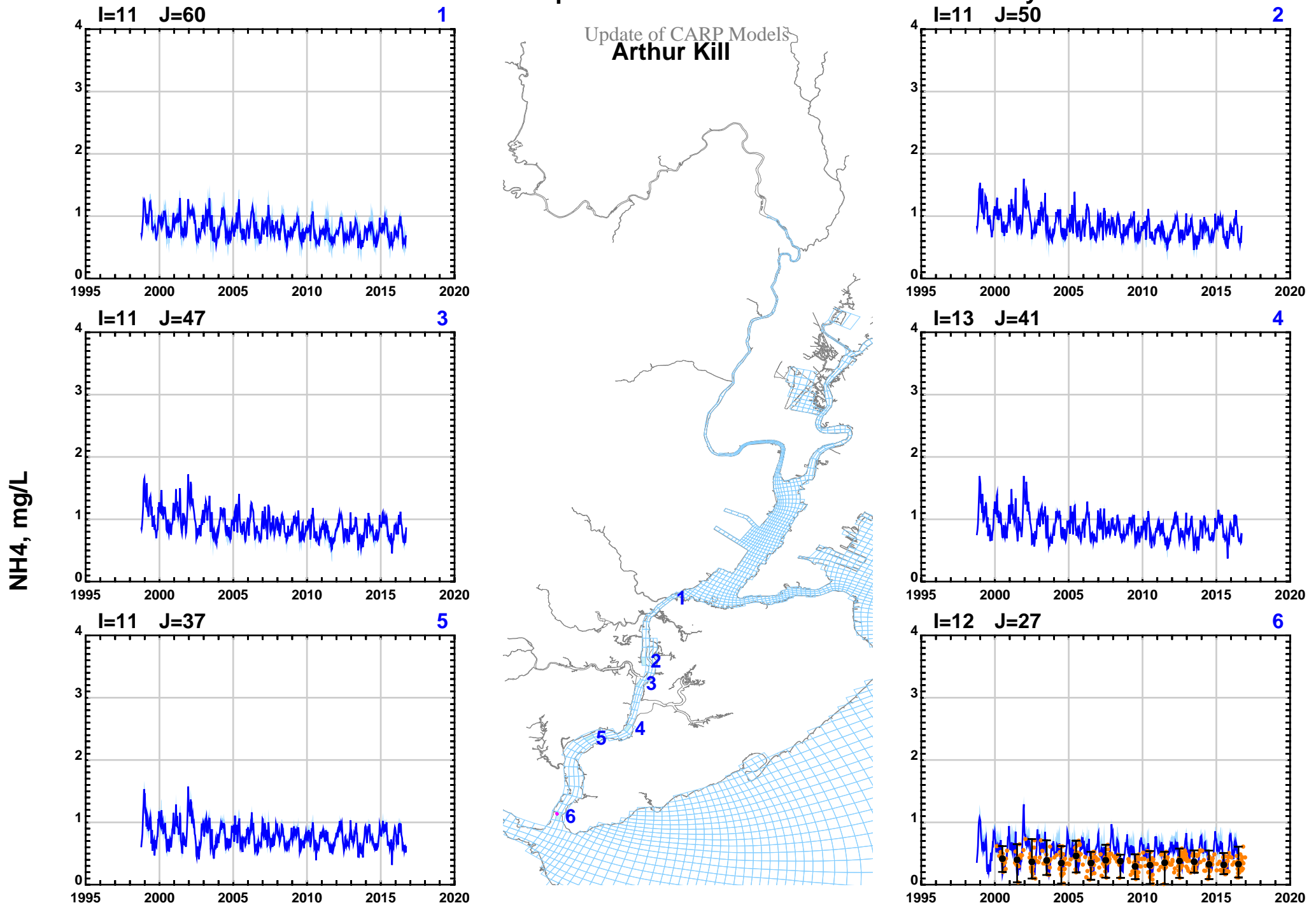


Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models
Hackensack River



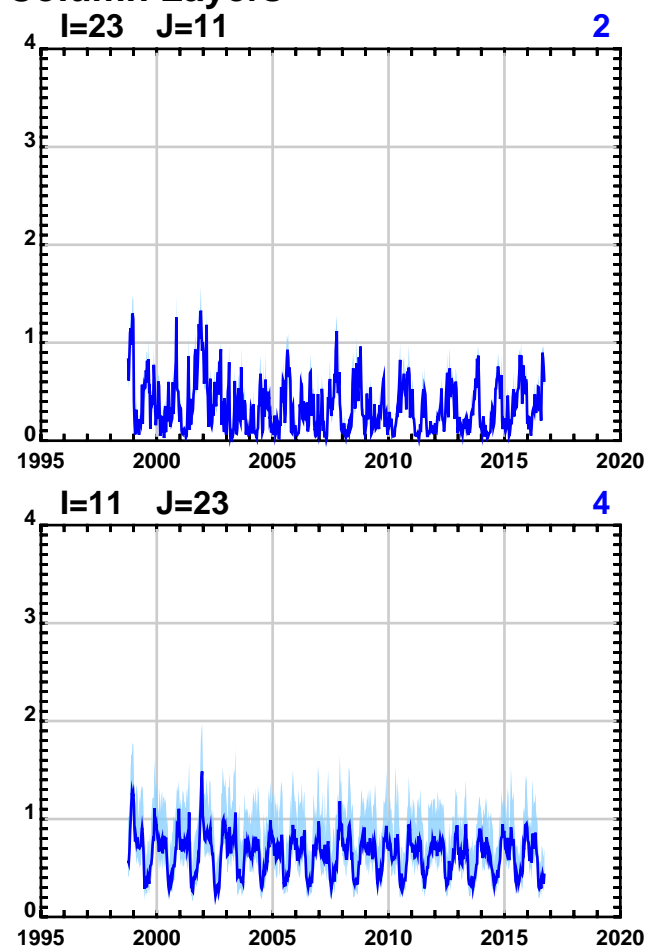
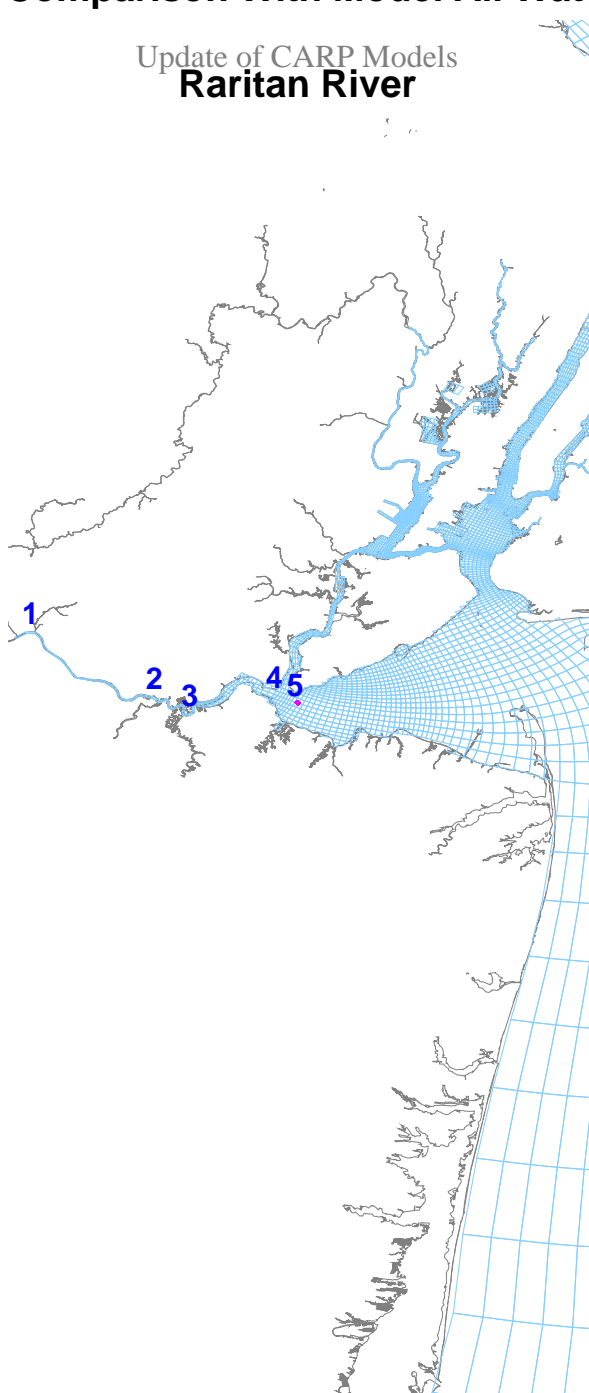
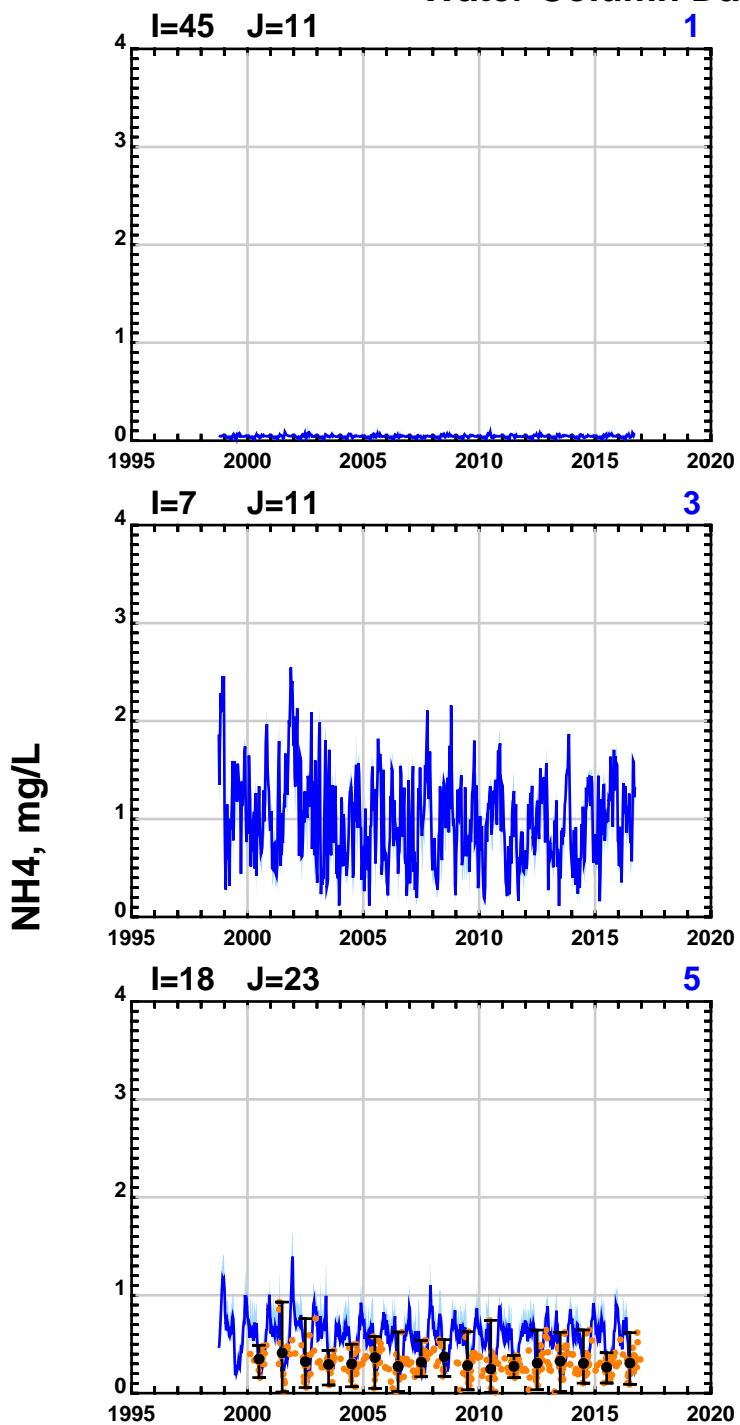
Water Column Data Comparison With Model All Water Column Layers



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 41 of 76

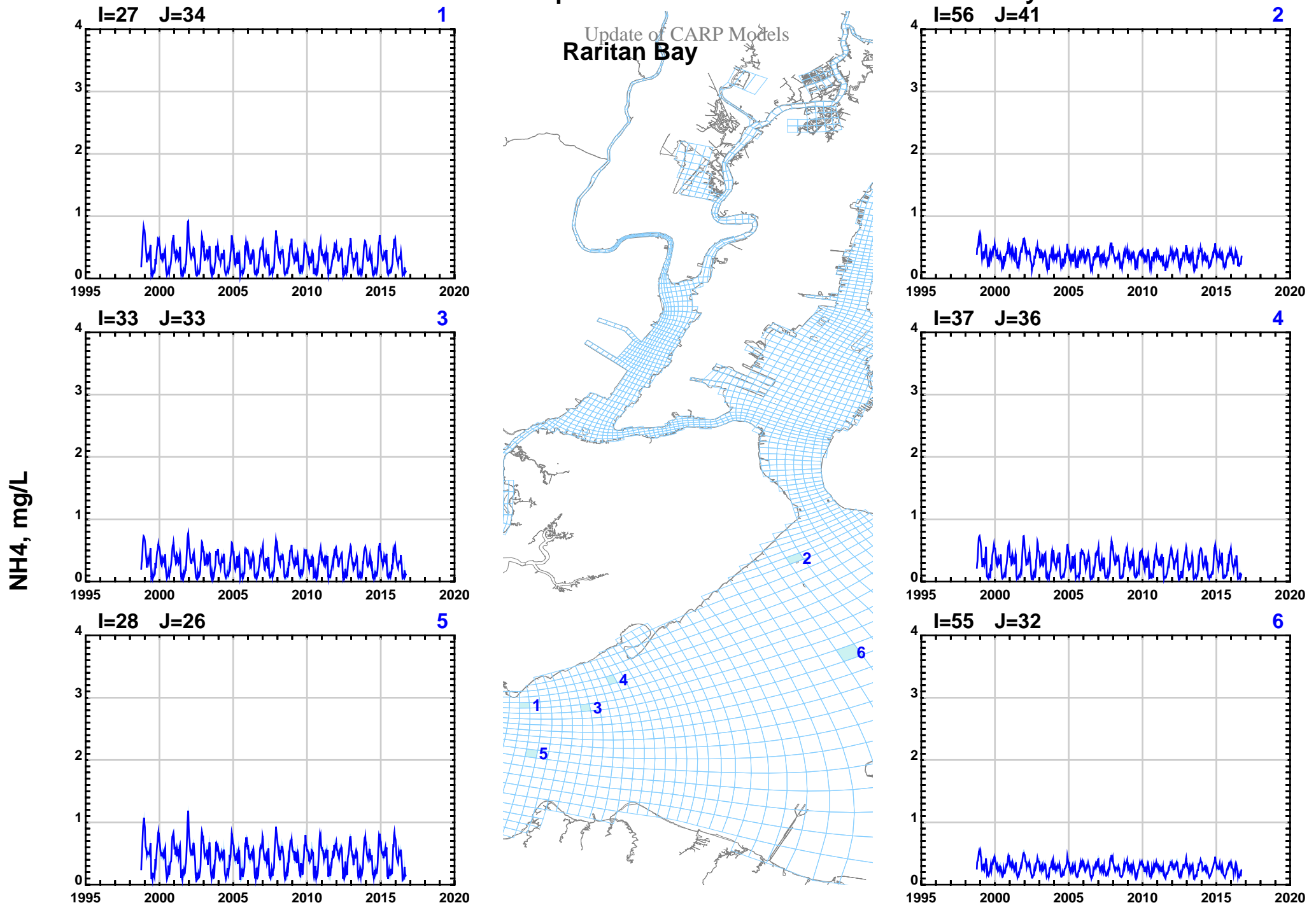
Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models
Raritan River



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 42 of 76

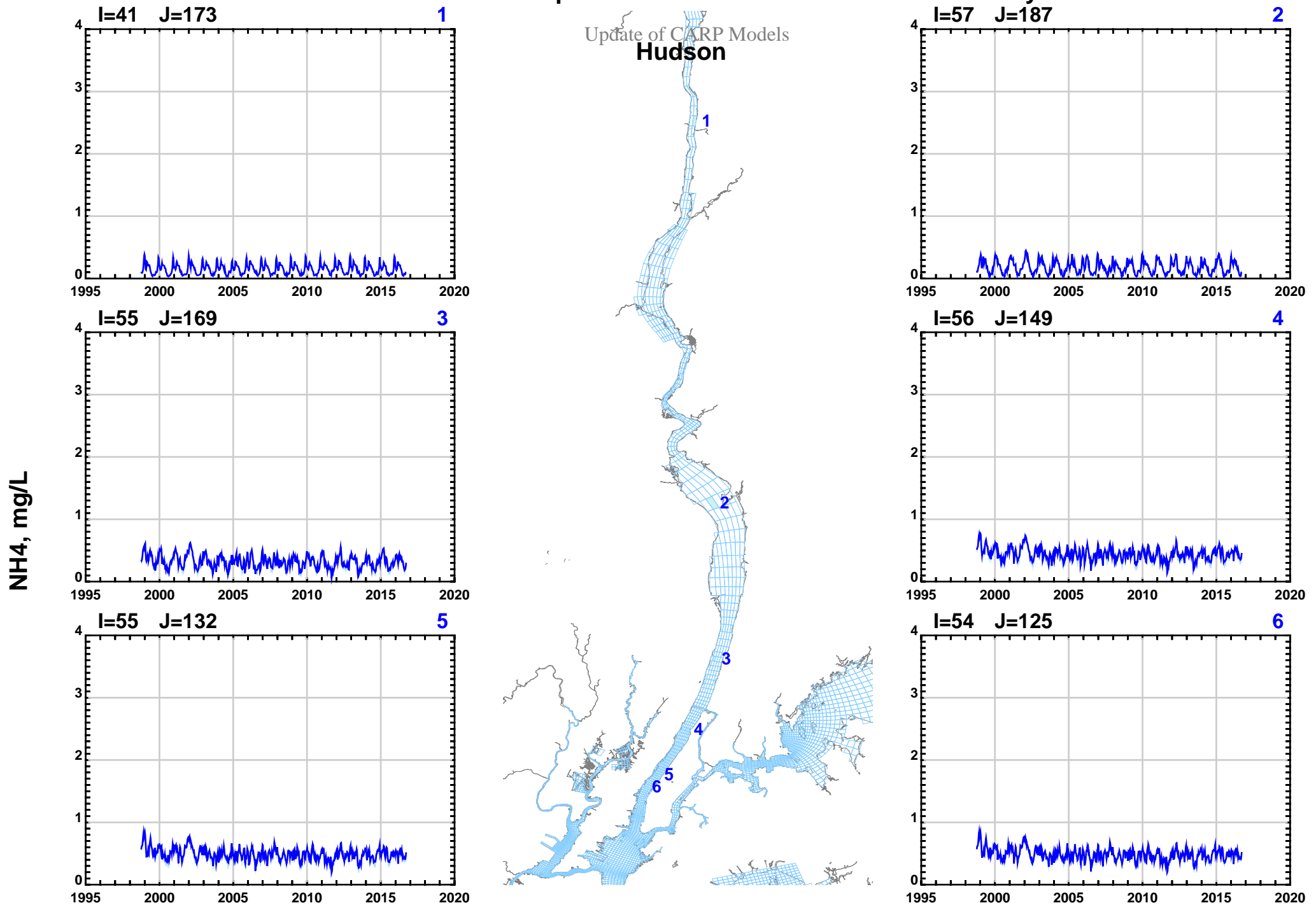
Water Column Data Comparison With Model All Water Column Layers



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 43 of 76

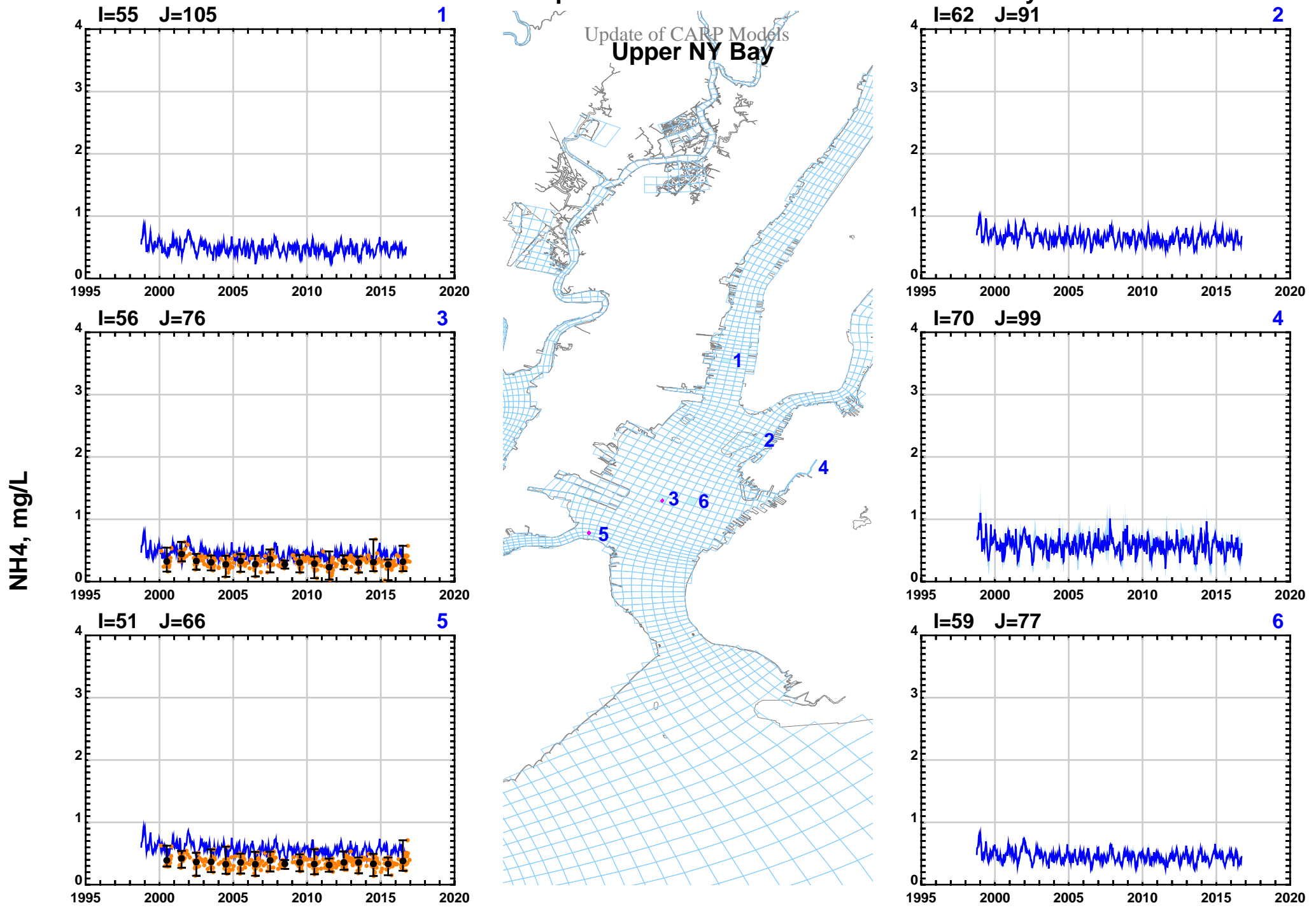
Water Column Data Comparison With Model All Water Column Layers

Update of C/ARP Models
Hudson



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 44 of 76

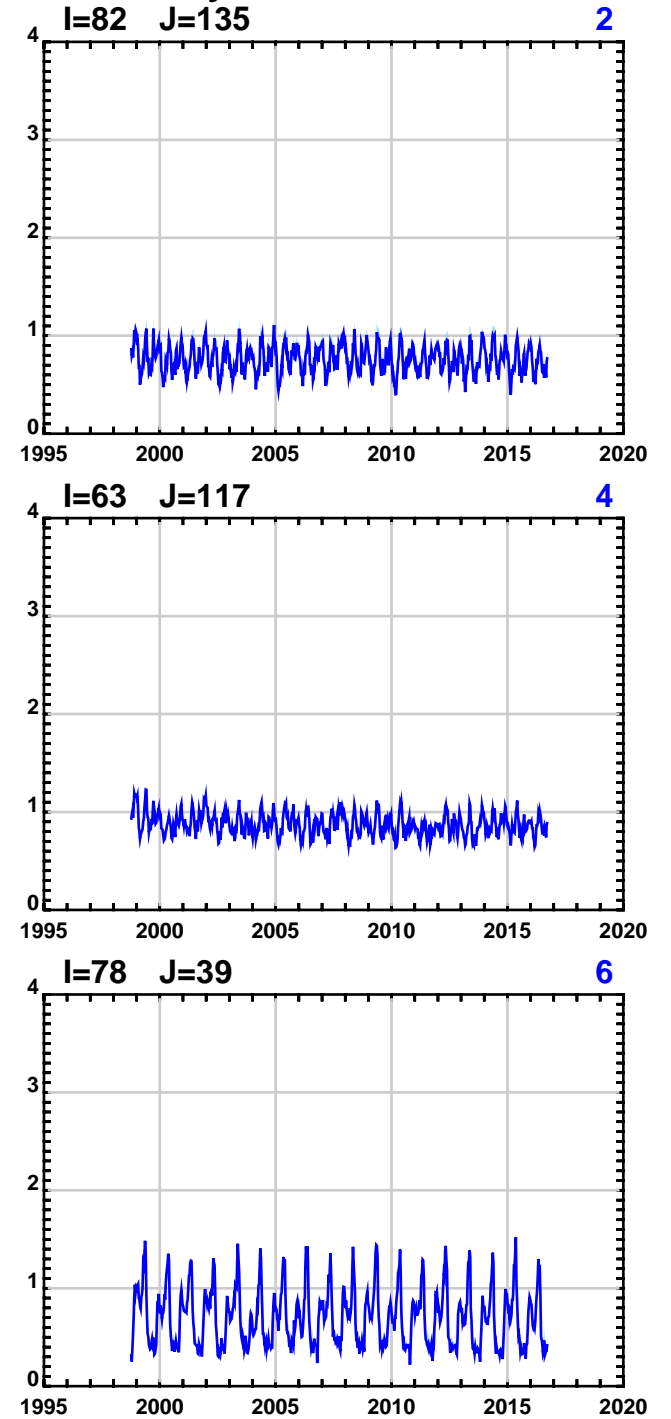
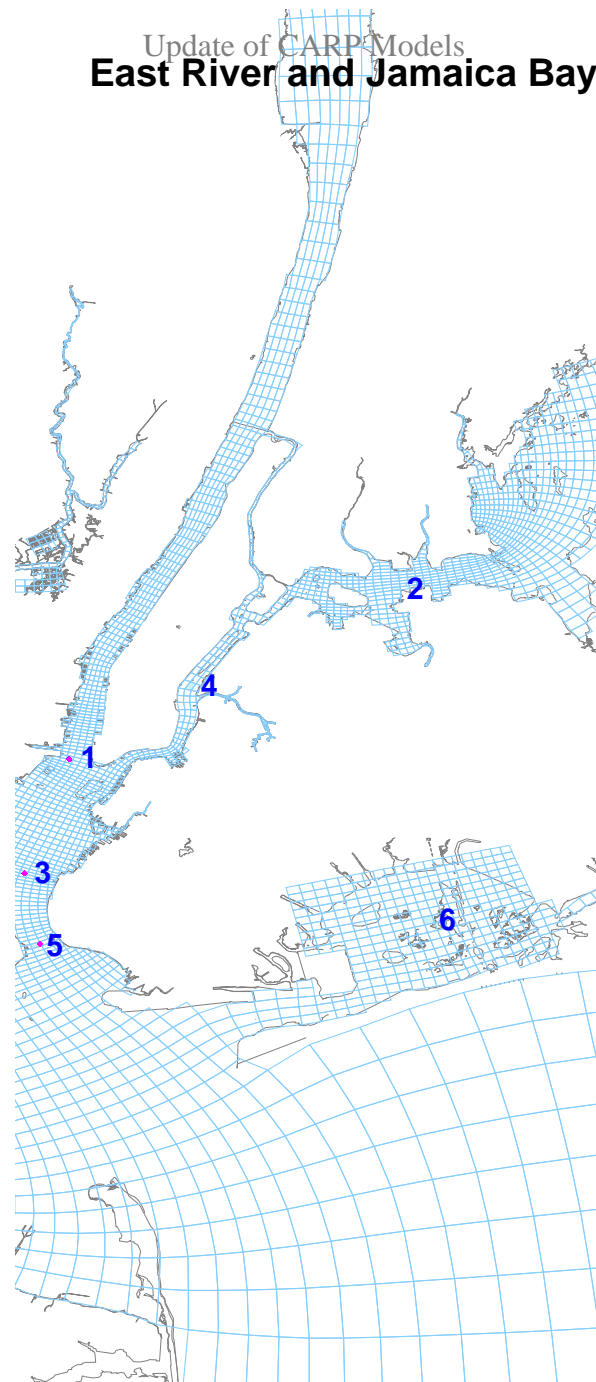
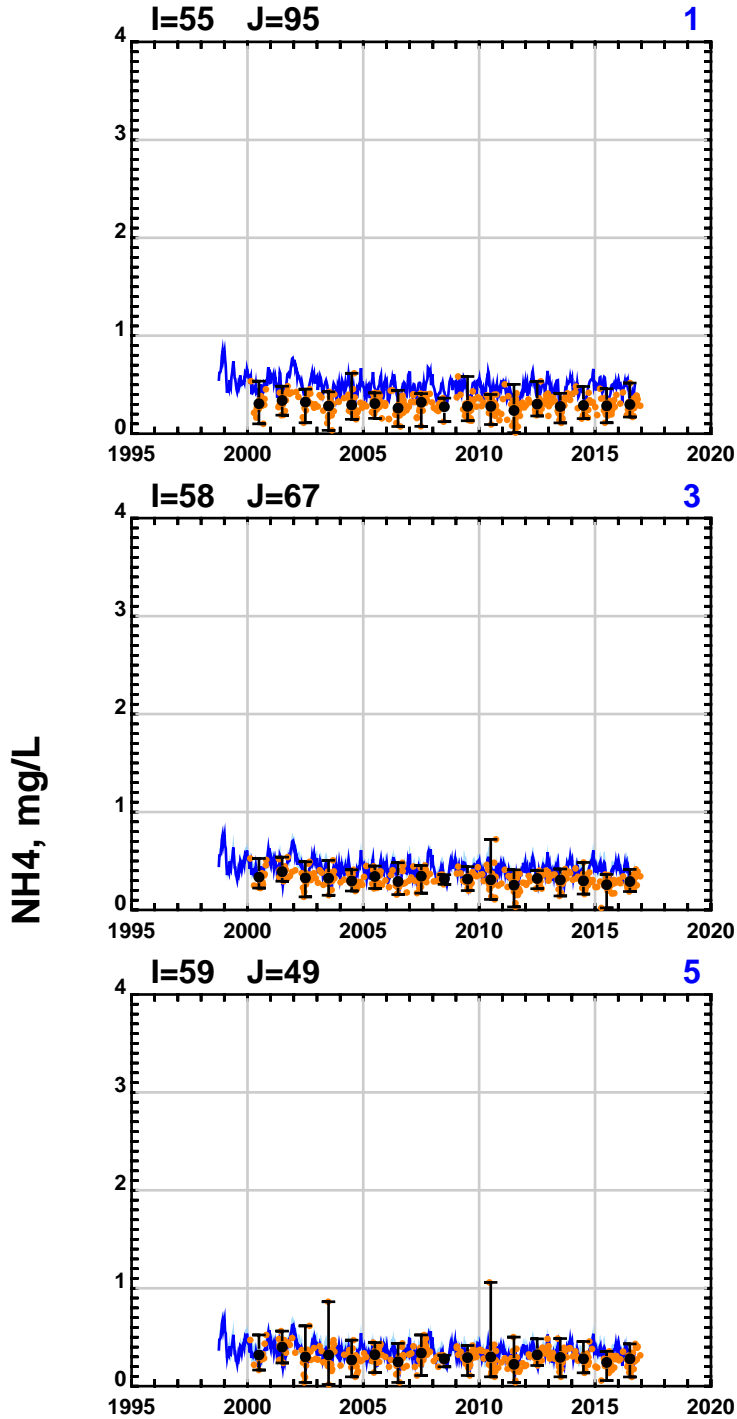
Water Column Data Comparison With Model All Water Column Layers



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 45 of 76

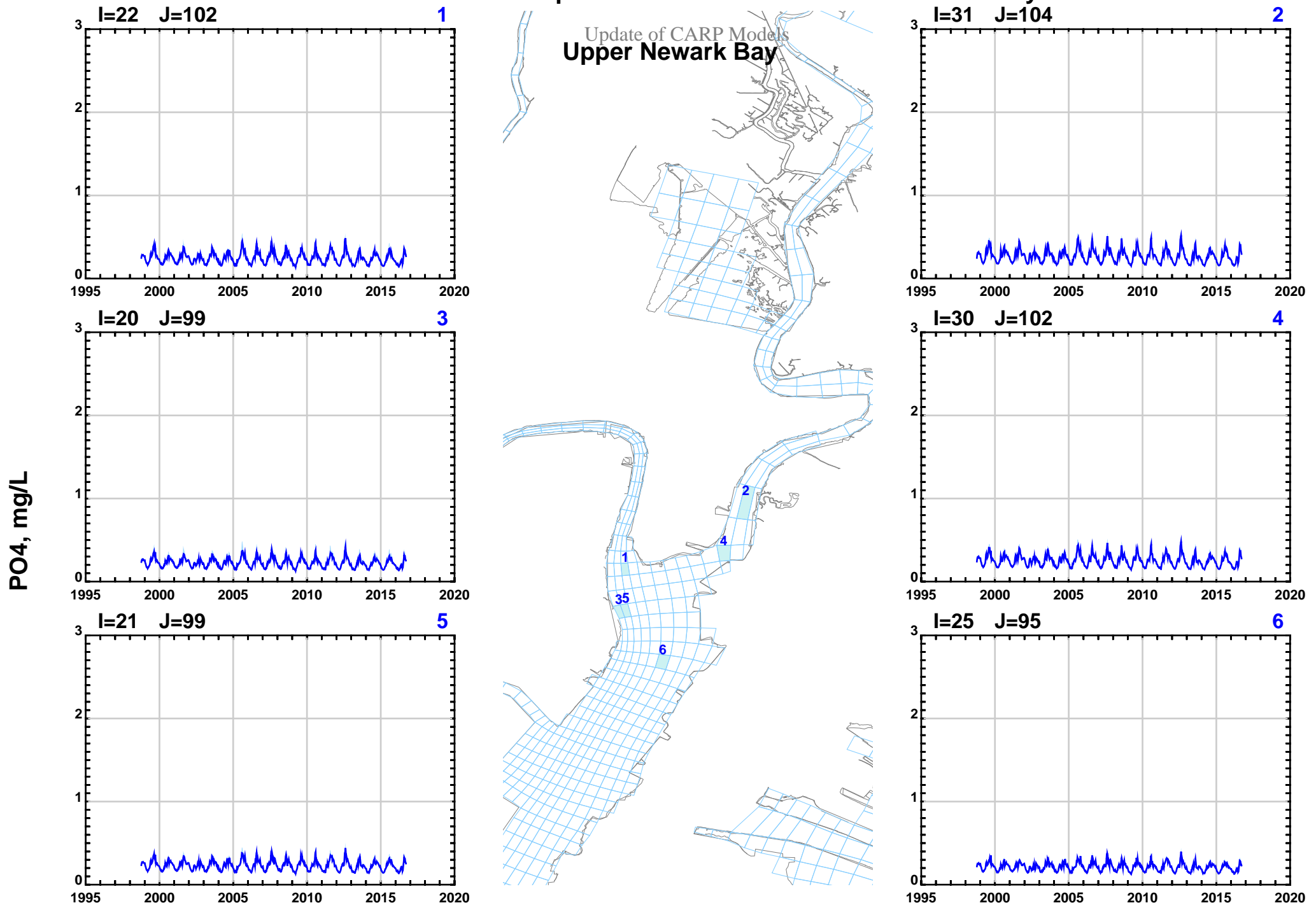
Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models East River and Jamaica Bay



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 46 of 76

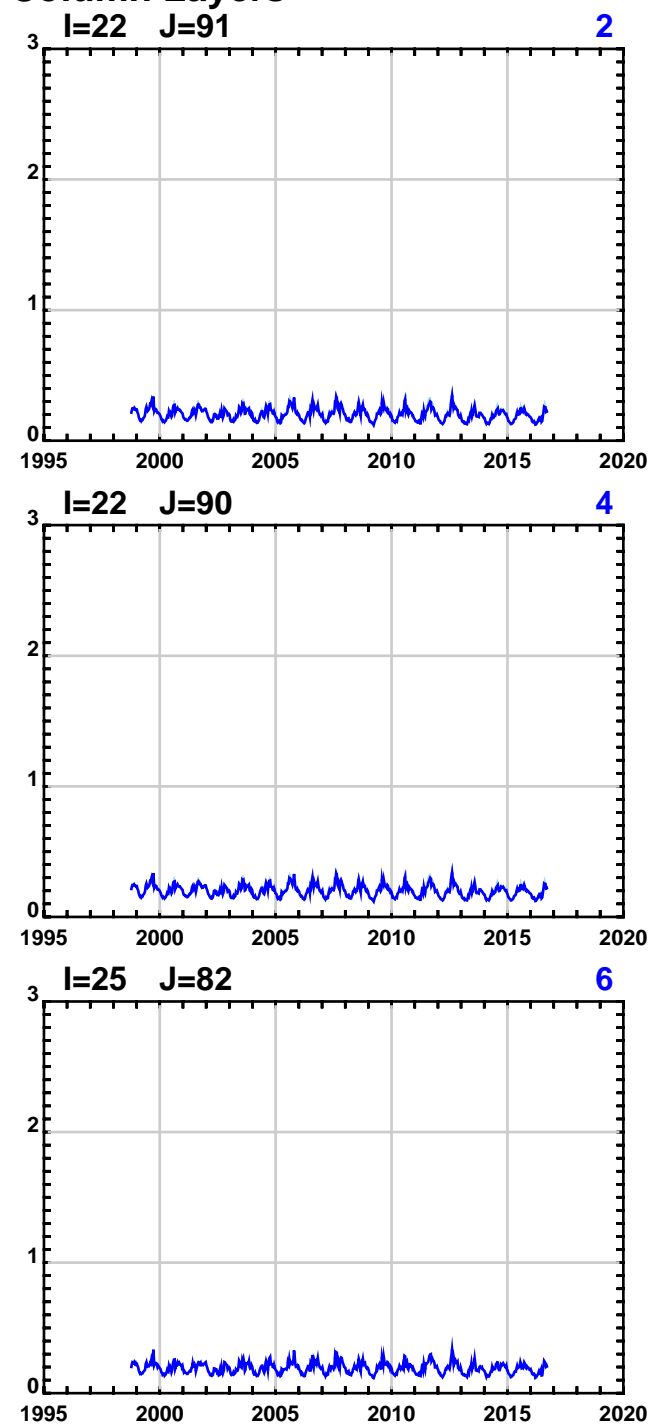
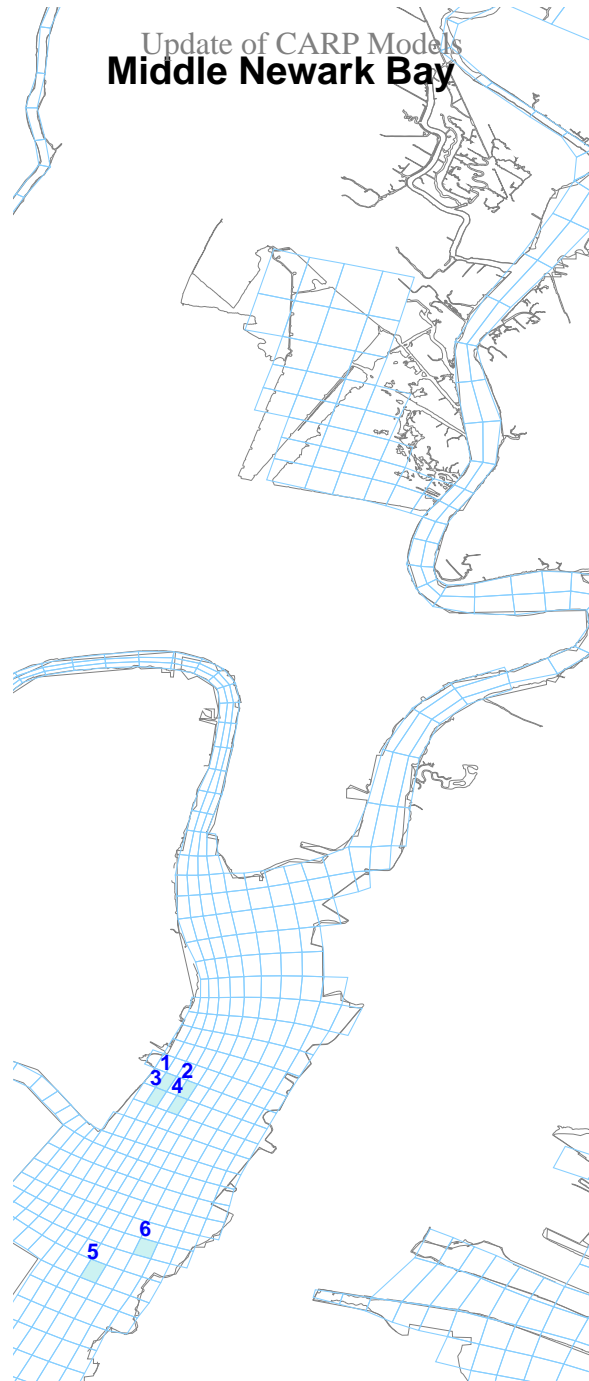
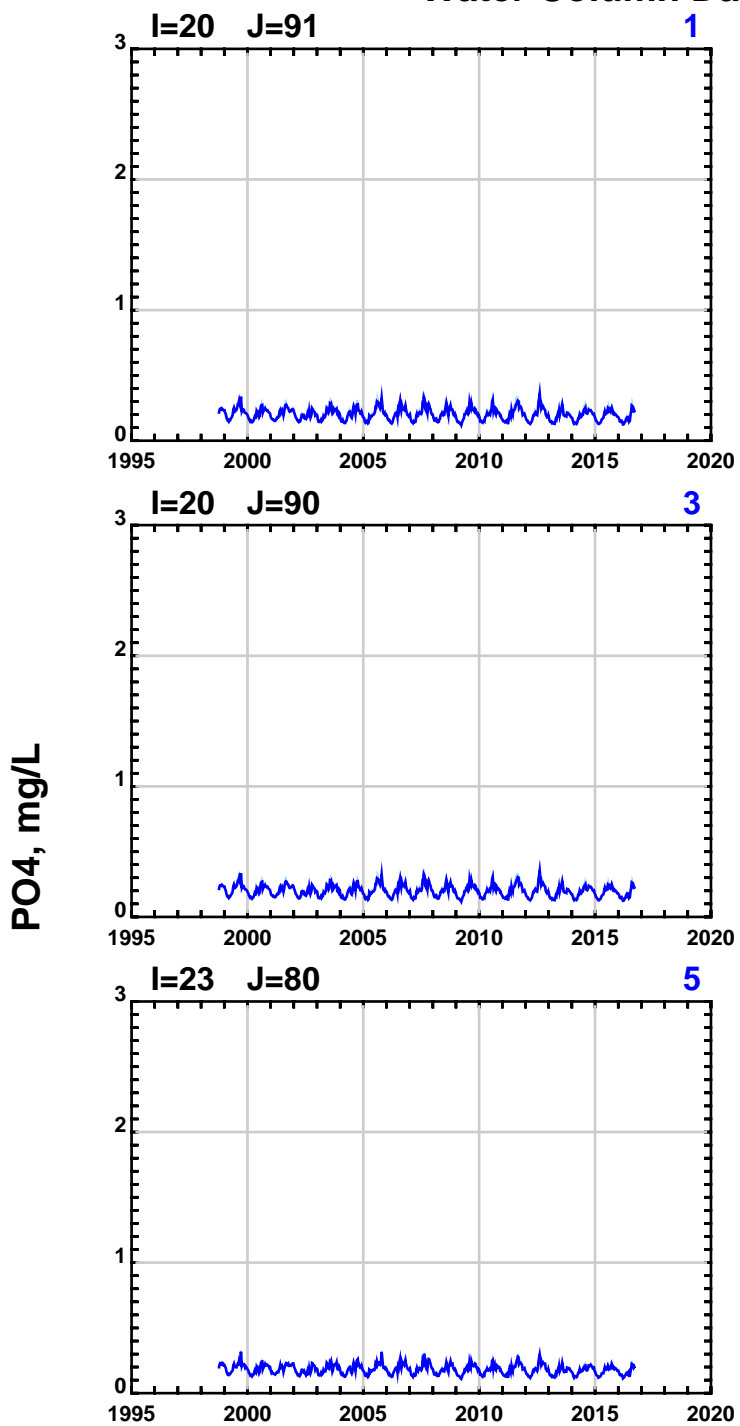
Water Column Data Comparison With Model All Water Column Layers



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 47 of 76

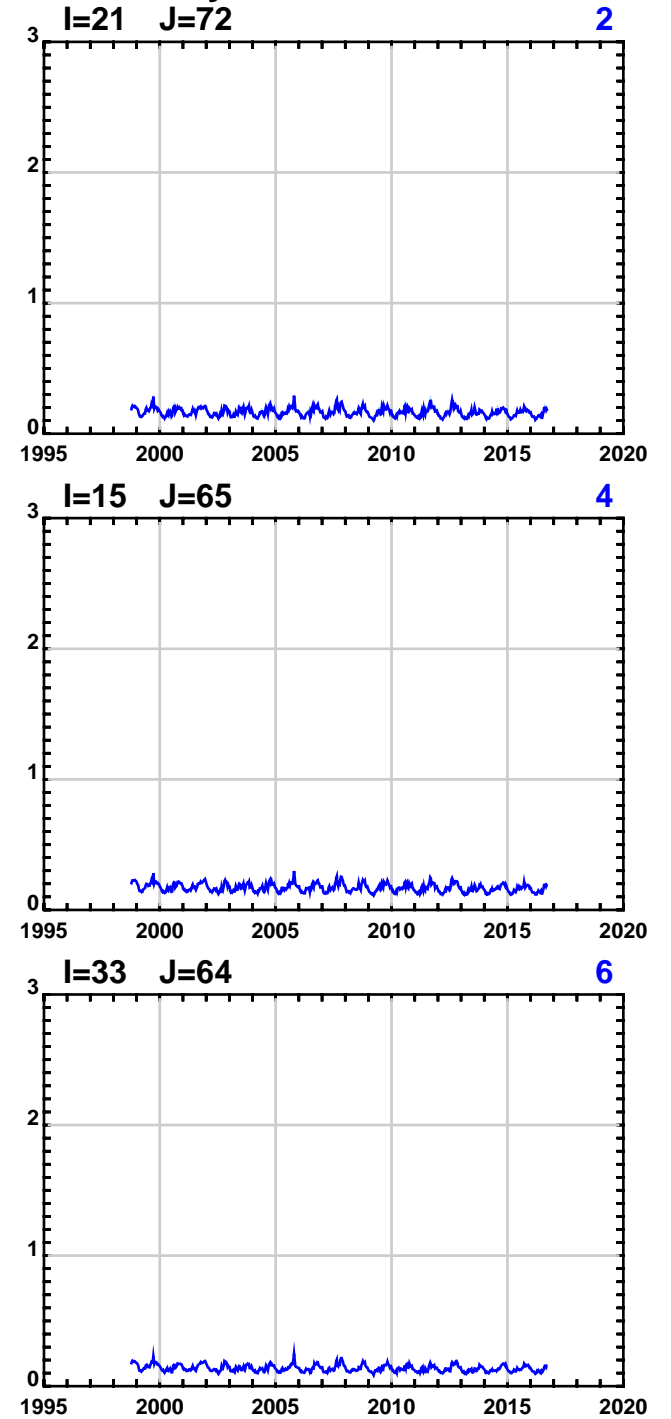
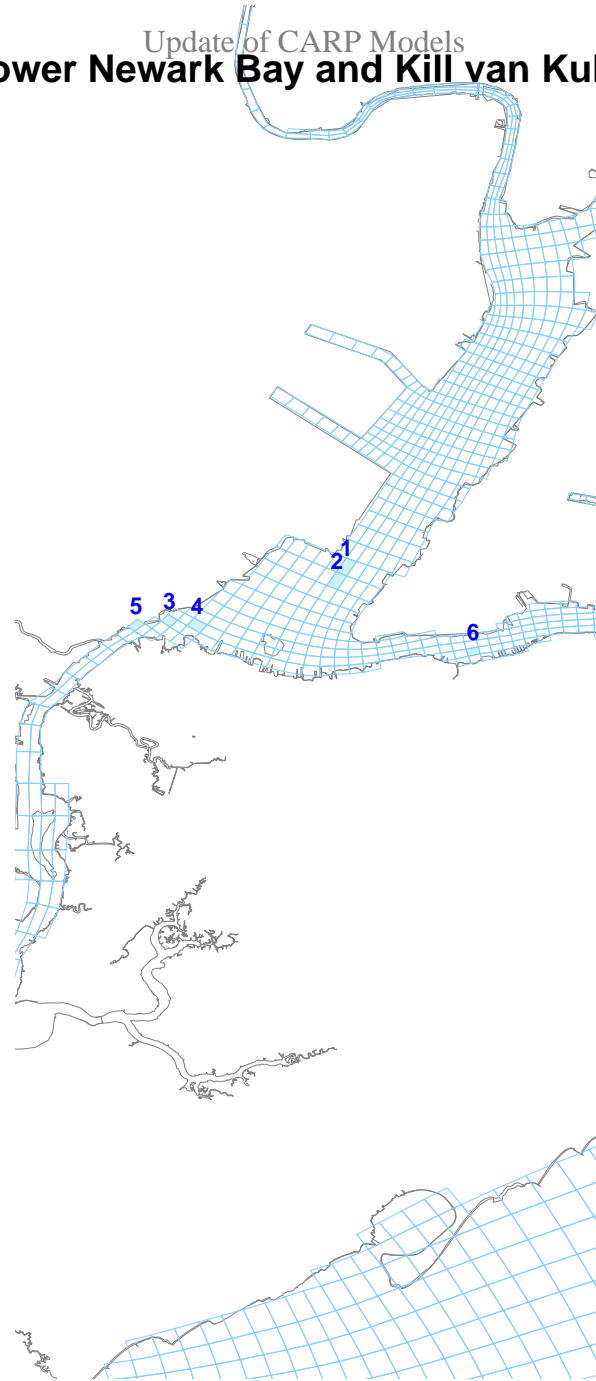
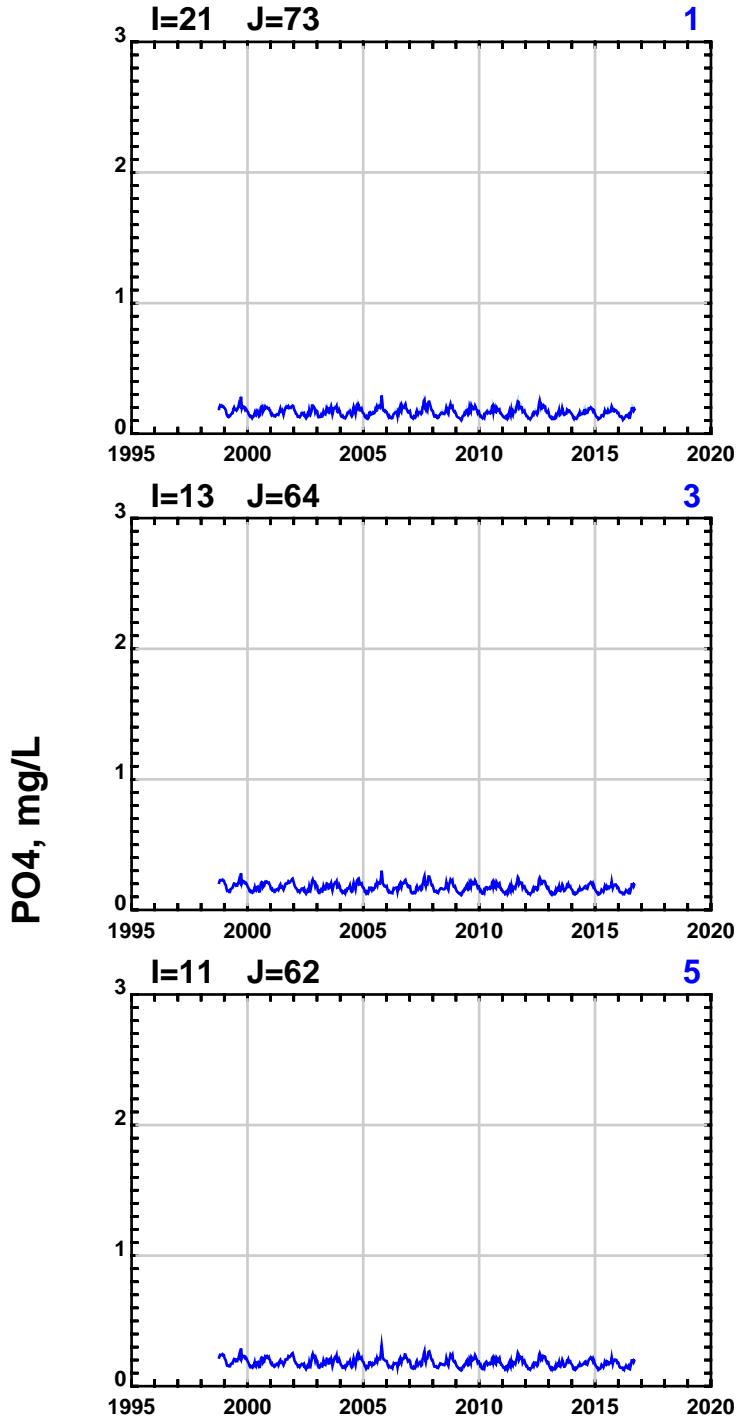
Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models
Middle Newark Bay



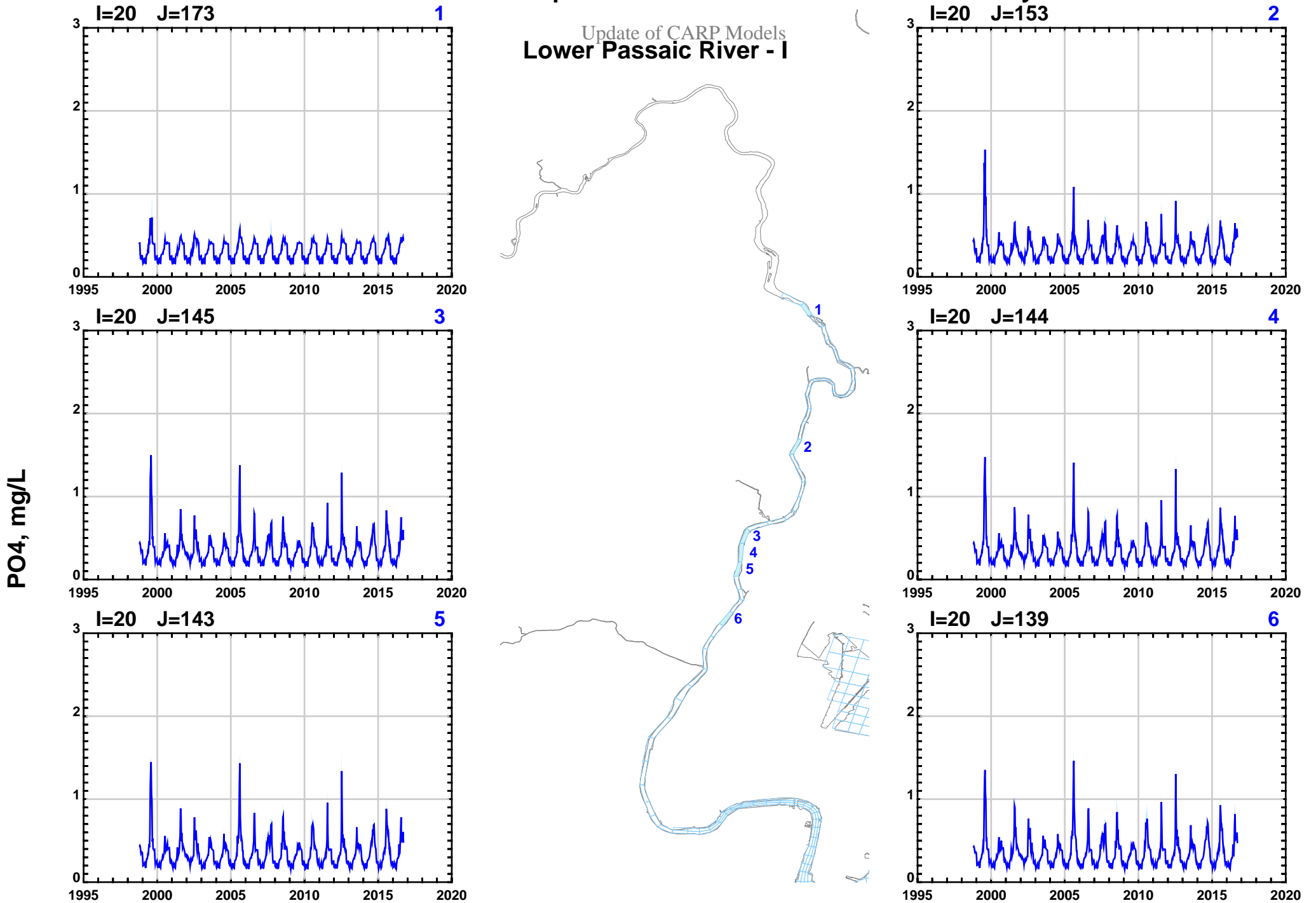
Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models Lower Newark Bay and Kill van Kull



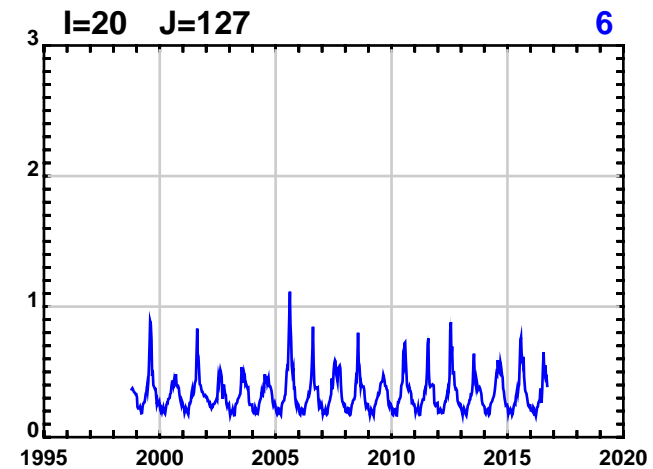
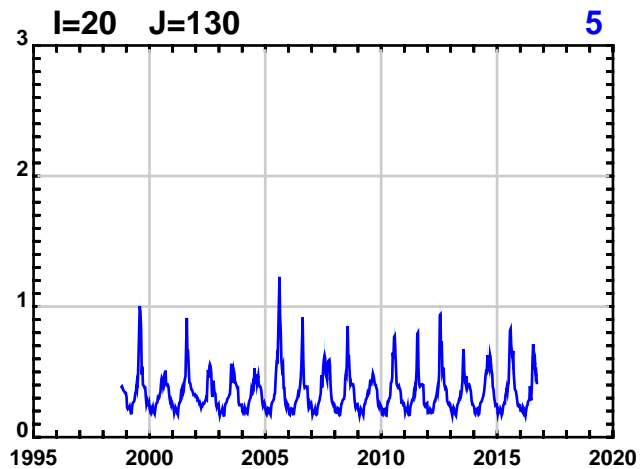
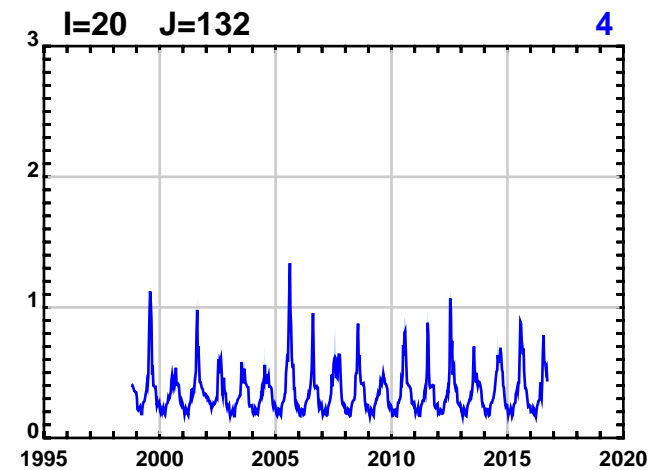
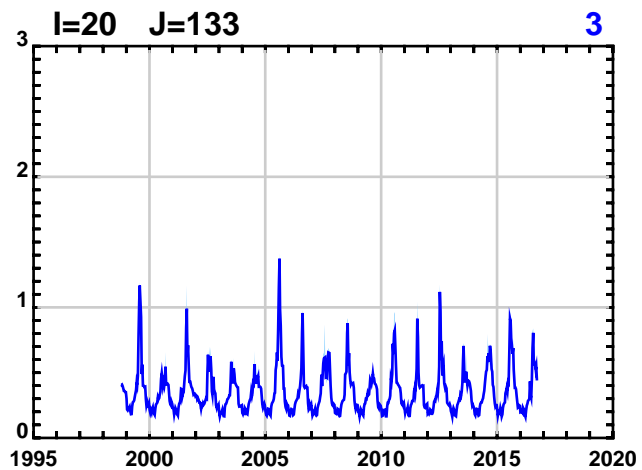
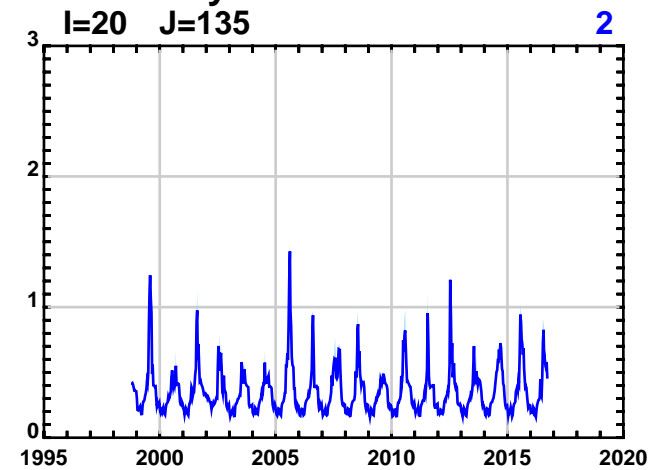
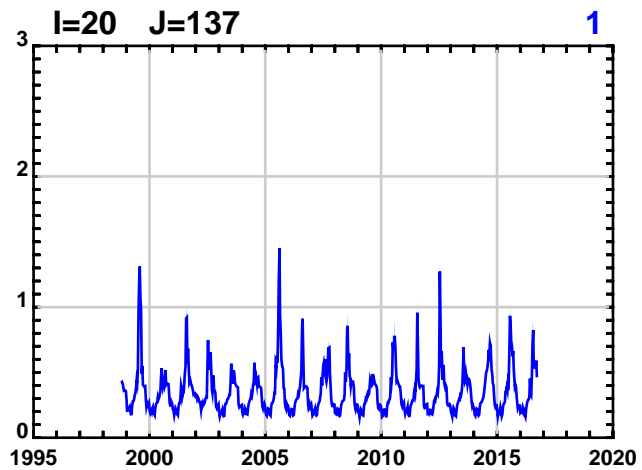
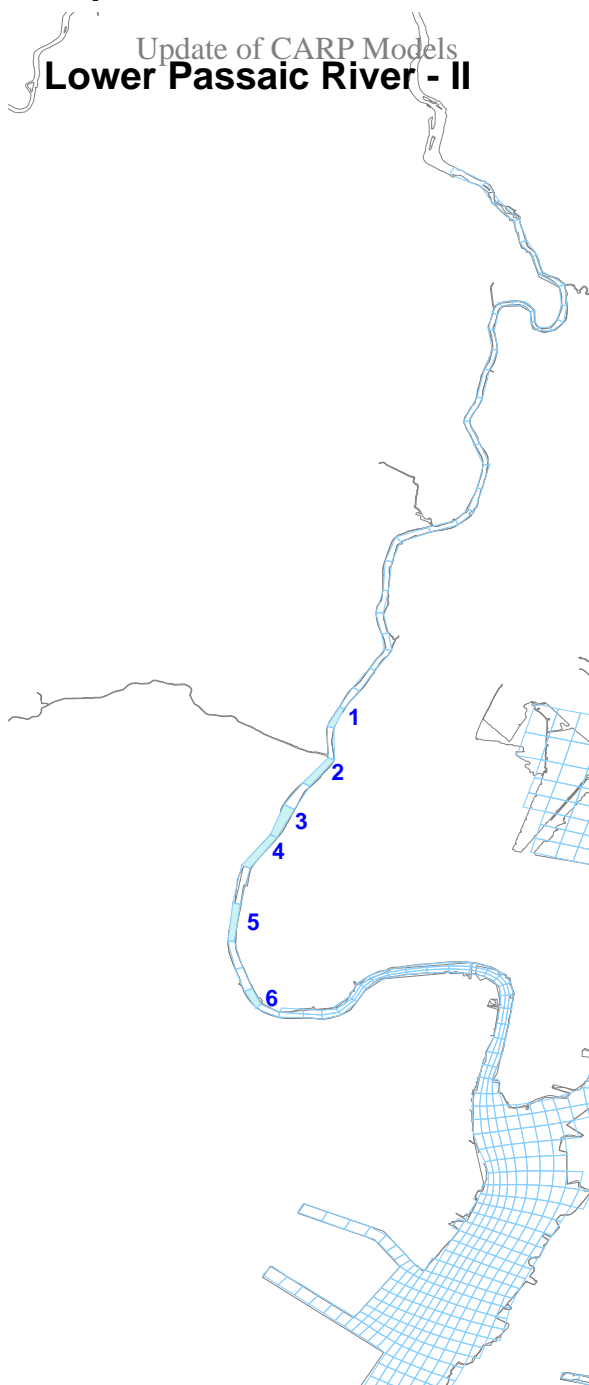
Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models Lower Passaic River - I



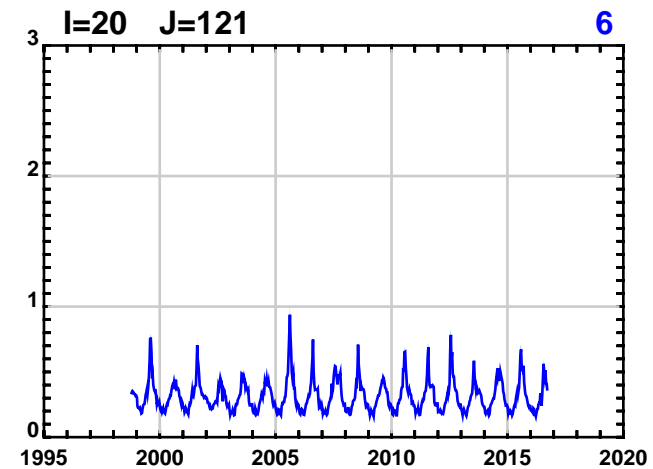
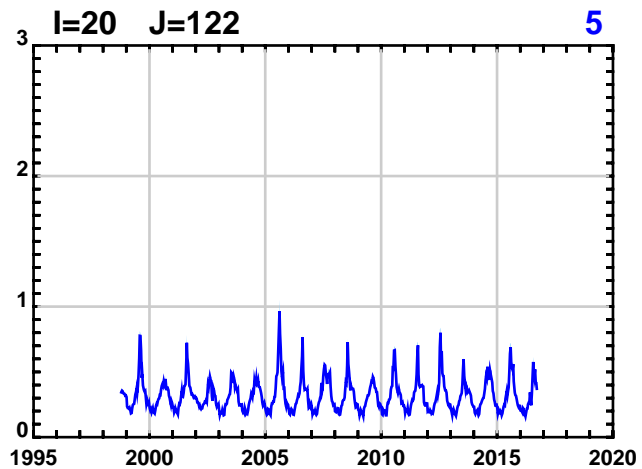
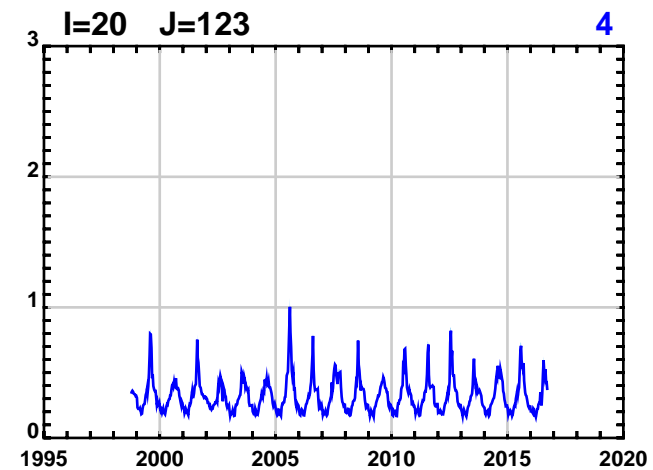
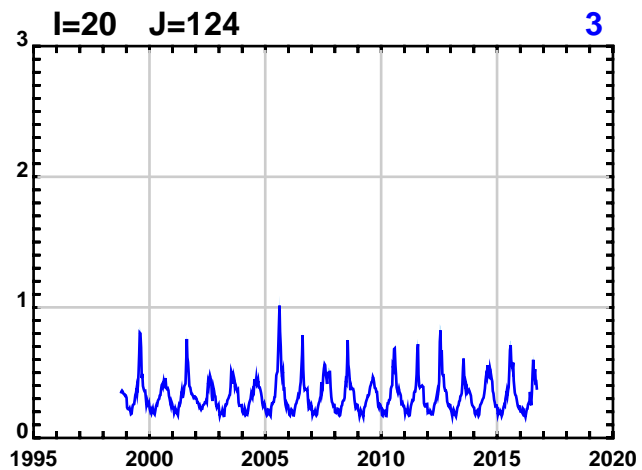
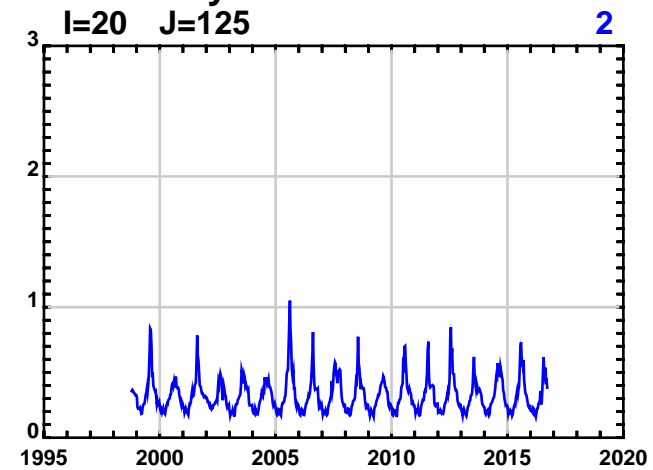
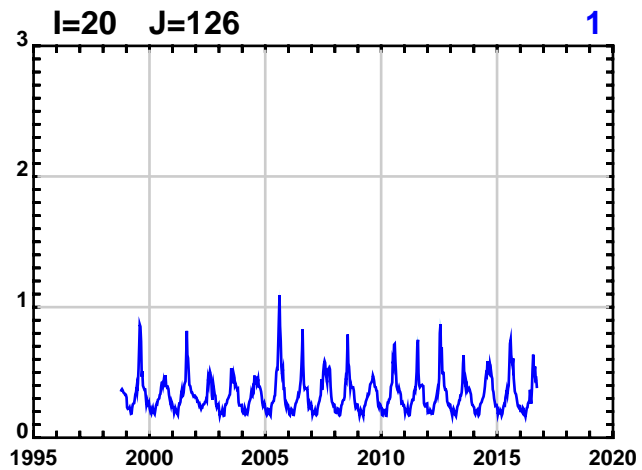
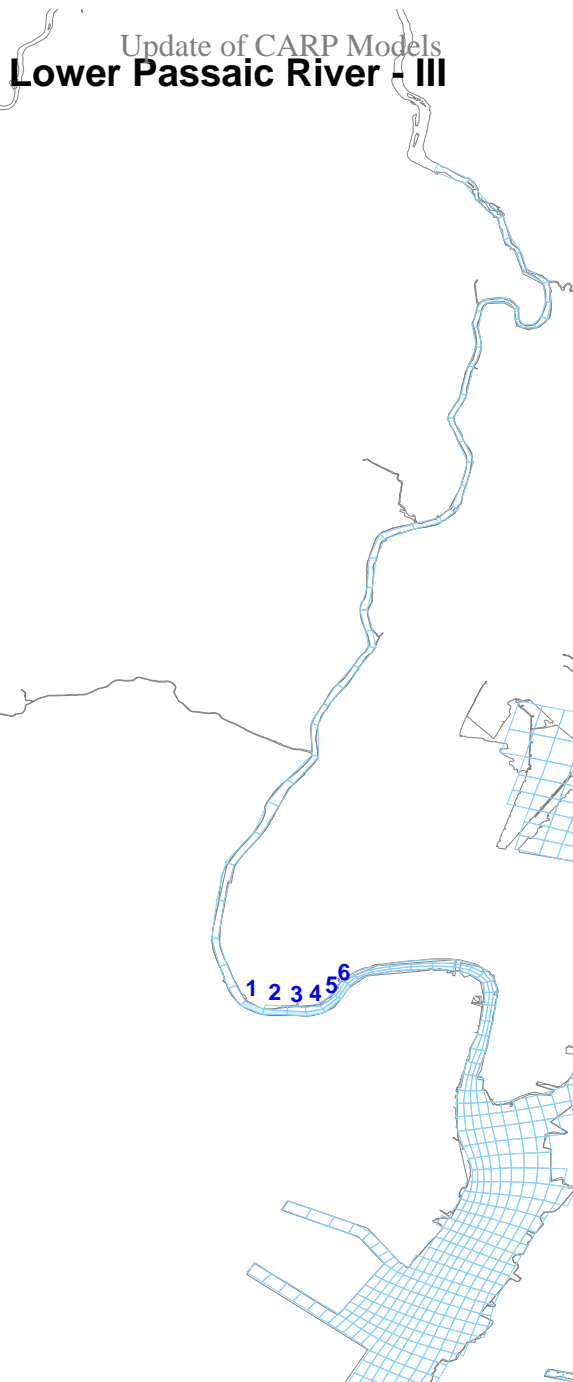
Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 50 of 76

Water Column Data Comparison With Model All Water Column Layers



PO4, mg/L

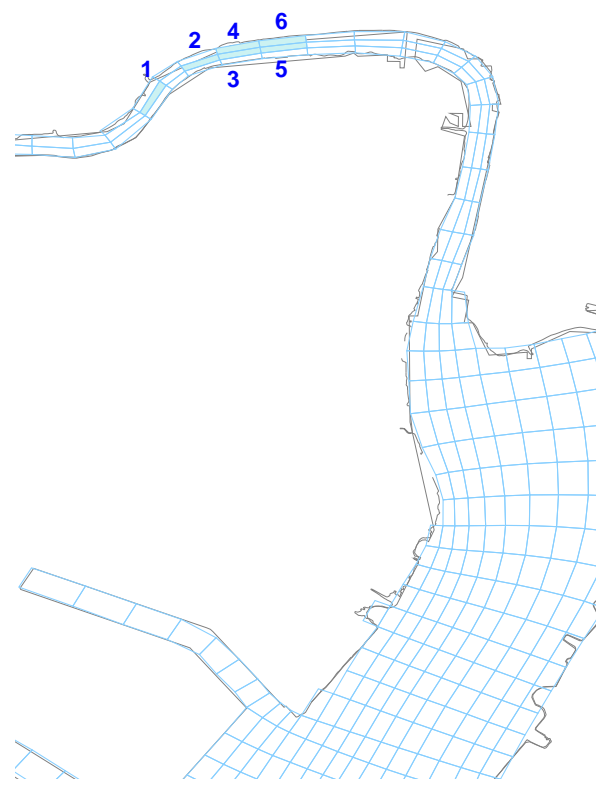
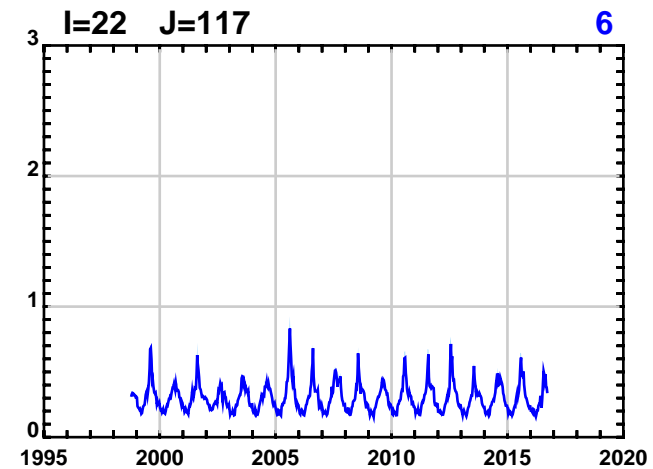
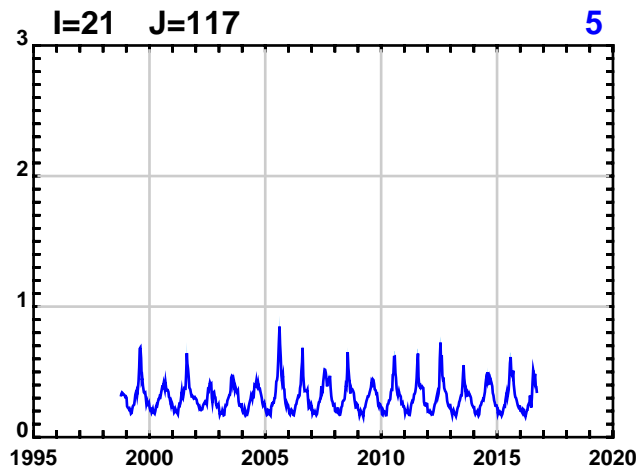
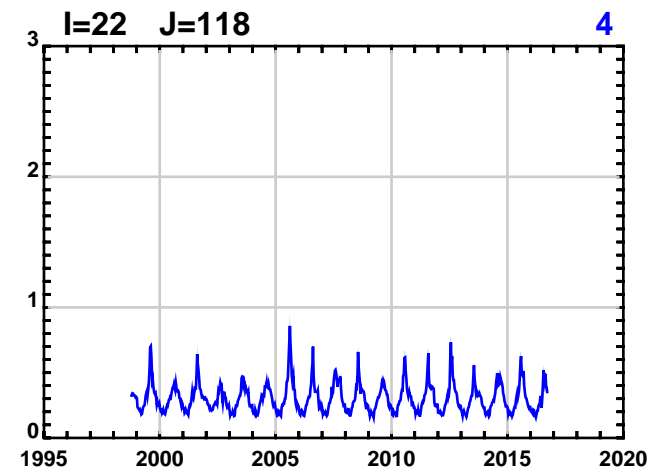
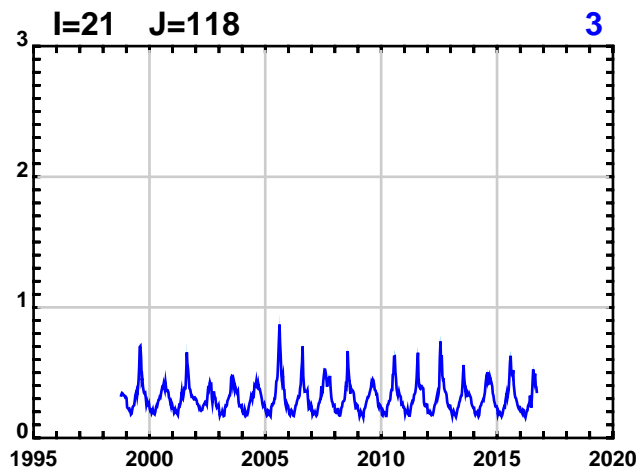
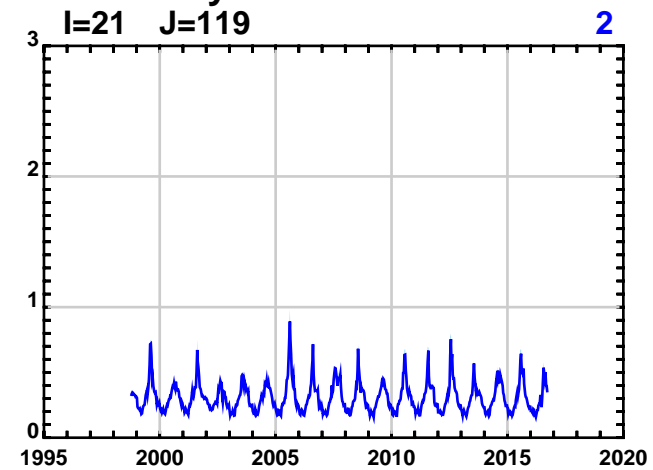
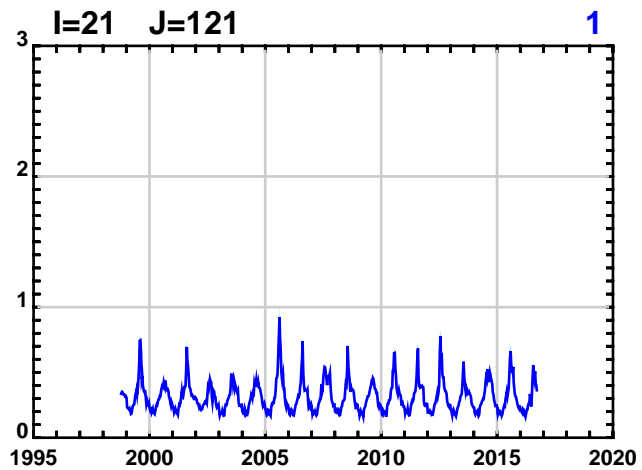
Water Column Data Comparison With Model All Water Column Layers



PO4, mg/L

Water Column Data Comparison With Model All Water Column Layers

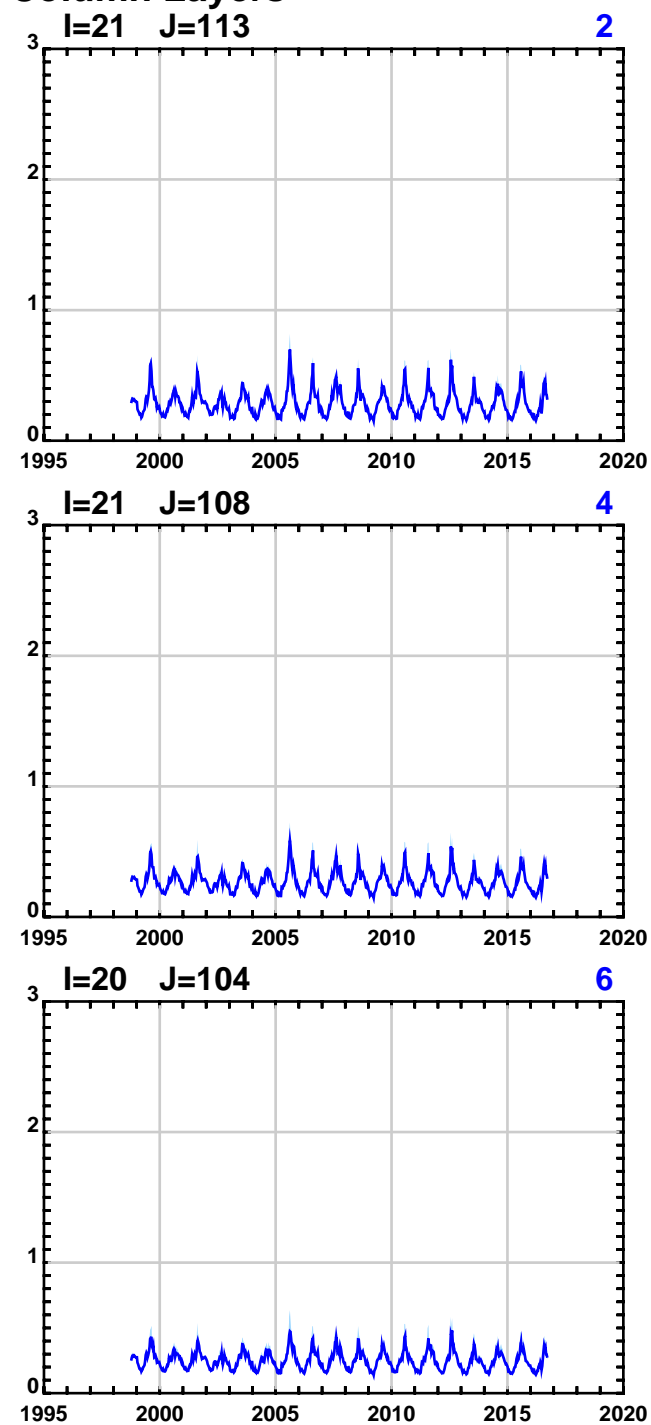
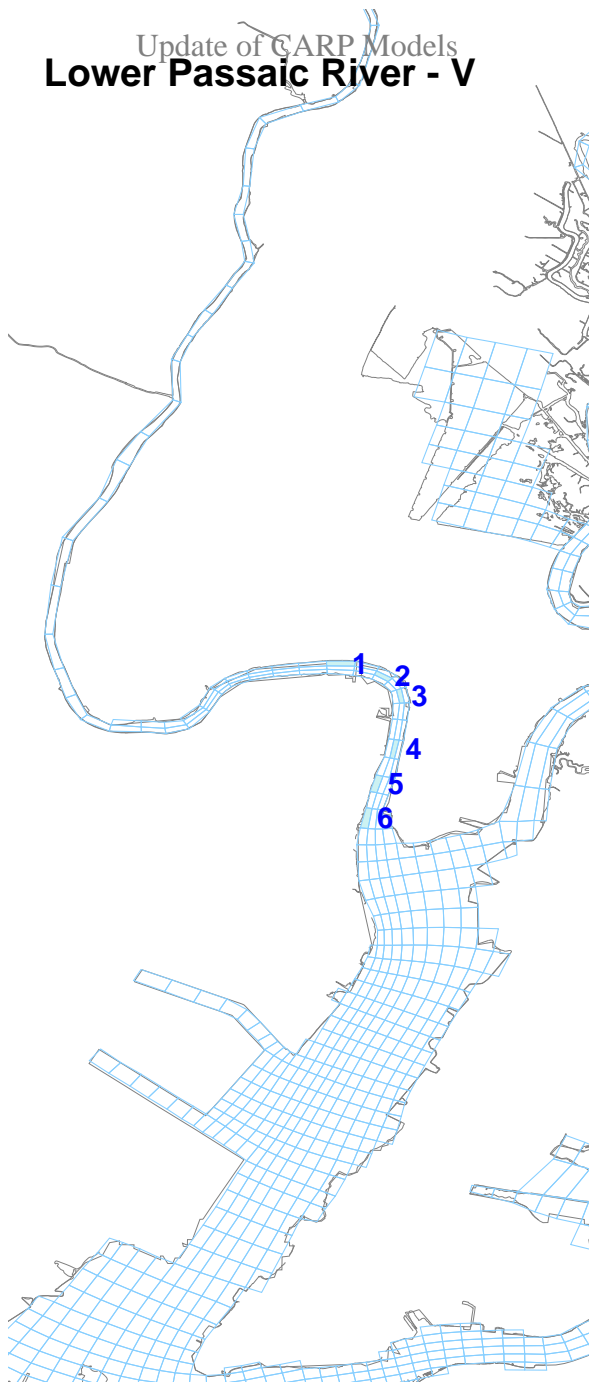
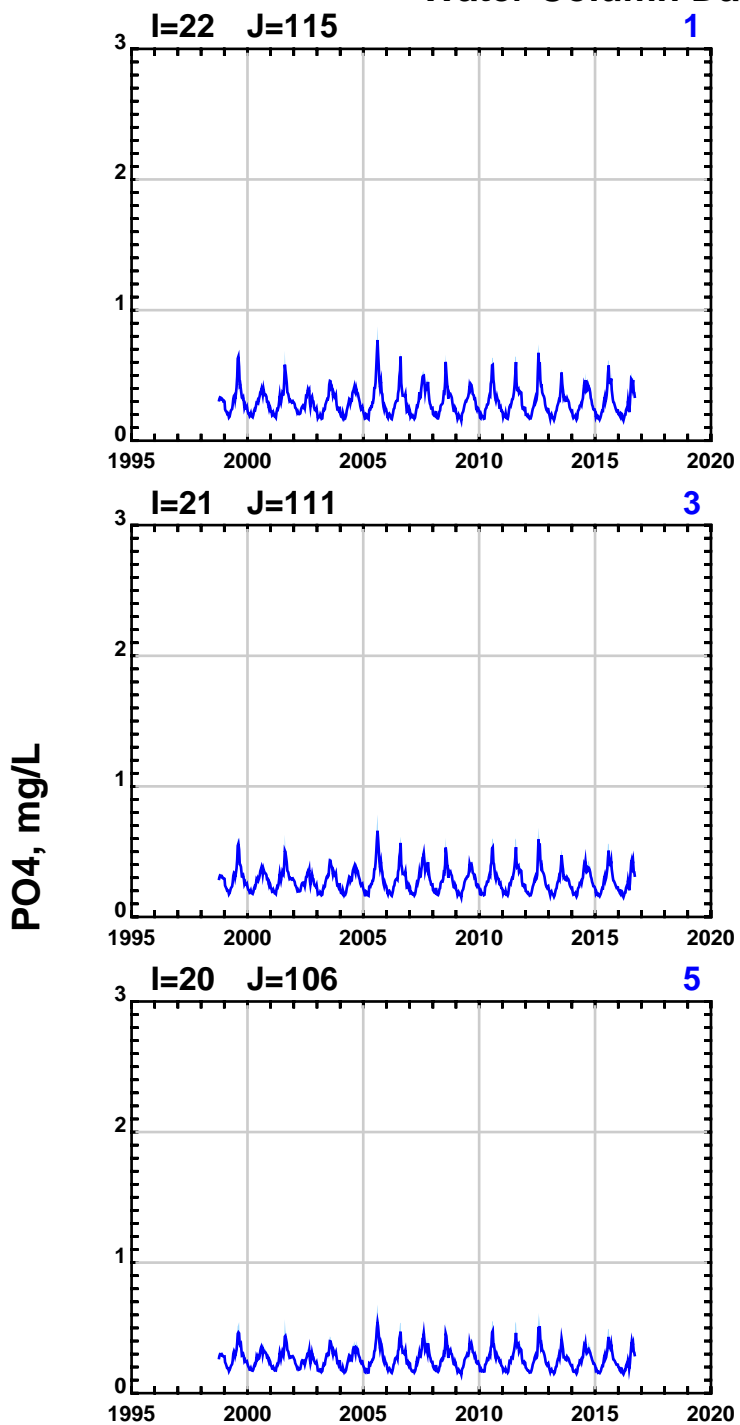
Update of CARP Models Lower Passaic River - IV



PO4, mg/L

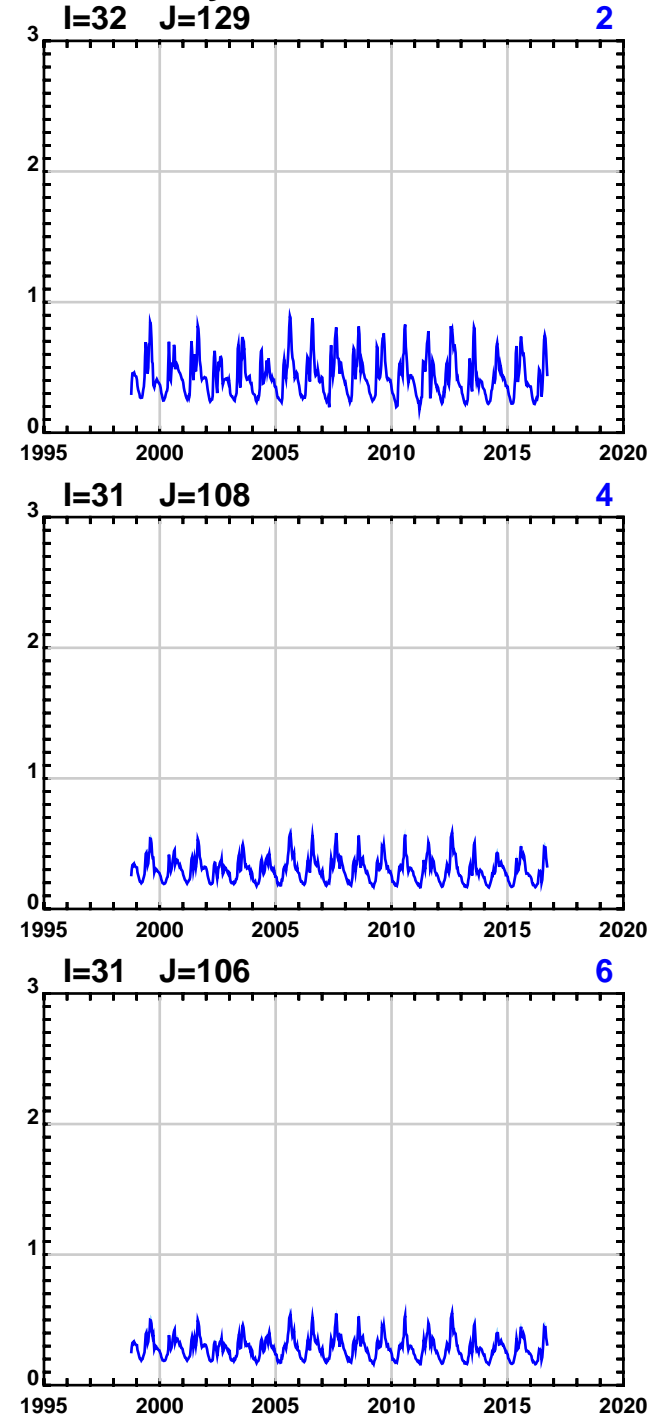
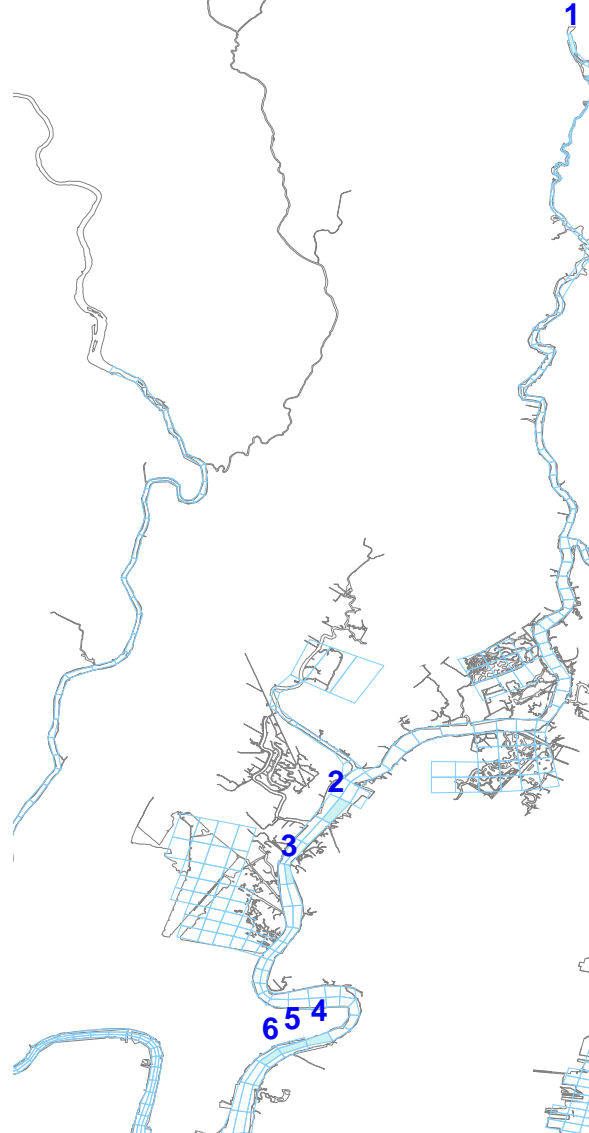
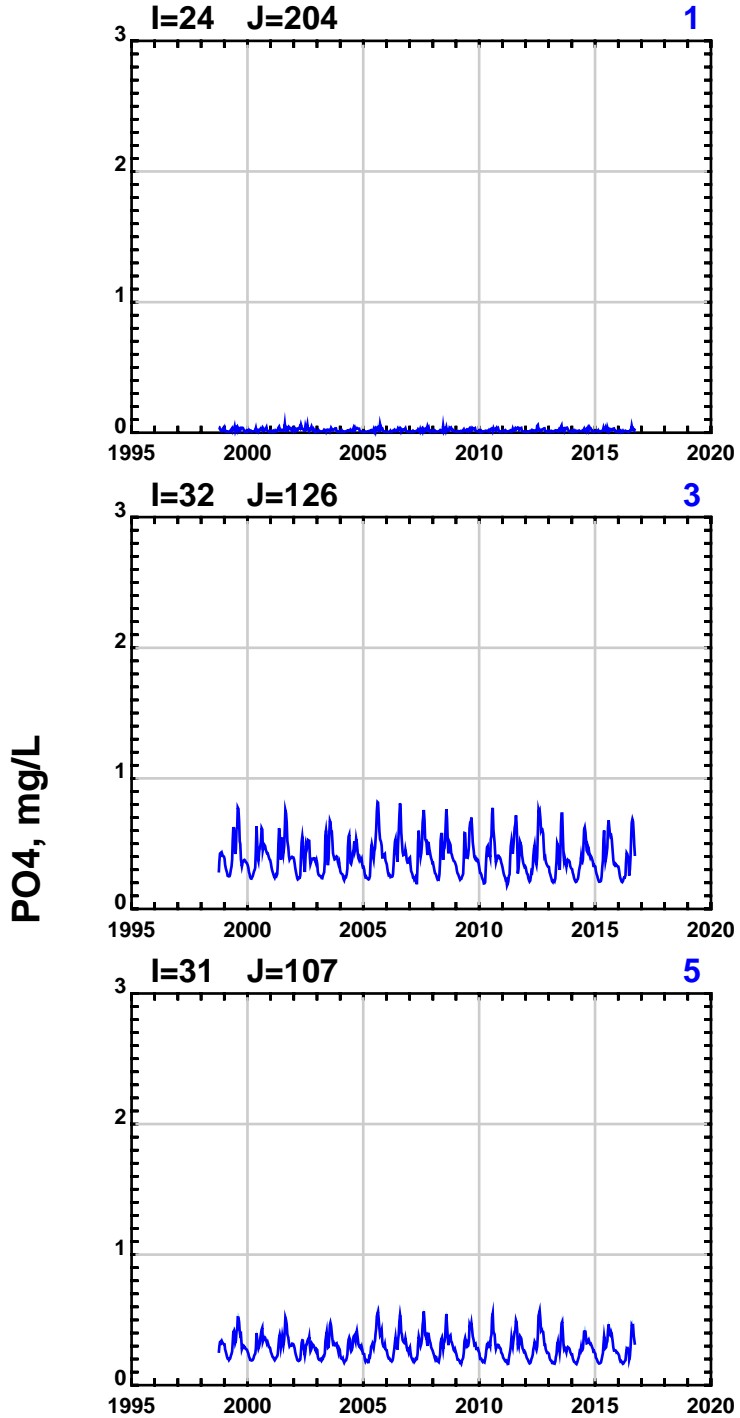
Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models Lower Passaic River - V

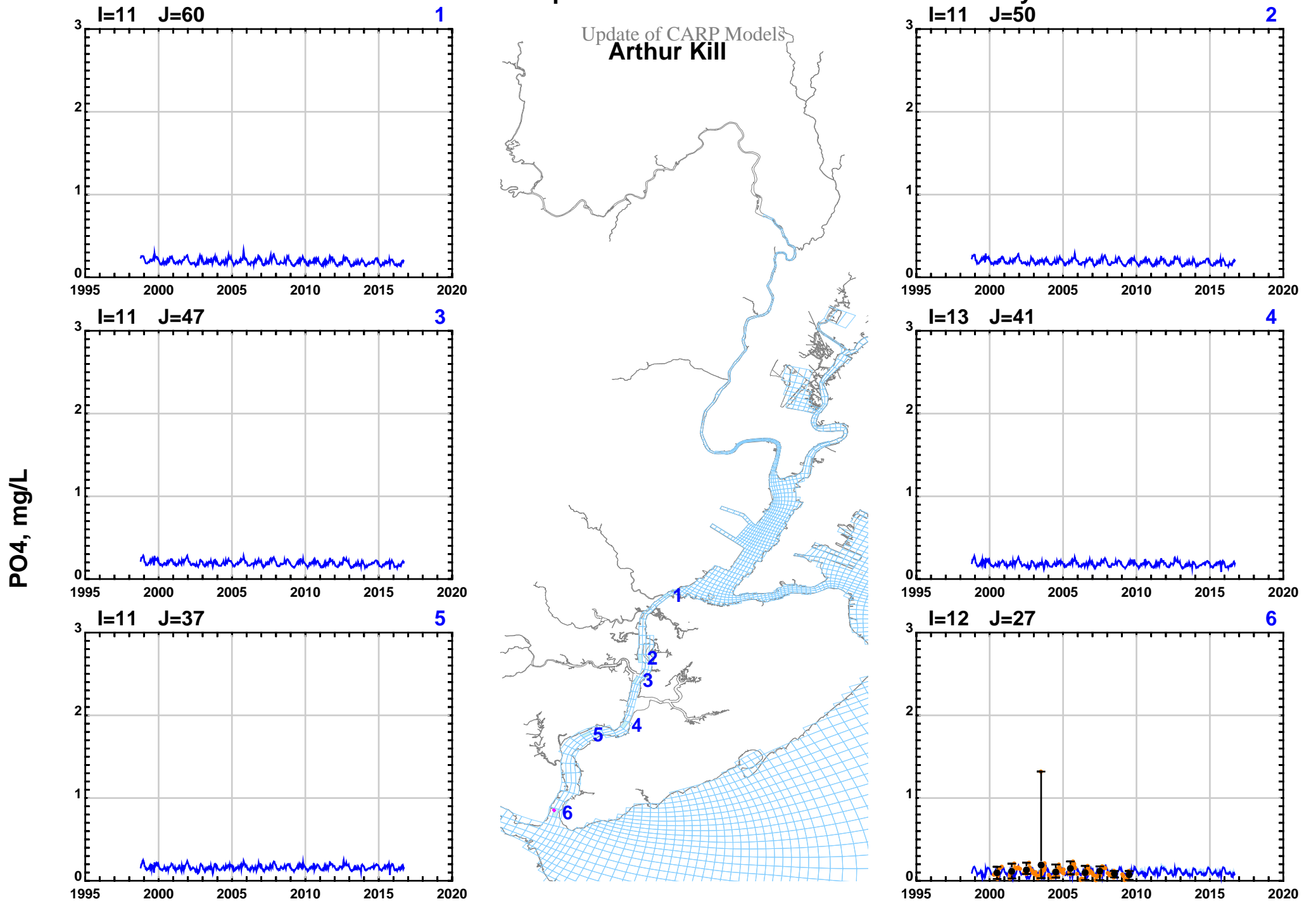


Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models
Hackensack River



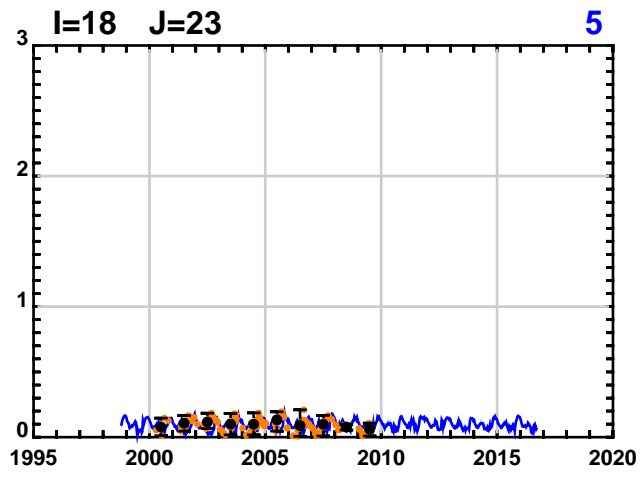
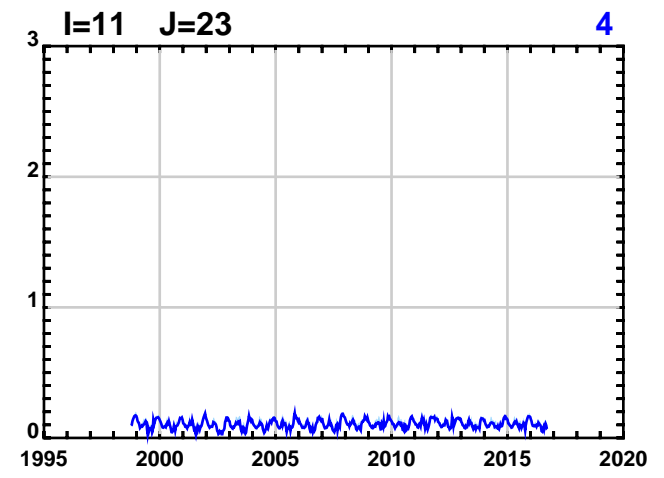
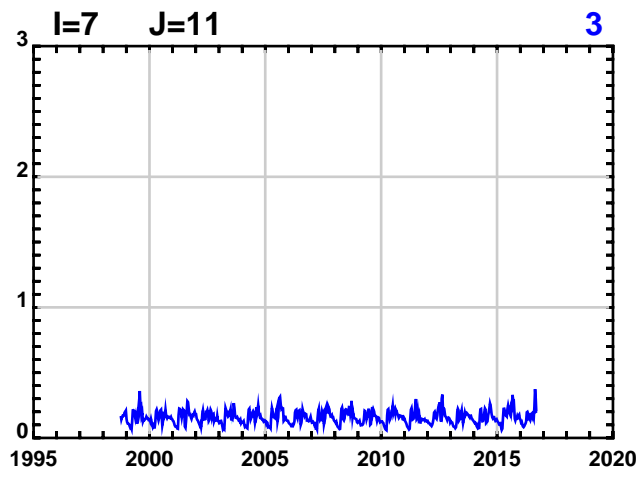
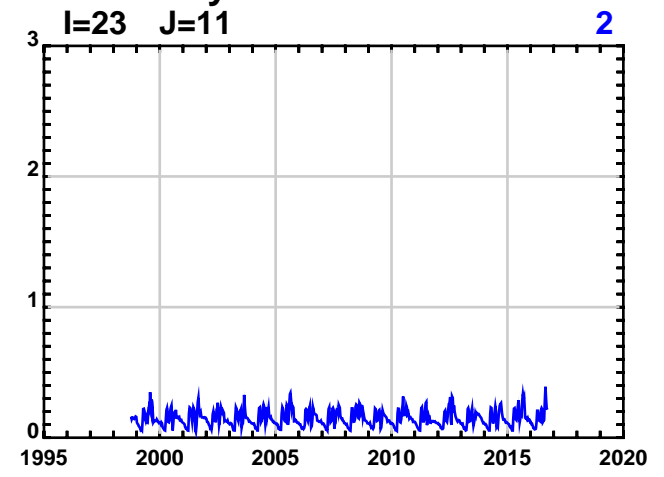
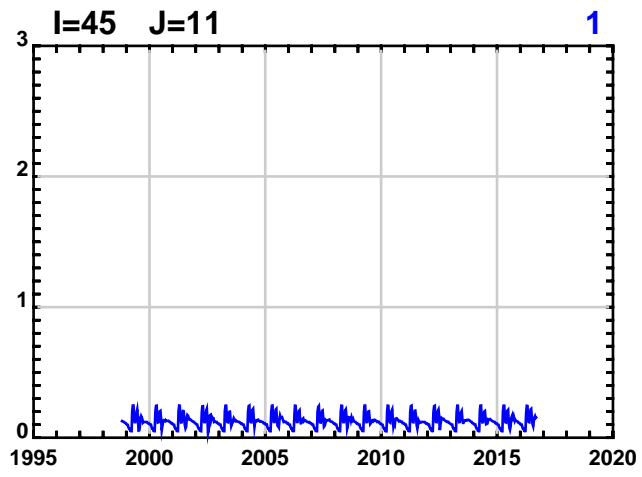
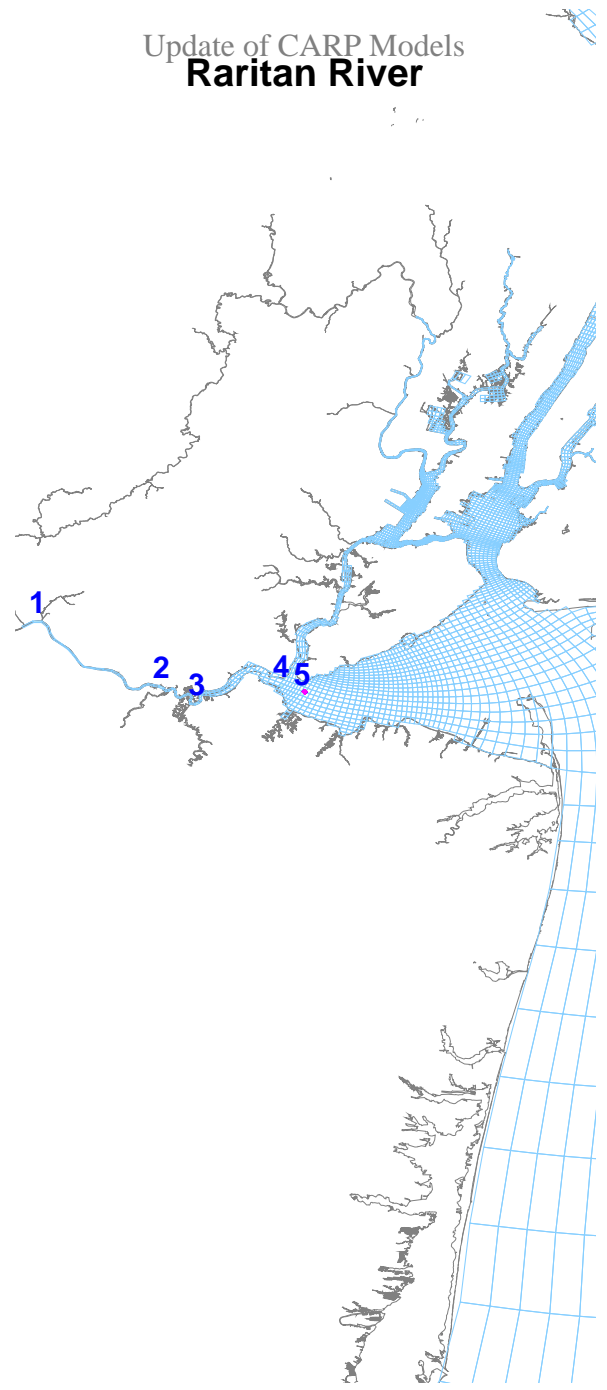
Water Column Data Comparison With Model All Water Column Layers



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 56 of 76

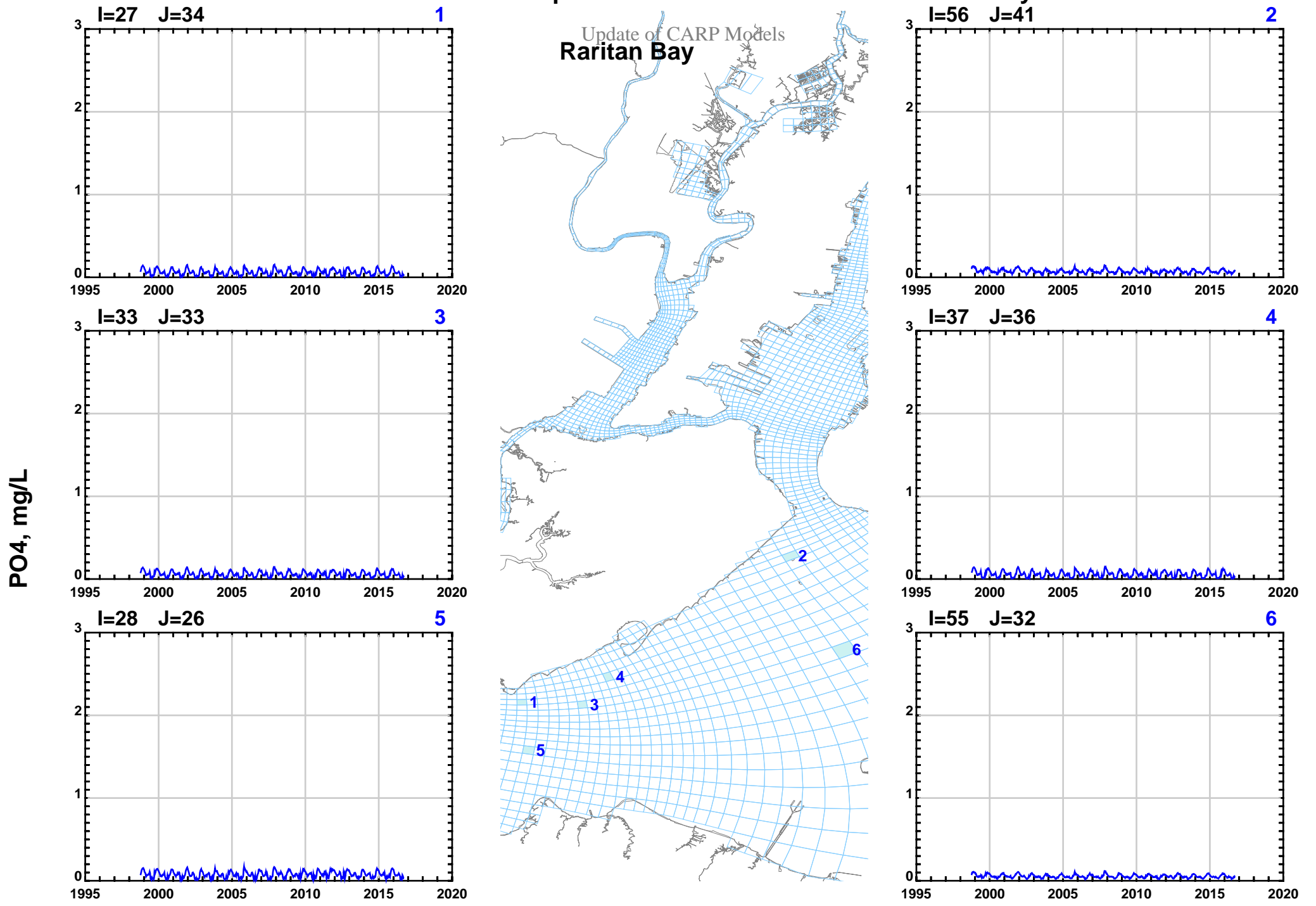
Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models
Raritan River



PO4, mg/L

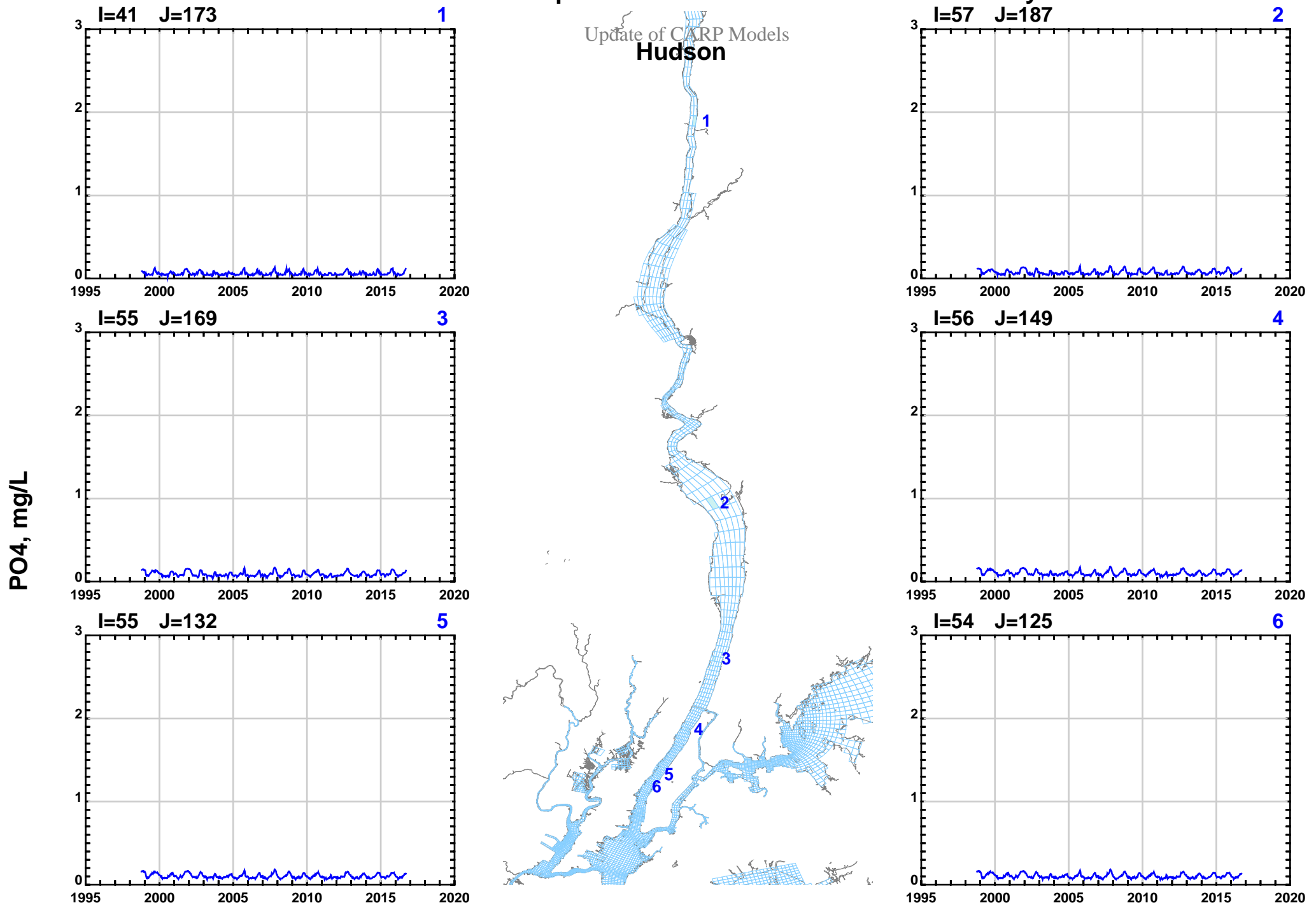
Water Column Data Comparison With Model All Water Column Layers



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 58 of 76

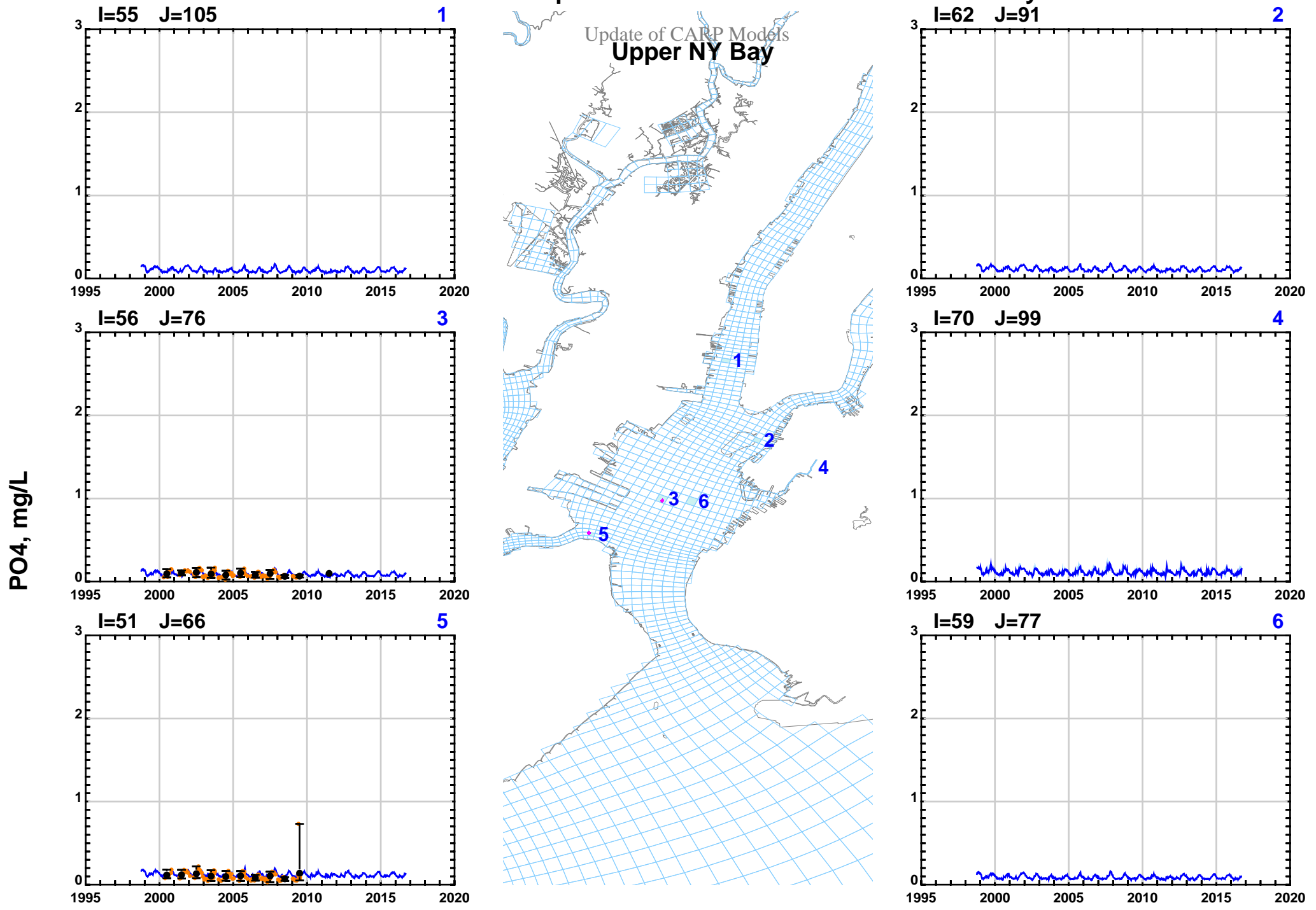
Water Column Data Comparison With Model All Water Column Layers

Update of C/ARP Models
Hudson



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 59 of 76

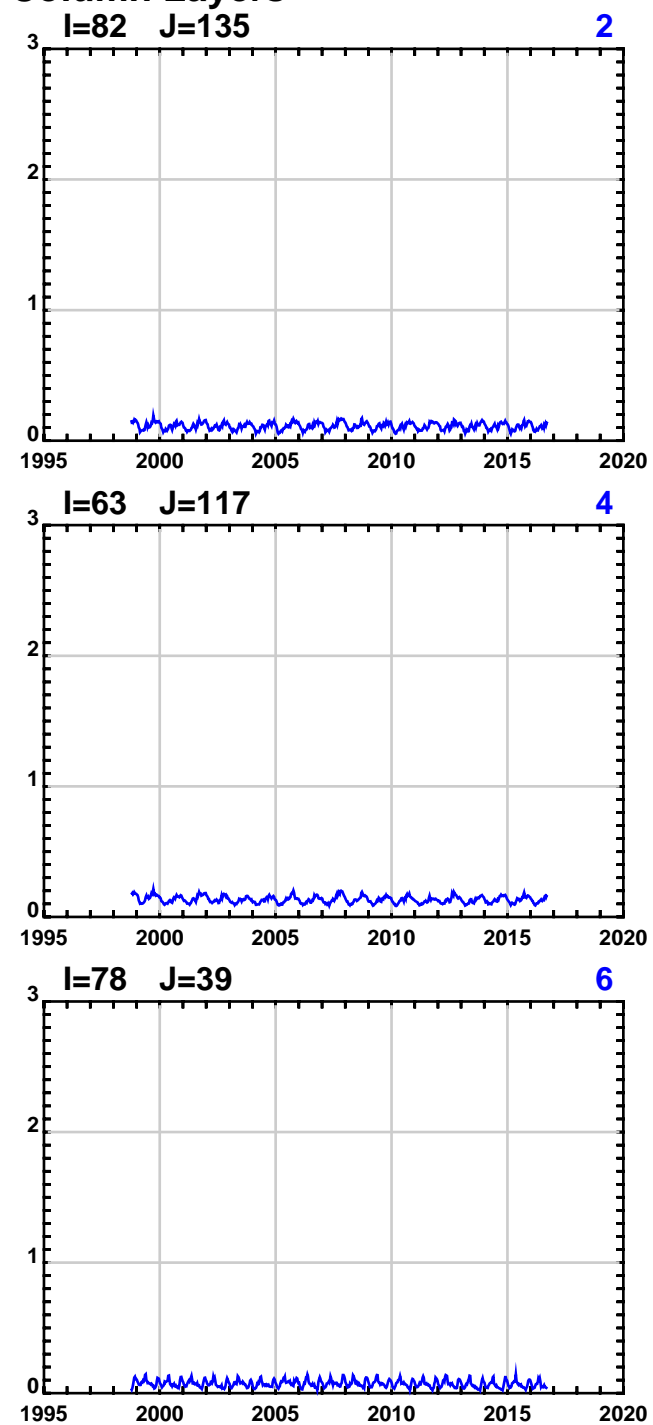
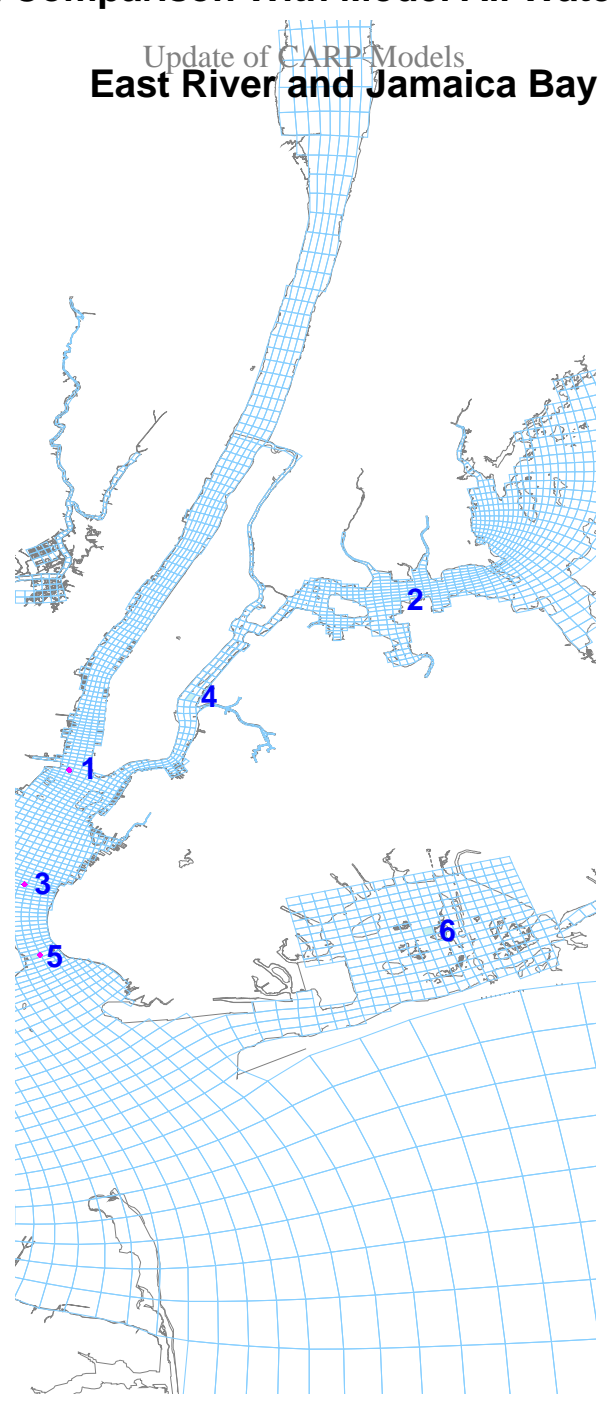
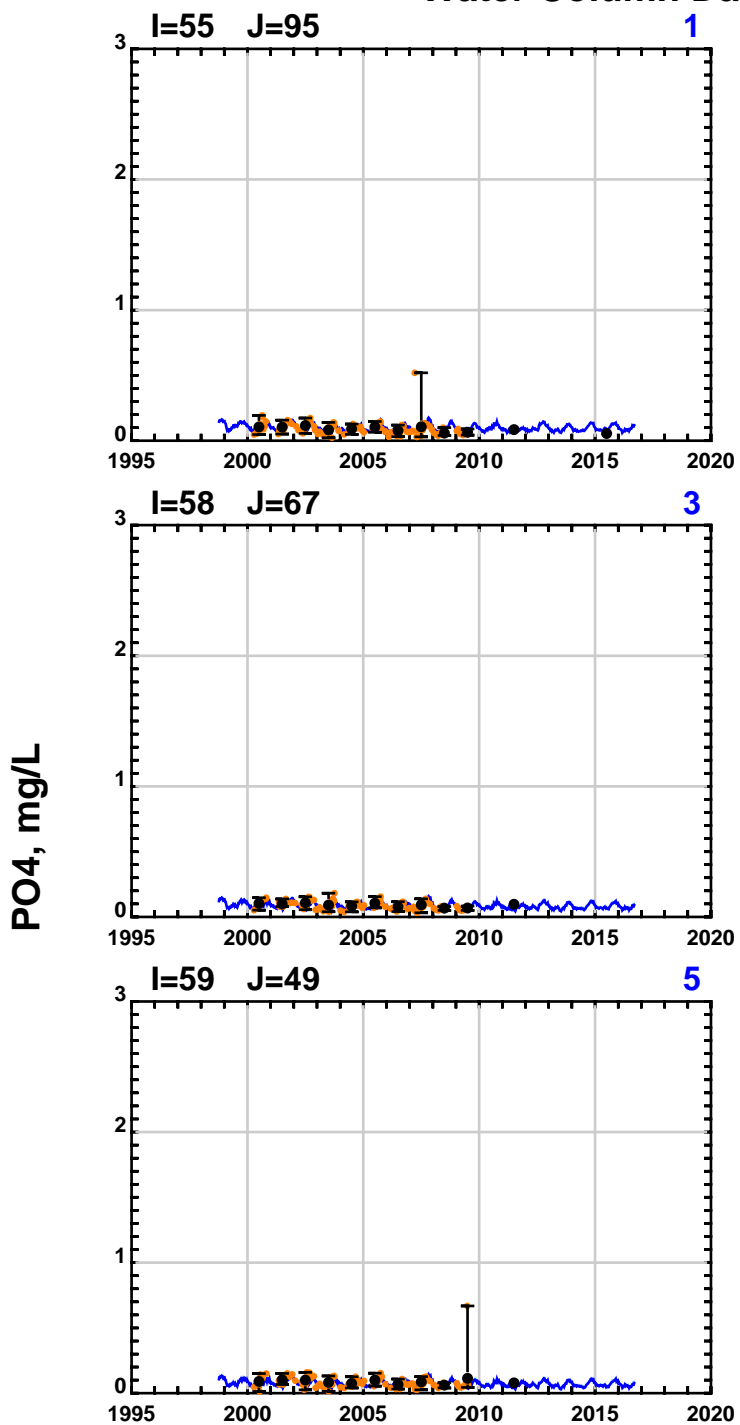
Water Column Data Comparison With Model All Water Column Layers



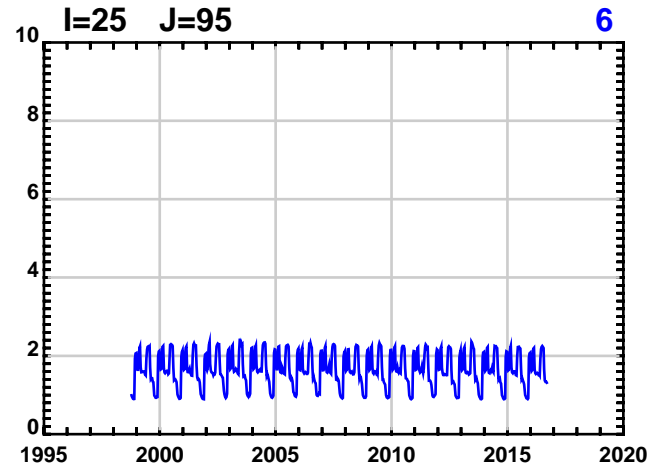
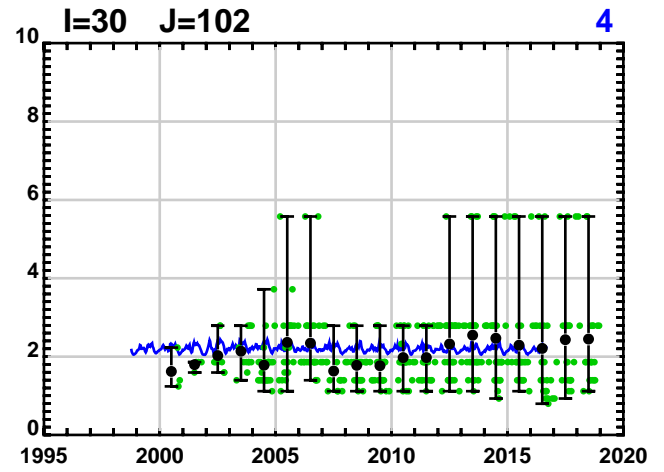
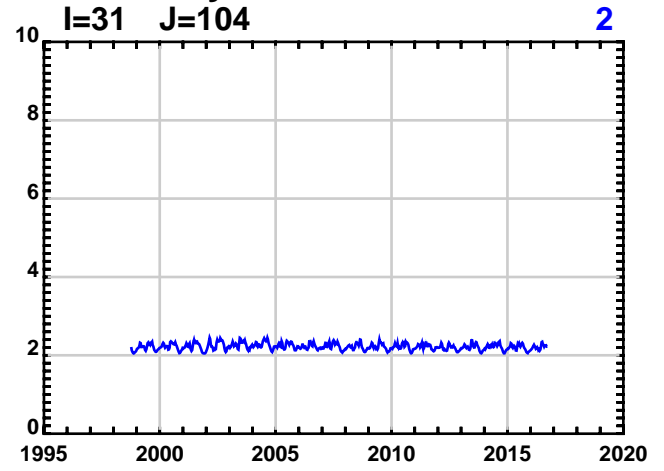
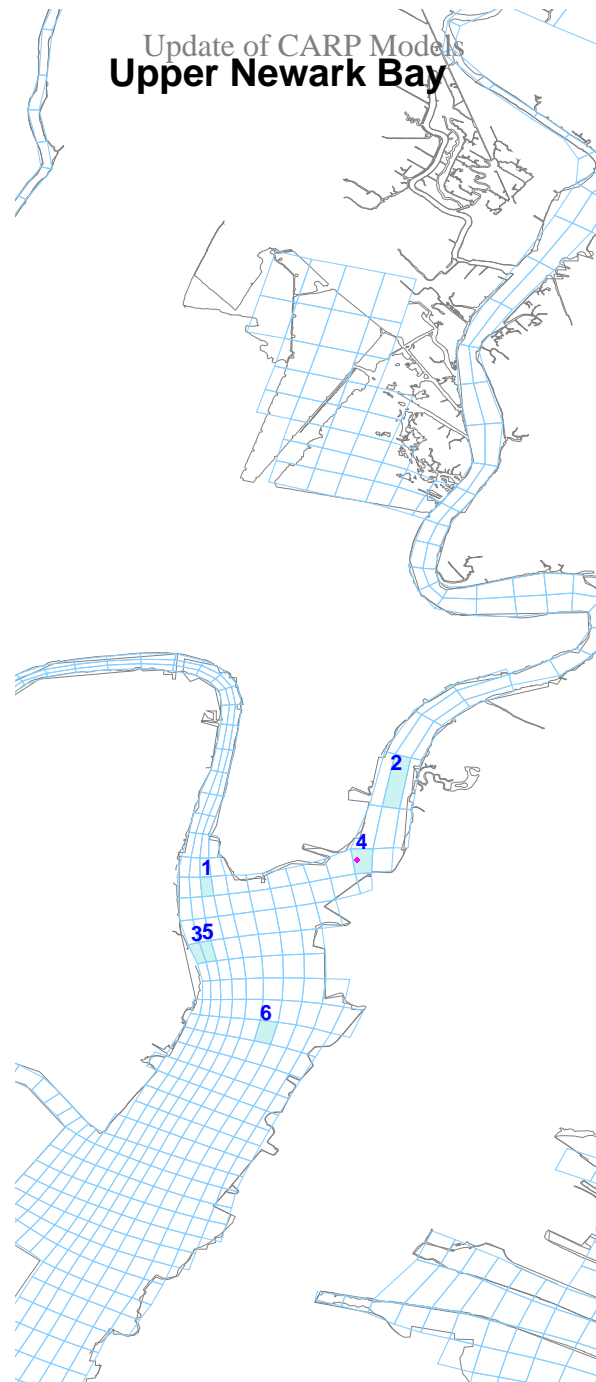
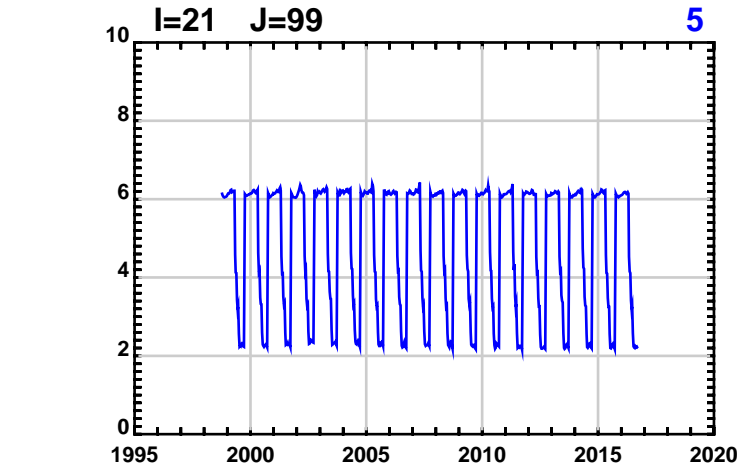
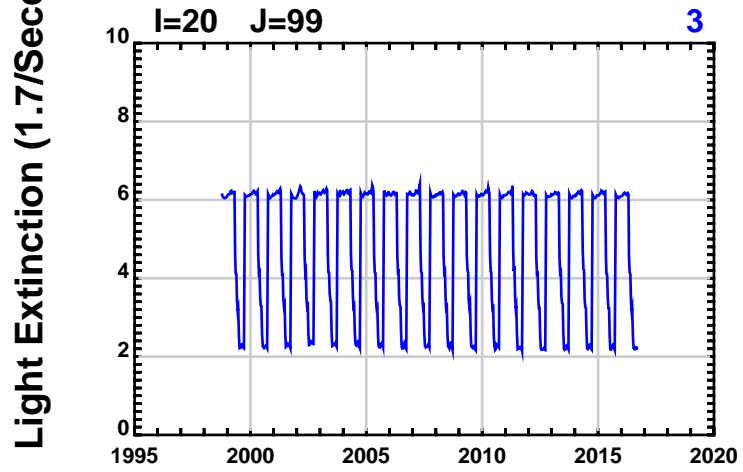
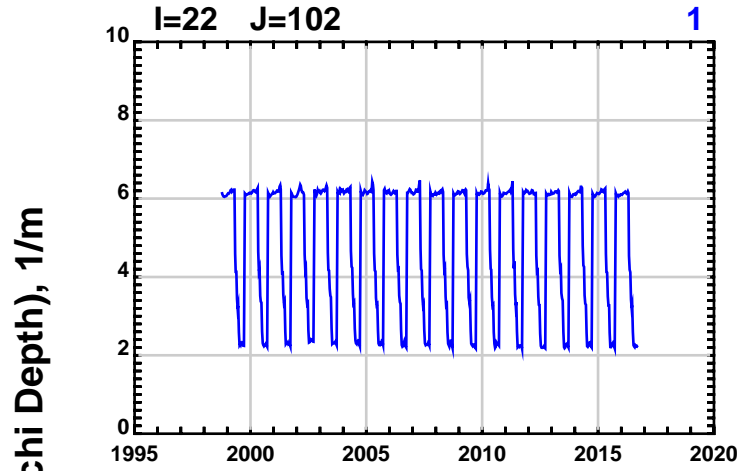
Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 60 of 76

Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models
East River and Jamaica Bay



Water Column Data Comparison With Model All Water Column Layers

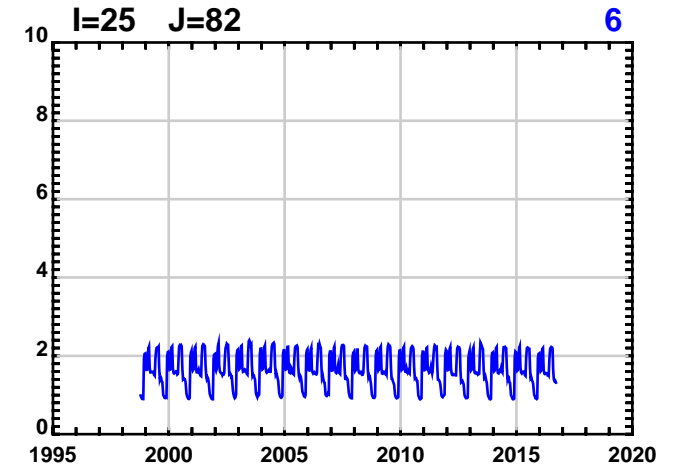
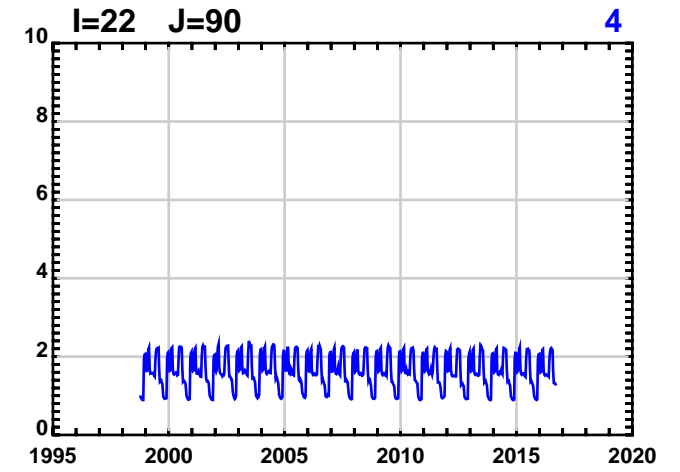
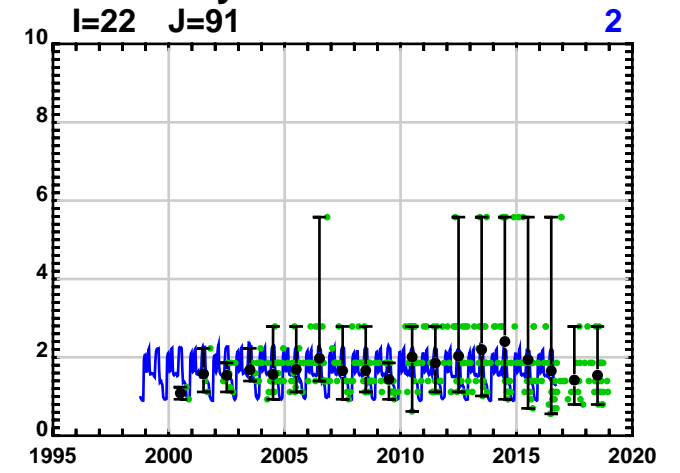
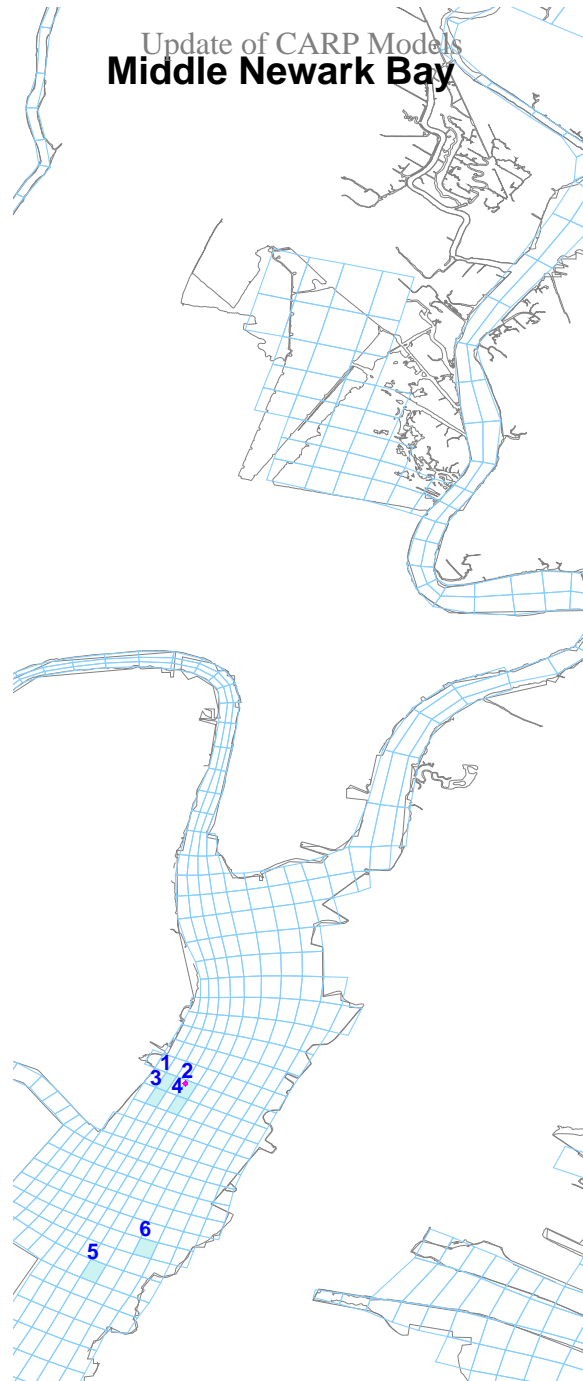
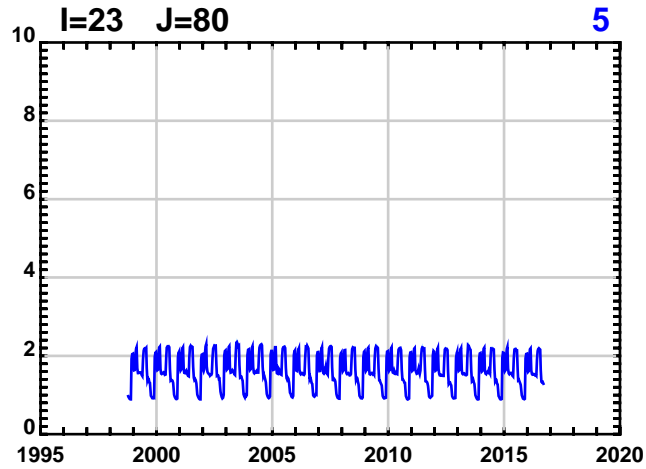
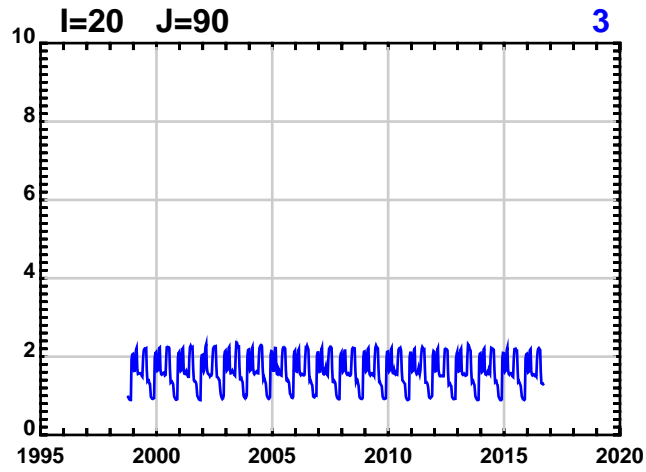
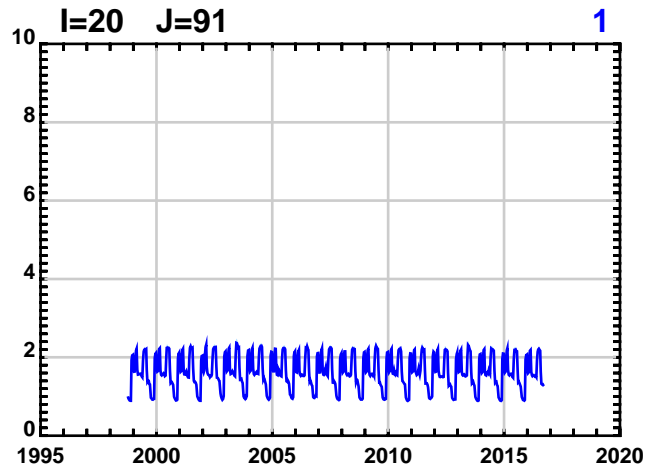


Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 62 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- Harbor Data
- NJHDG Data

Water Column Data Comparison With Model All Water Column Layers

Light Extinction (1.7/Secchi Depth), 1/m

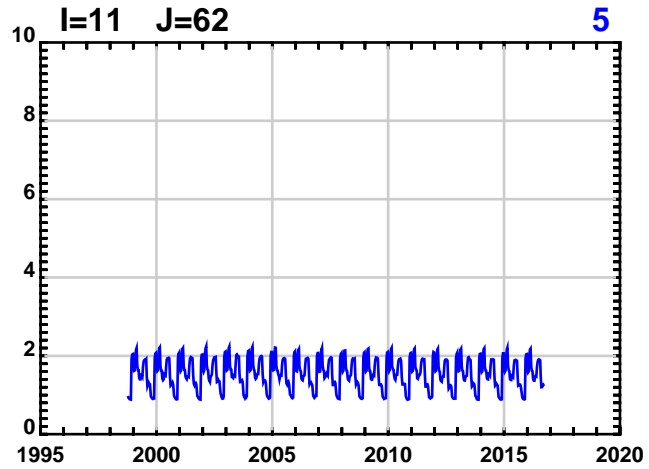
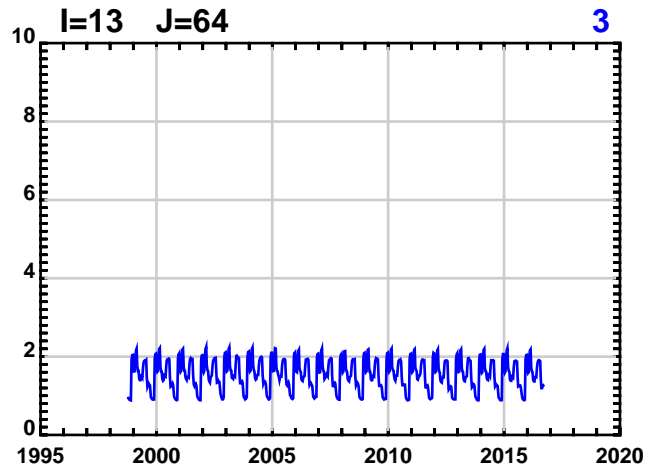
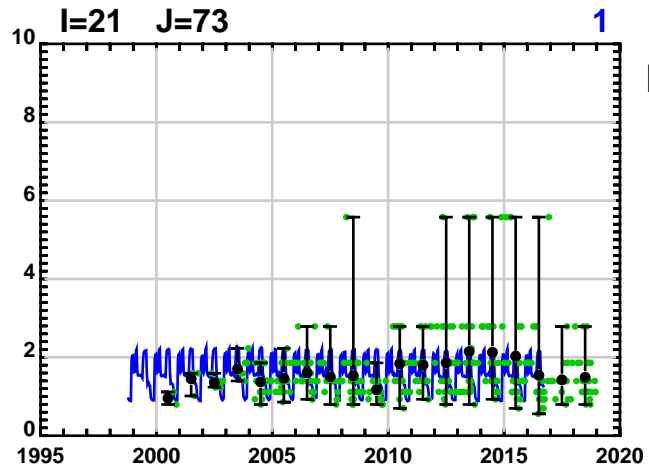


Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 63 of 76

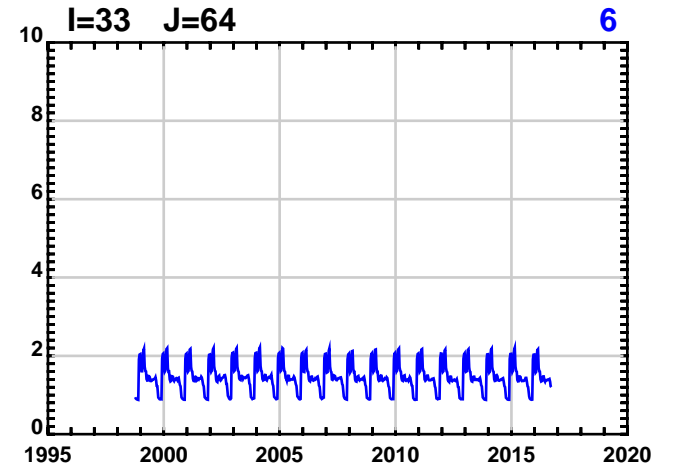
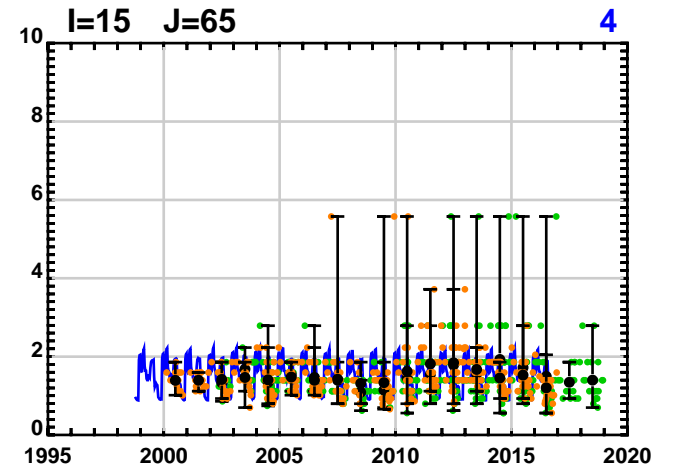
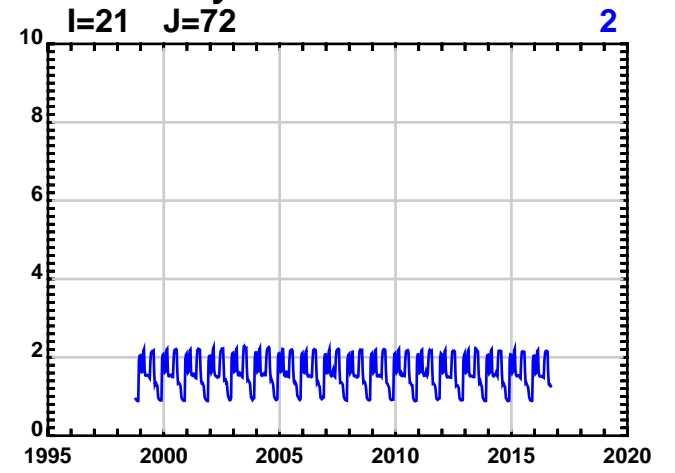
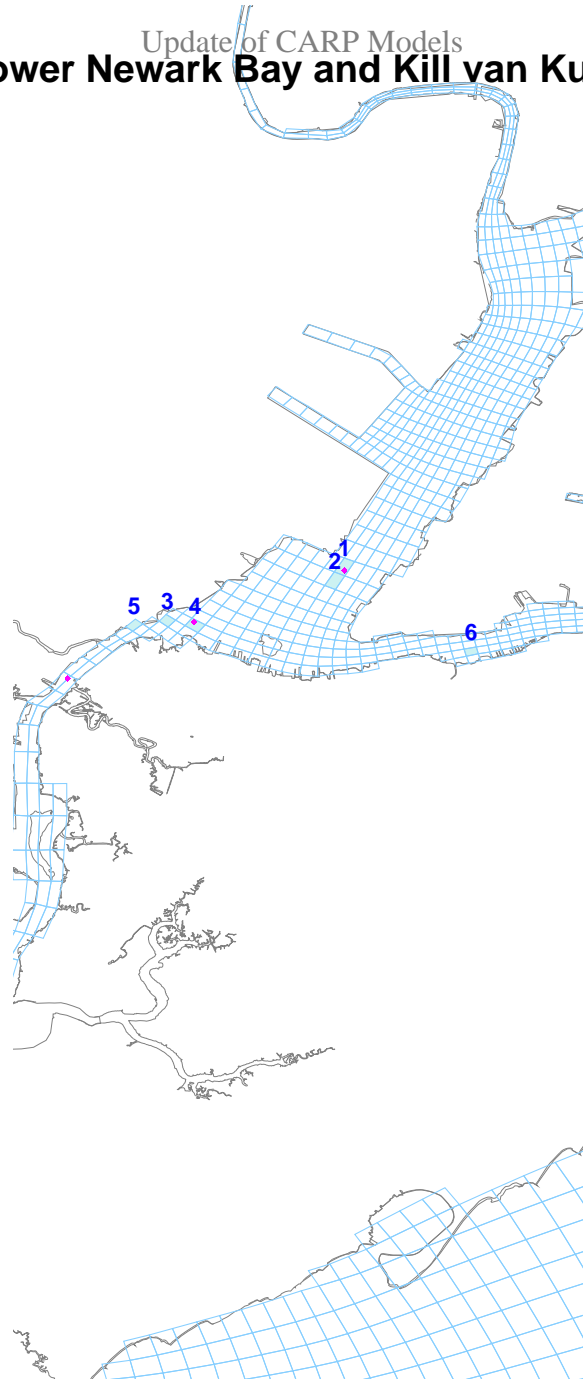
- Water Column Data: yearly mean and range
- CARP2 Data
- Harbor Data
- NJHDG Data

Water Column Data Comparison With Model All Water Column Layers

Light Extinction (1.7/Secchi Depth), 1/m



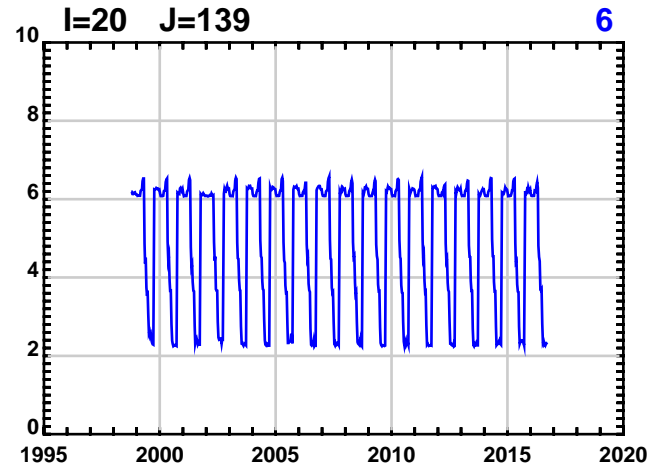
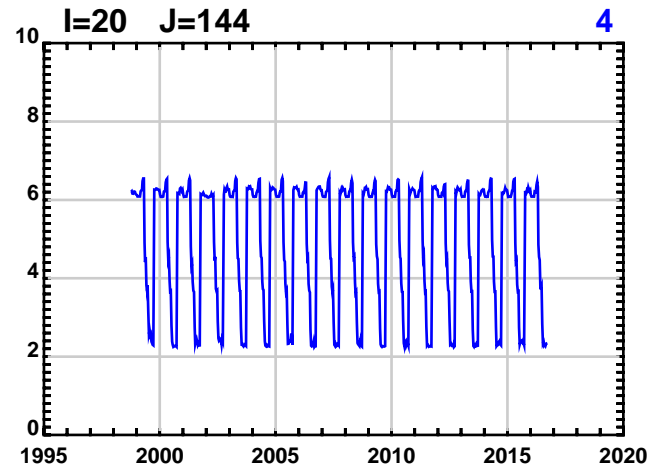
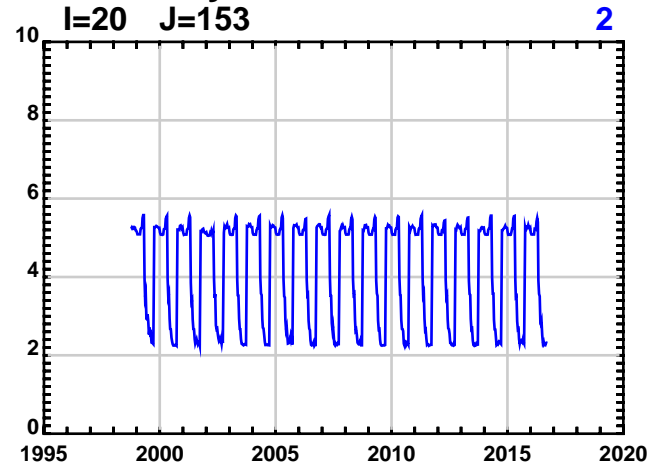
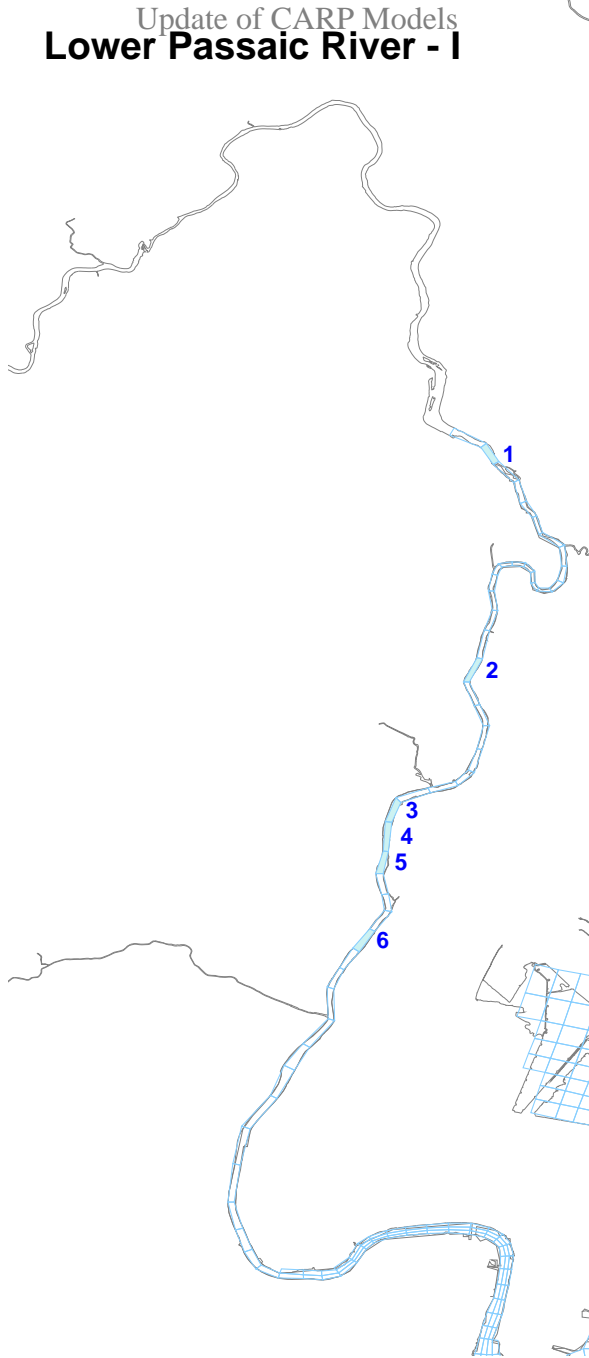
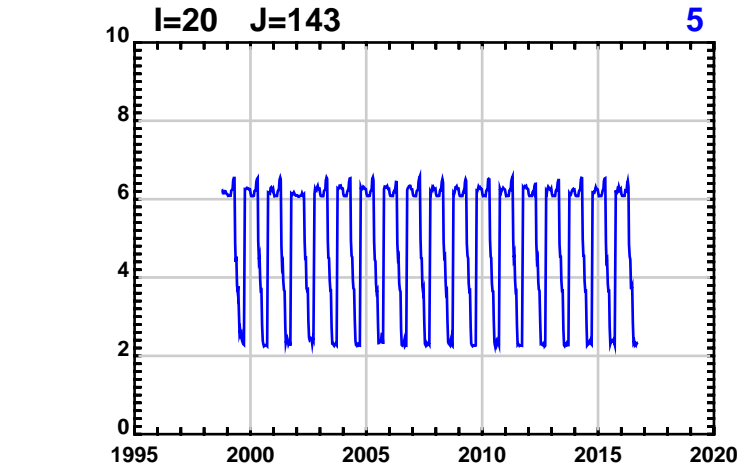
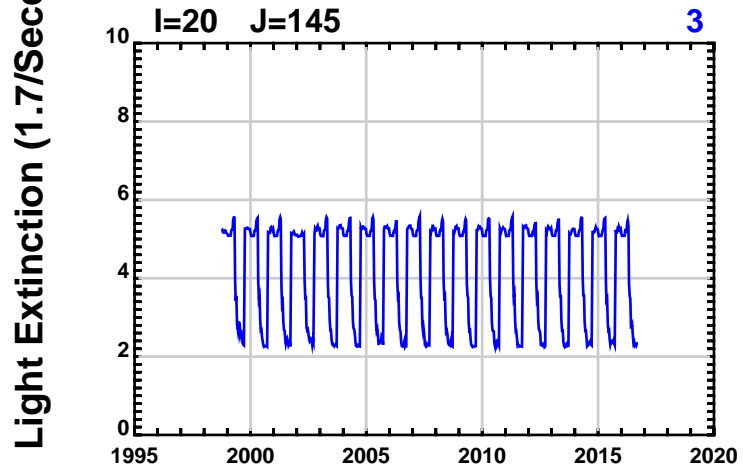
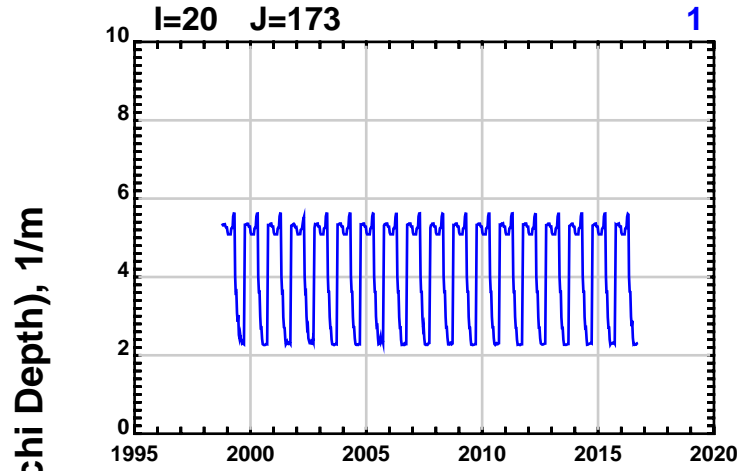
Update of CARP Models Lower Newark Bay and Kill van Kull



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 64 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- Harbor Data
- NJHDG Data

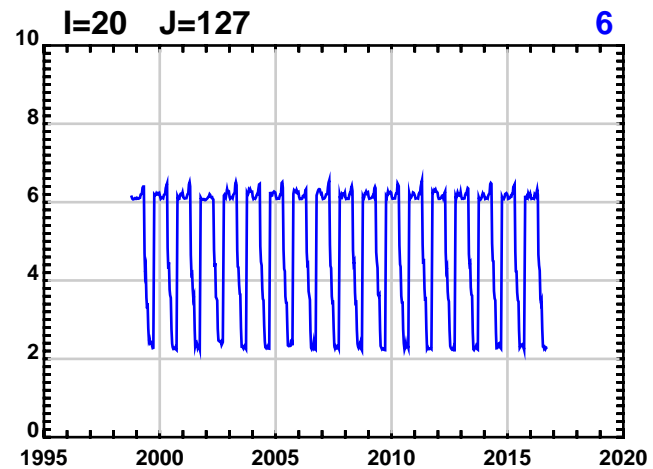
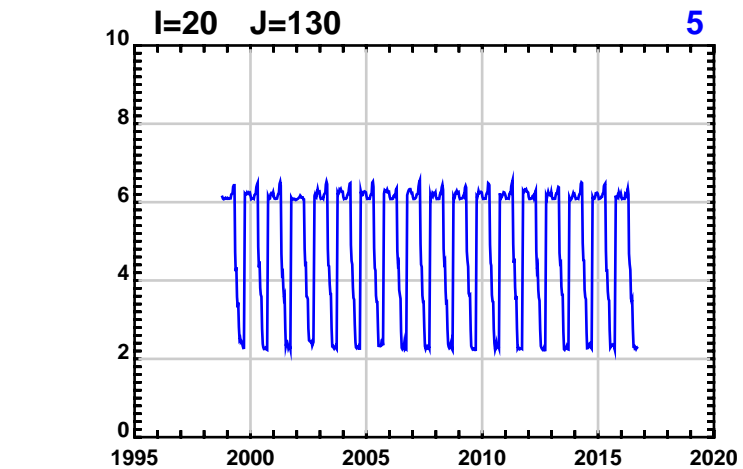
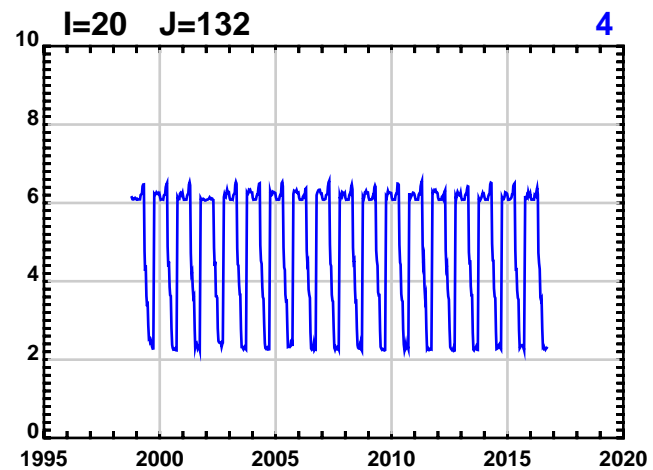
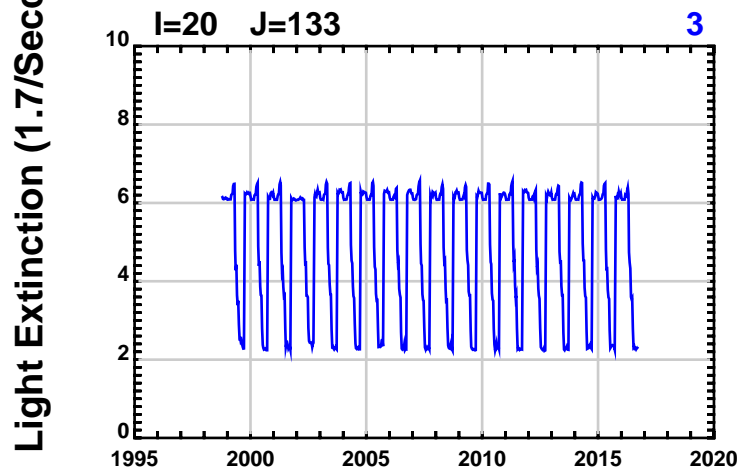
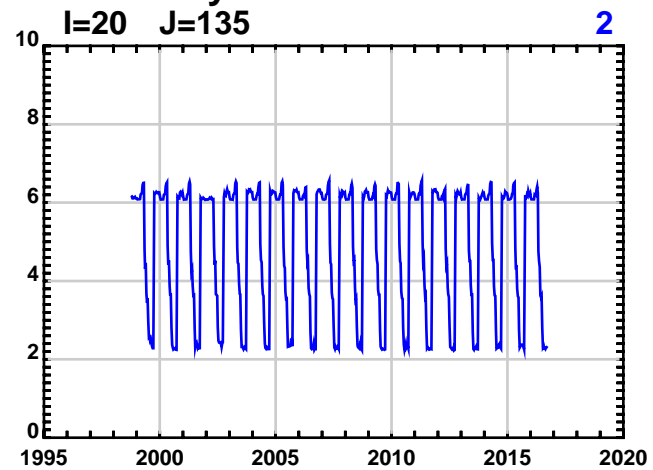
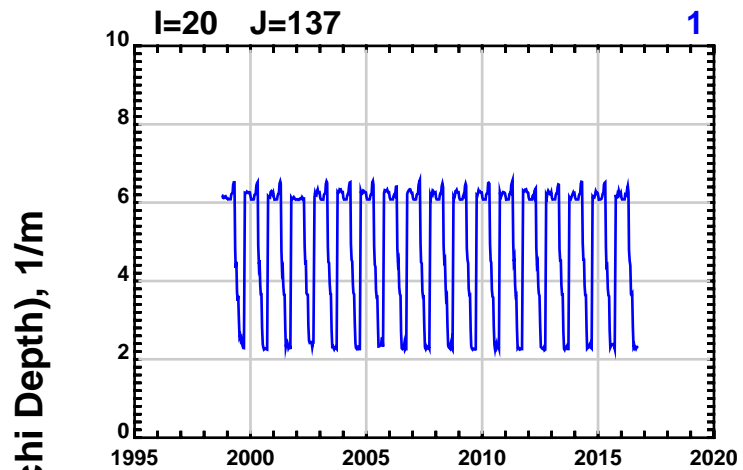
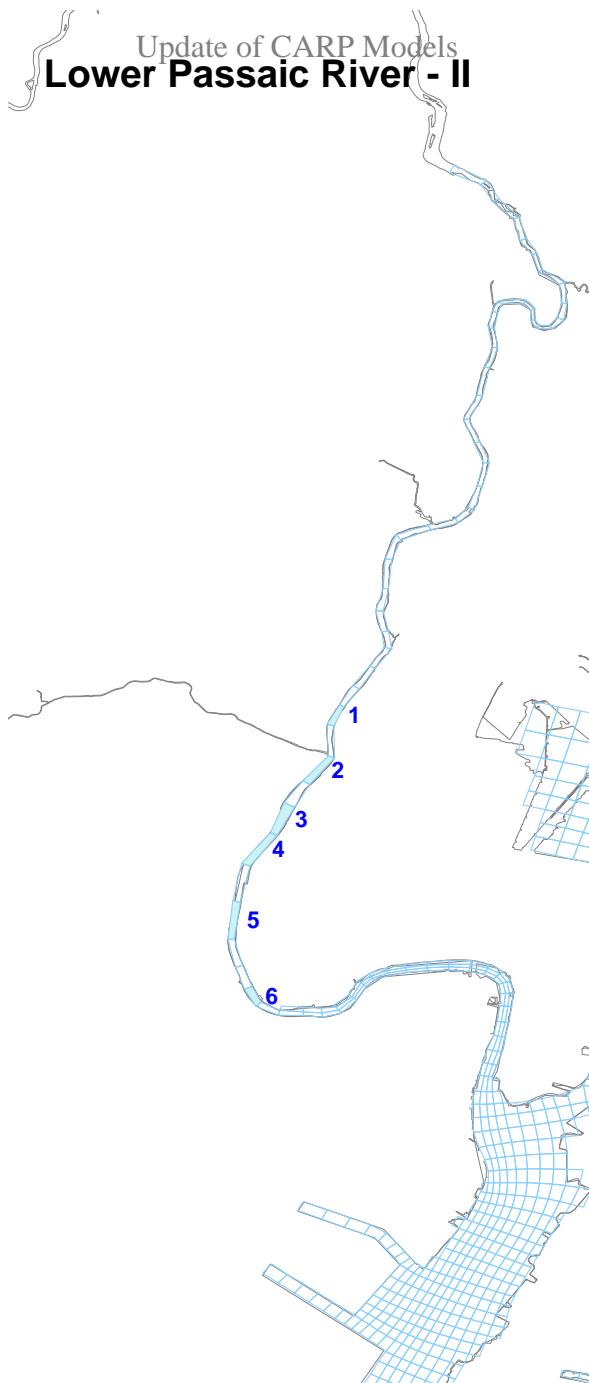
Water Column Data Comparison With Model All Water Column Layers



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 65 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- NJHDG Data
- Harbor Data

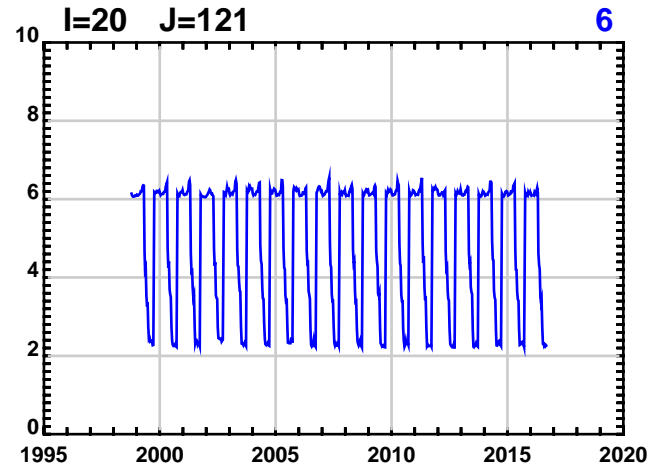
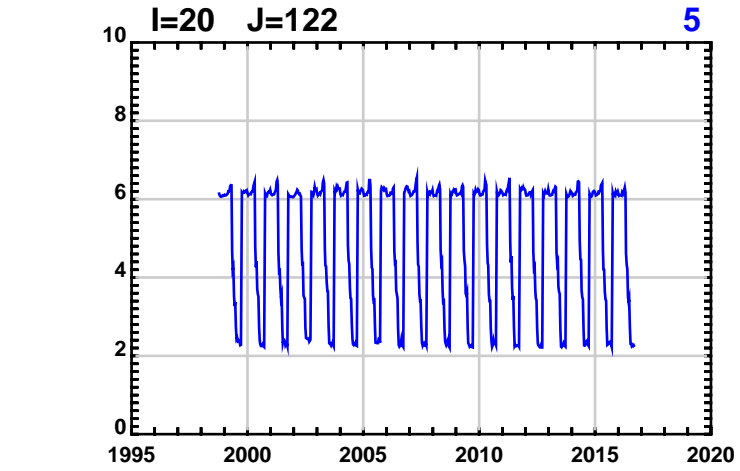
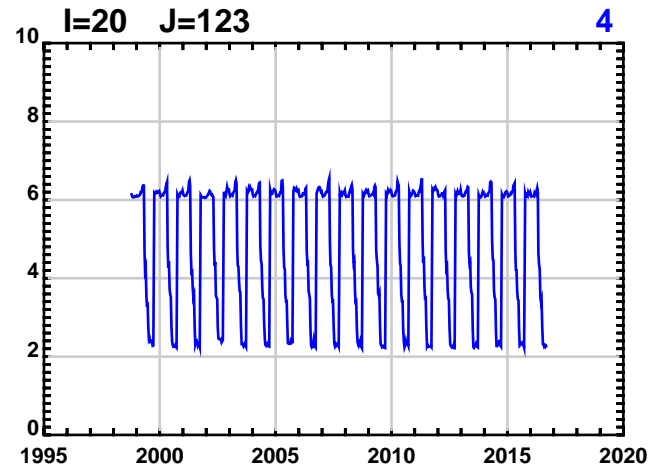
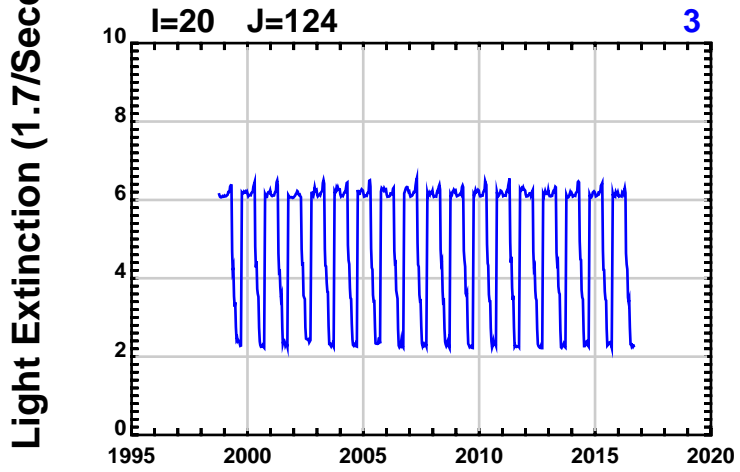
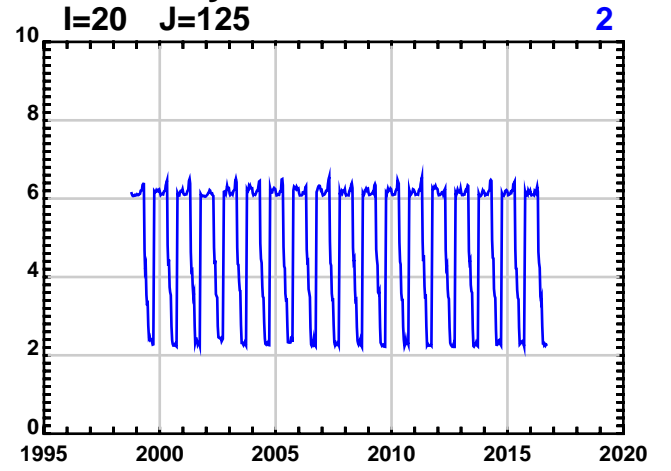
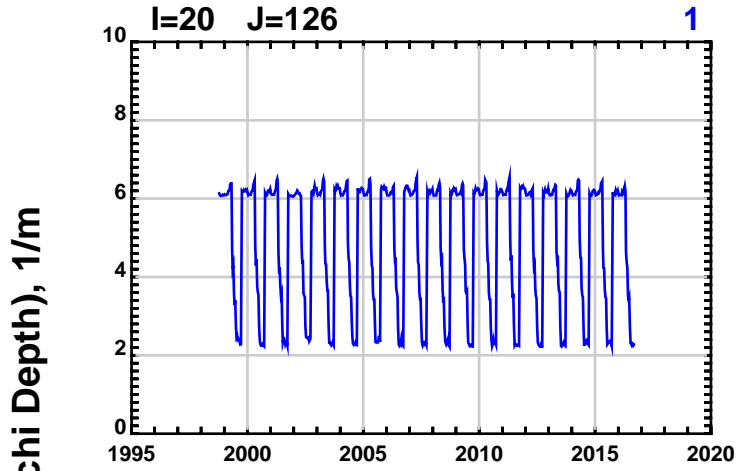
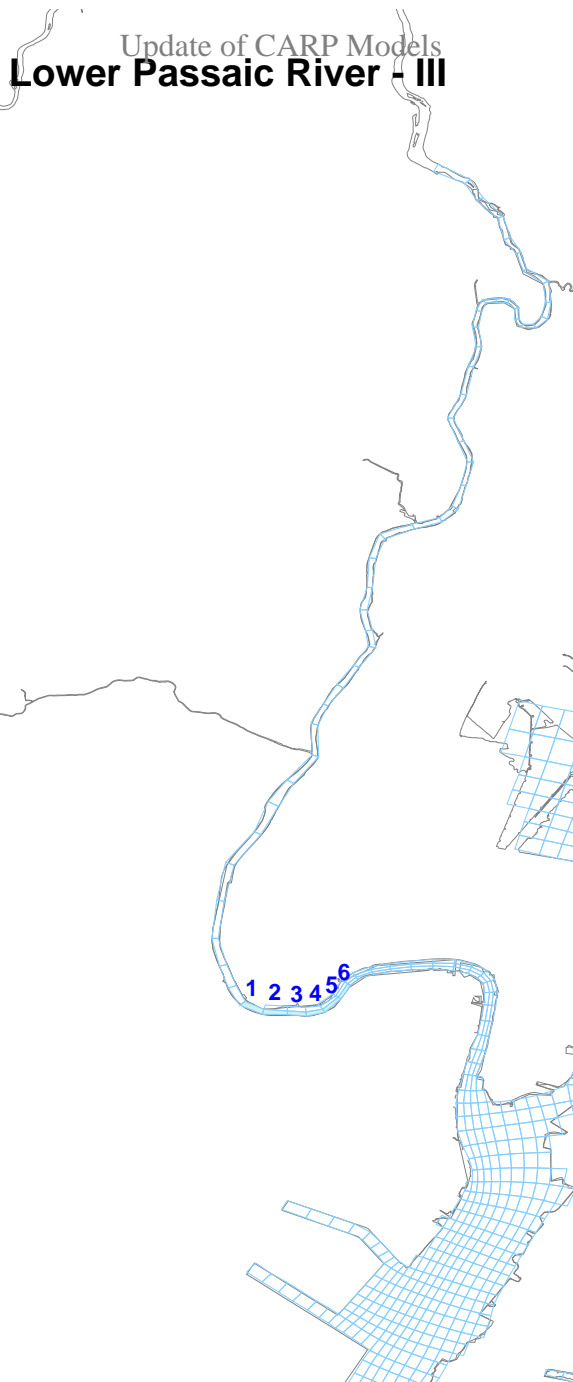
Water Column Data Comparison With Model All Water Column Layers



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 66 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- NJHDG Data
- Harbor Data

Water Column Data Comparison With Model All Water Column Layers

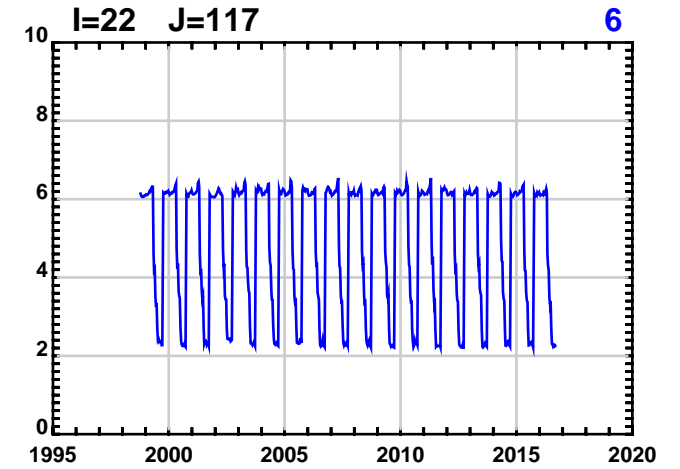
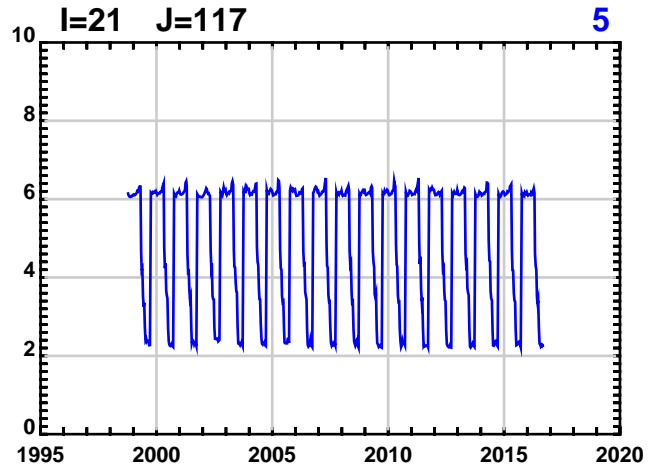
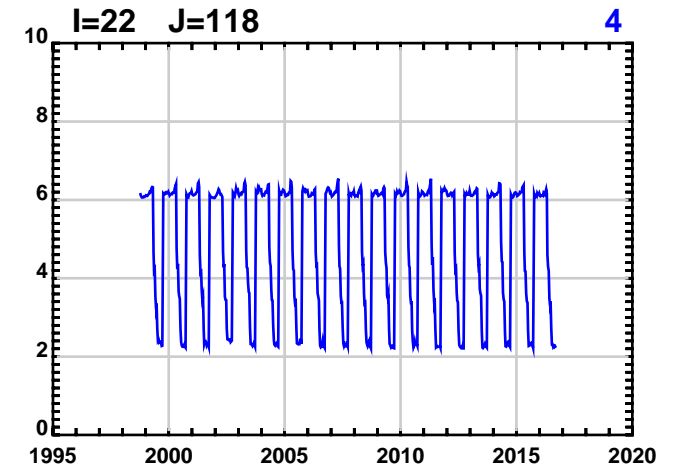
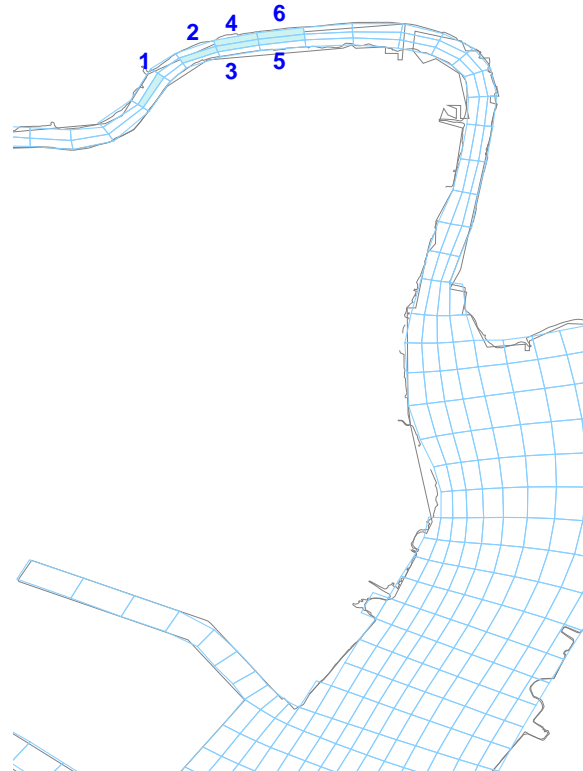
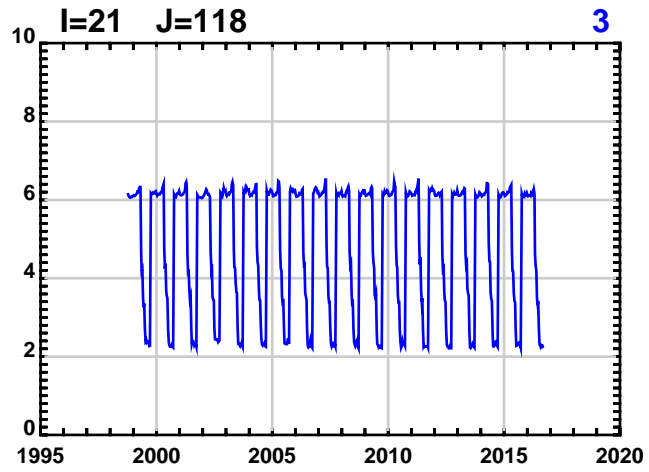
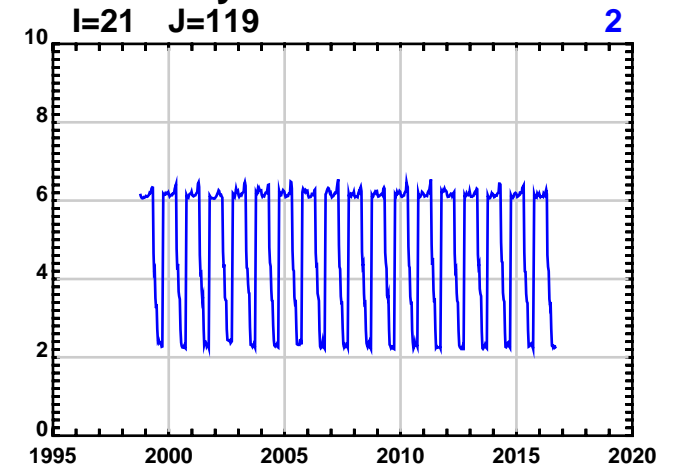
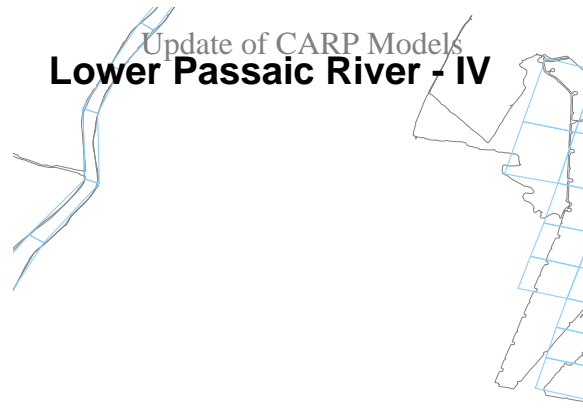
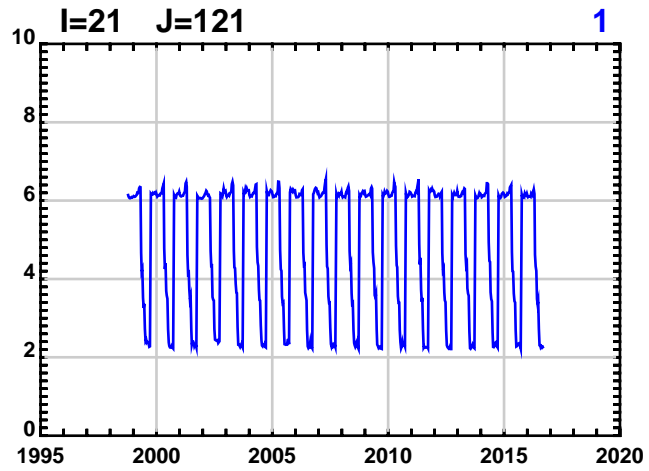


Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 67 of 76

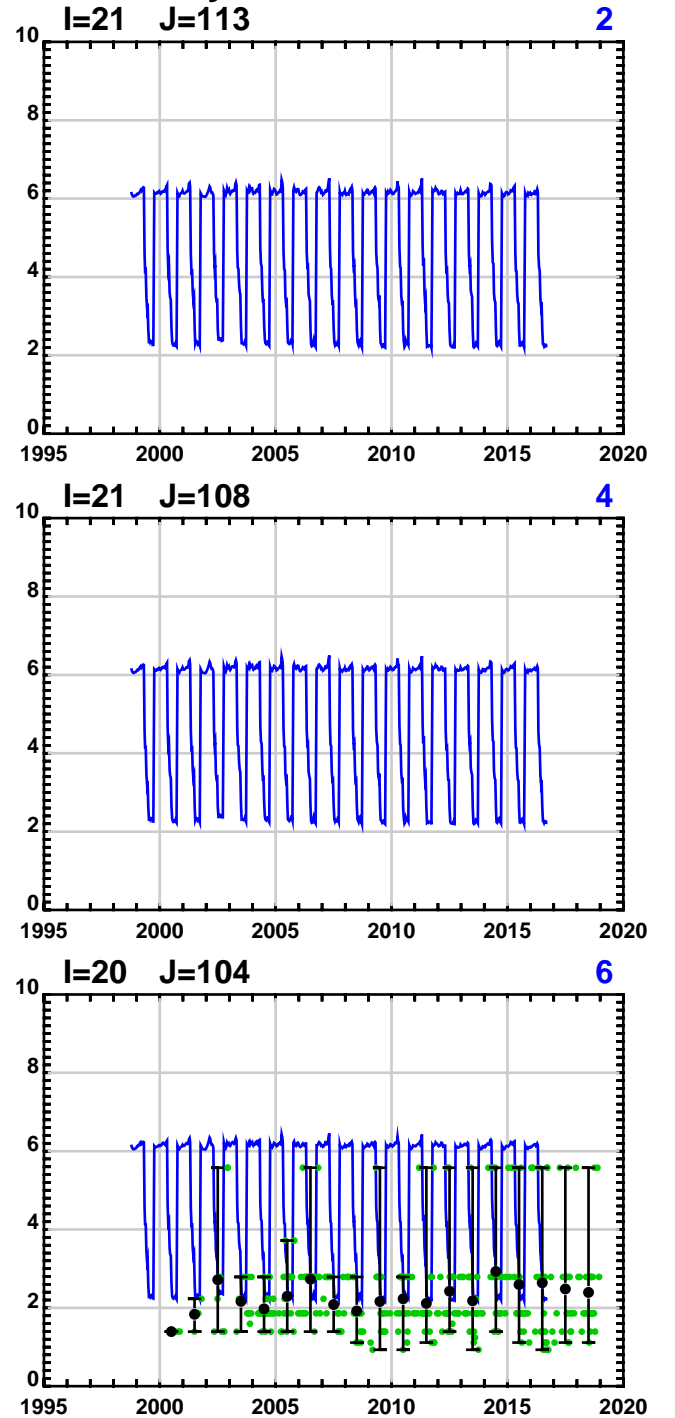
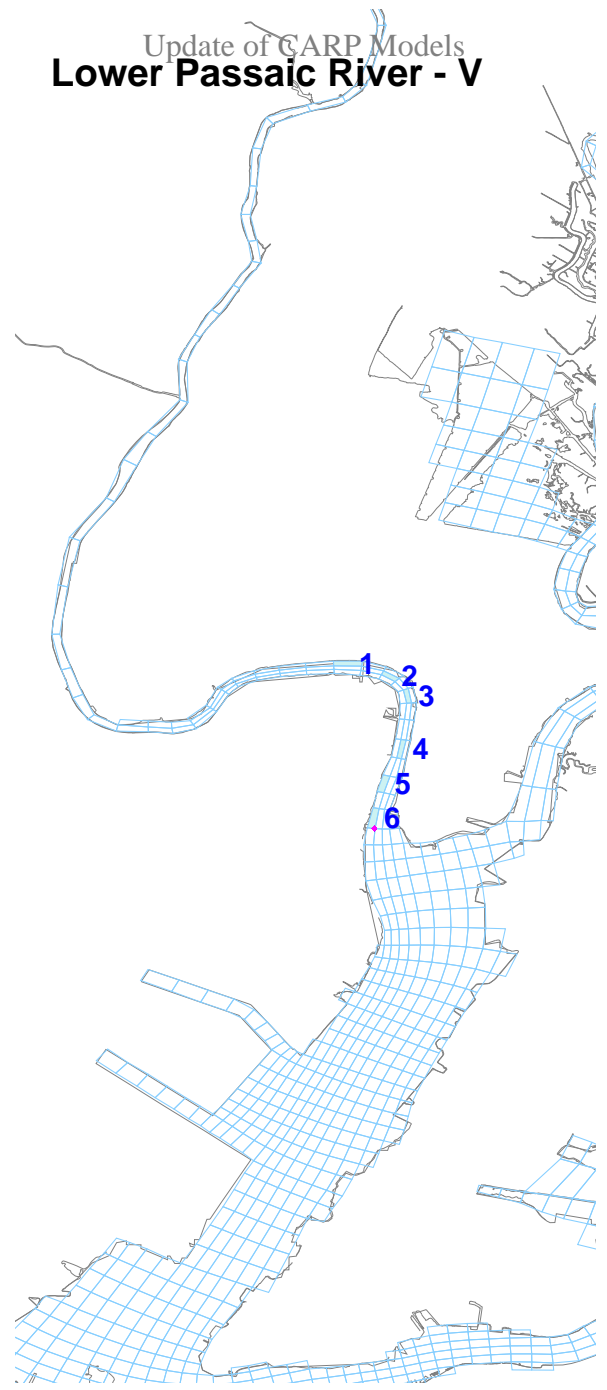
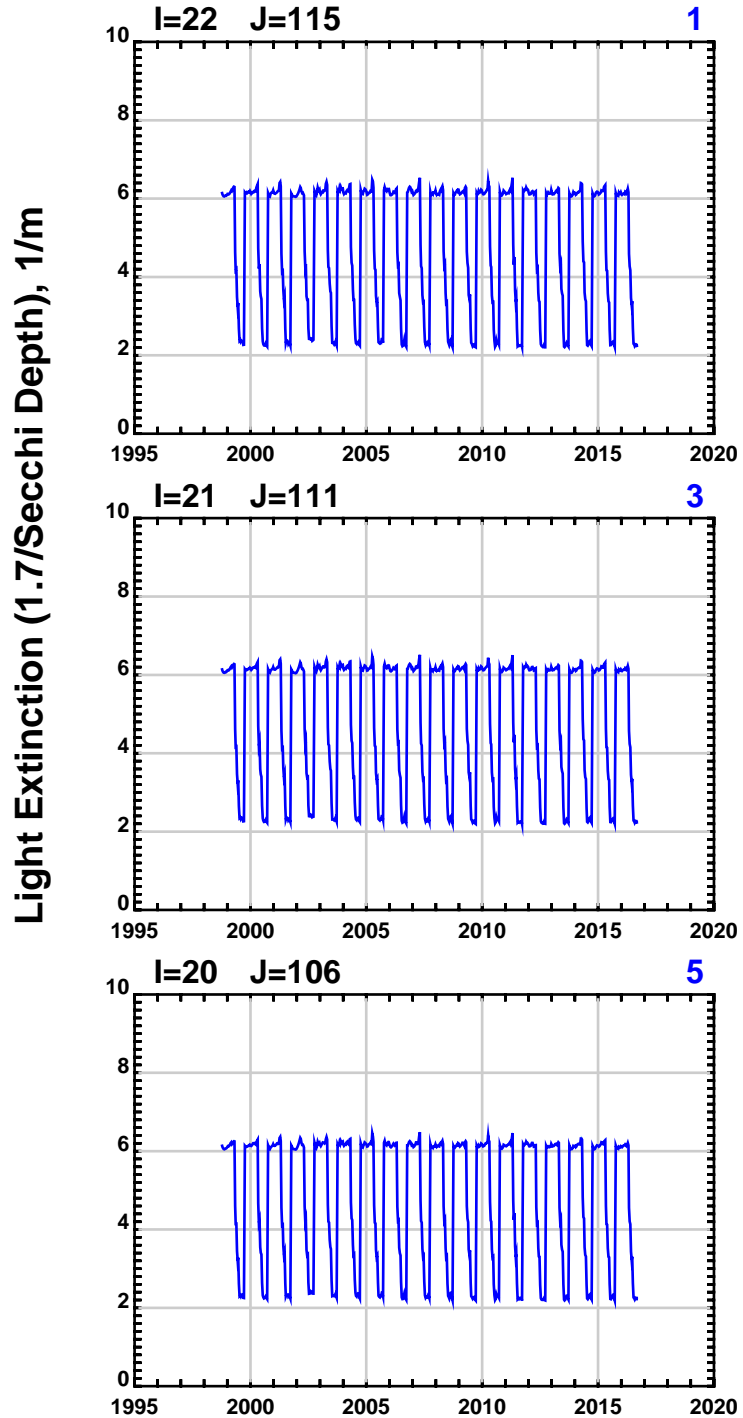
- Water Column Data: yearly mean and range
- CARP2 Data
- NJHDG Data
- Harbor Data

Water Column Data Comparison With Model All Water Column Layers

Light Extinction (1.7/Secchi Depth), 1/m



Water Column Data Comparison With Model All Water Column Layers

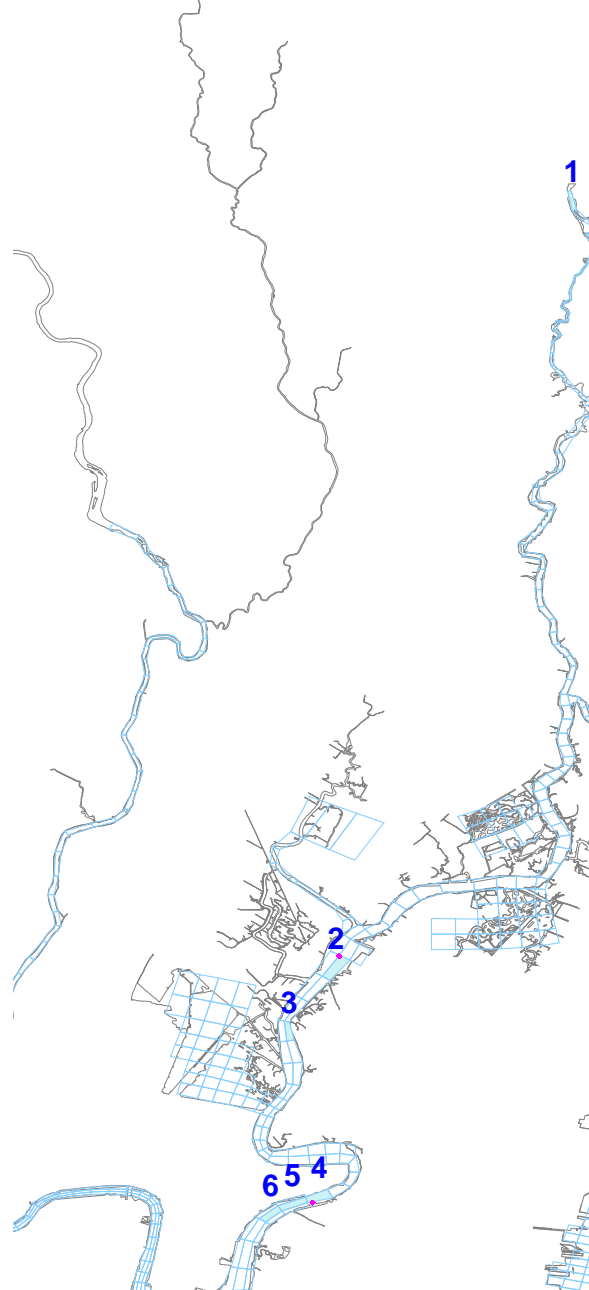
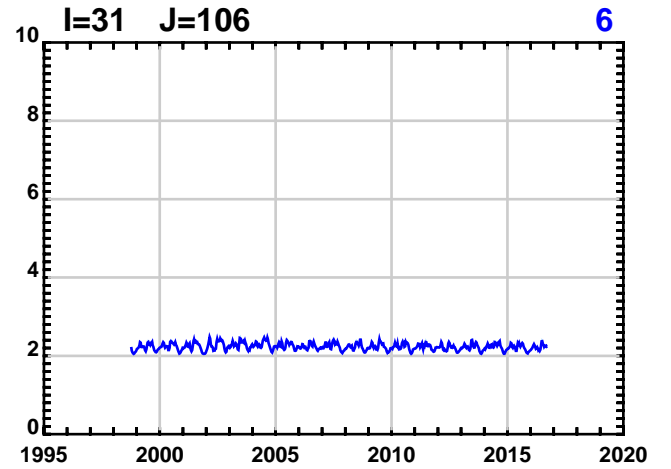
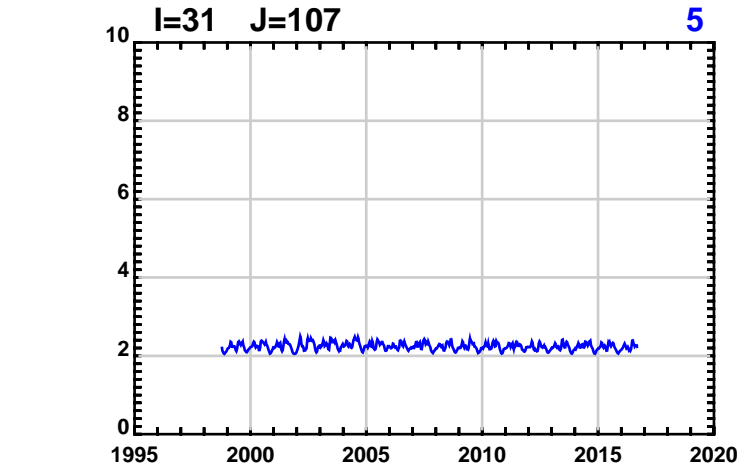
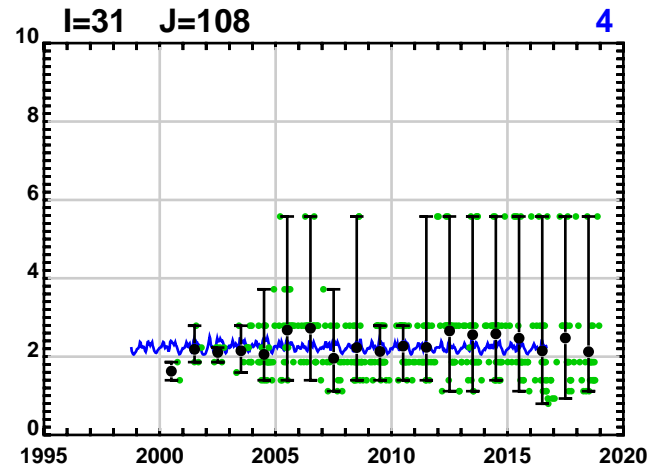
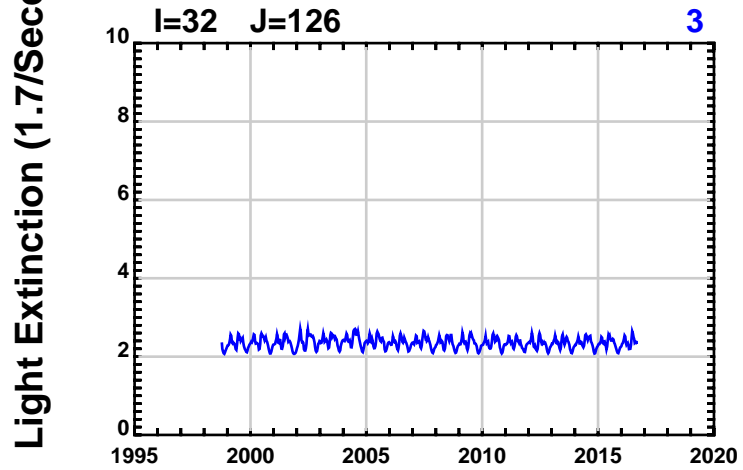
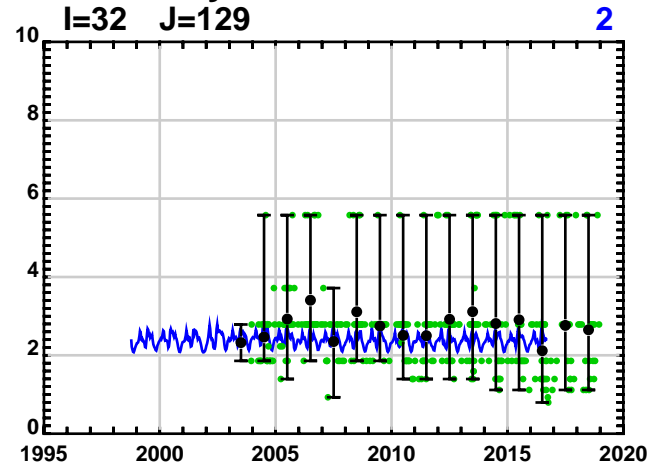
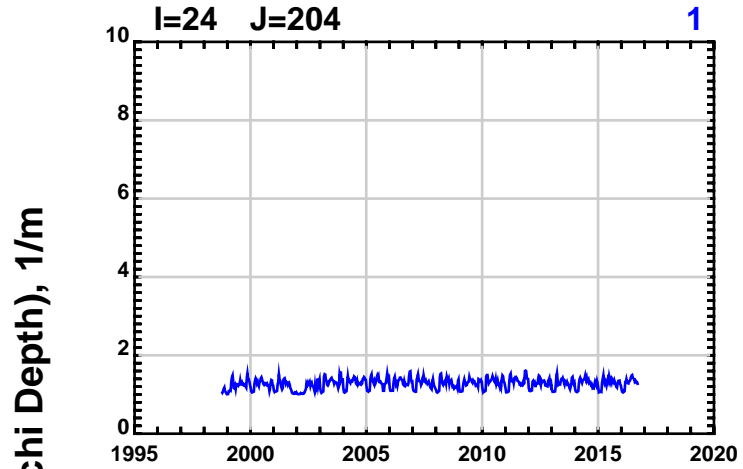


Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 69 of 76

● Water Column Data: yearly mean and range
 ● CARP2 Data
 ● Harbor Data
 ● NJHDG Data

Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models Hackensack River

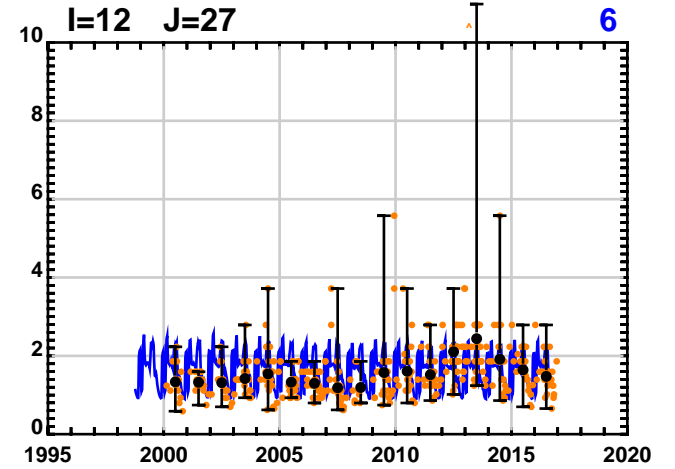
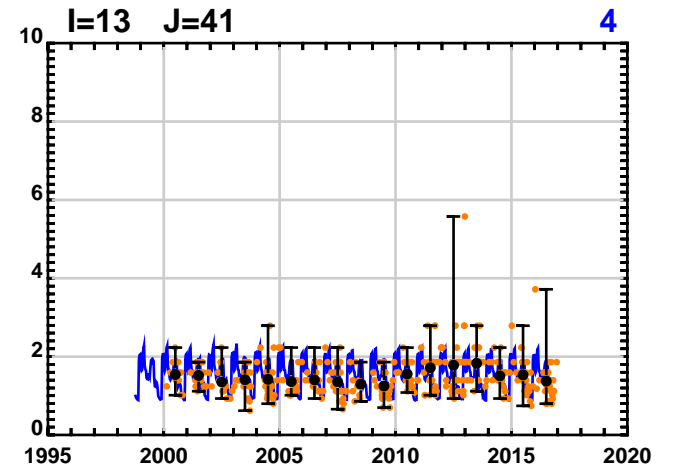
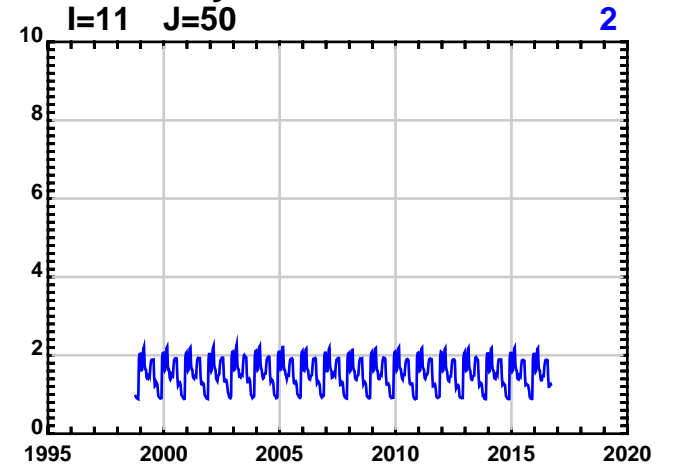
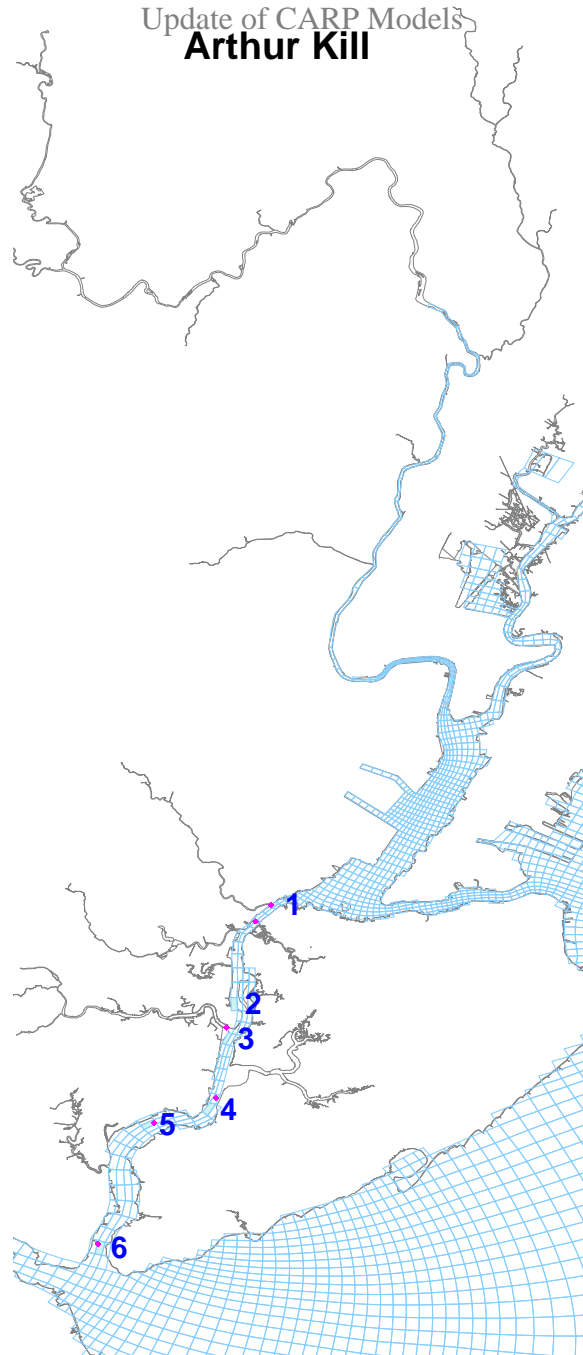
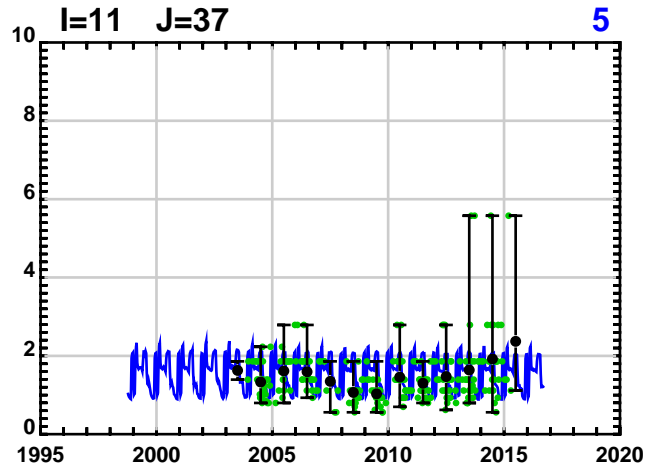
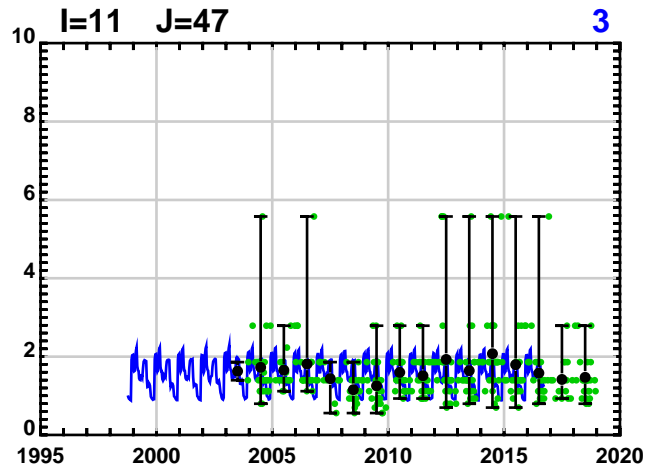
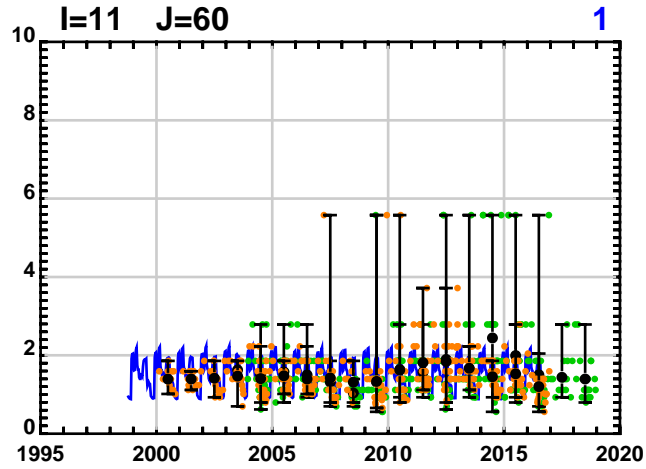


Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 70 of 76

● Water Column Data: yearly mean and range
● CARP2 Data
● Harbor Data
● NJHDG Data

Water Column Data Comparison With Model All Water Column Layers

Light Extinction (1.7/Secchi Depth), 1/m



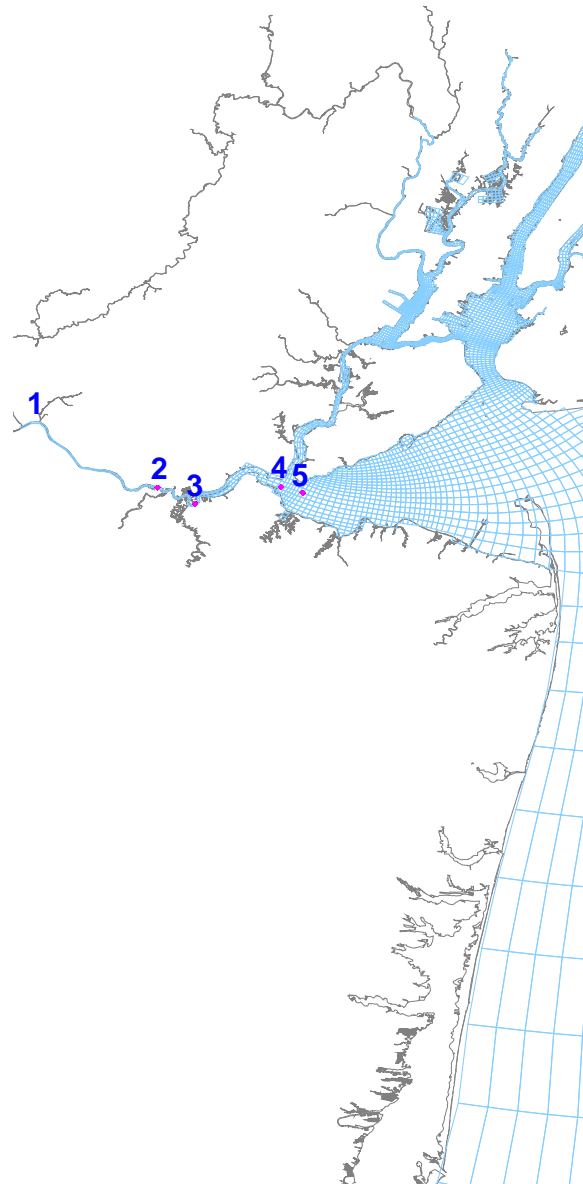
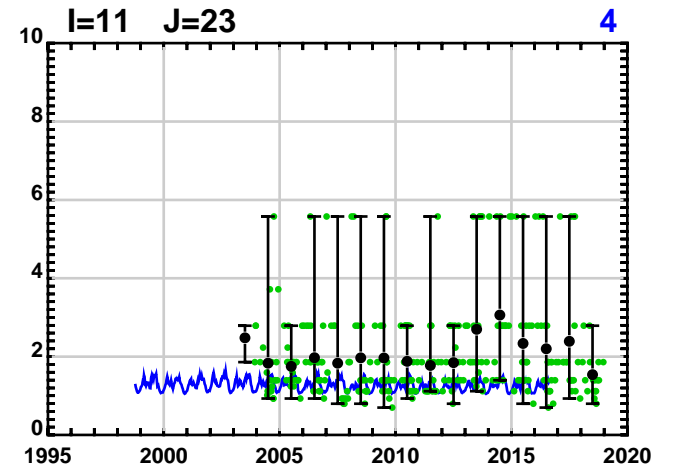
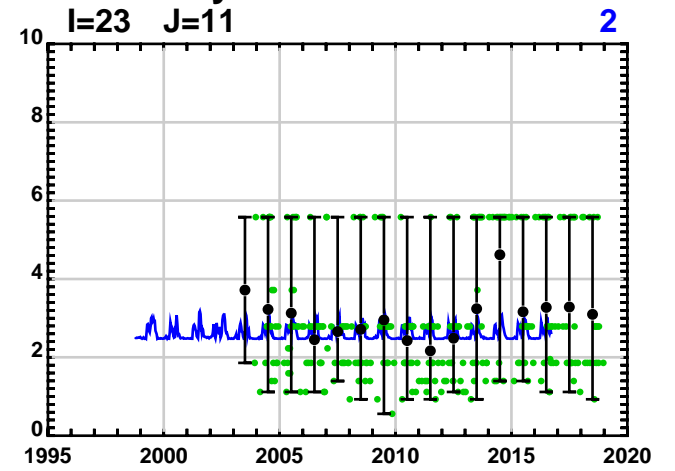
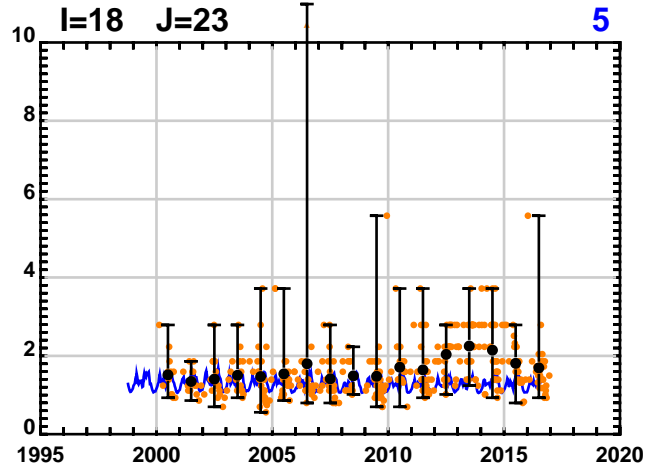
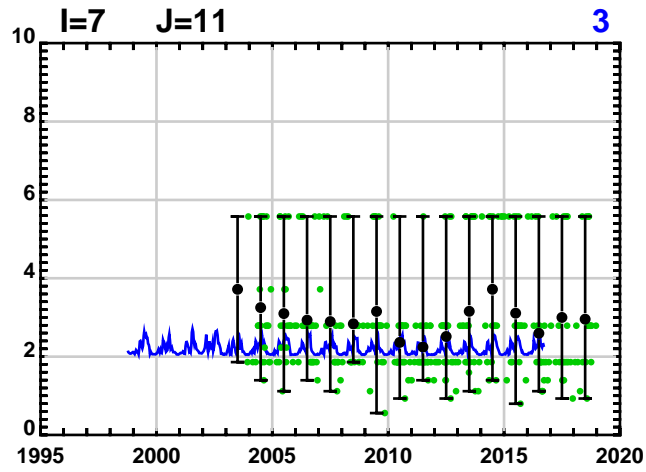
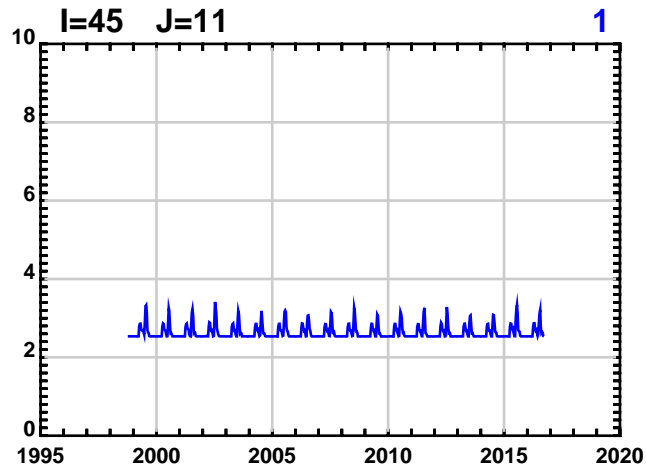
Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 71 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- Harbor Data
- NJHDG Data

Water Column Data Comparison With Model All Water Column Layers

Update of CARP Models
Raritan River

Light Extinction (1.7/Secchi Depth), 1/m

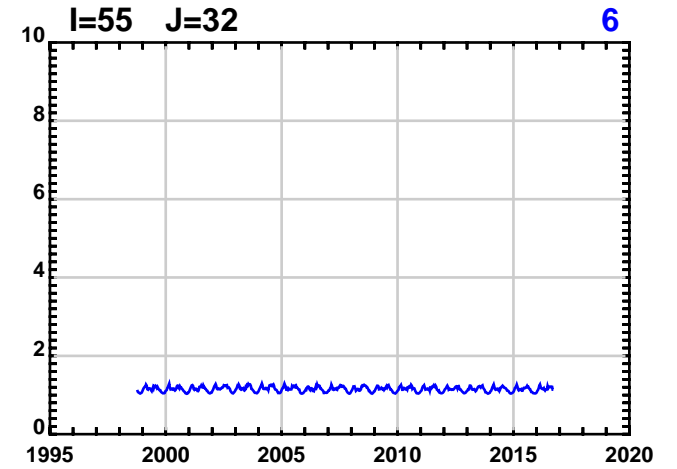
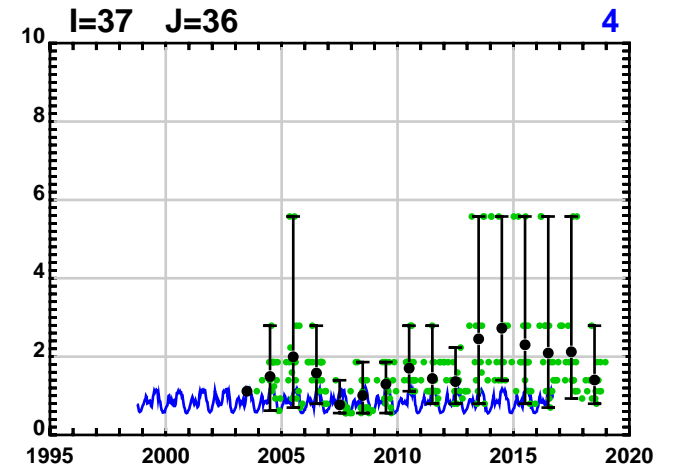
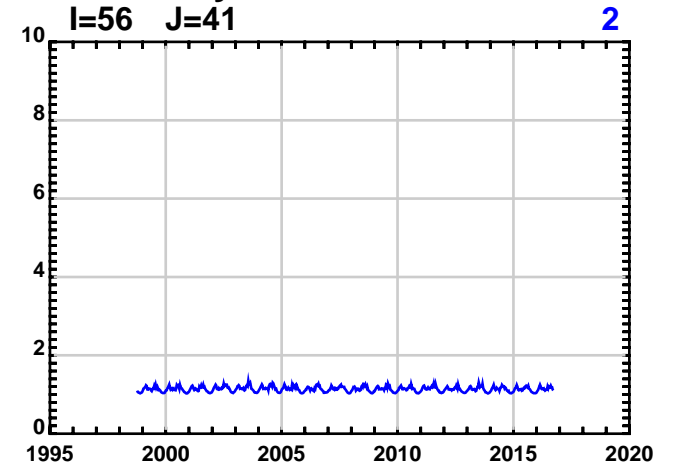
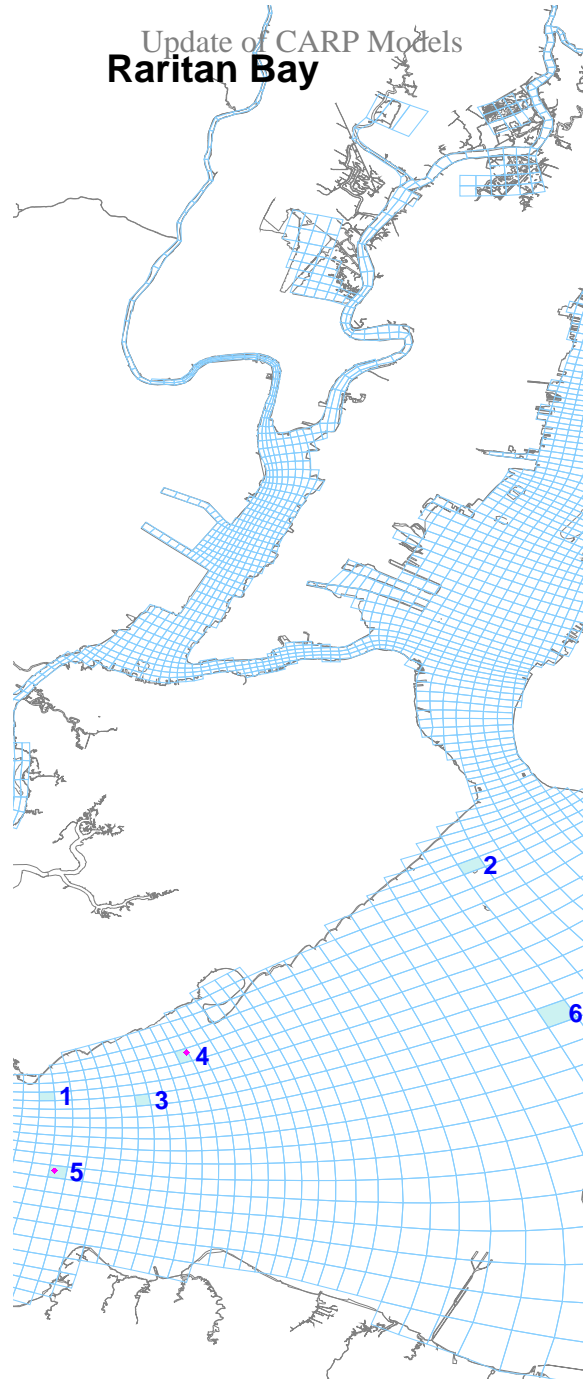
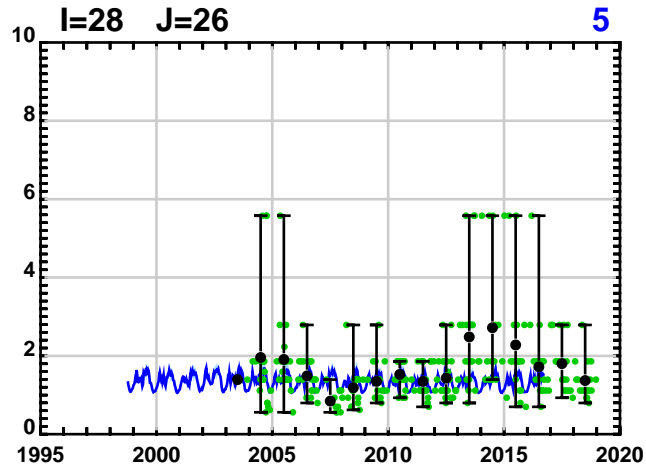
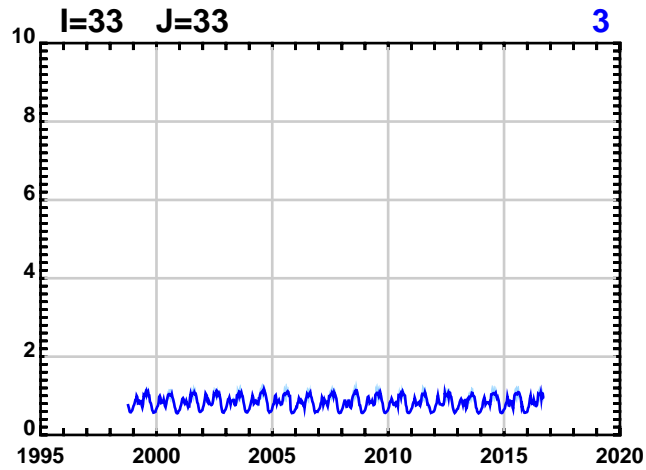
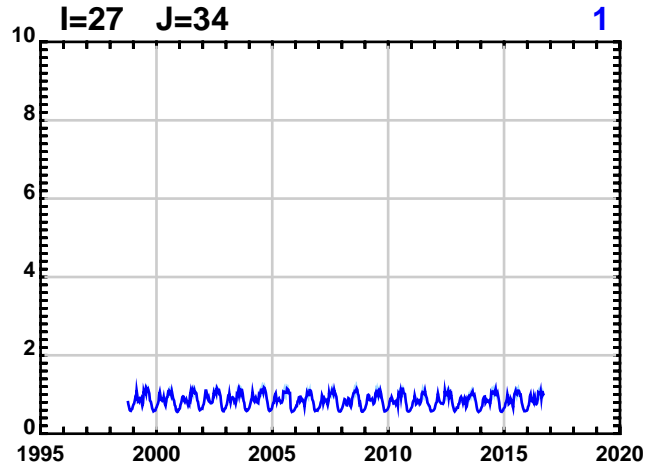


Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 72 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- NJHDG Data
- Harbor Data

Water Column Data Comparison With Model All Water Column Layers

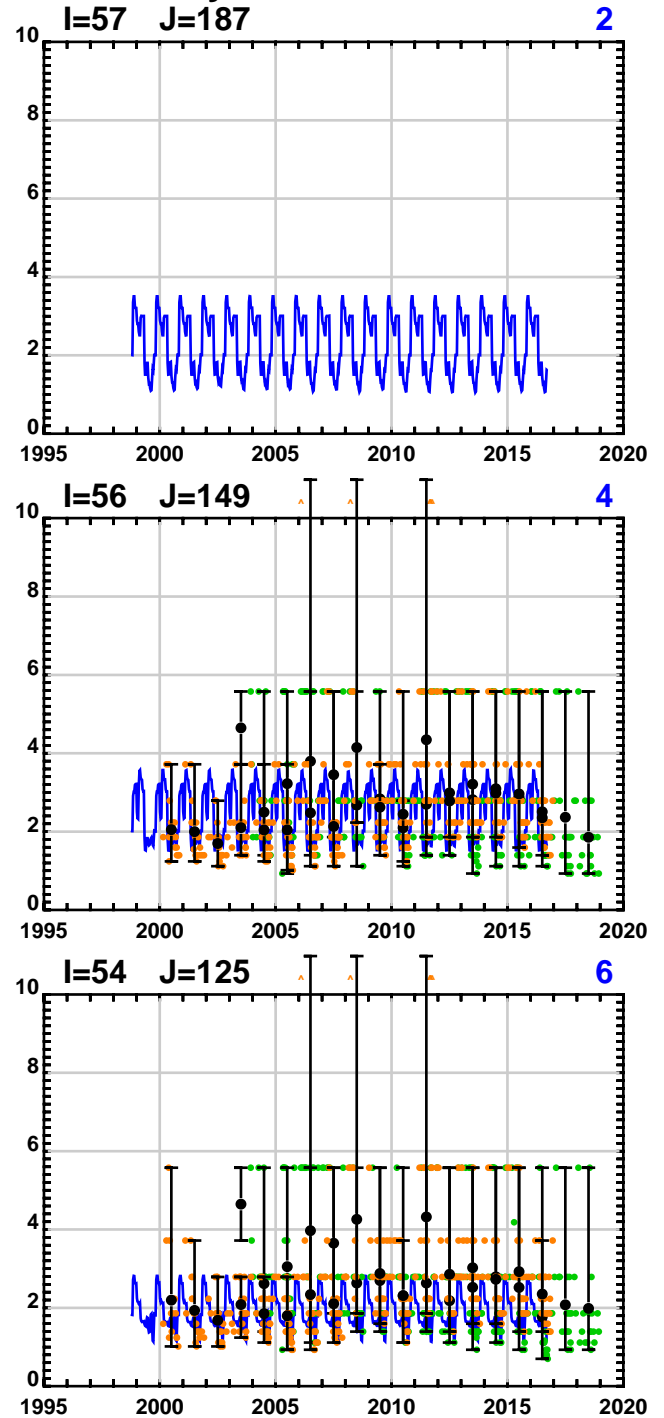
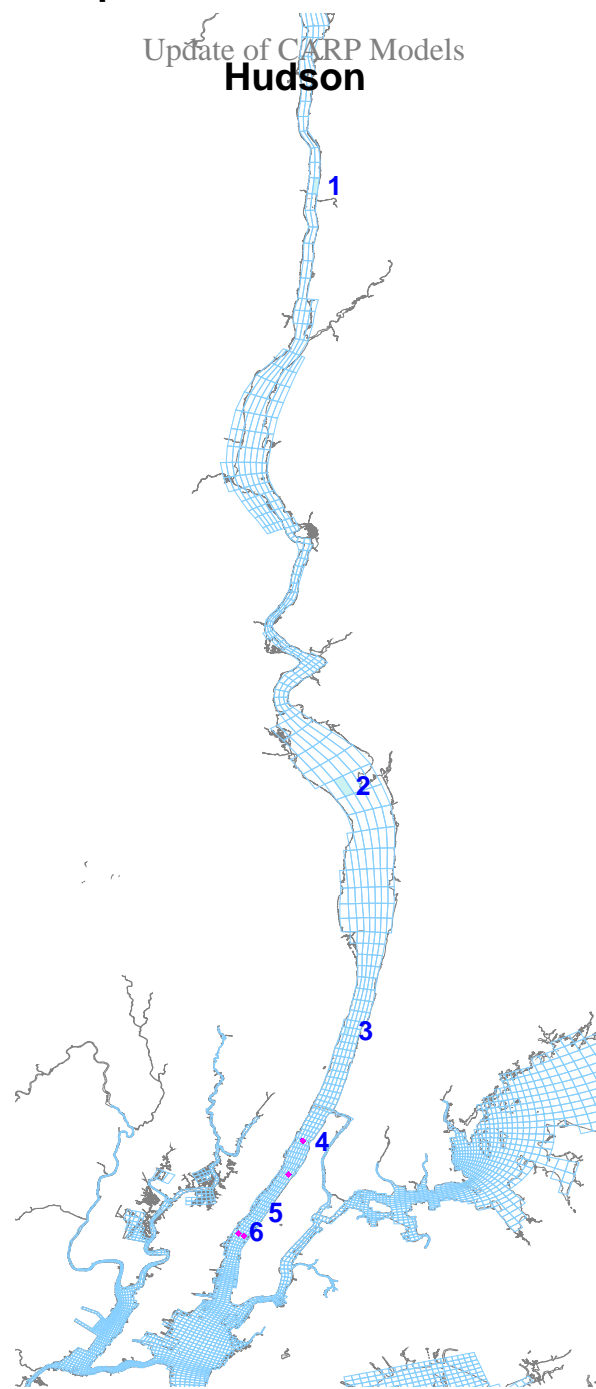
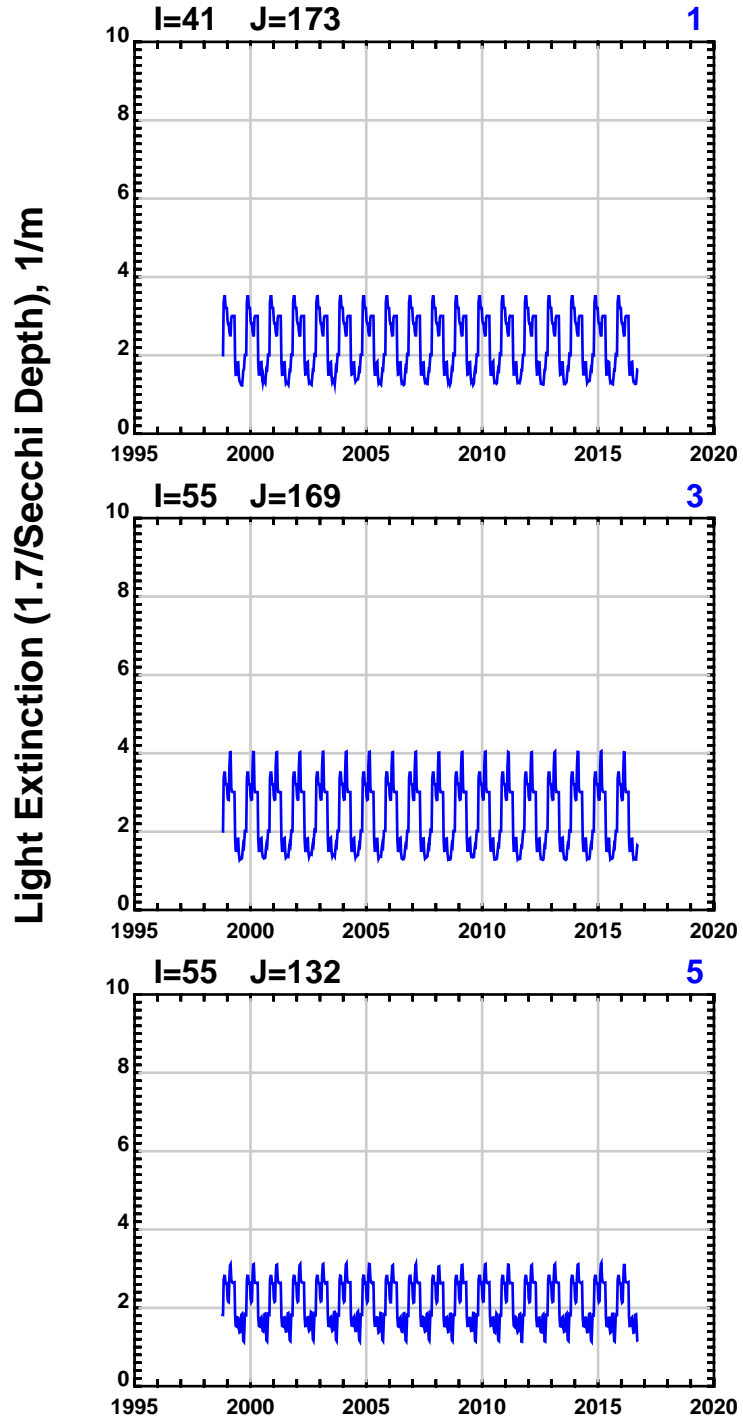
Light Extinction (1.7/Secchi Depth), 1/m



Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 73 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- NJHDG Data
- Harbor Data

Water Column Data Comparison With Model All Water Column Layers

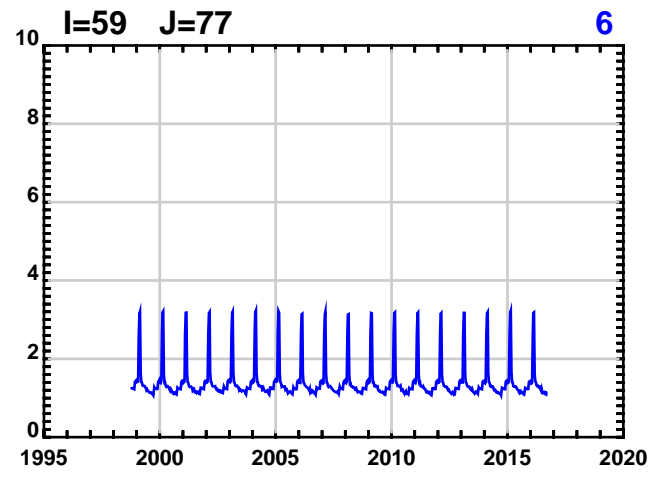
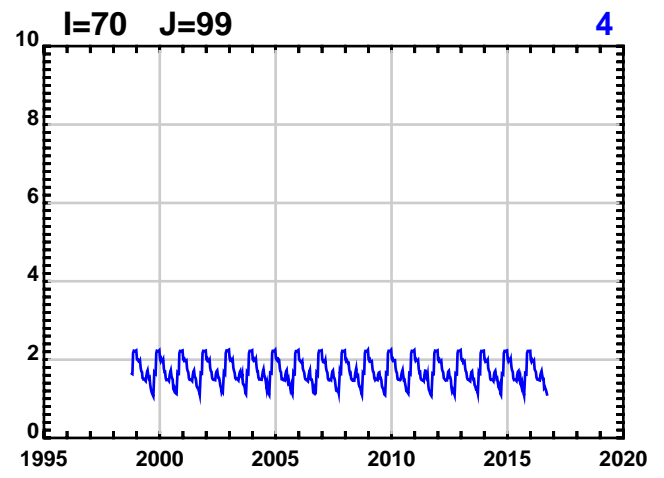
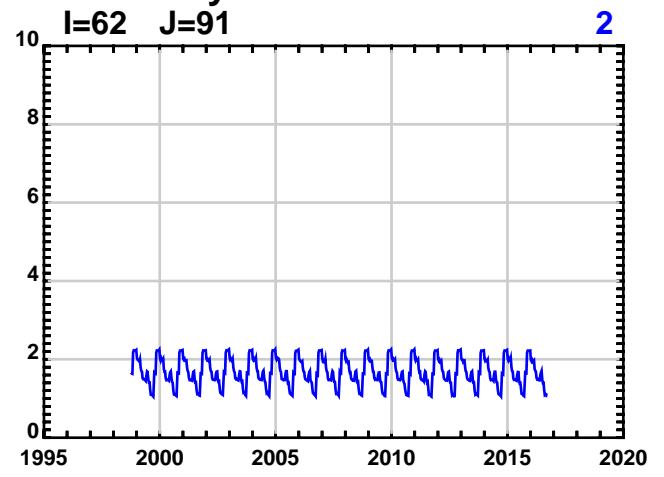
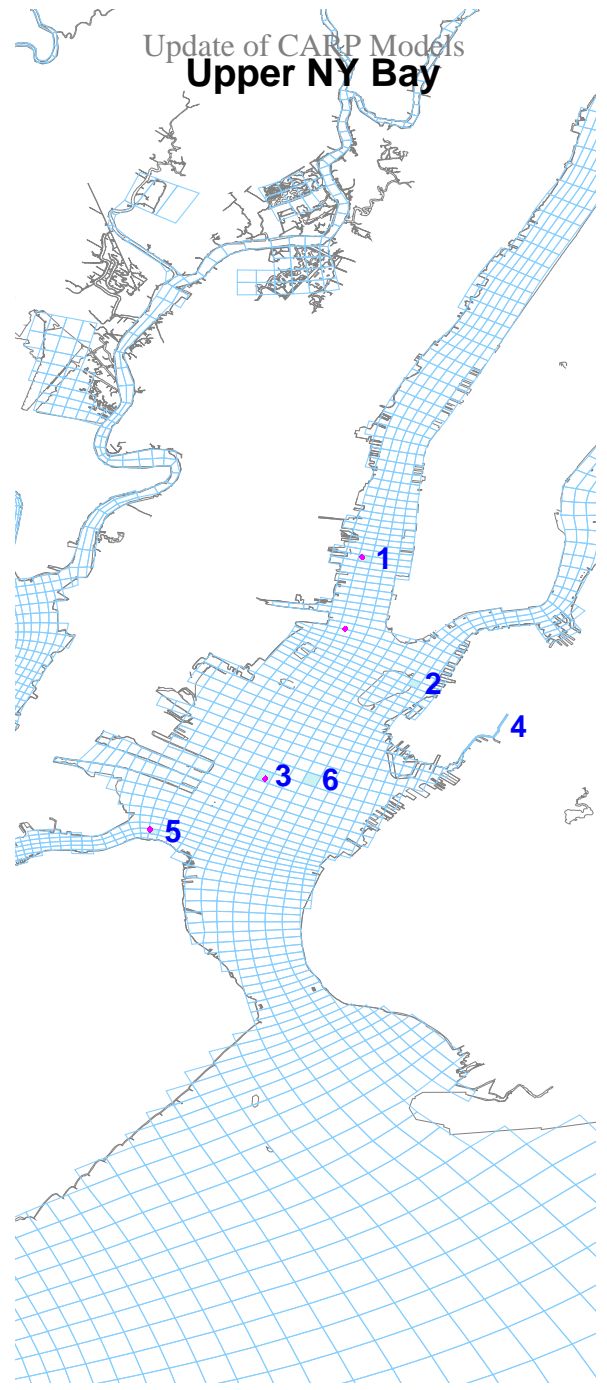
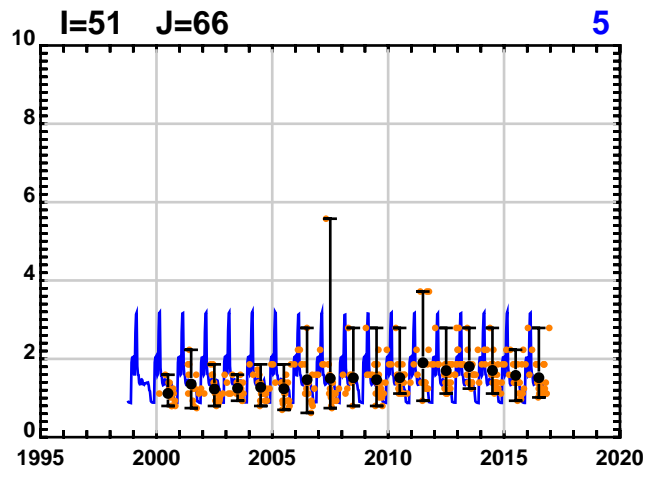
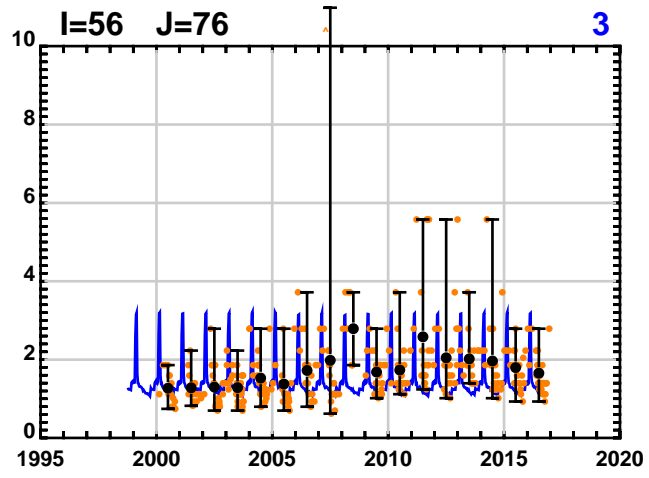
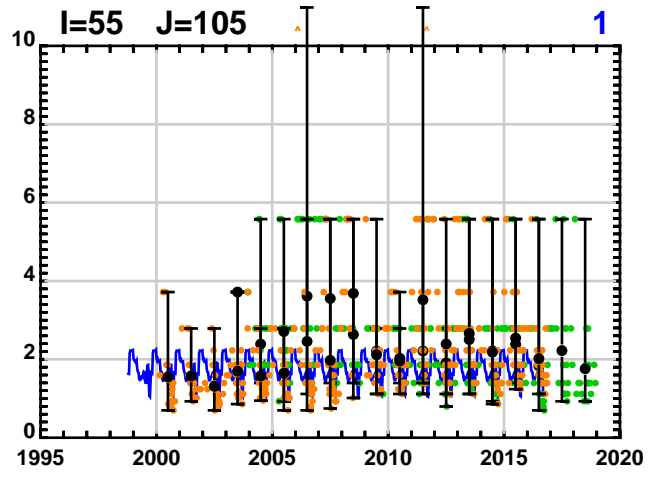


Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 74 of 76

● Water Column Data: yearly mean and range
 ● CARP2 Data
 ● Harbor Data
 ● NJHDG Data

Water Column Data Comparison With Model All Water Column Layers

Light Extinction (1.7/Secchi Depth), 1/m

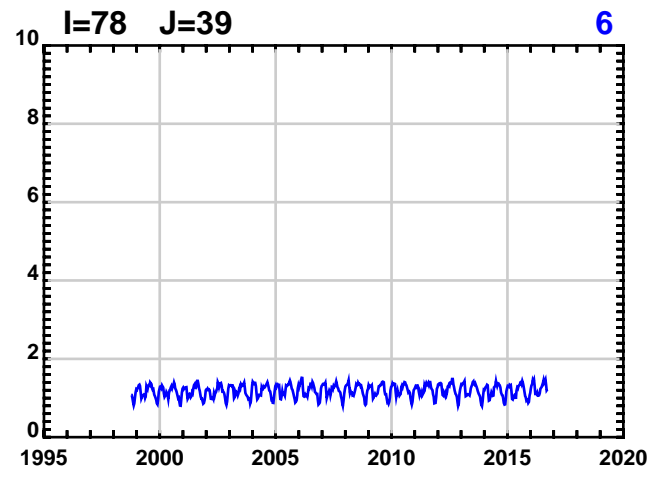
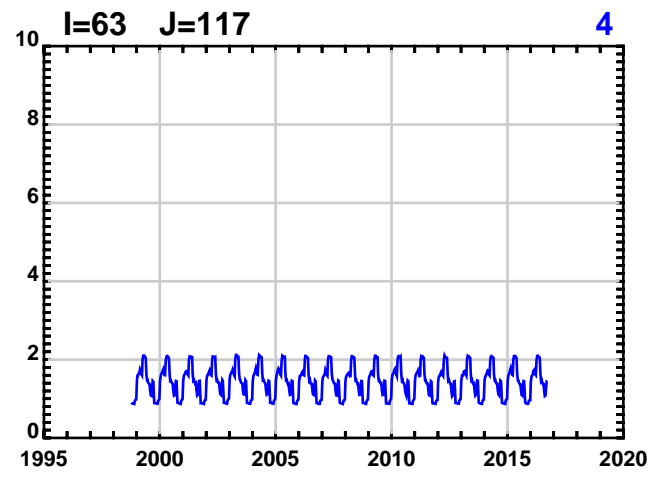
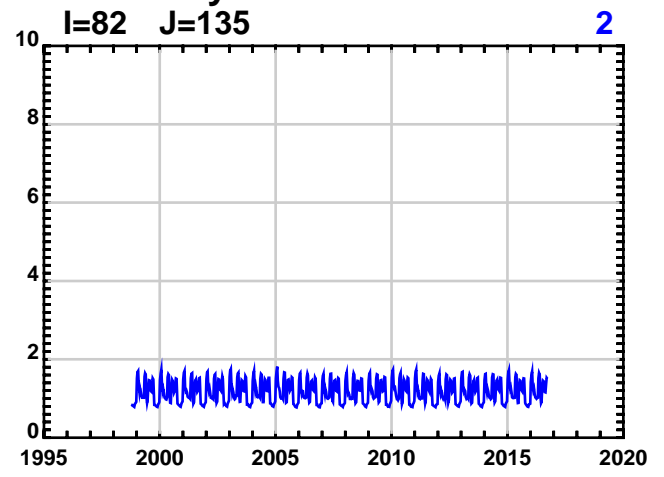
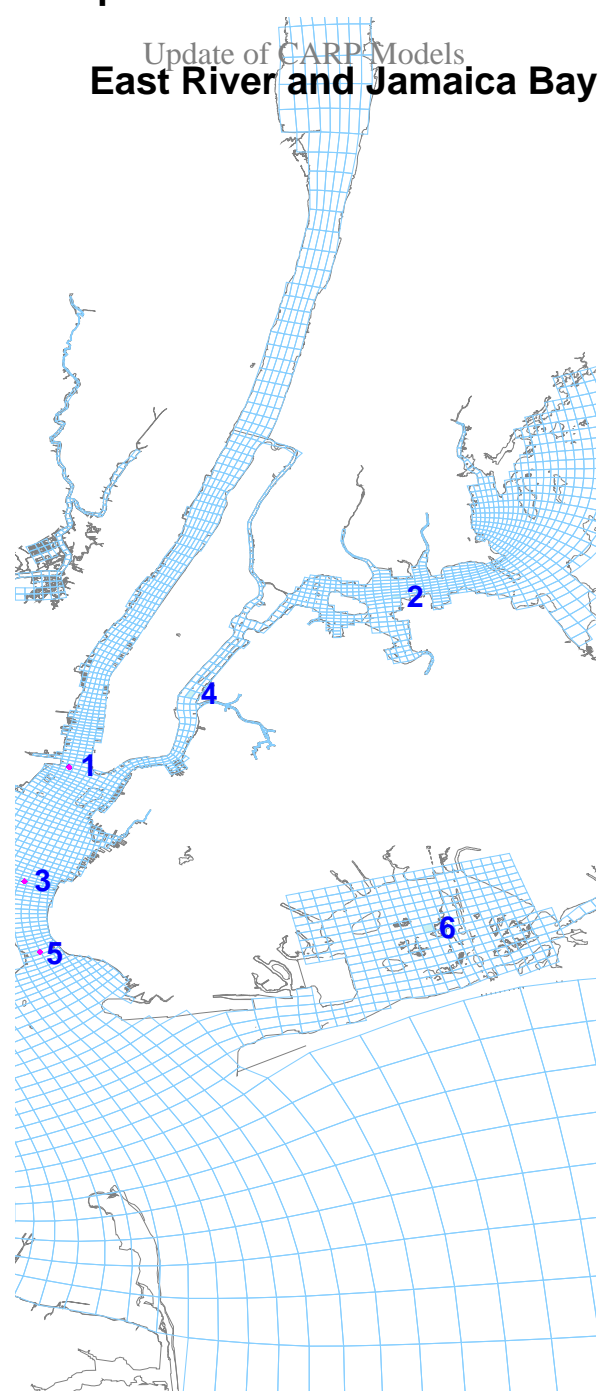
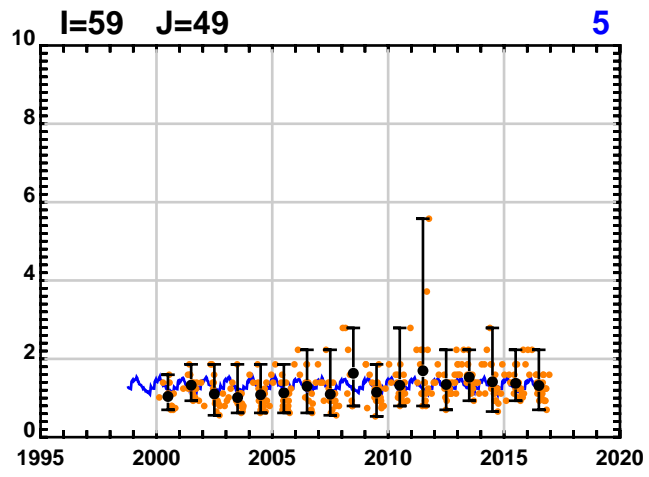
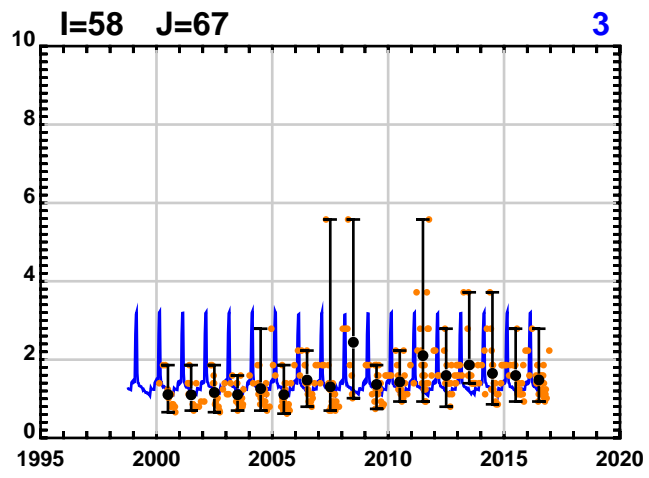
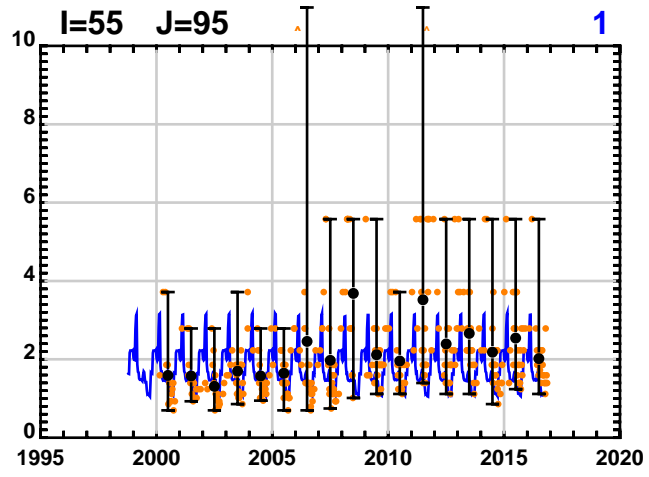


Detect Data
Model: mean and range of values in Water Column Appendix 12 Page 75 of 76

- Water Column Data: yearly mean and range
- CARP2 Data
- Harbor Data
- NJHDG Data

Water Column Data Comparison With Model All Water Column Layers

Light Extinction (1.7/Secchi Depth), 1/m



Detect Data
Model: mean and range of values in Water Column

- Water Column Data: yearly mean and range
- CARP2 Data
- NJHDG Data
- Harbor Data