



PROGRESS REPORT OF RAPPAHANNOCK RIVER MODELING

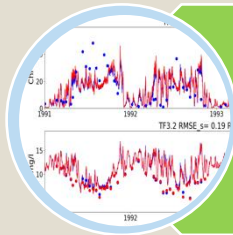
Quarterly meeting: Oct. 28, 2026

*PIs: Jian Shen, Qubin Qin, Zhengui Wang, and Pierre St-Laurent
Advisory team: Joseph Zhang and Marjorie Friedrichs*

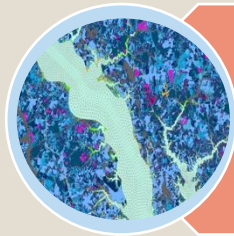
Outline



Progress summary

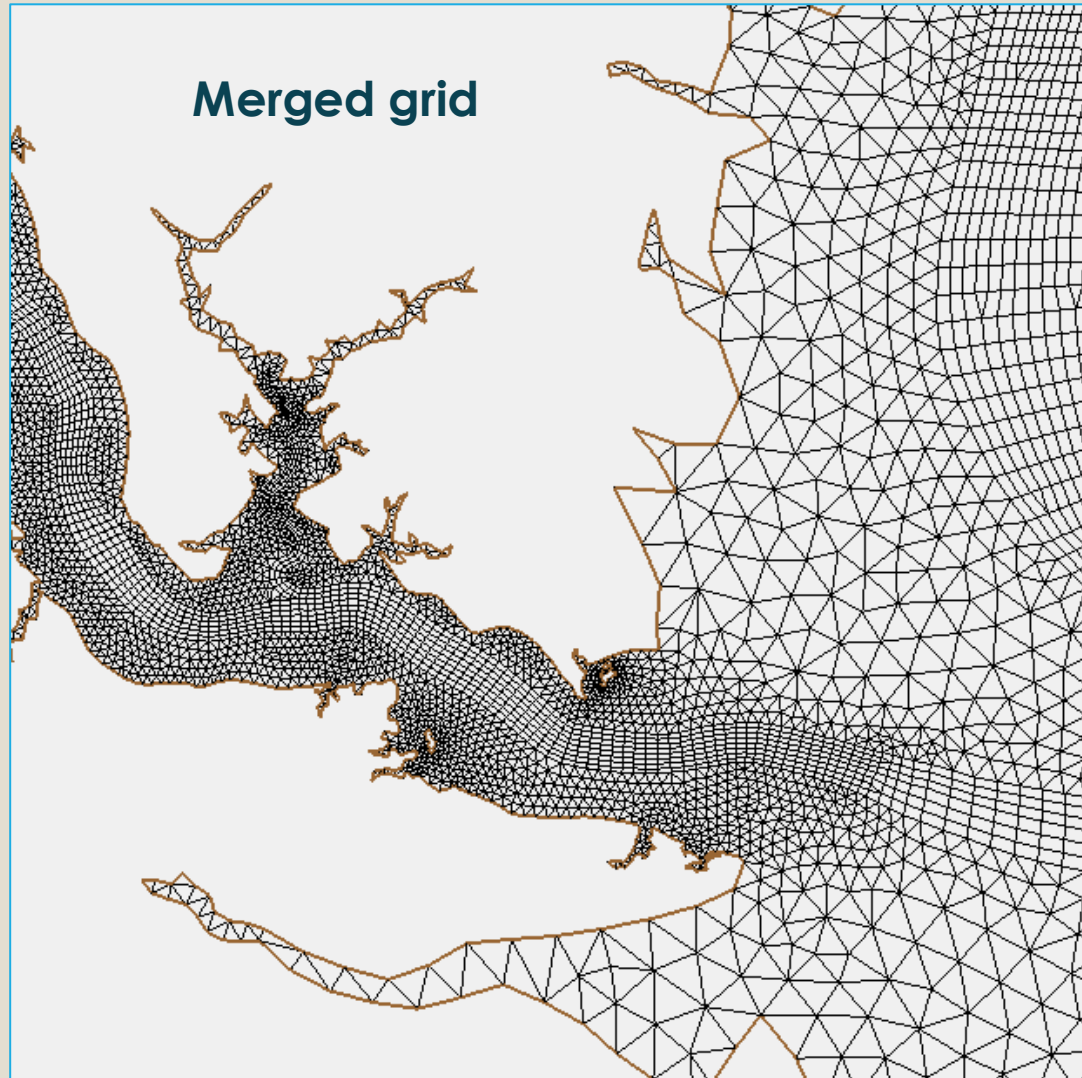
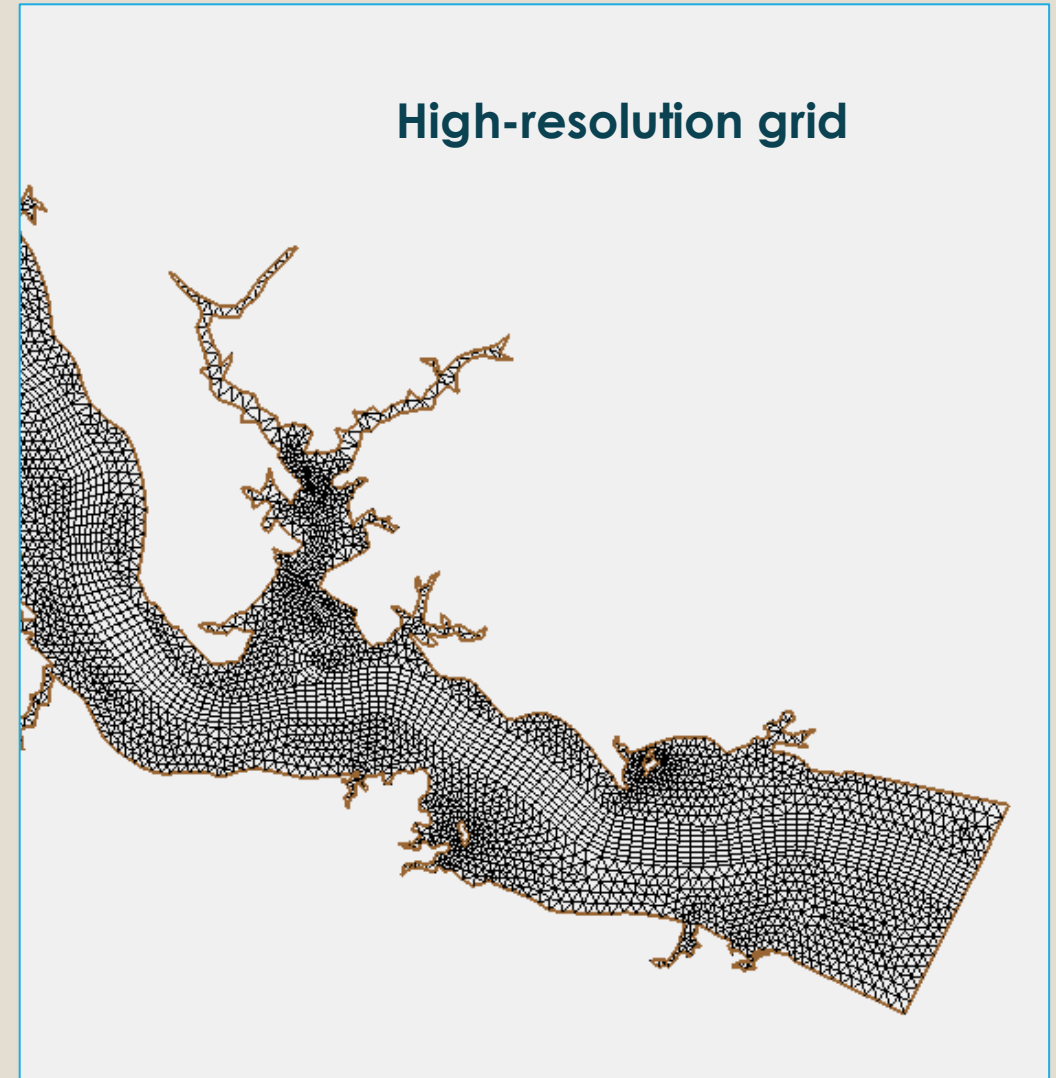


Compare model with new loading vs. previous version



Summary and next step

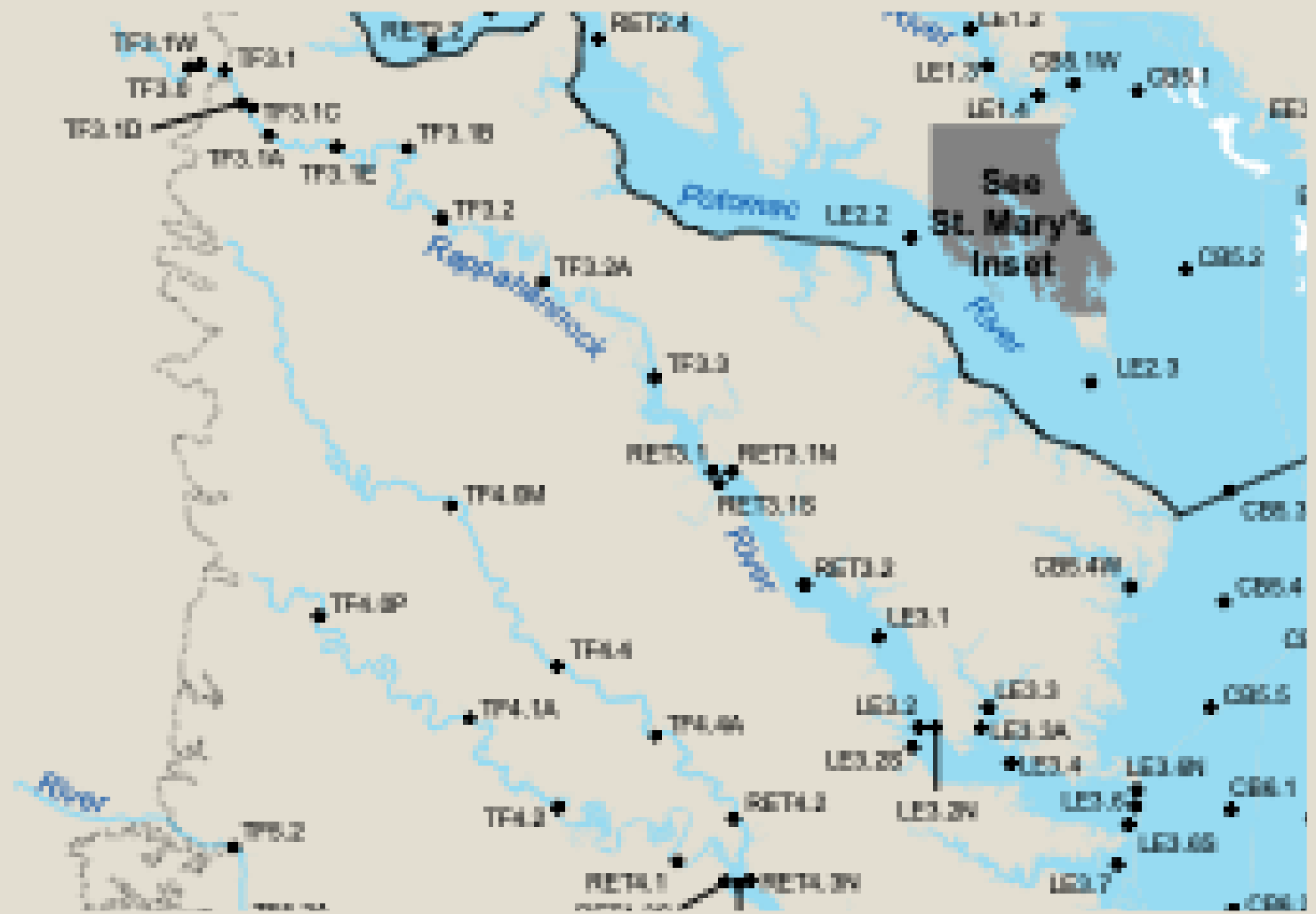
Marge bay grid and Rappahannock River grid



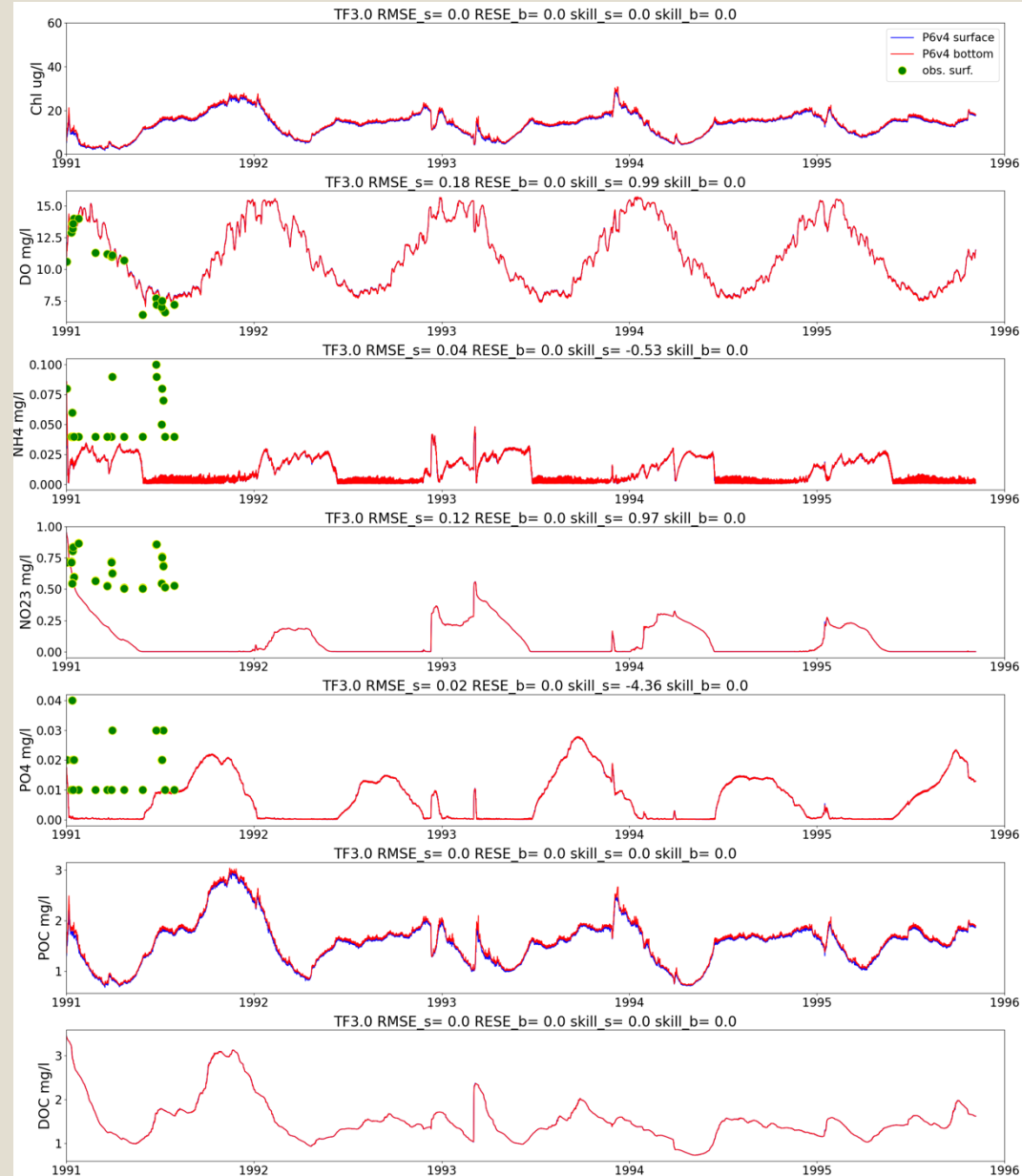
Progress

- Configure Rappahannock River using updated MBM
 - Changed watershed loading
 - marsh input and SAV included
- Test both hydrodynamic model and water quality model

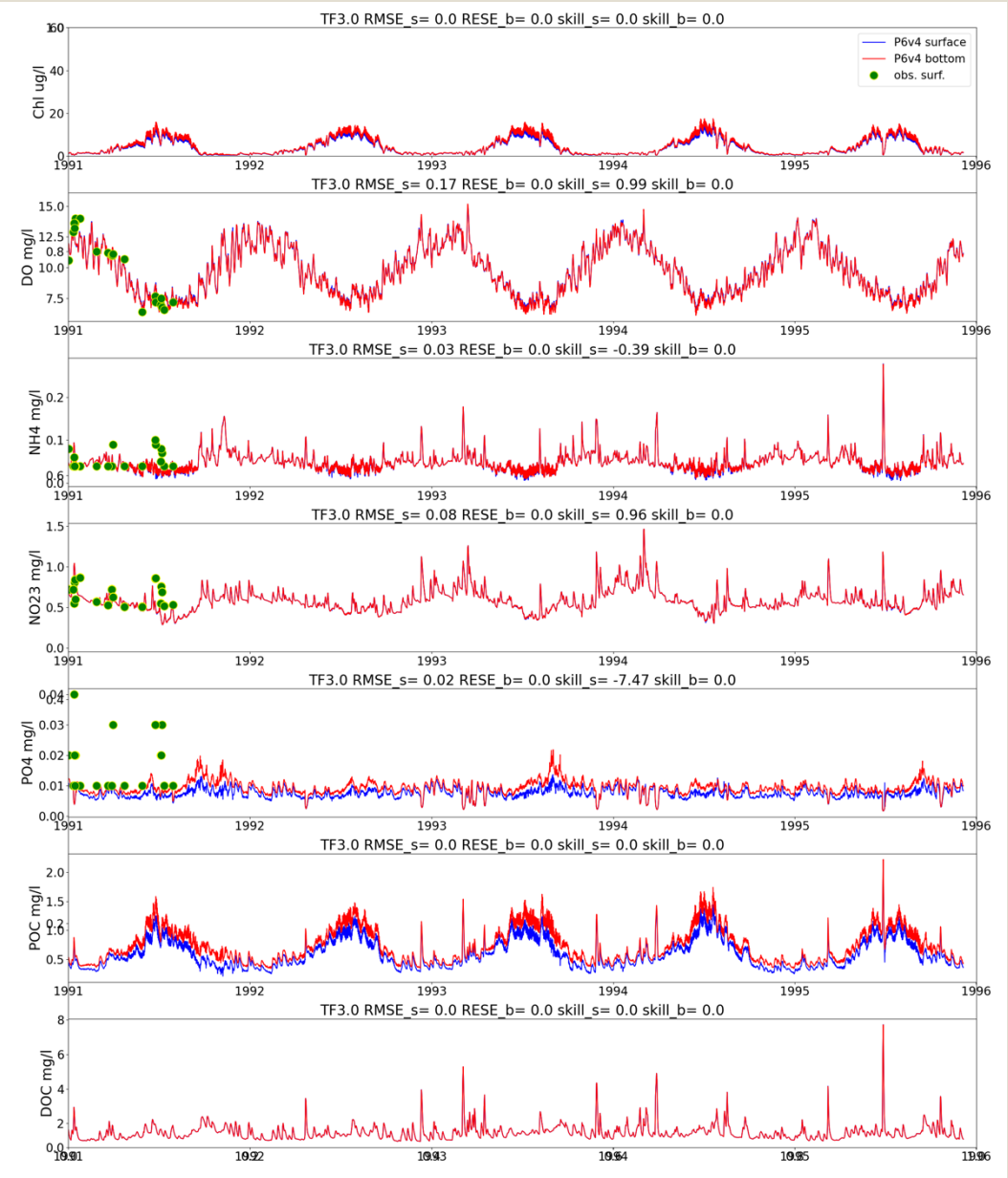
Station Location



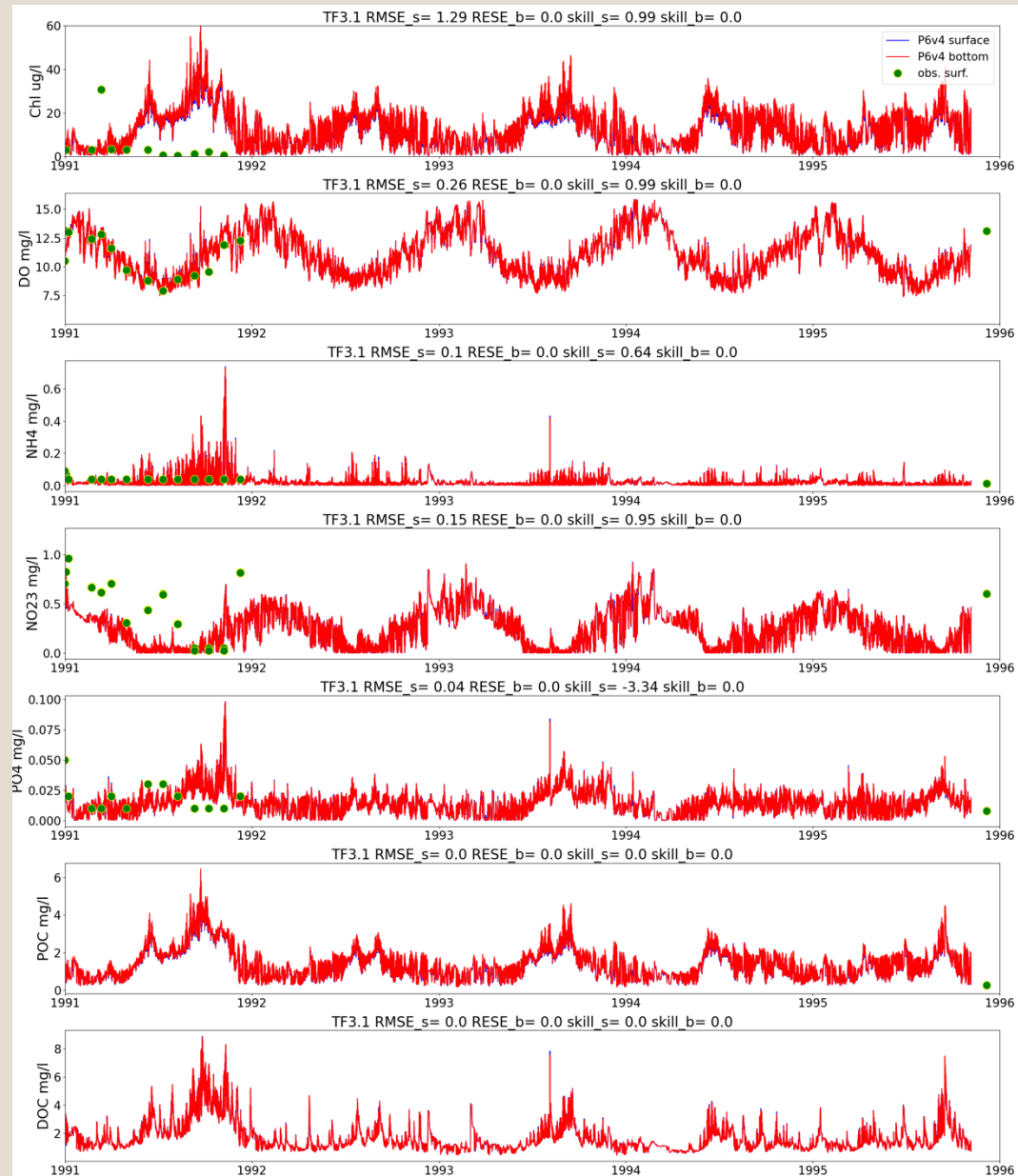
Previous Rapp. model results



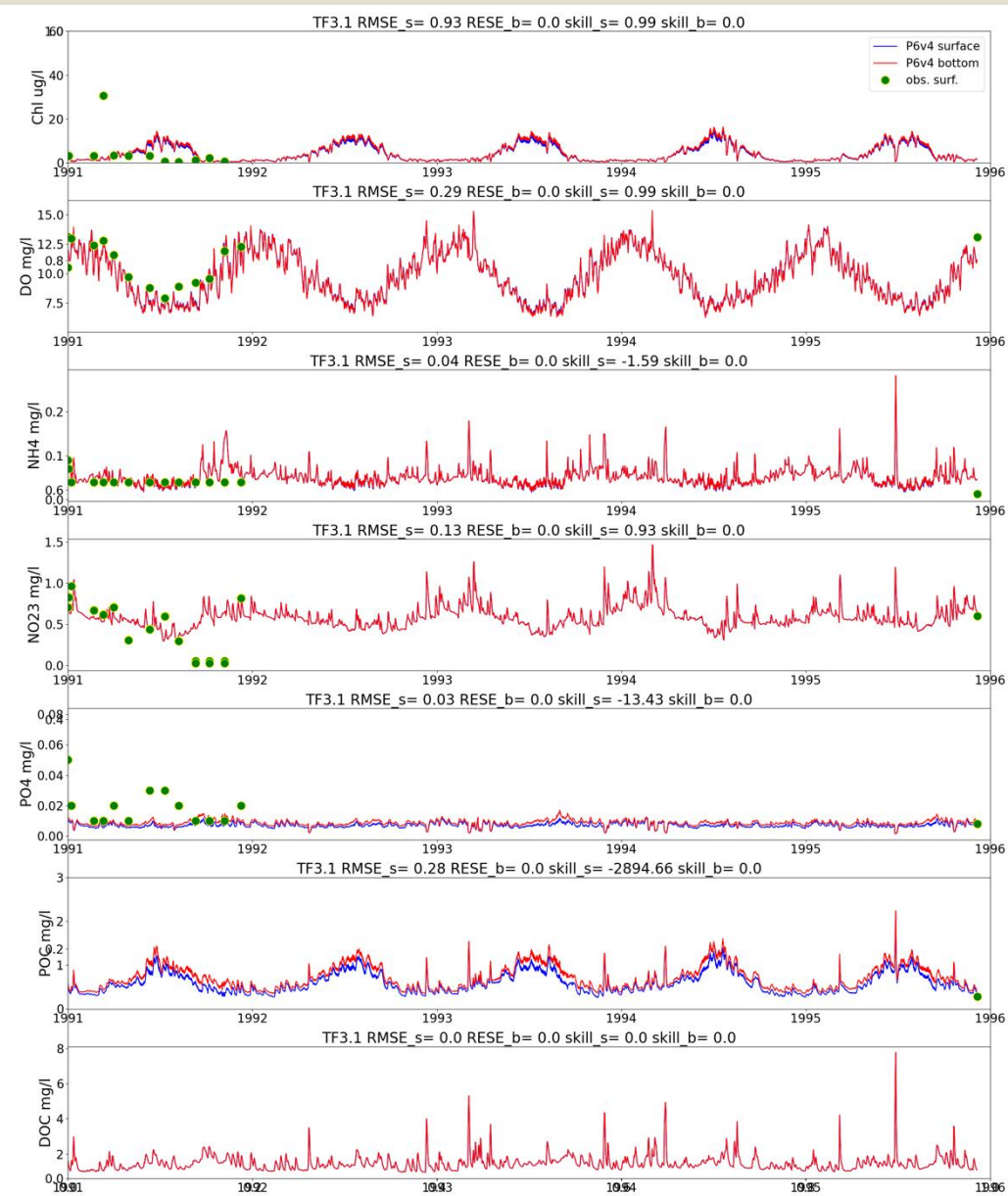
Current MBM Results



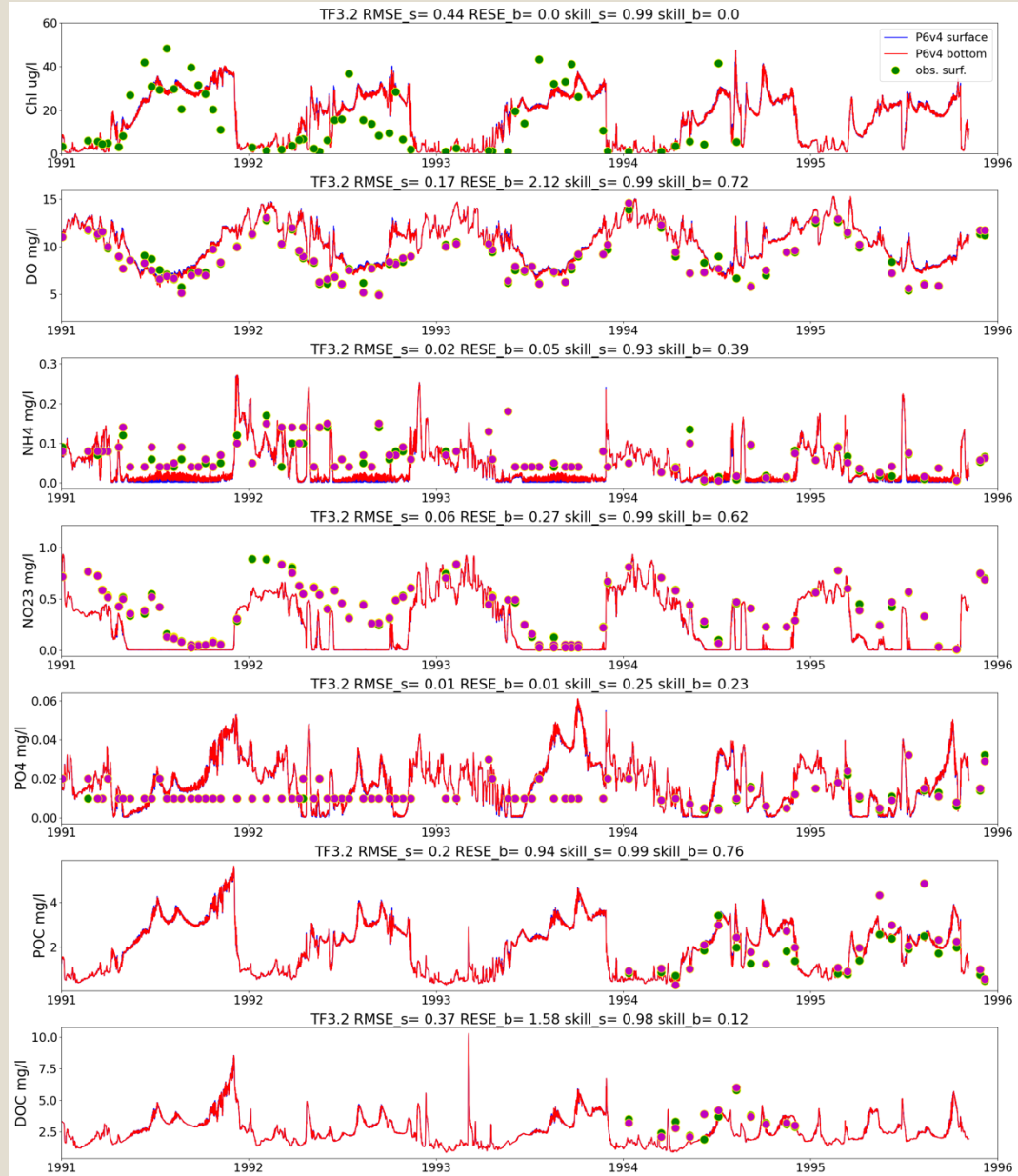
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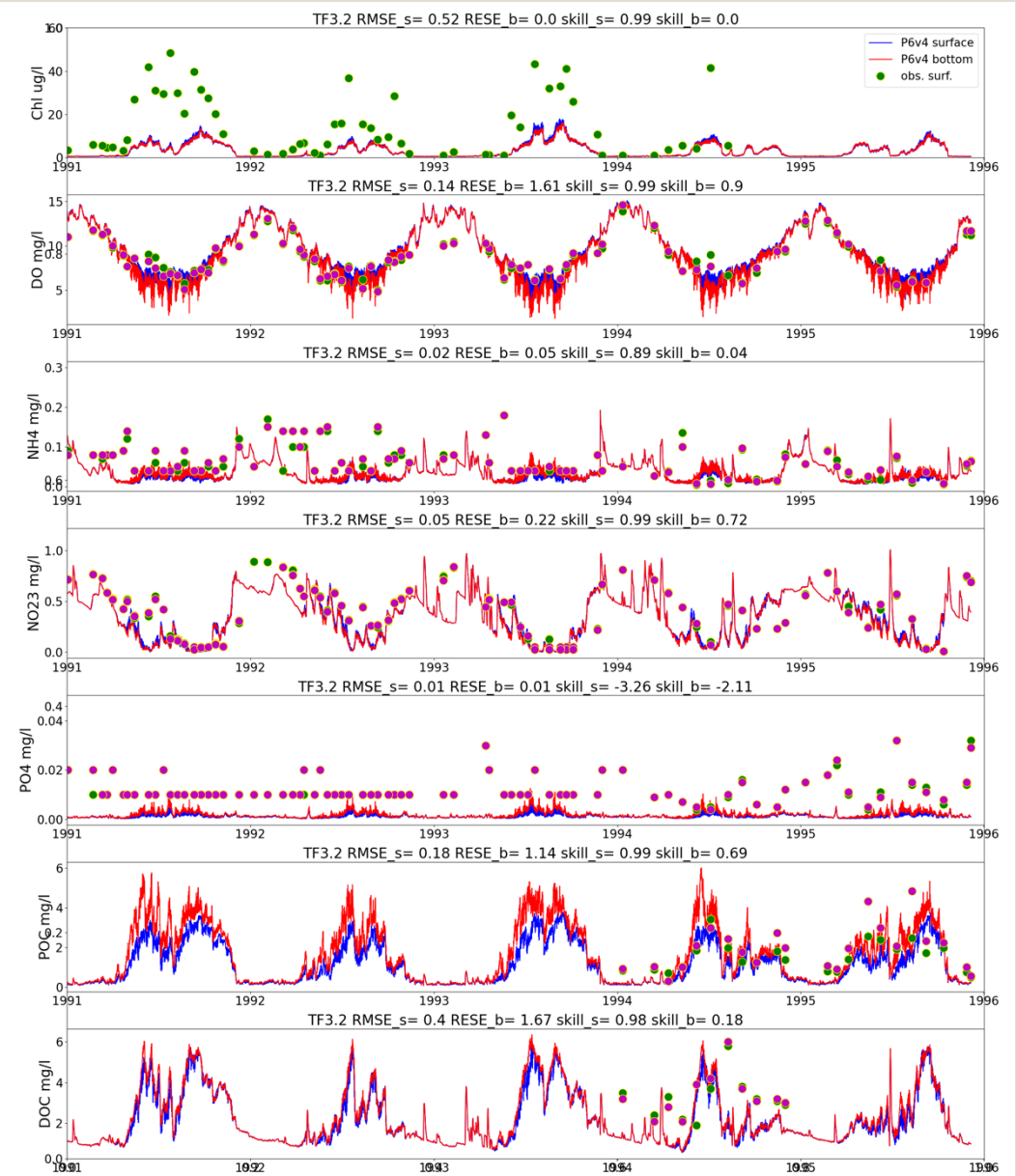
Current MBM Results



Previous Rapp. model results



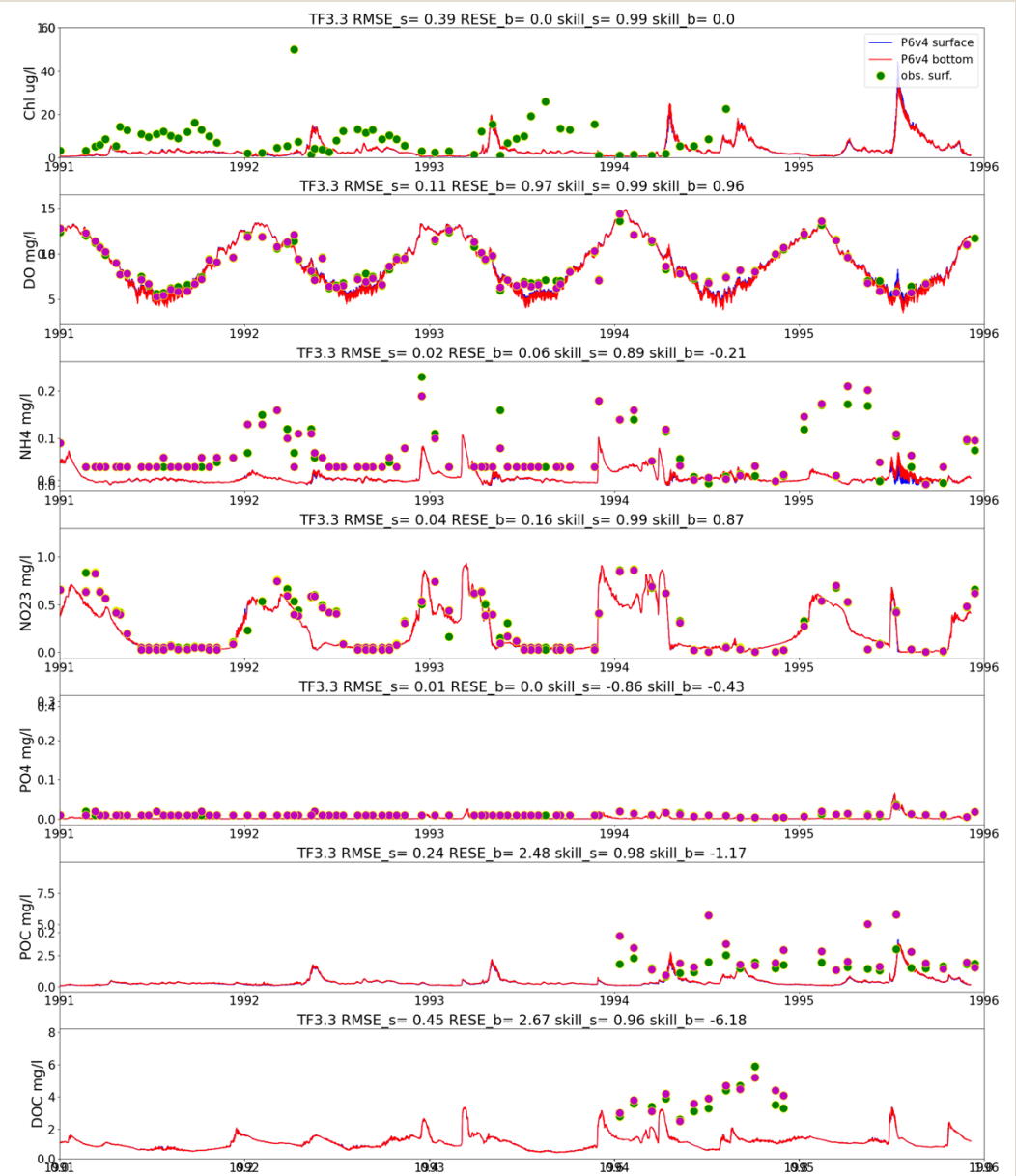
Current MBM Results



Previous Rapp. model results



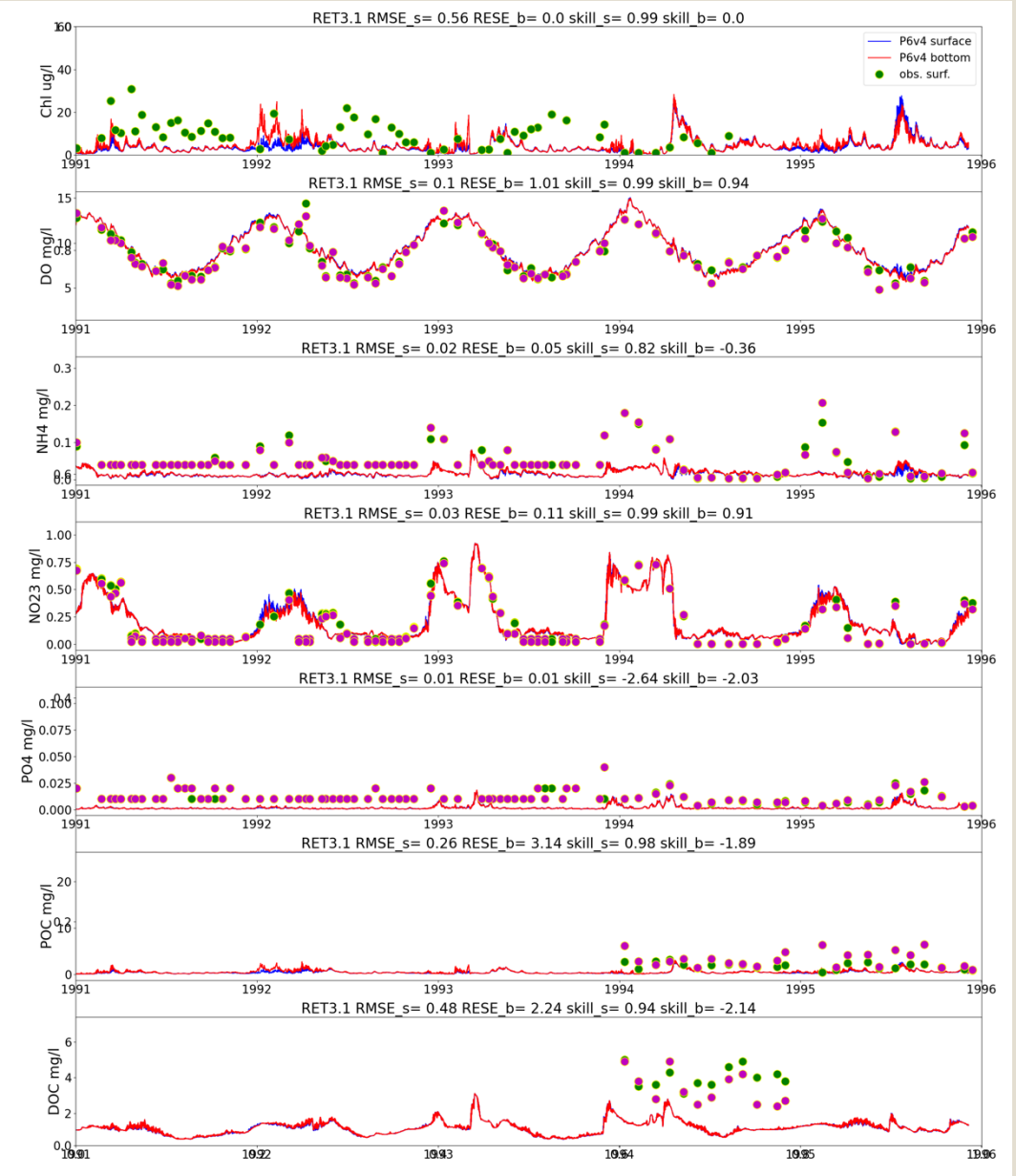
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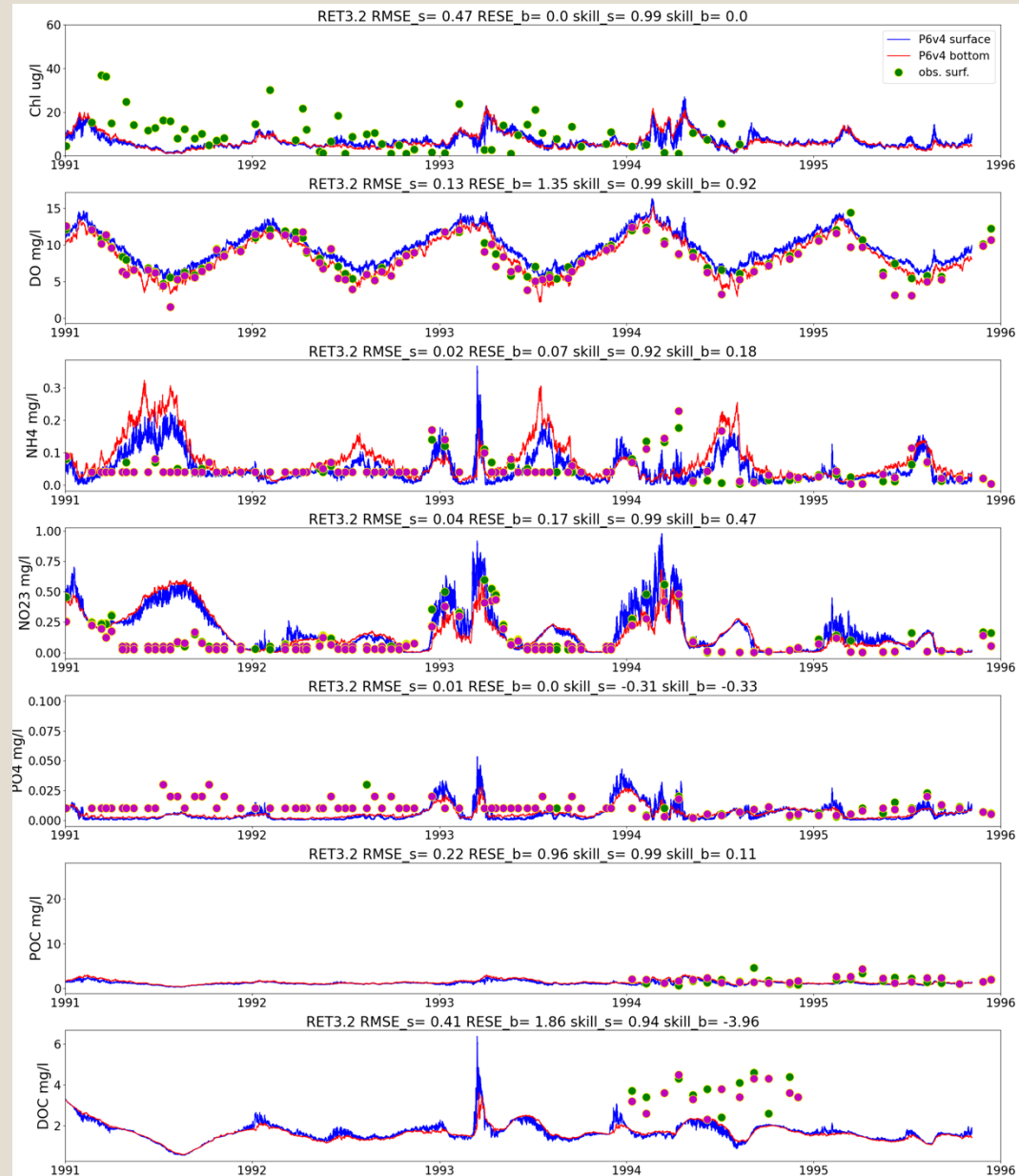
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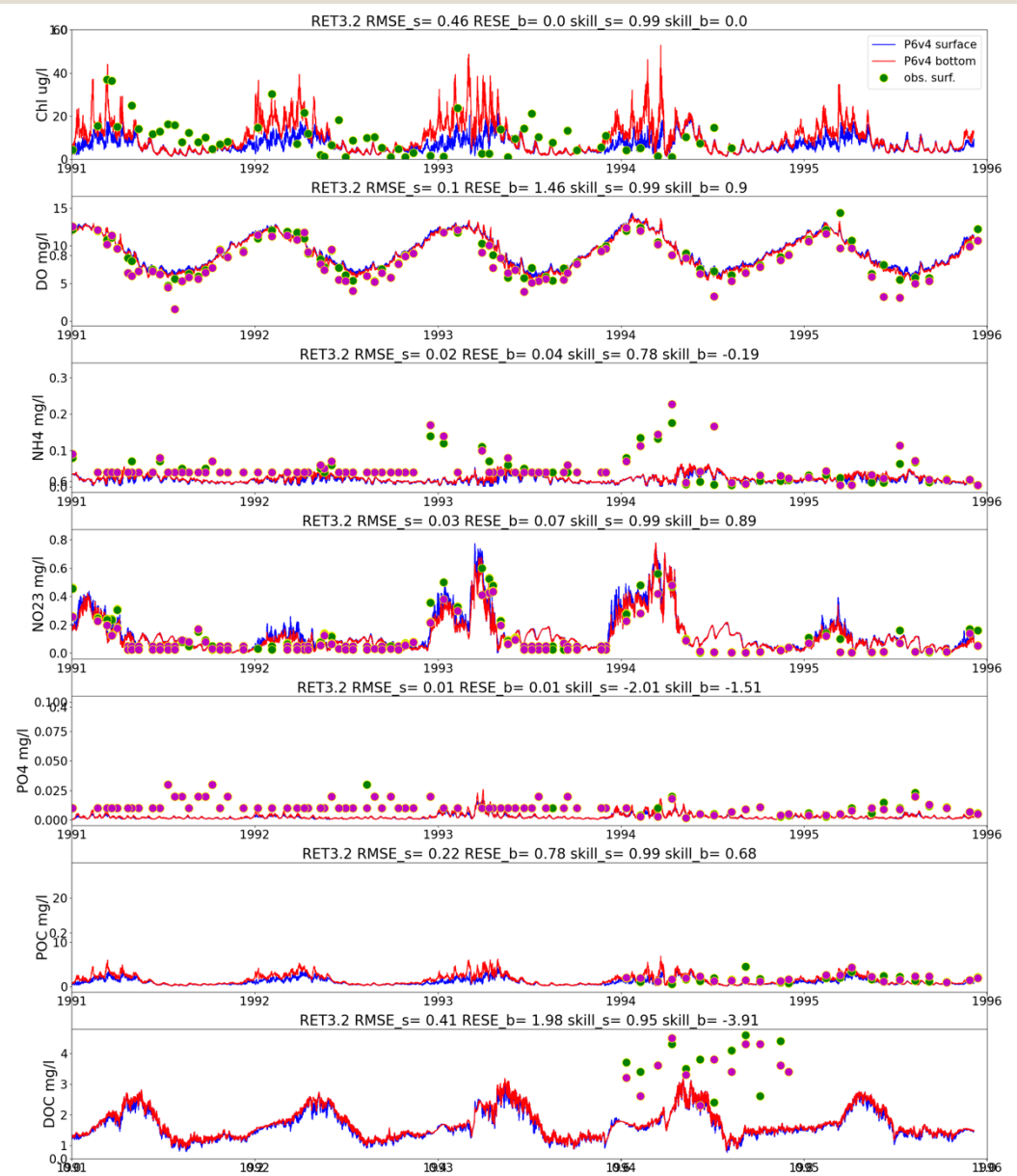
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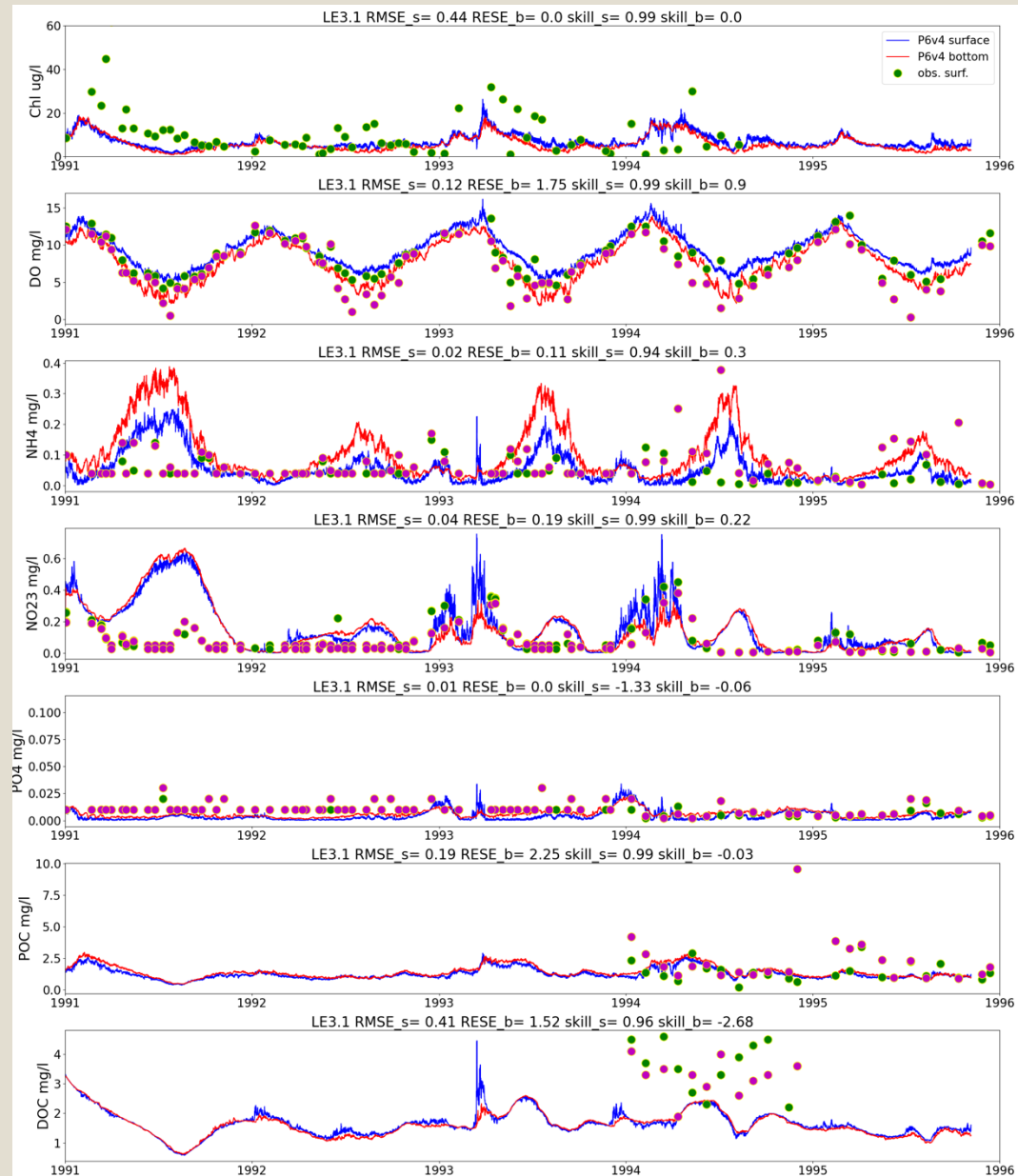
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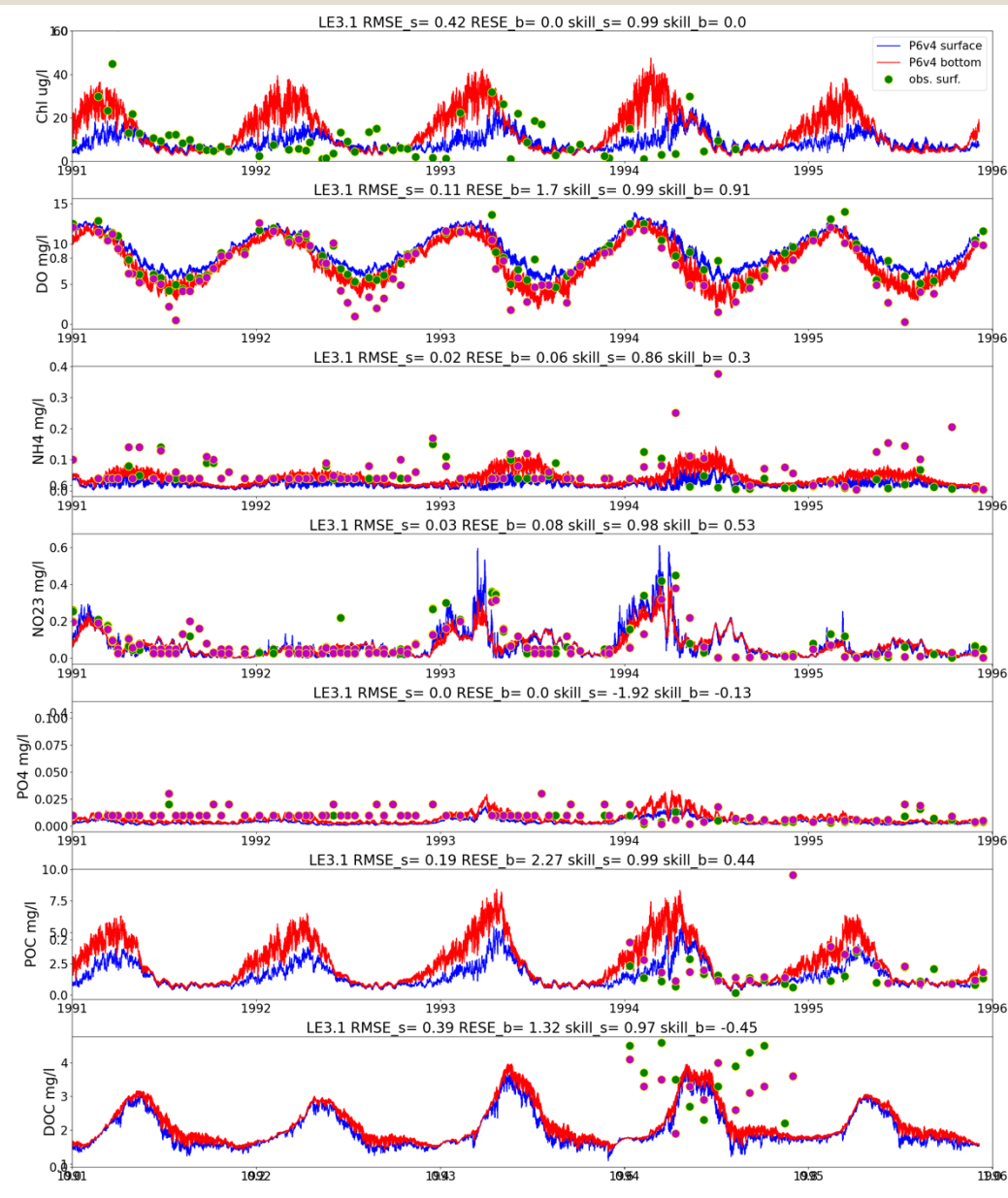
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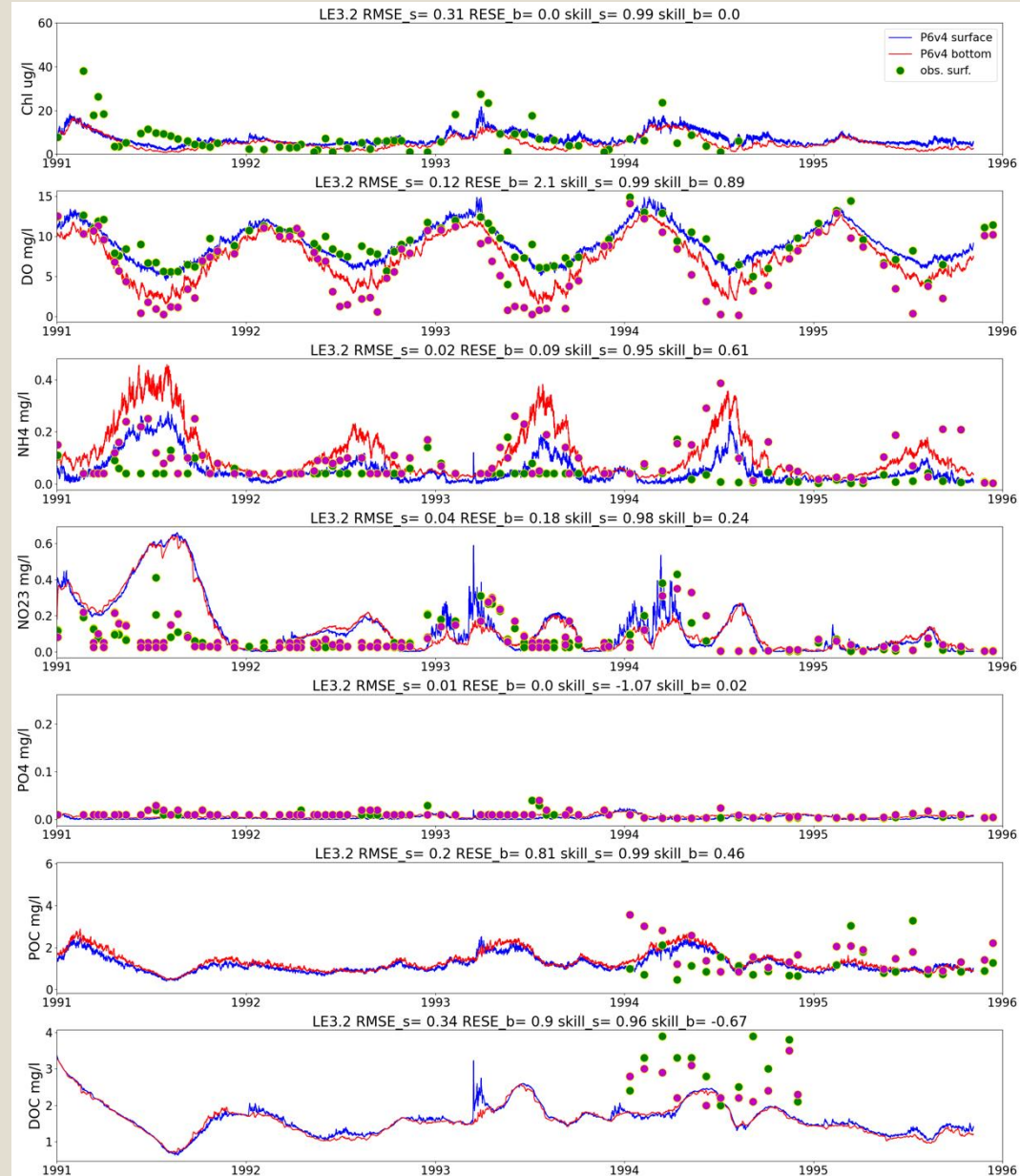
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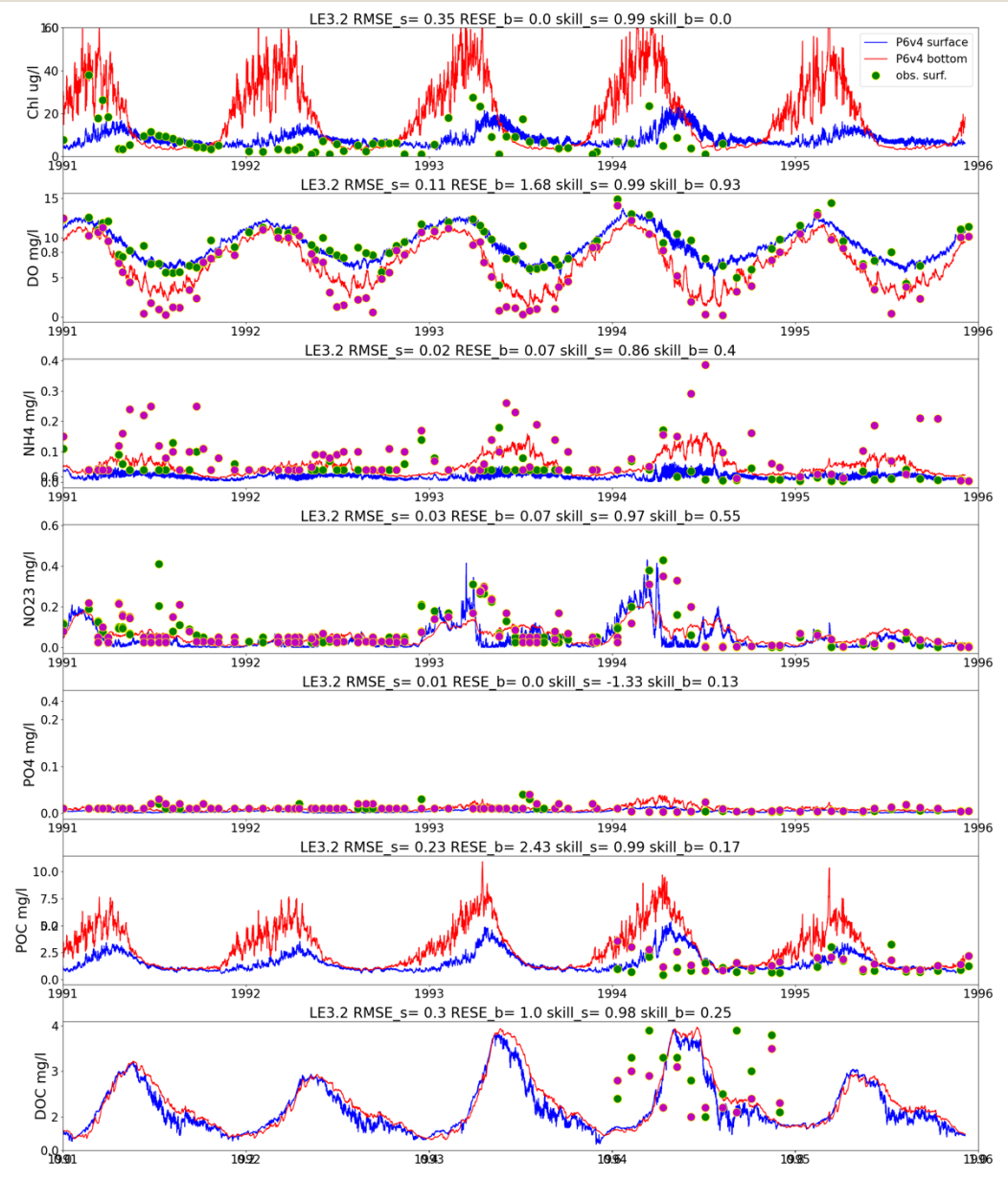
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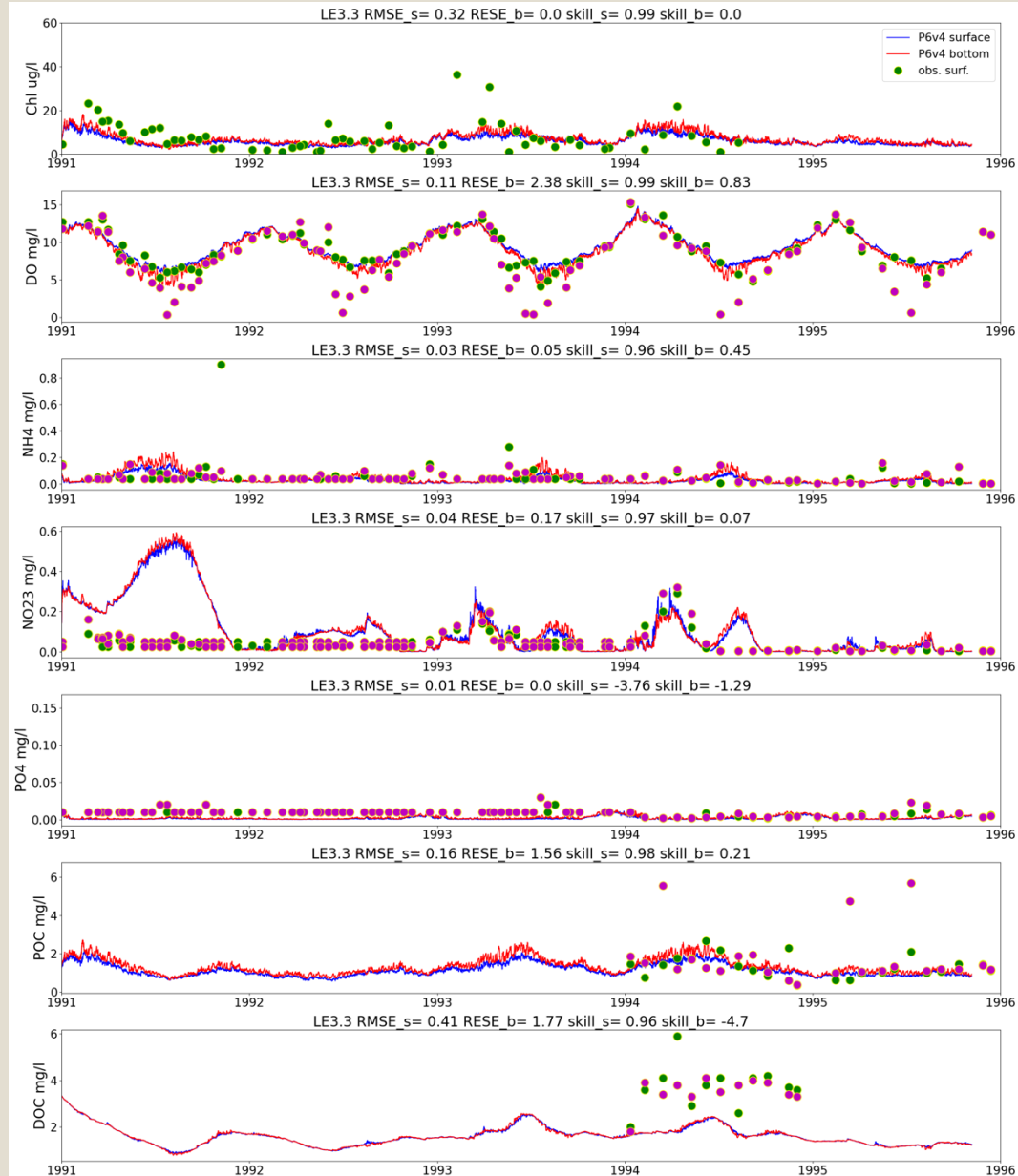
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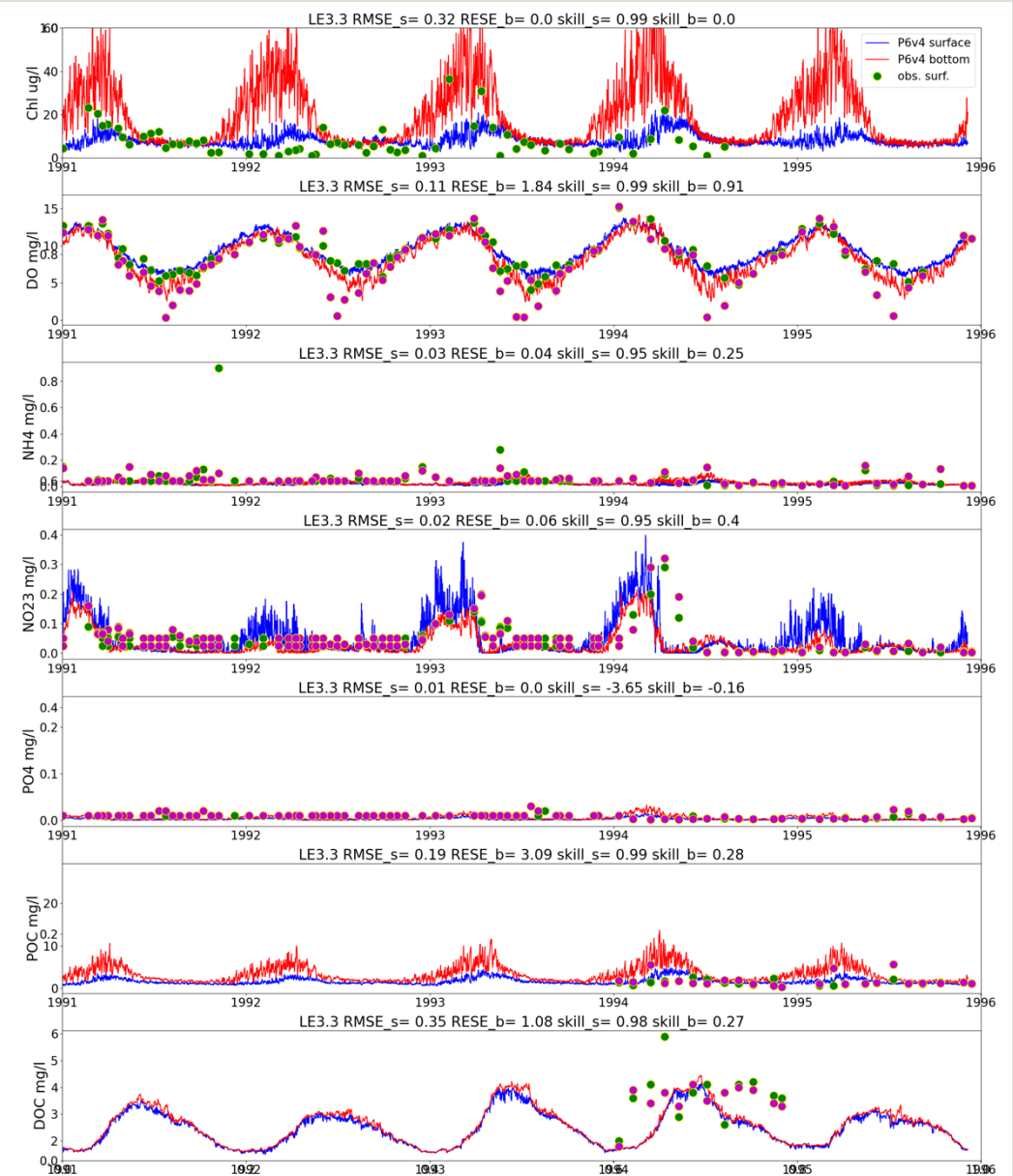
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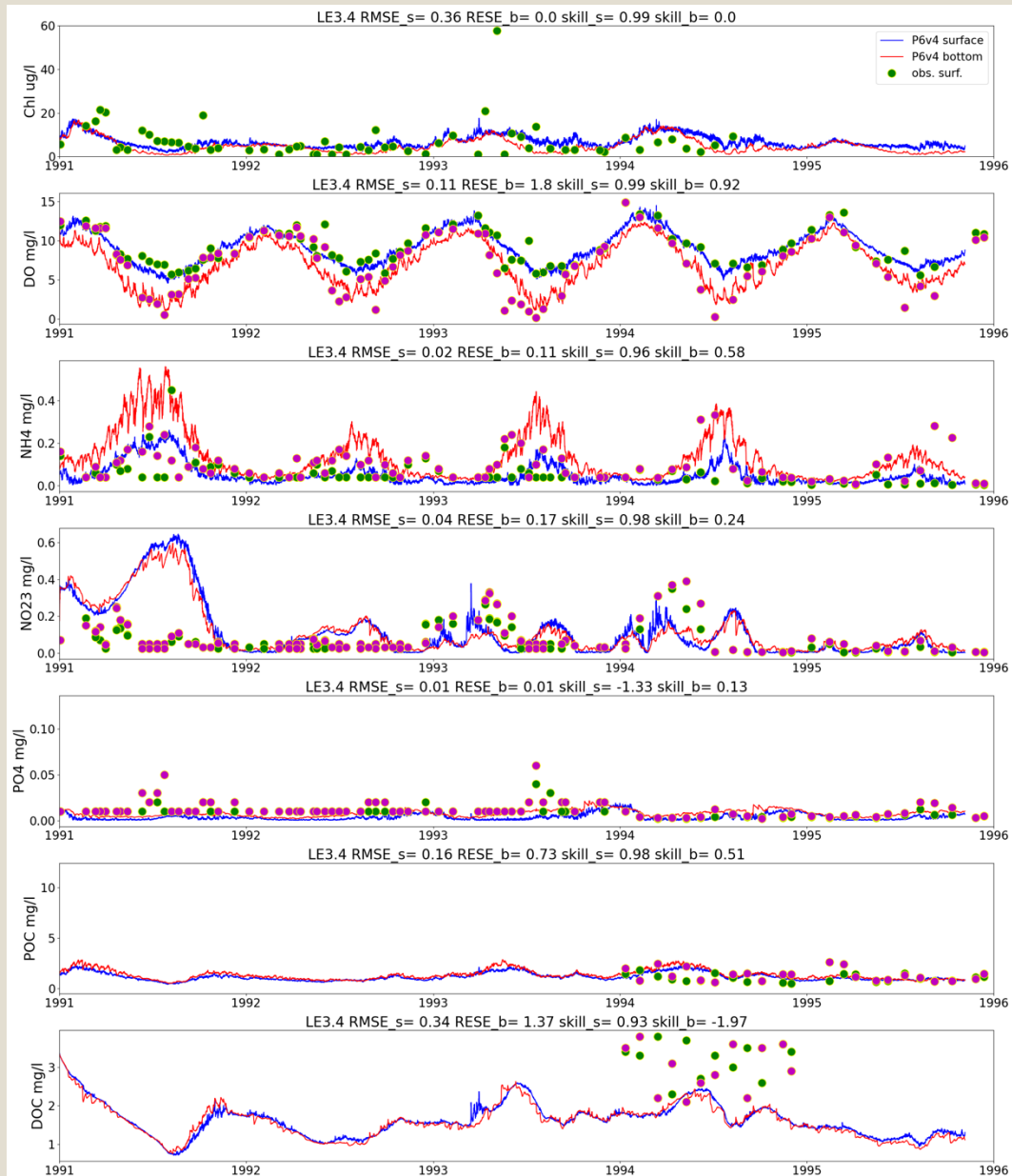
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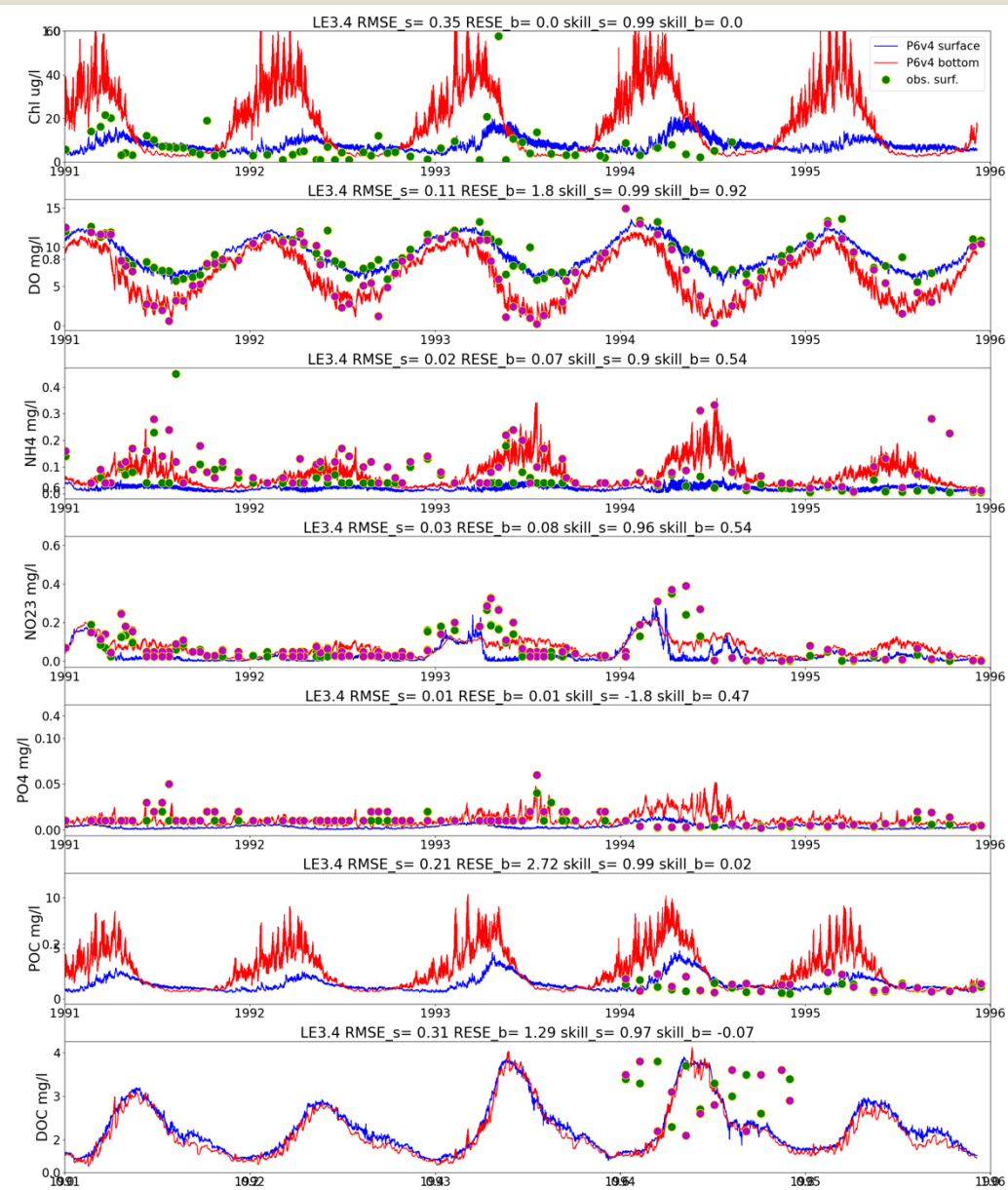
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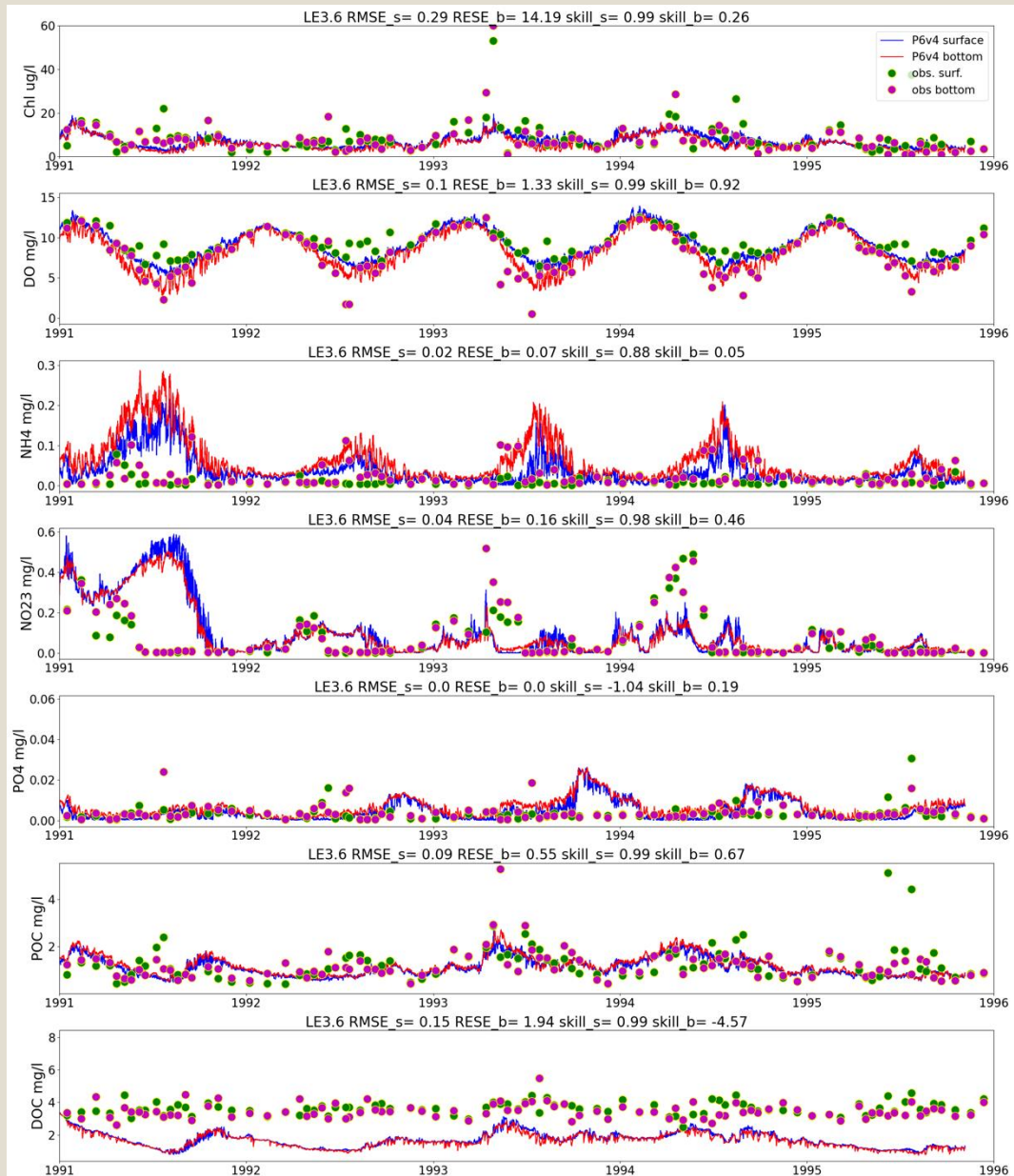
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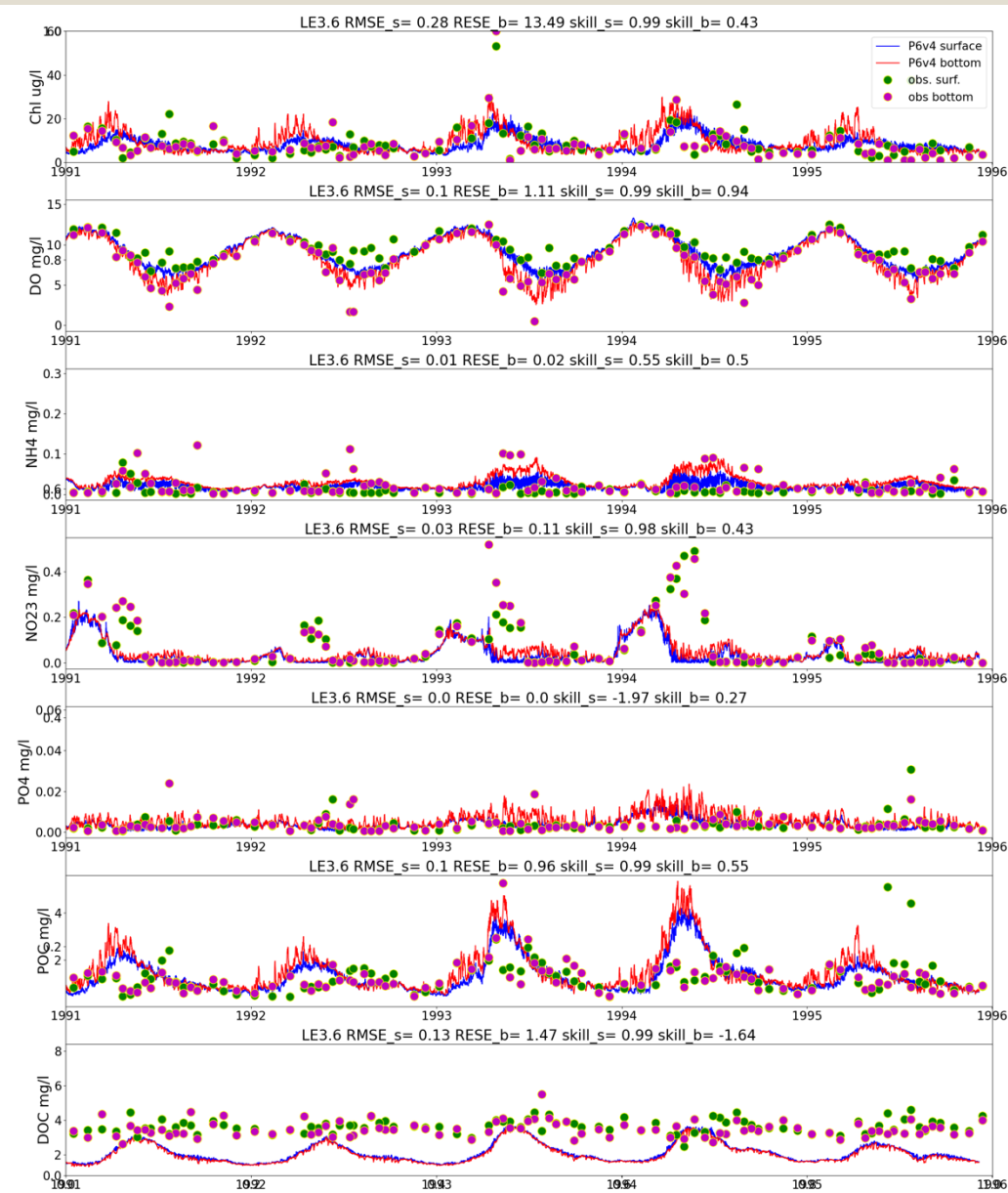
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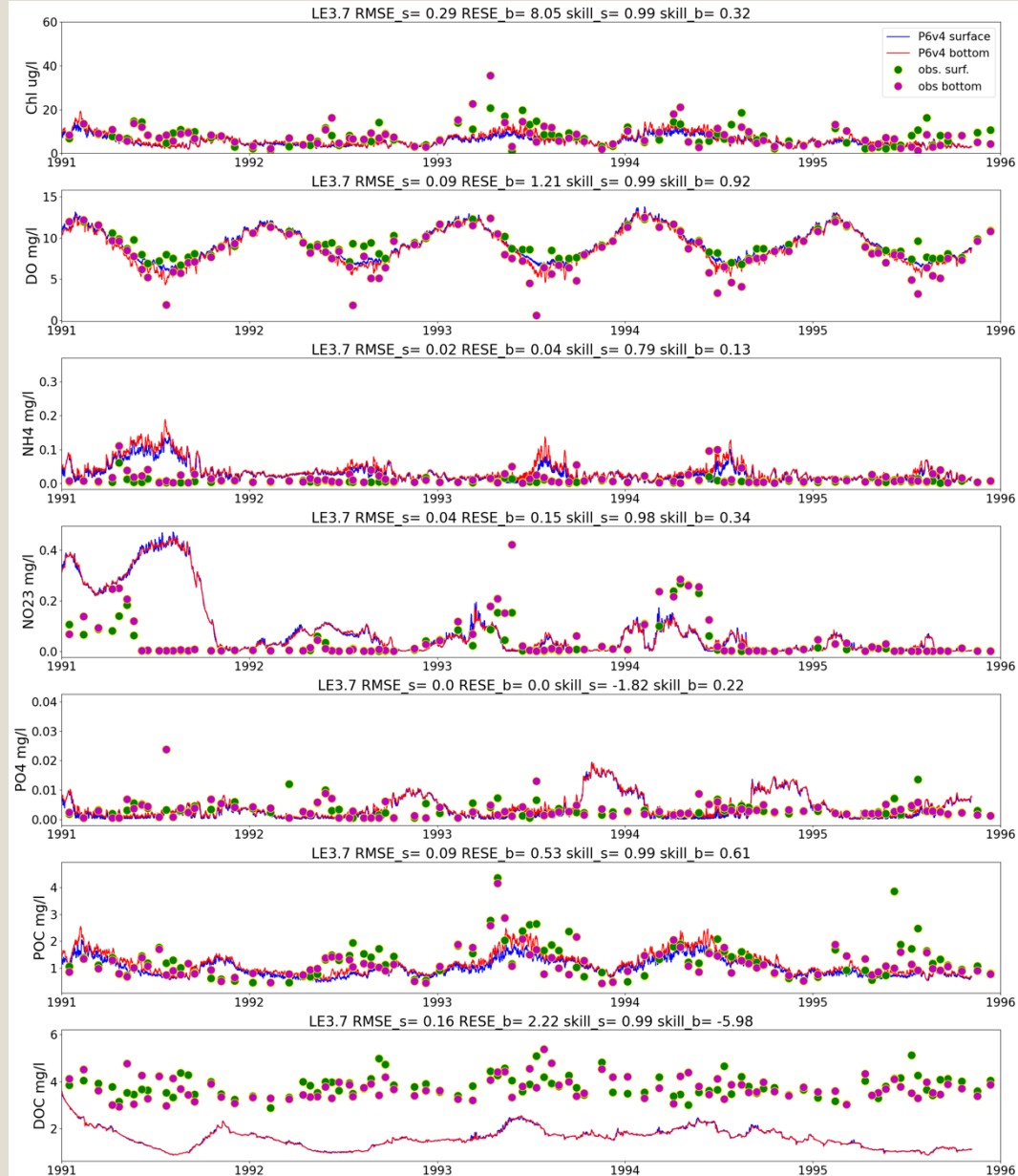
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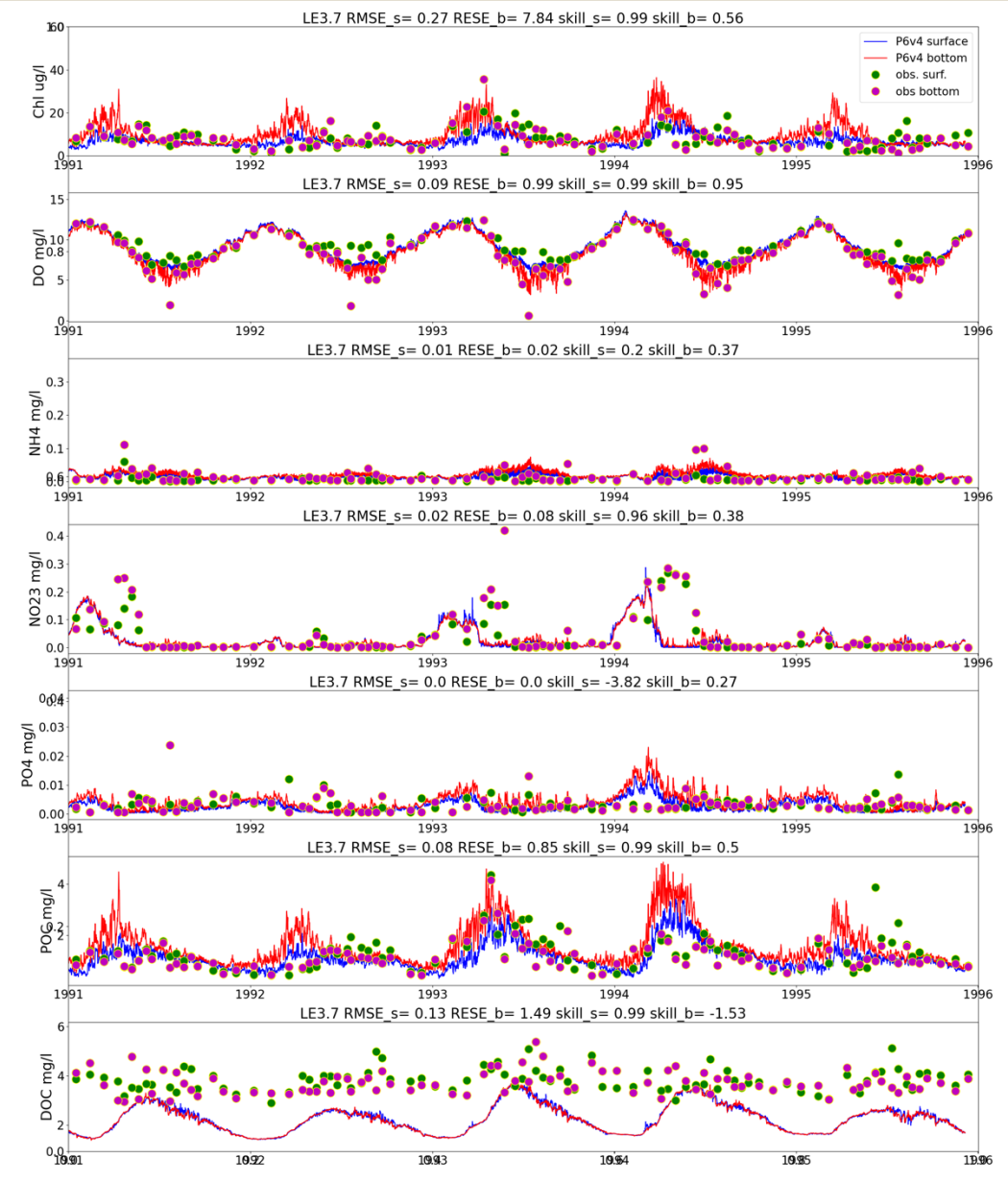
Current MBM Results



Previous Rapp. model results

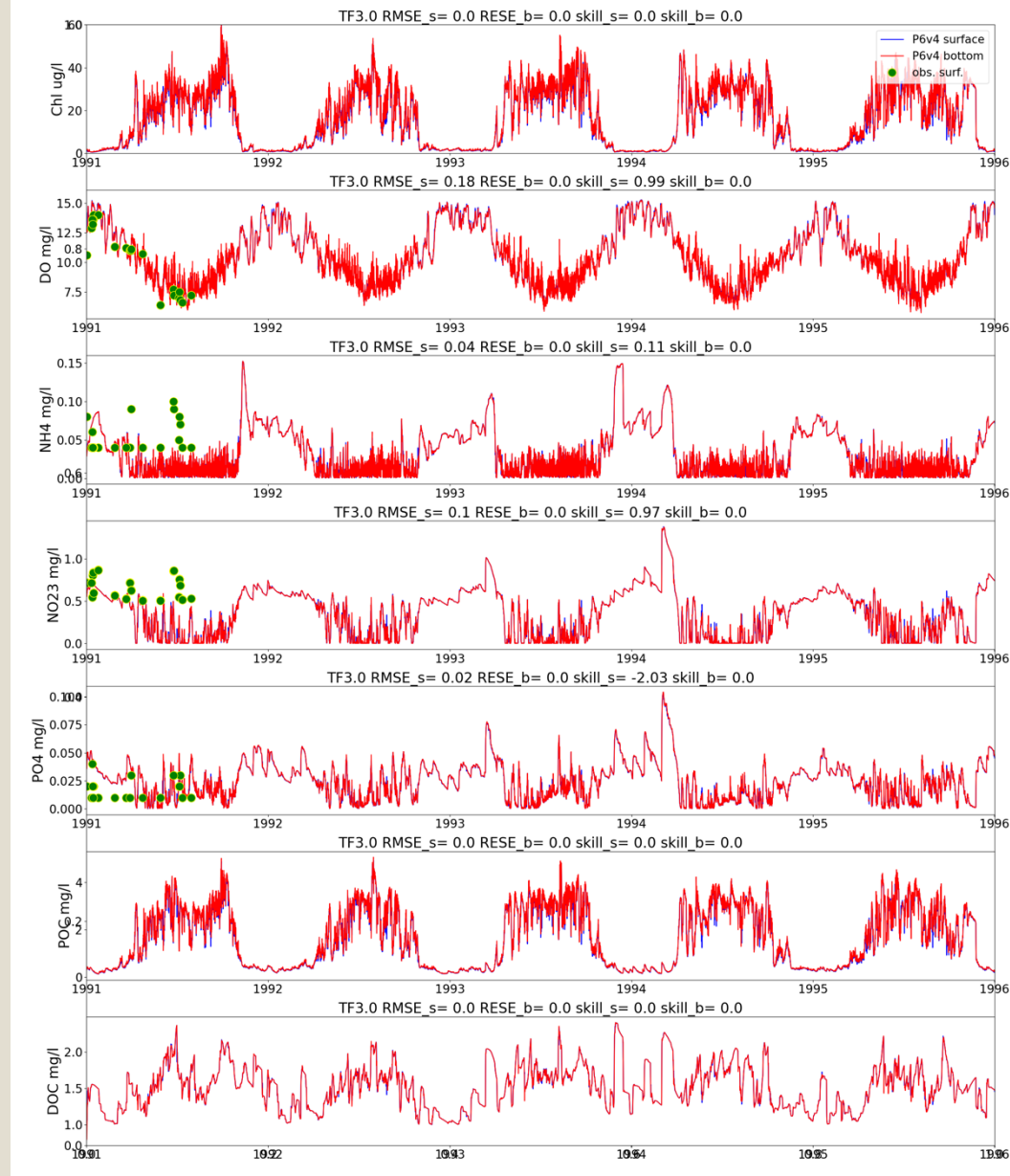


Current MBM Results

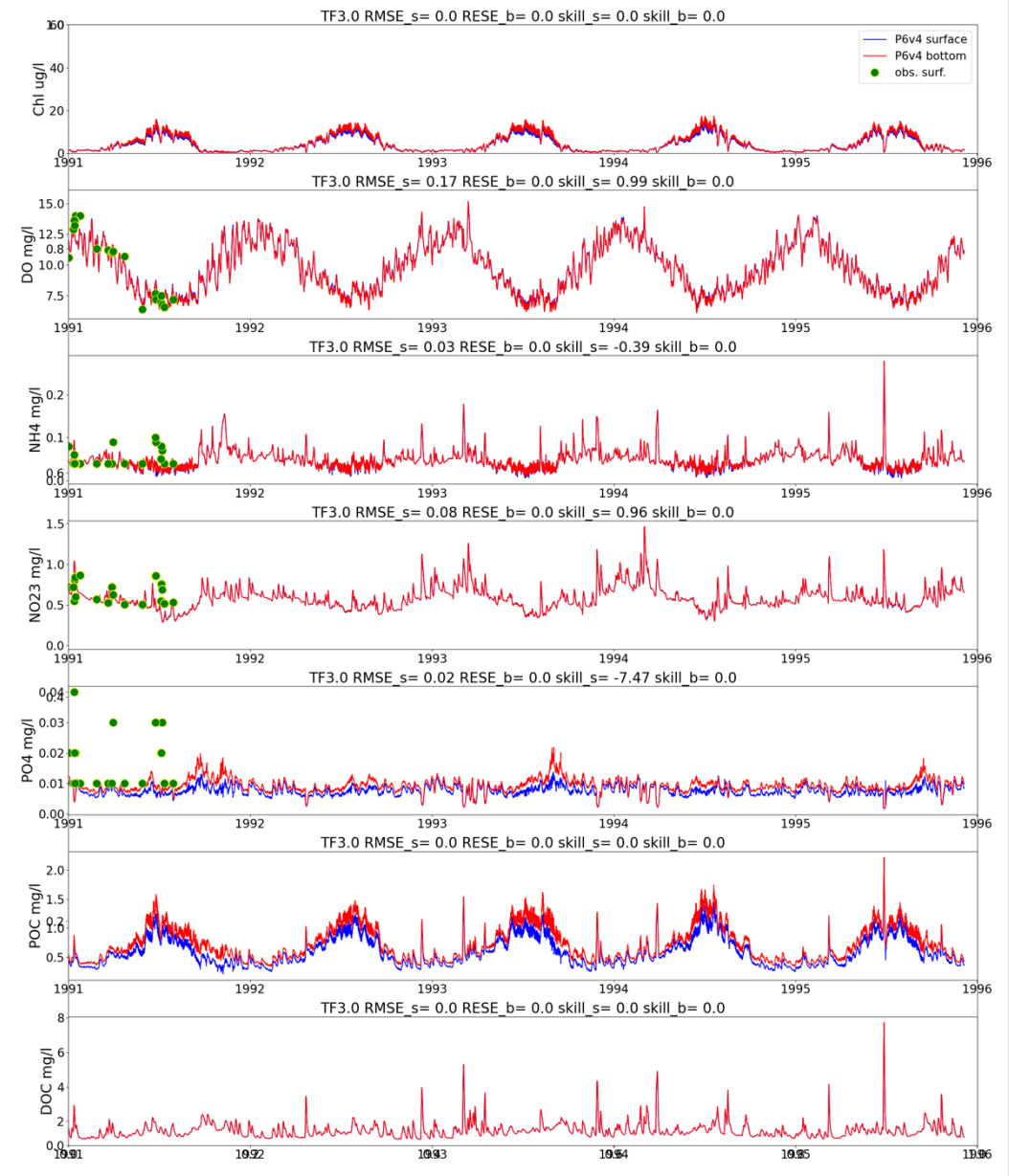


Results of New Rapp. Model

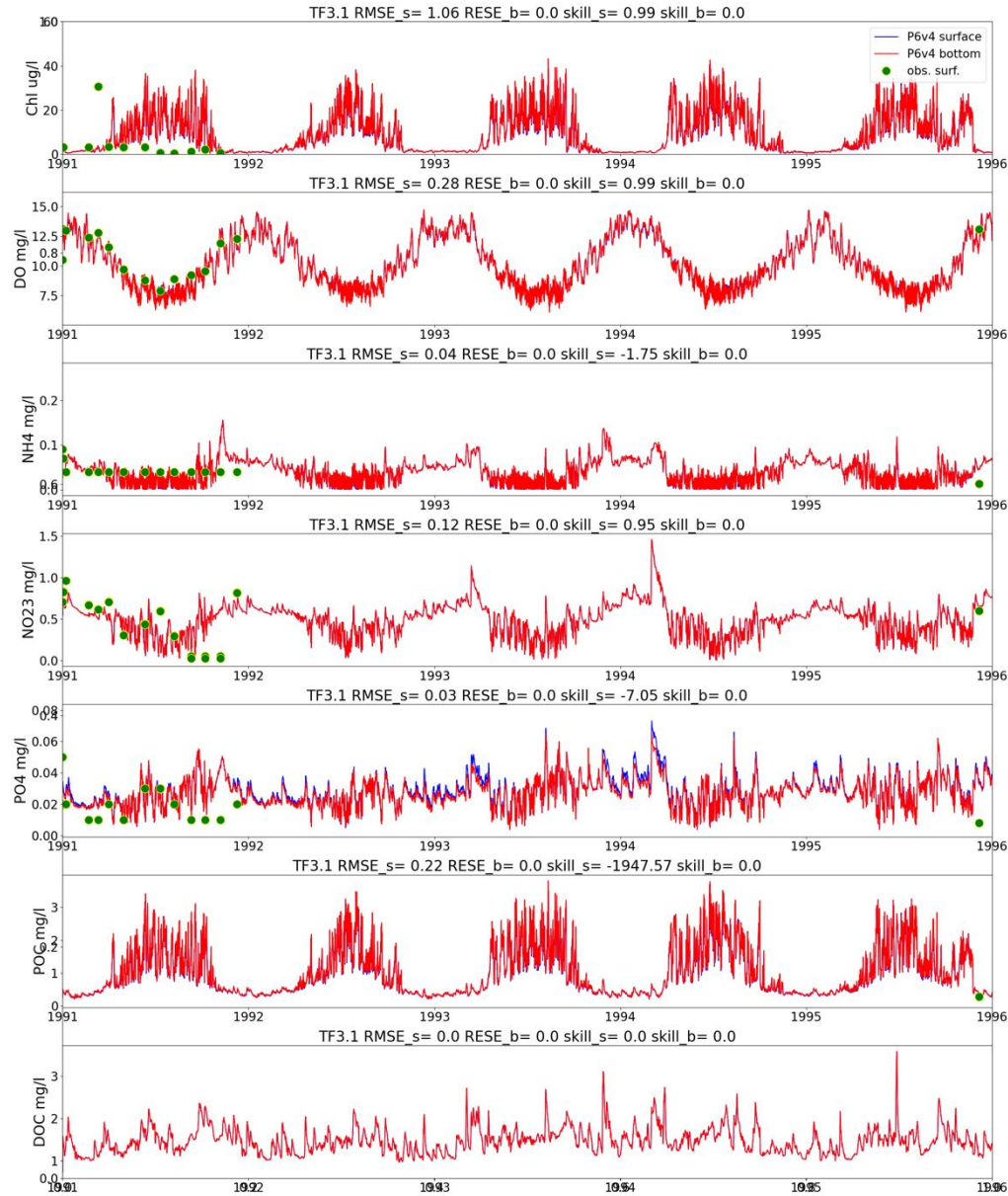
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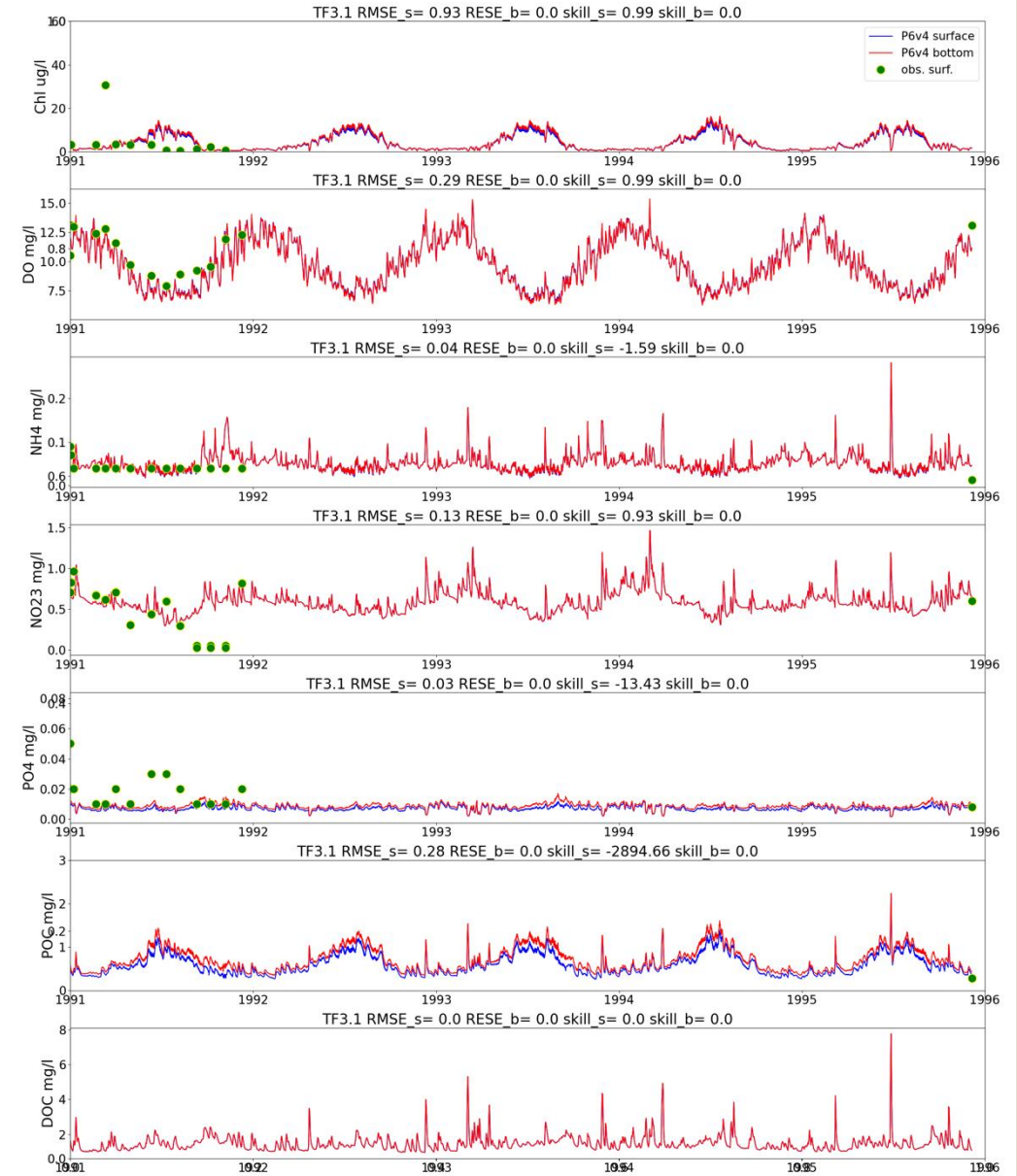
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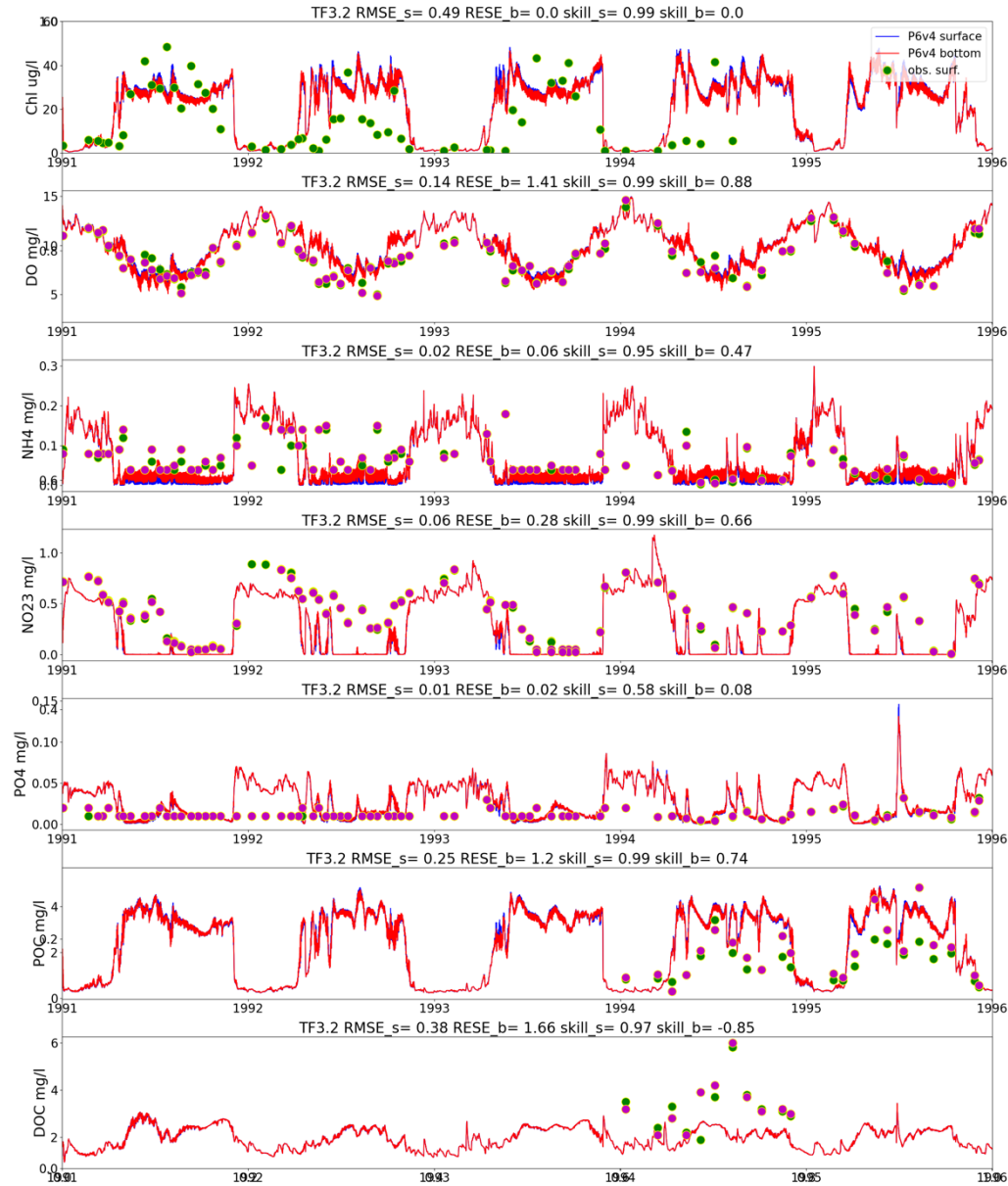
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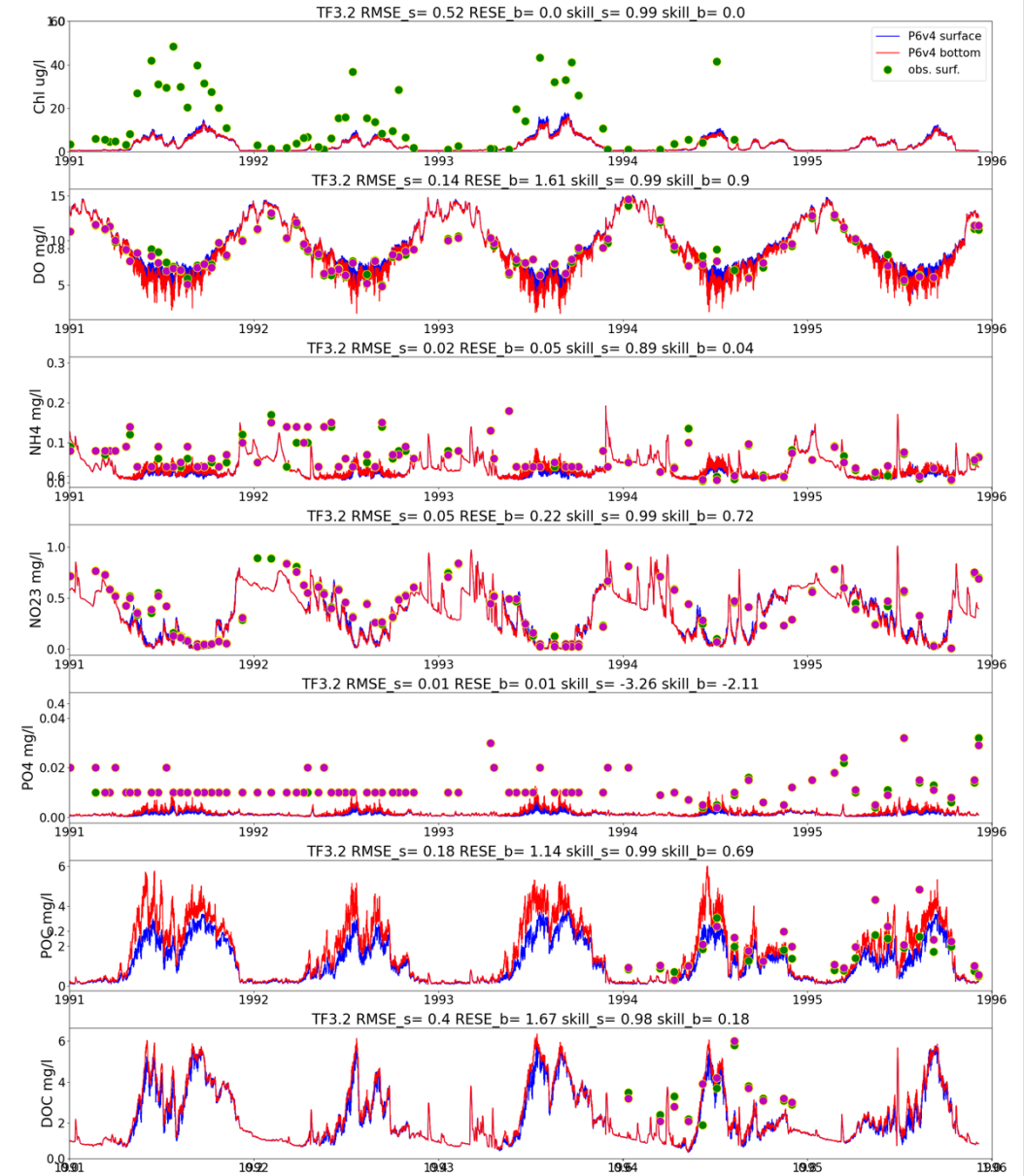
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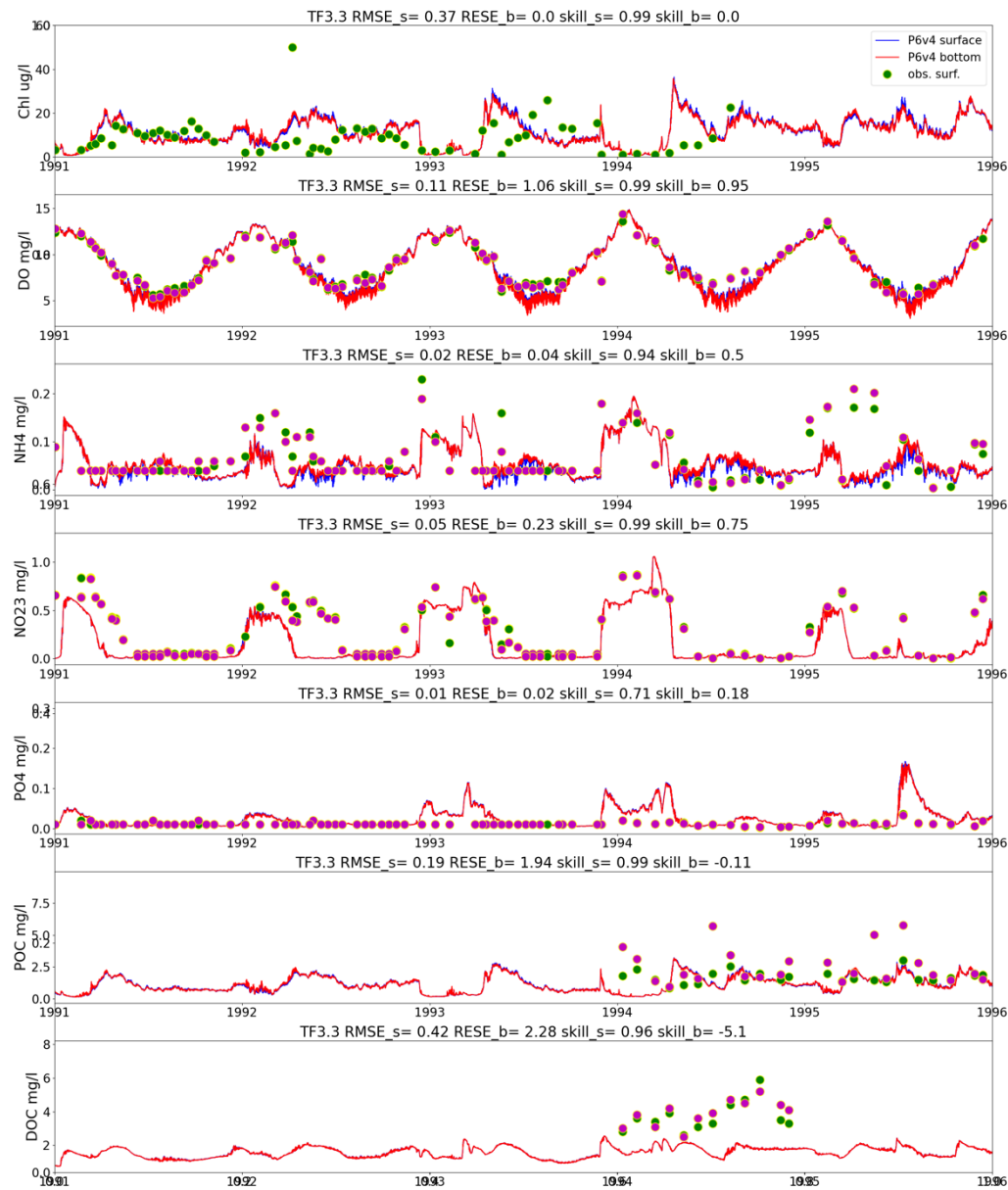
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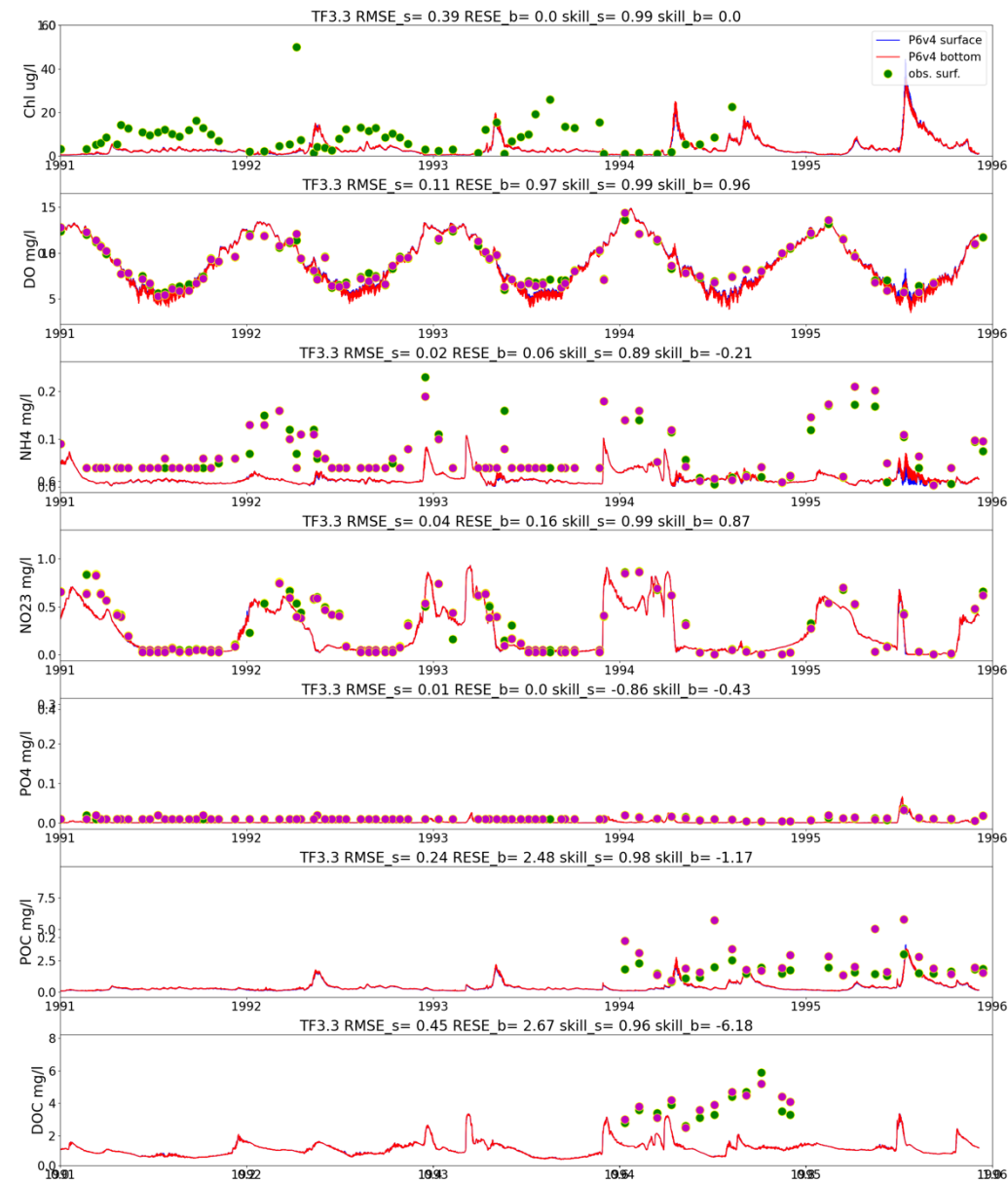
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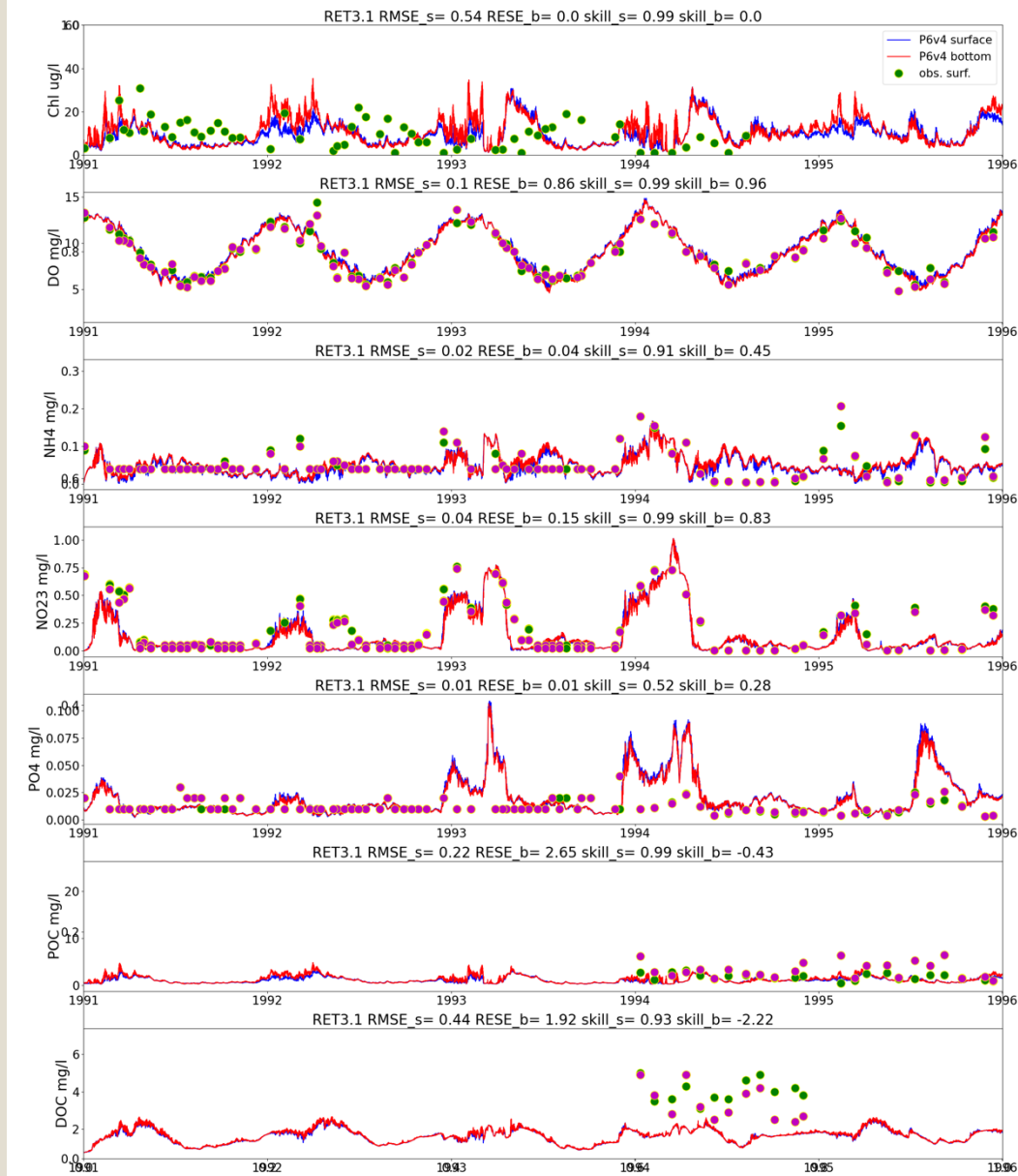
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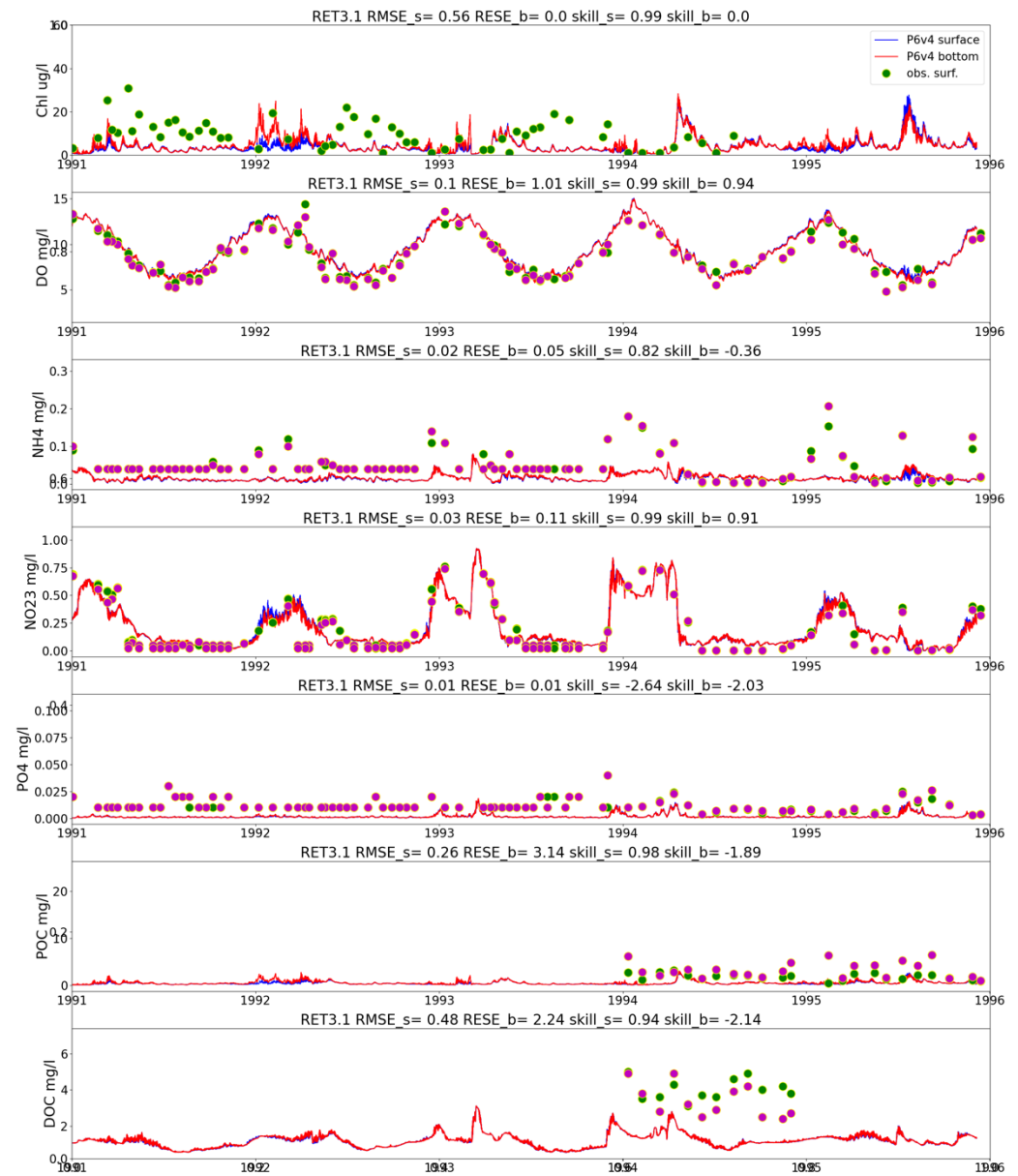
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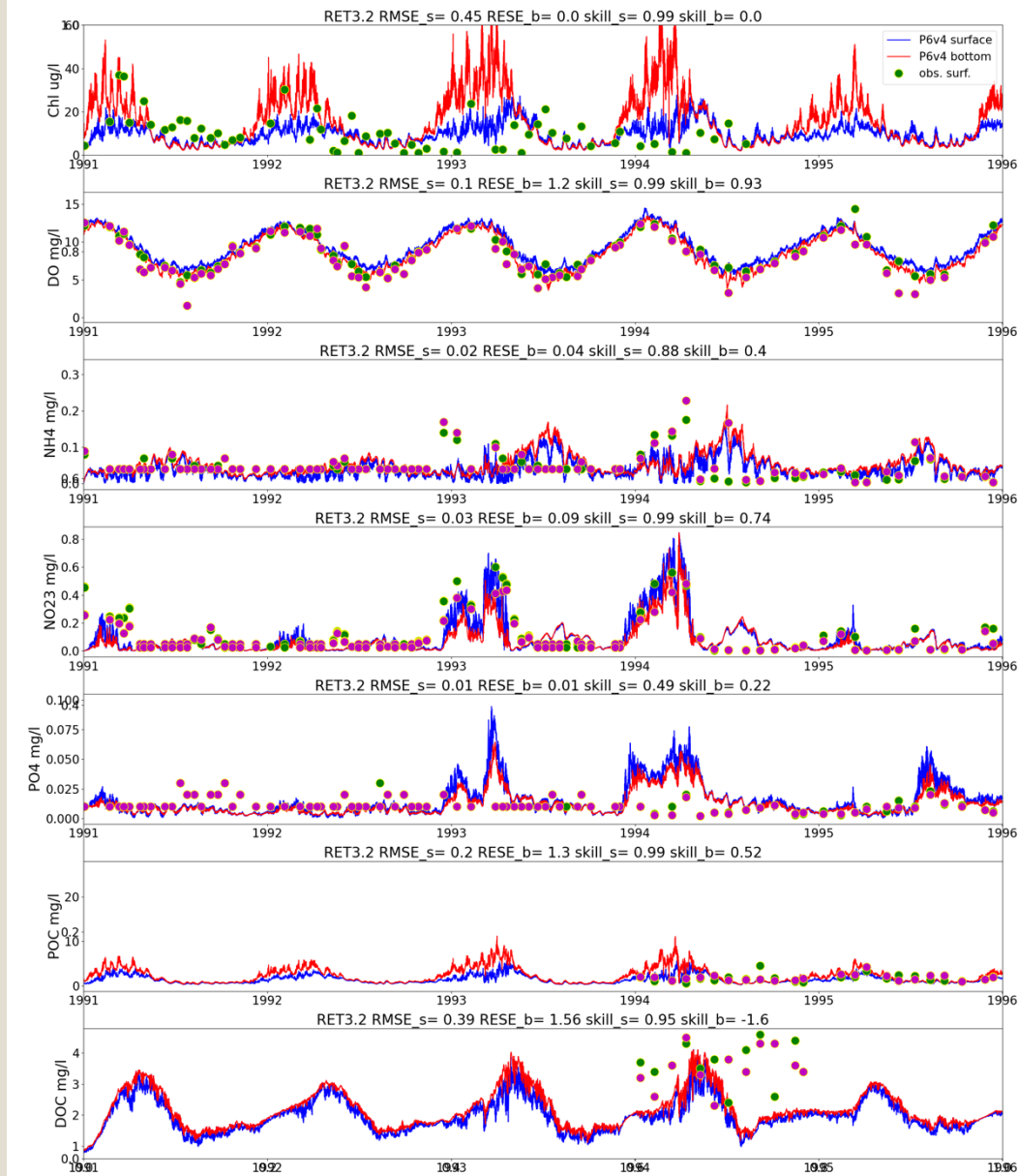
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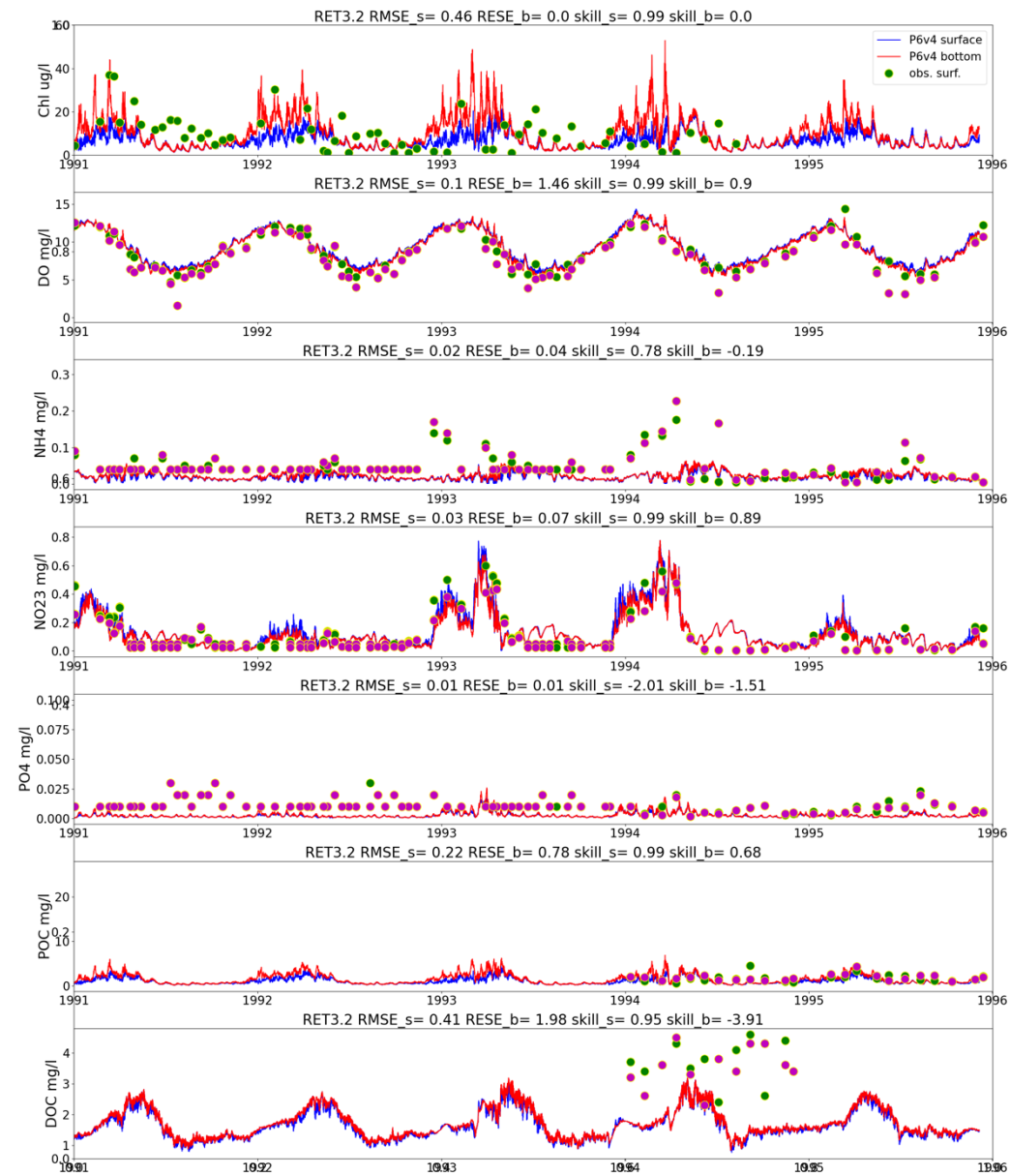
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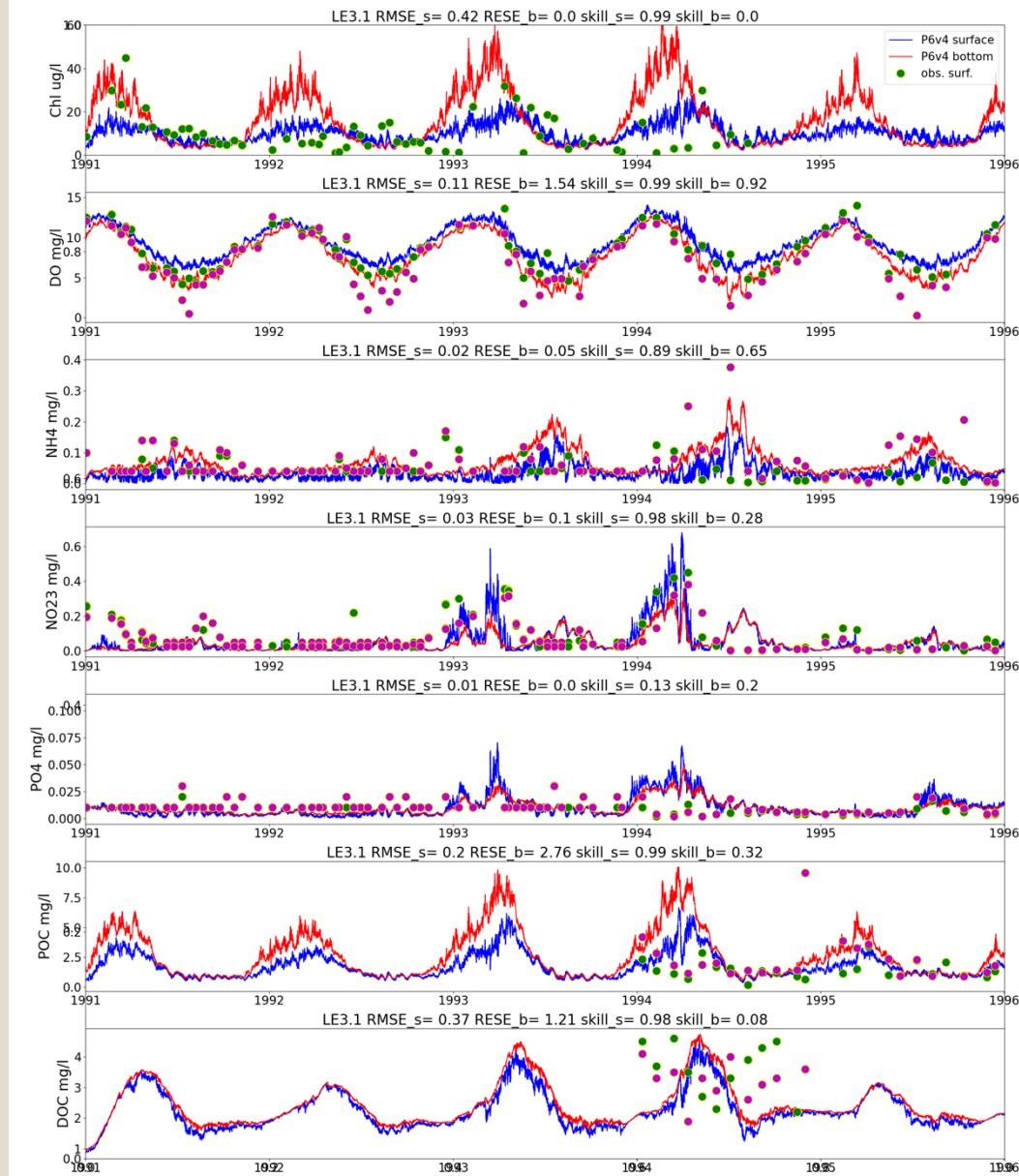
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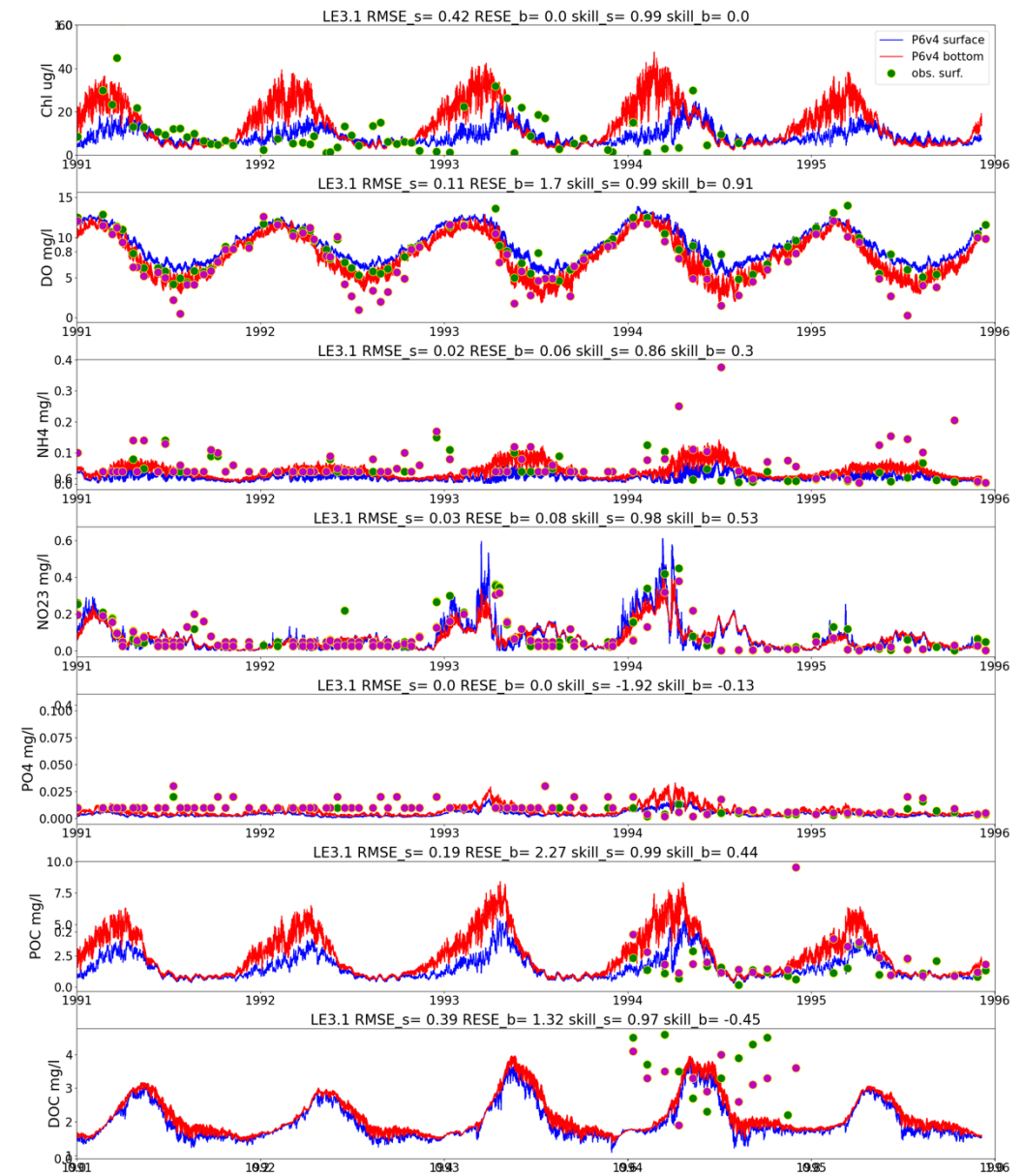
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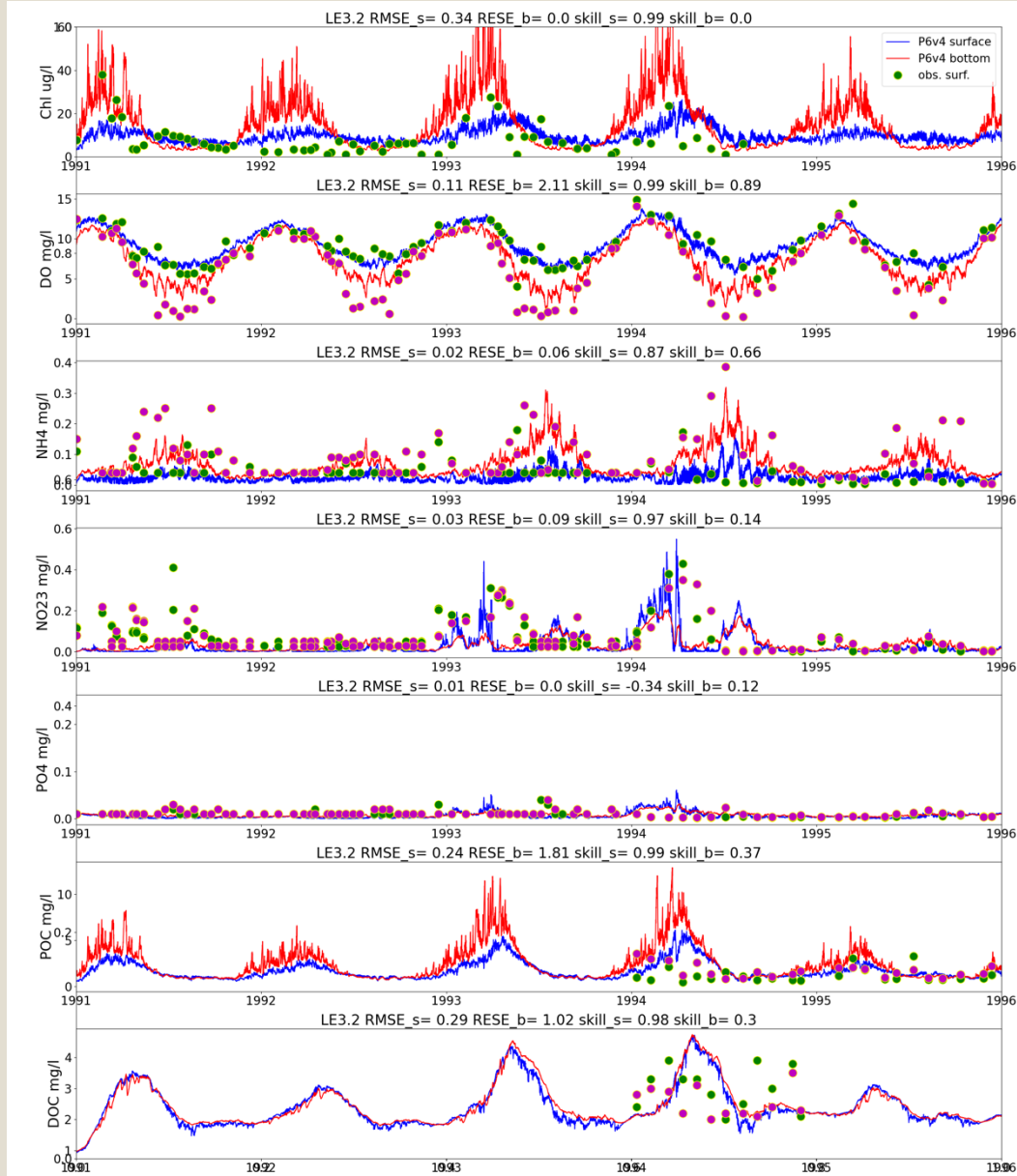
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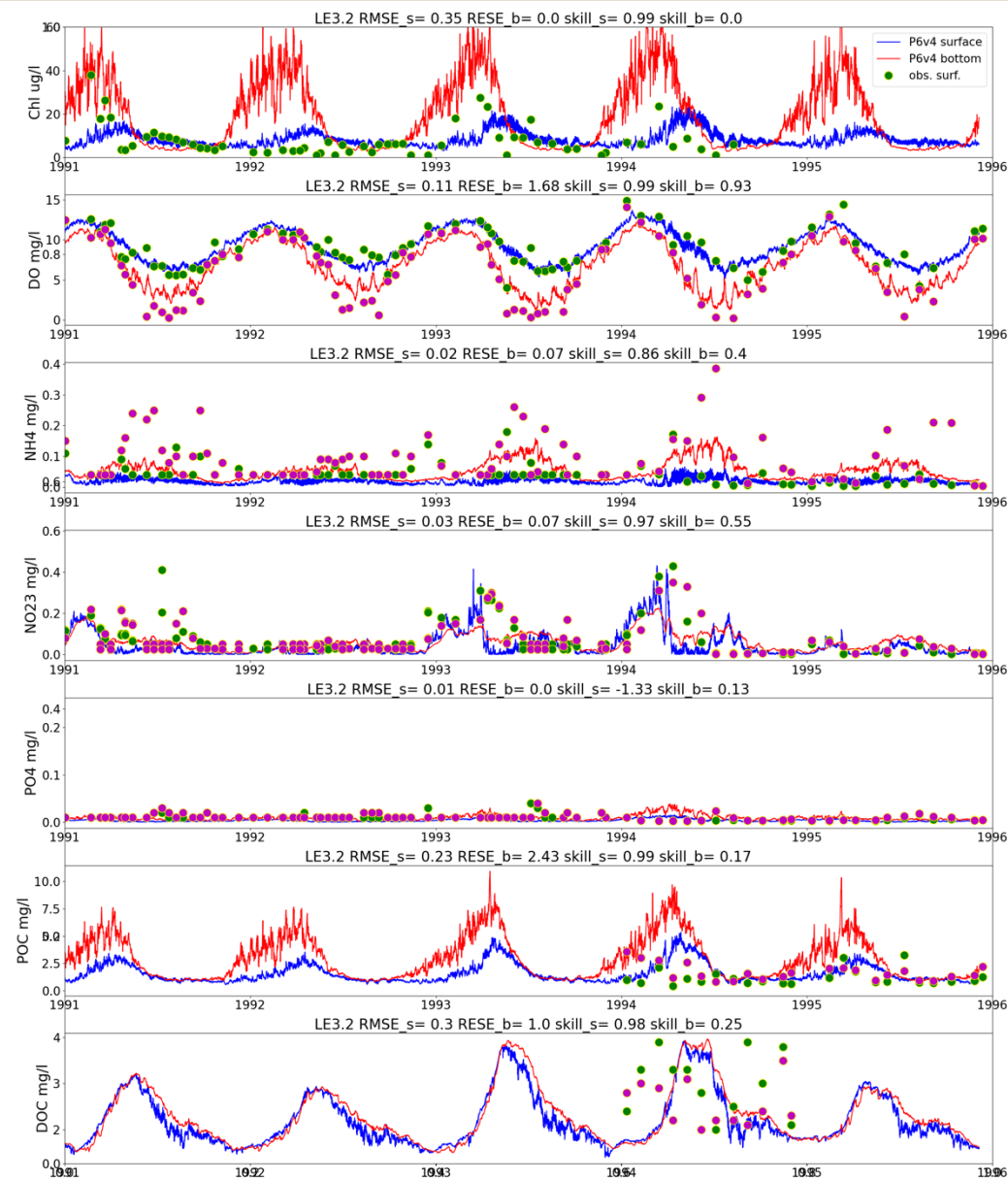
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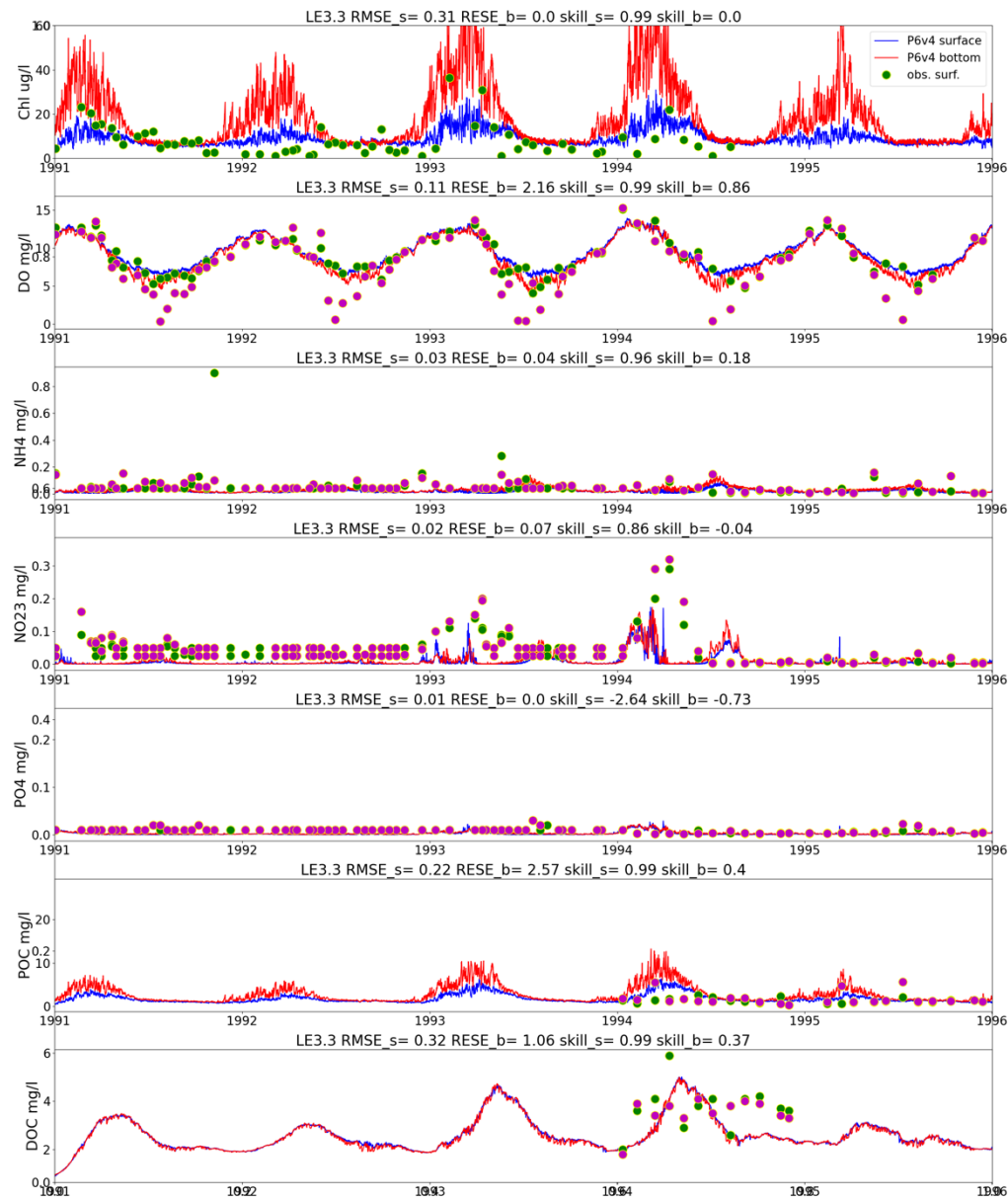
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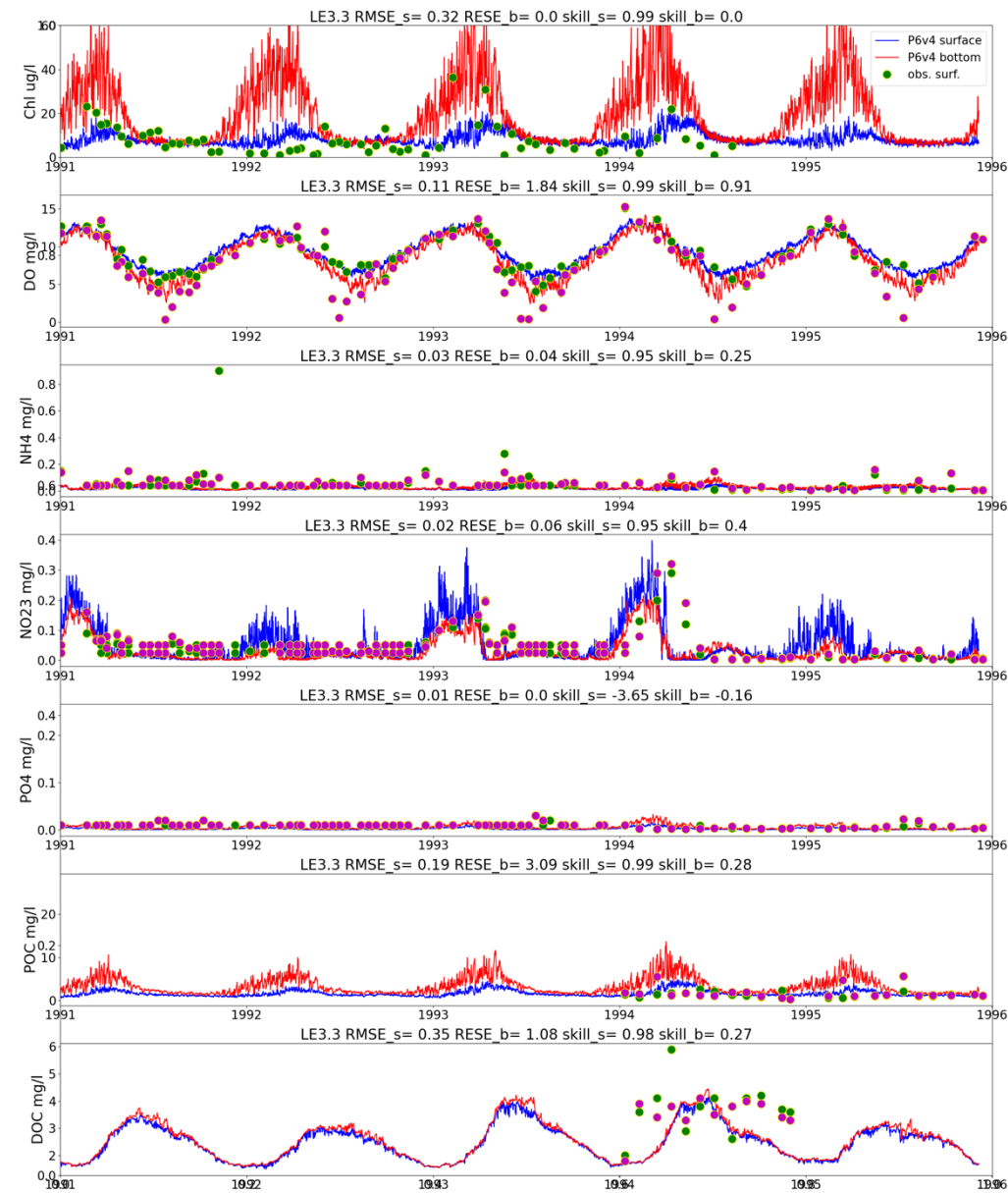
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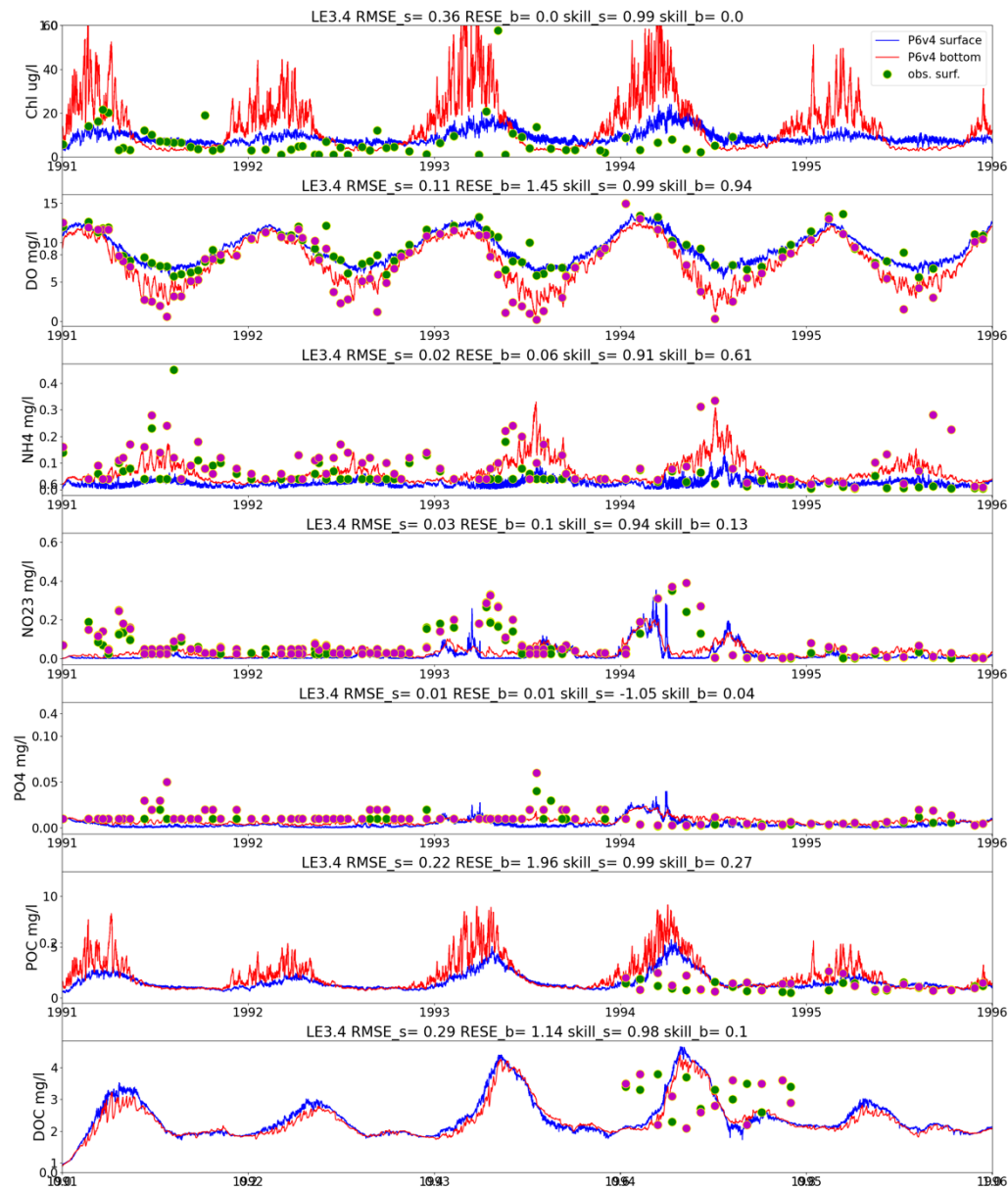
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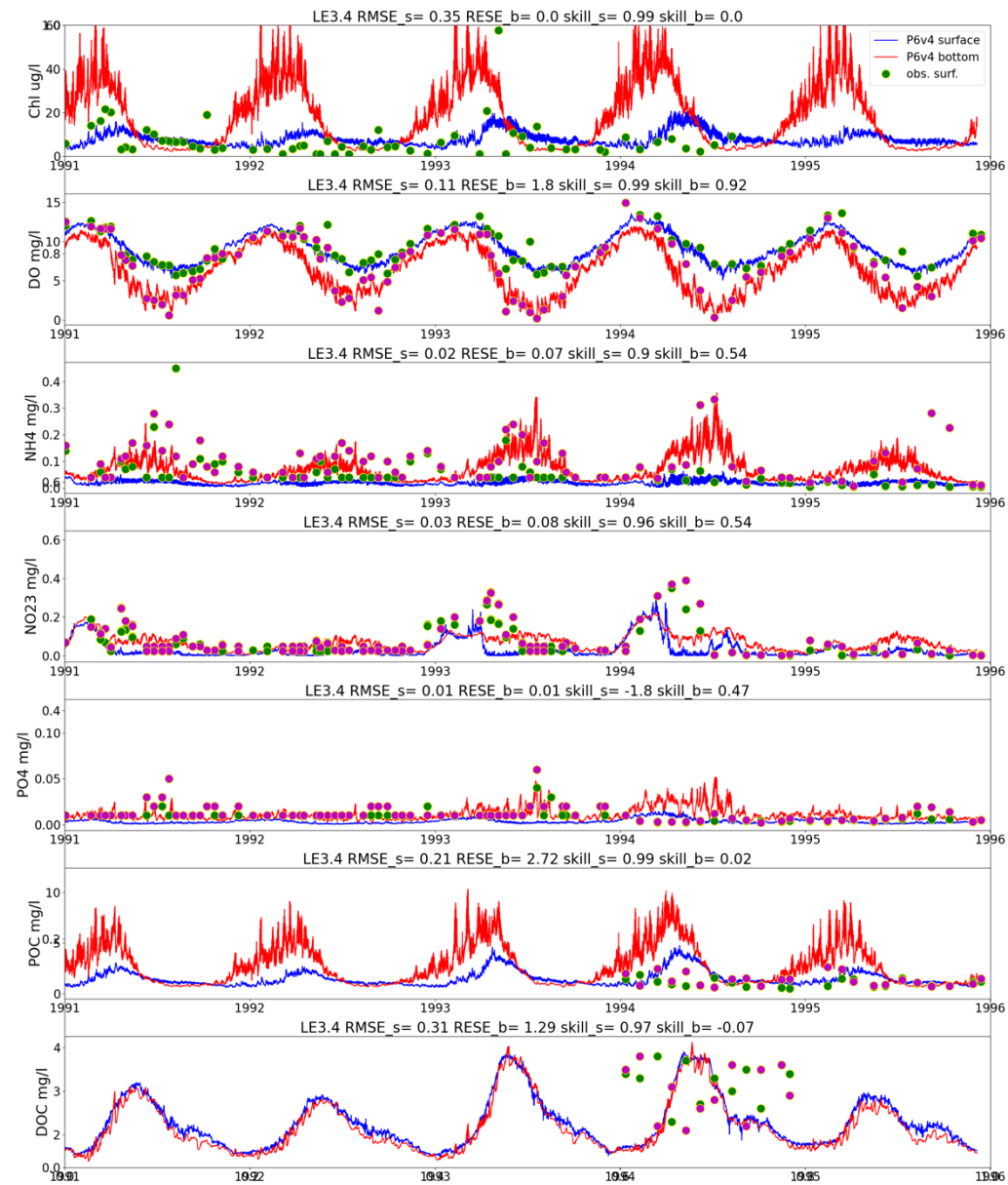
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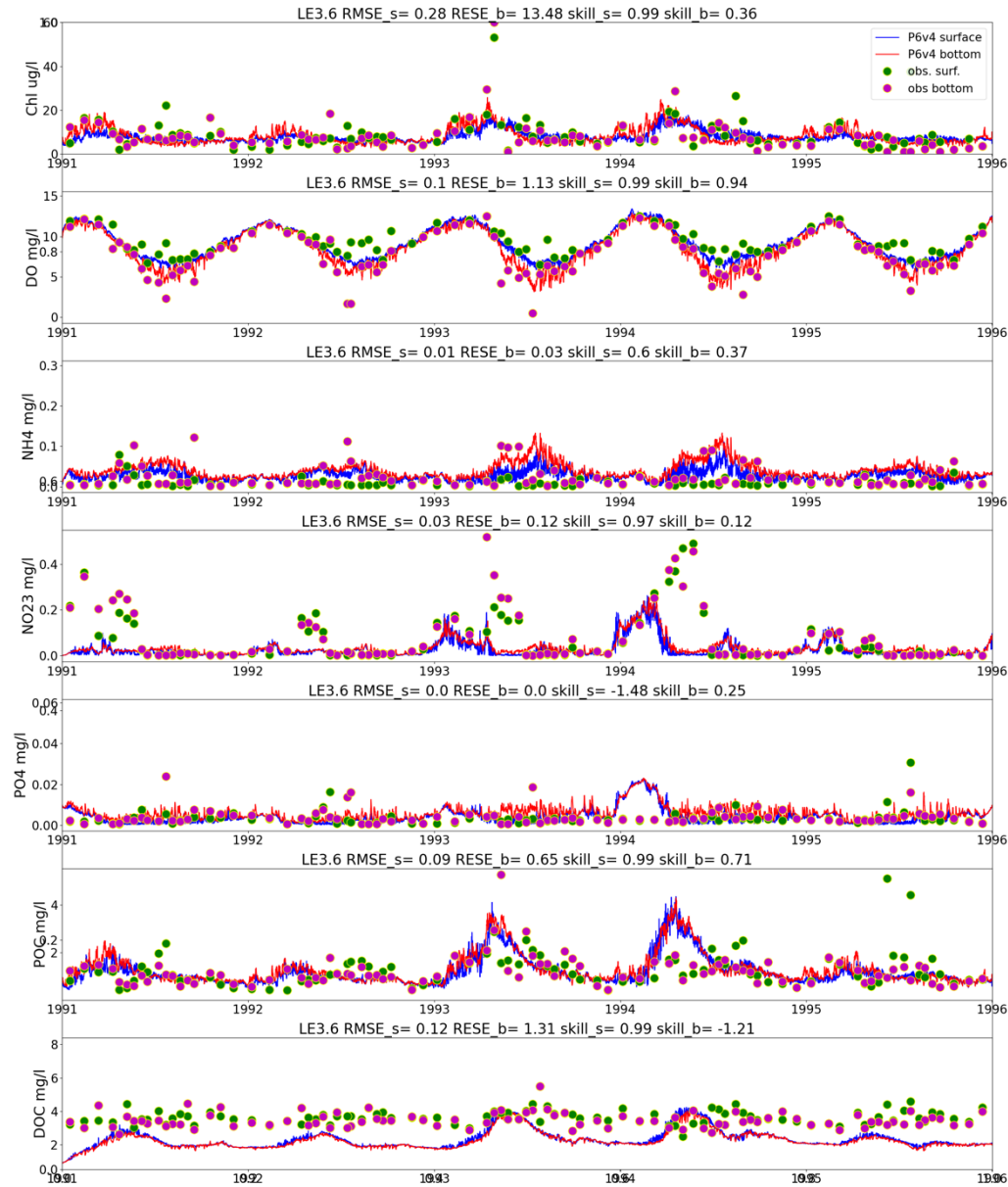
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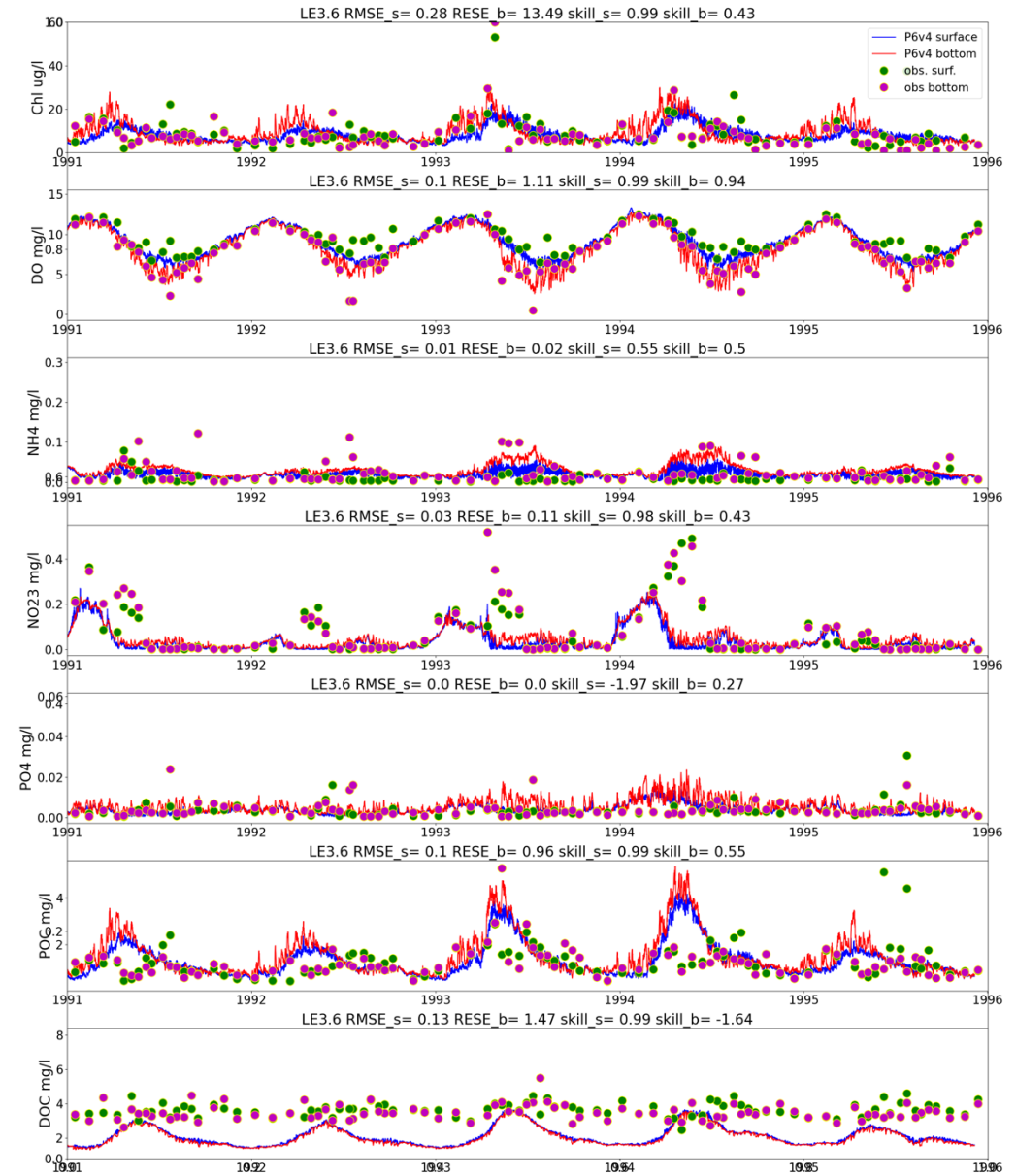
Current MBM Results



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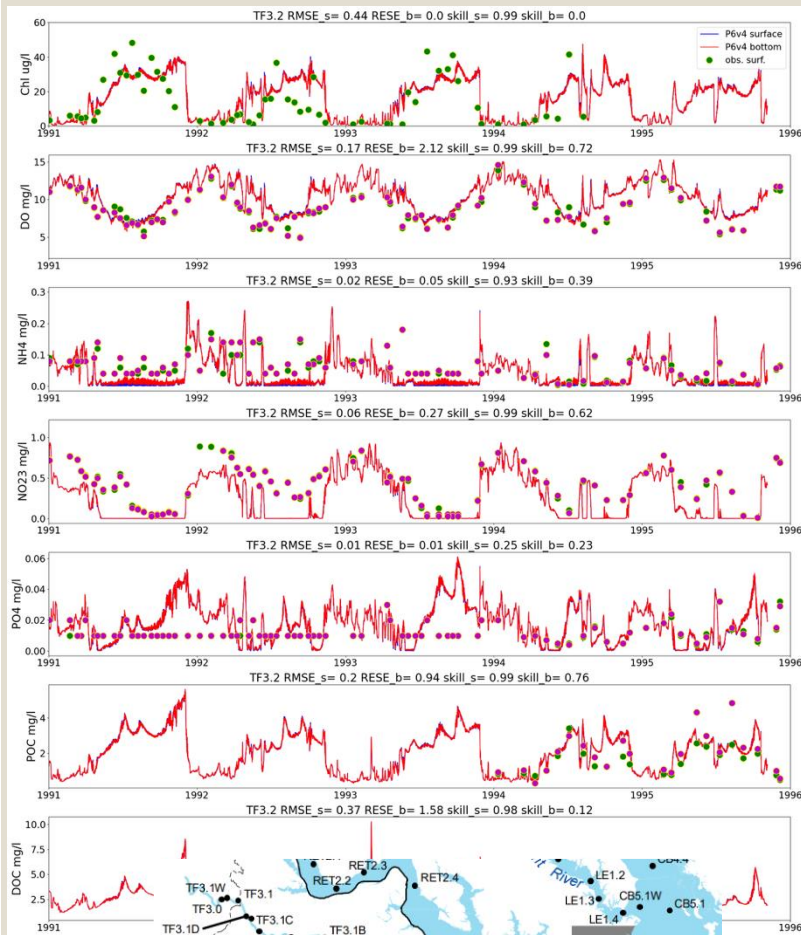
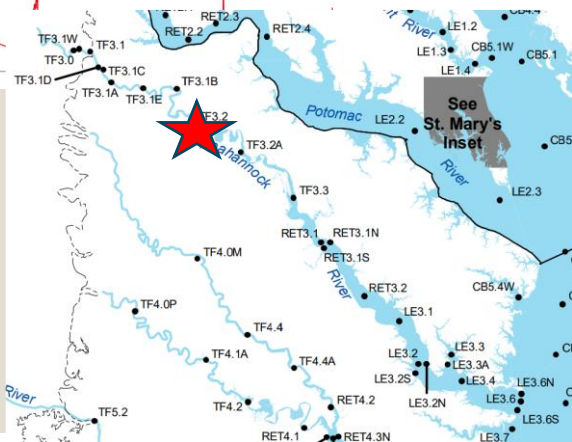


Current MBM Results

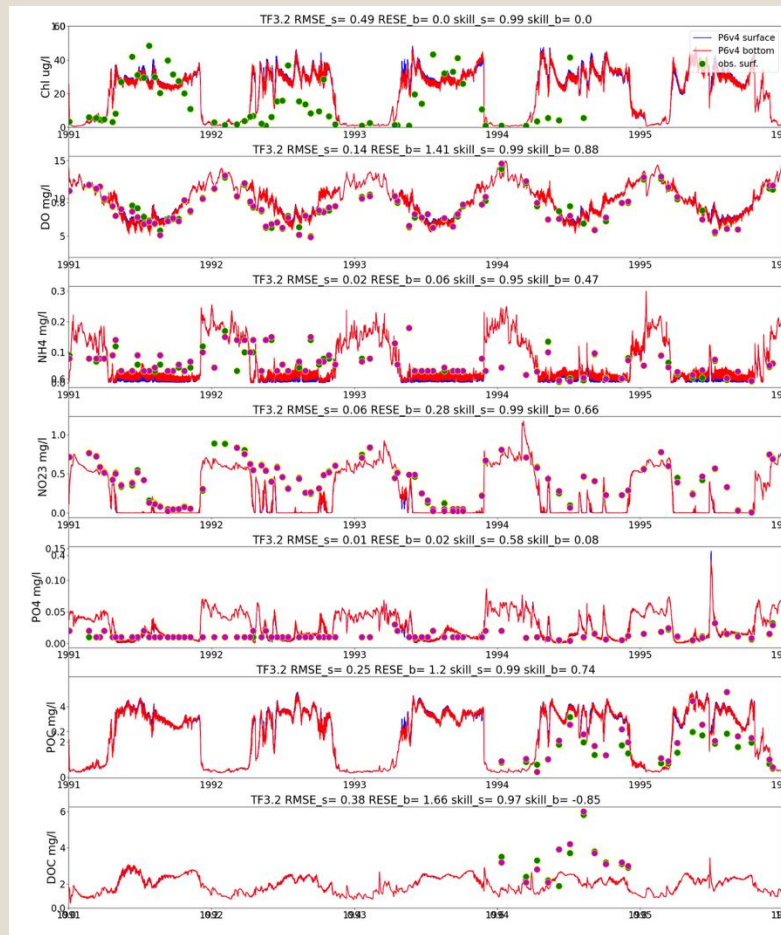


Further comparisons

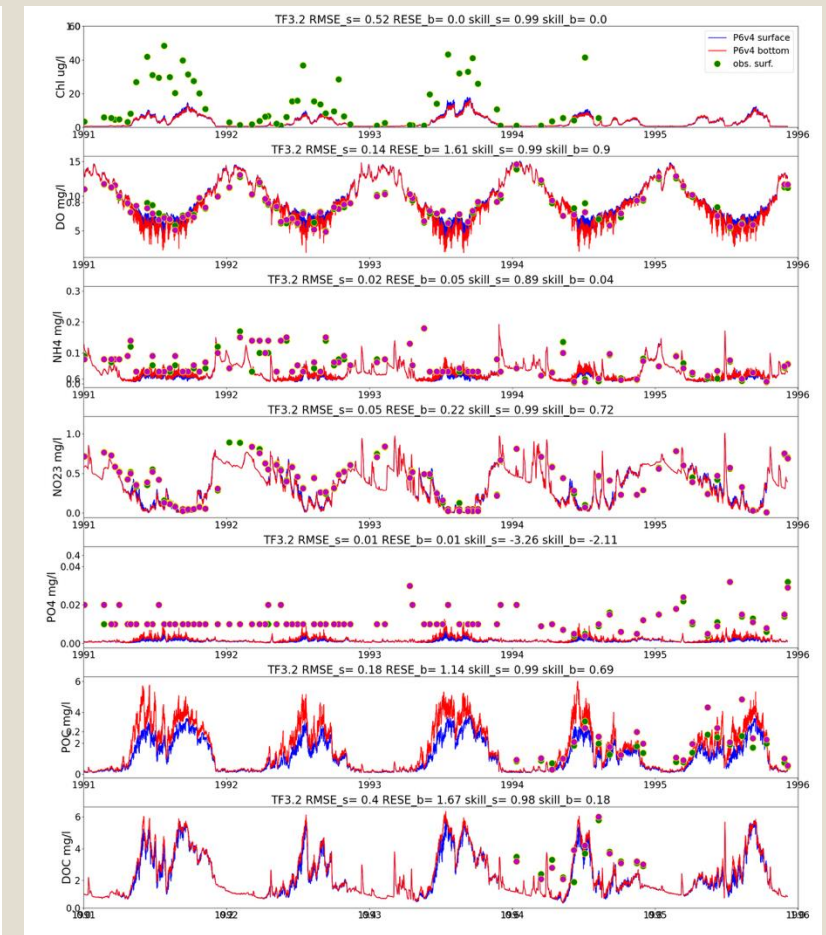
Previous Rapp. model results



New Rapp. model results

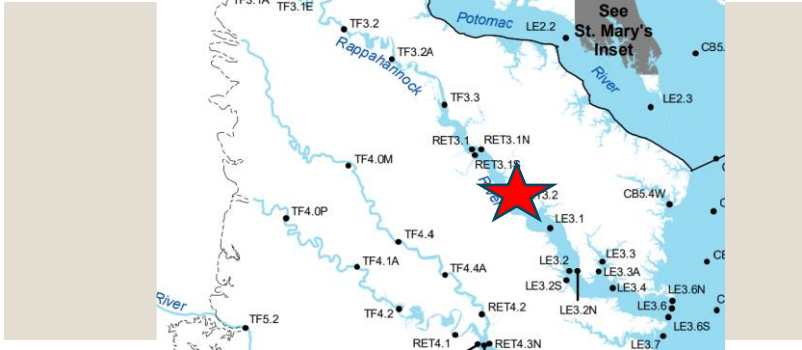


Current MBM Results

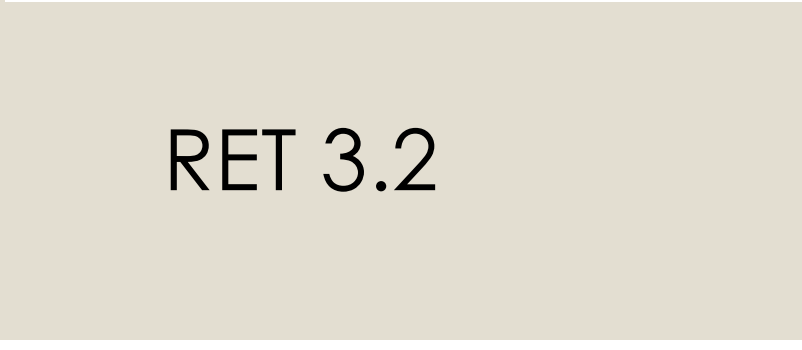


TE 3.2

Previous Rapp. model results



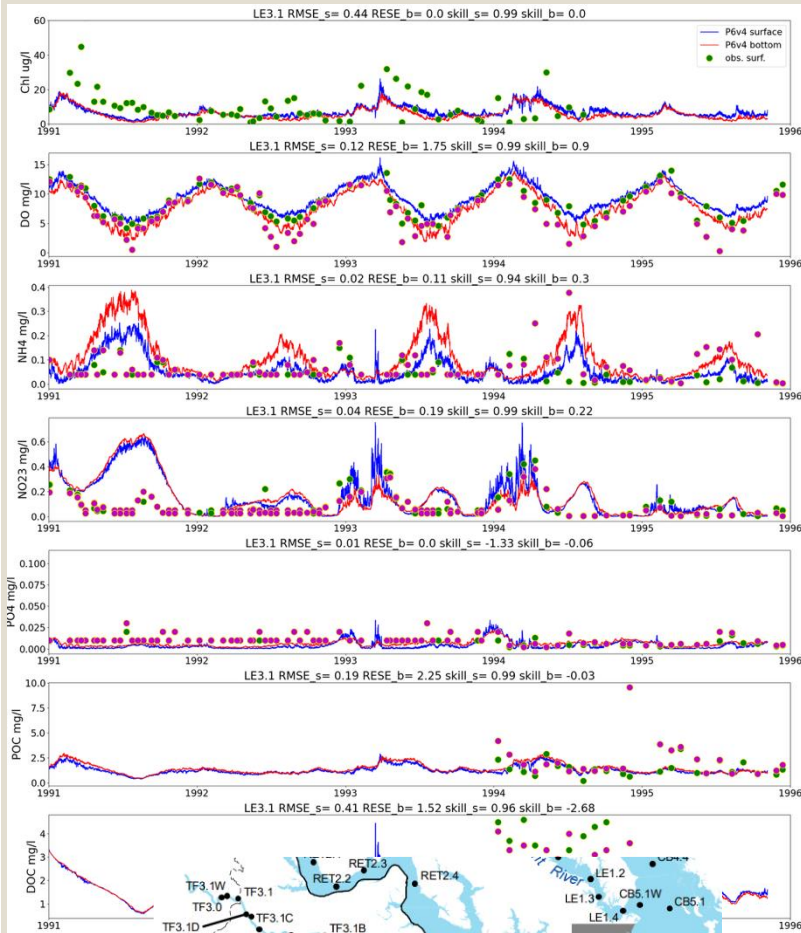
New Rapp. model results



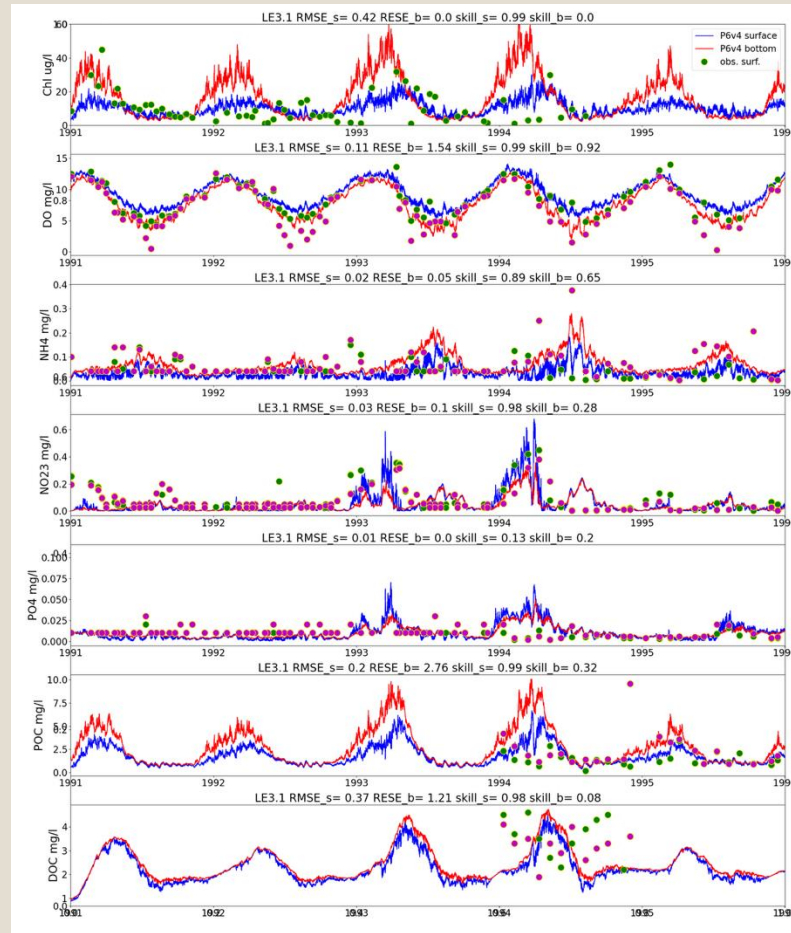
Current MBM Results

RET 3.2

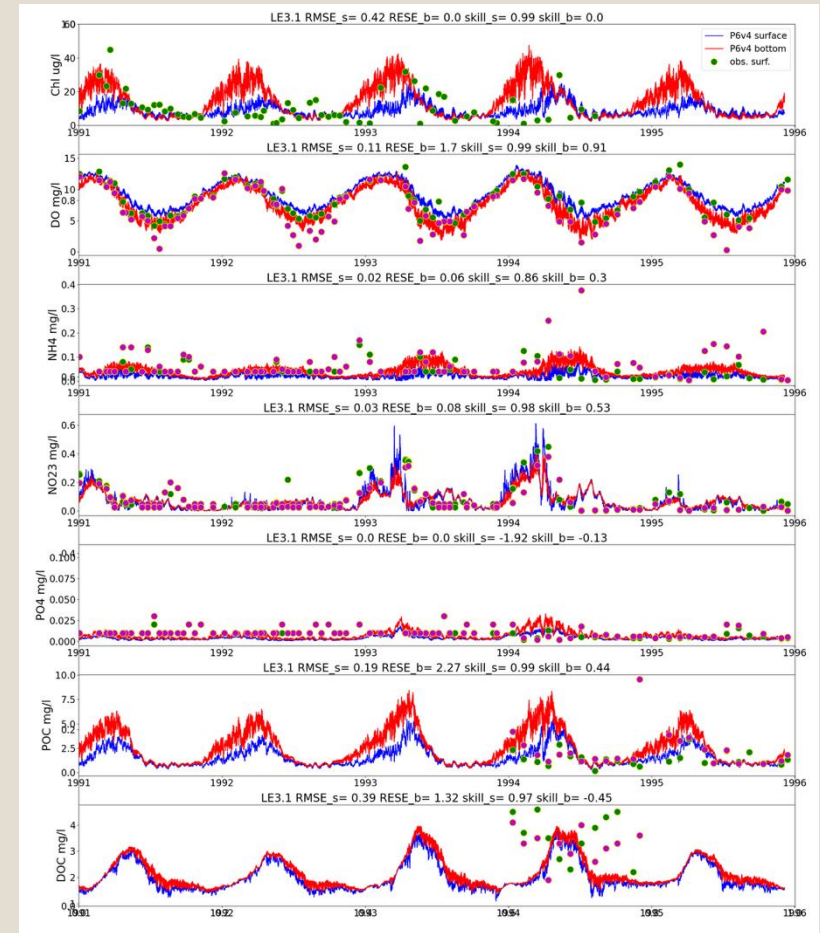
Previous Rapp. model results



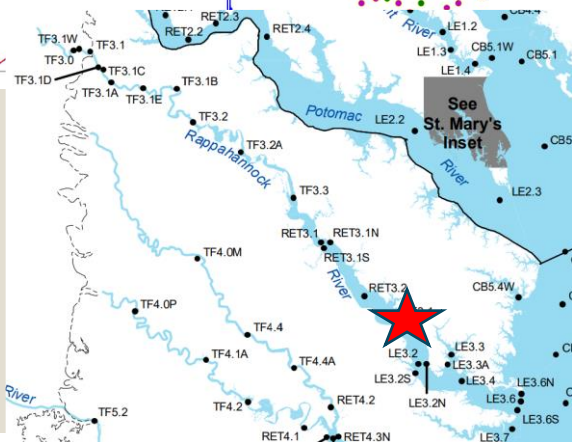
New Rapp. model results



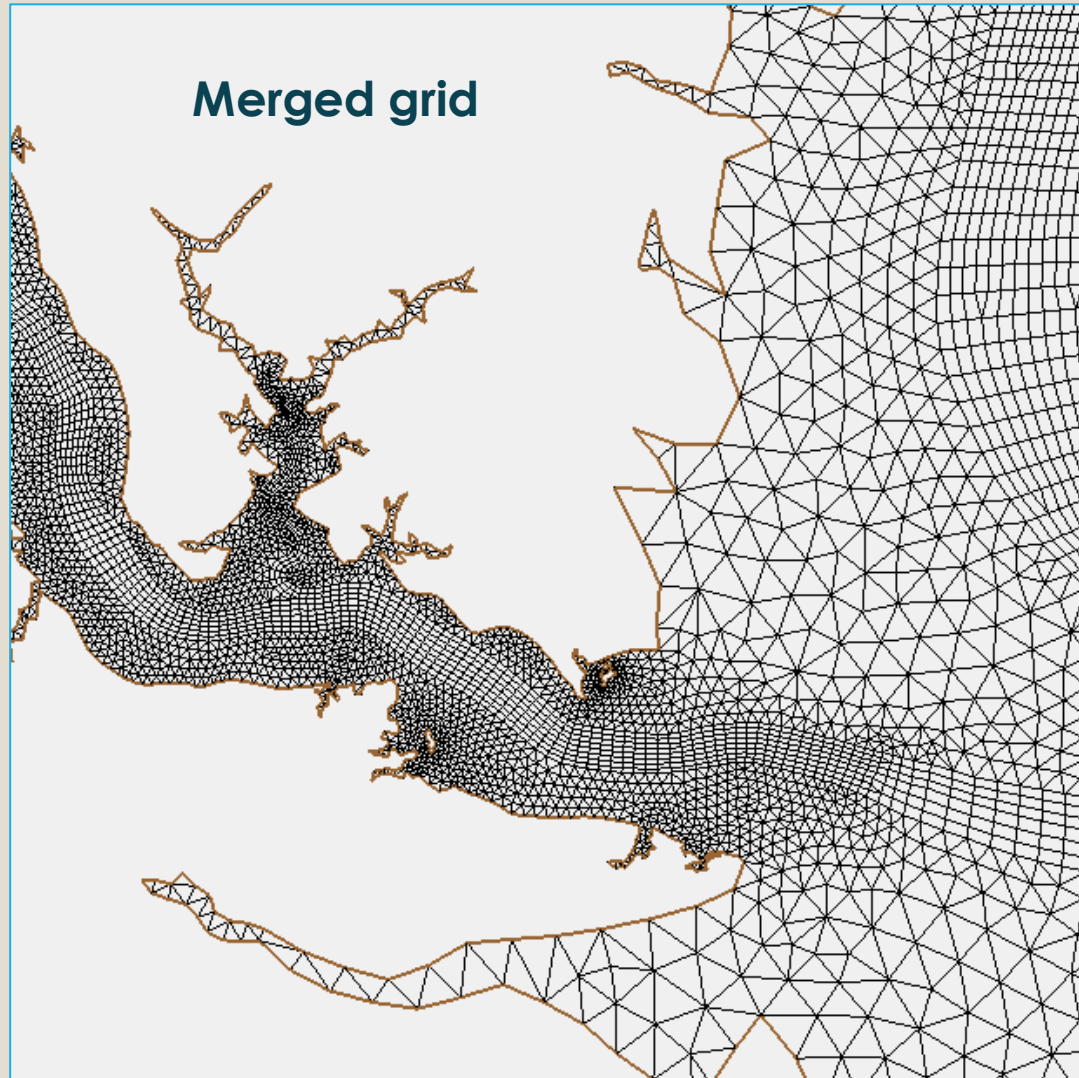
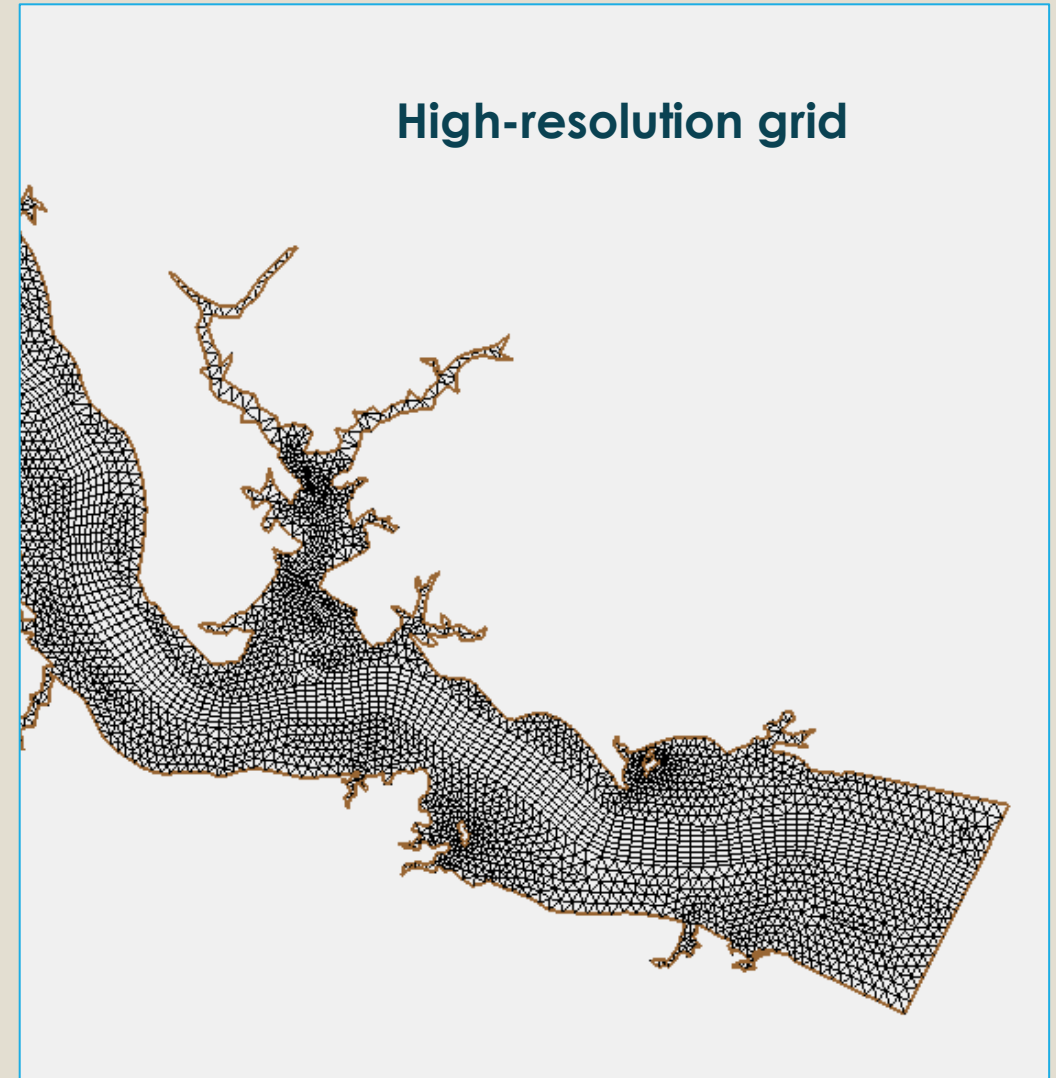
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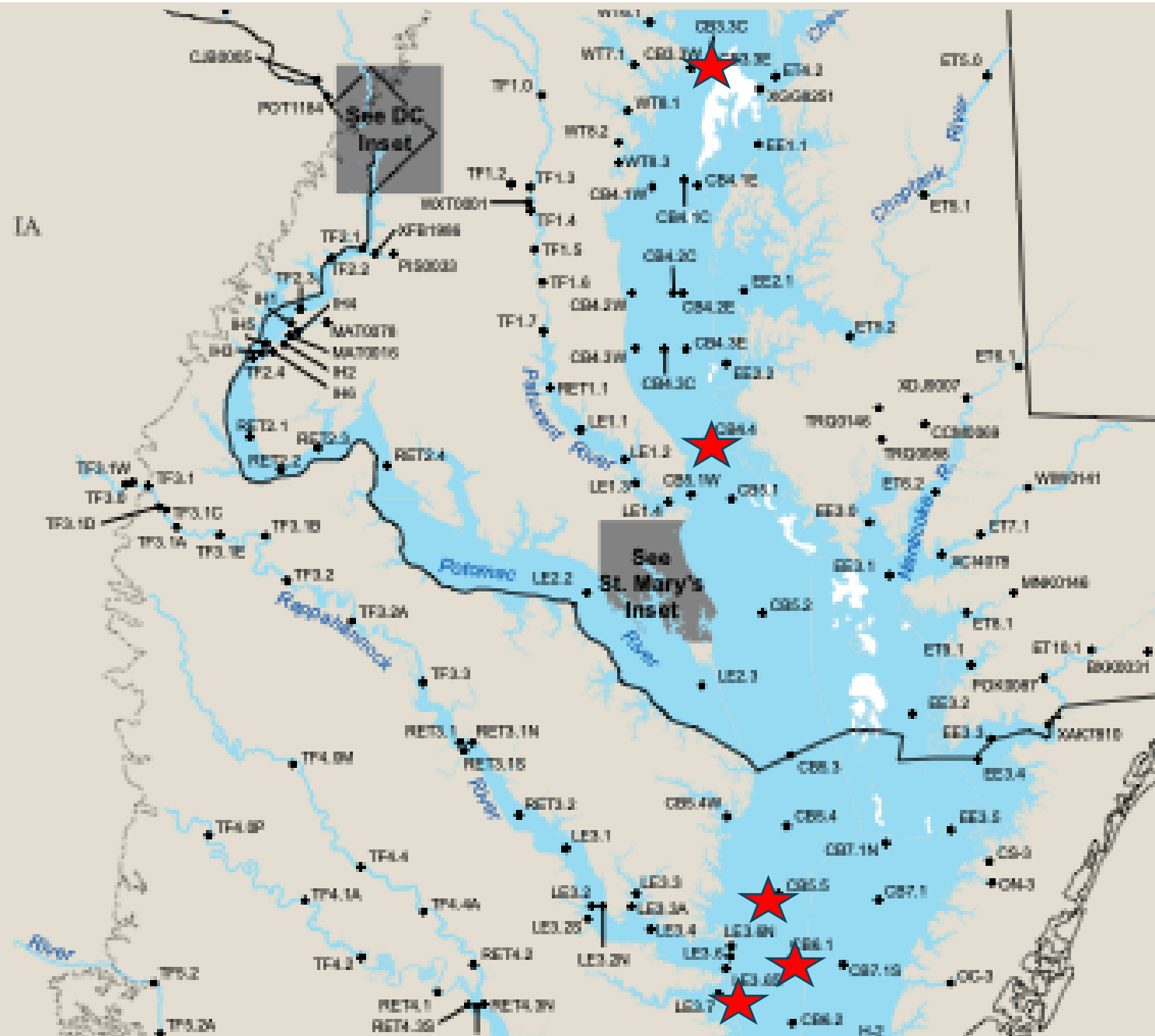
LE 3.1



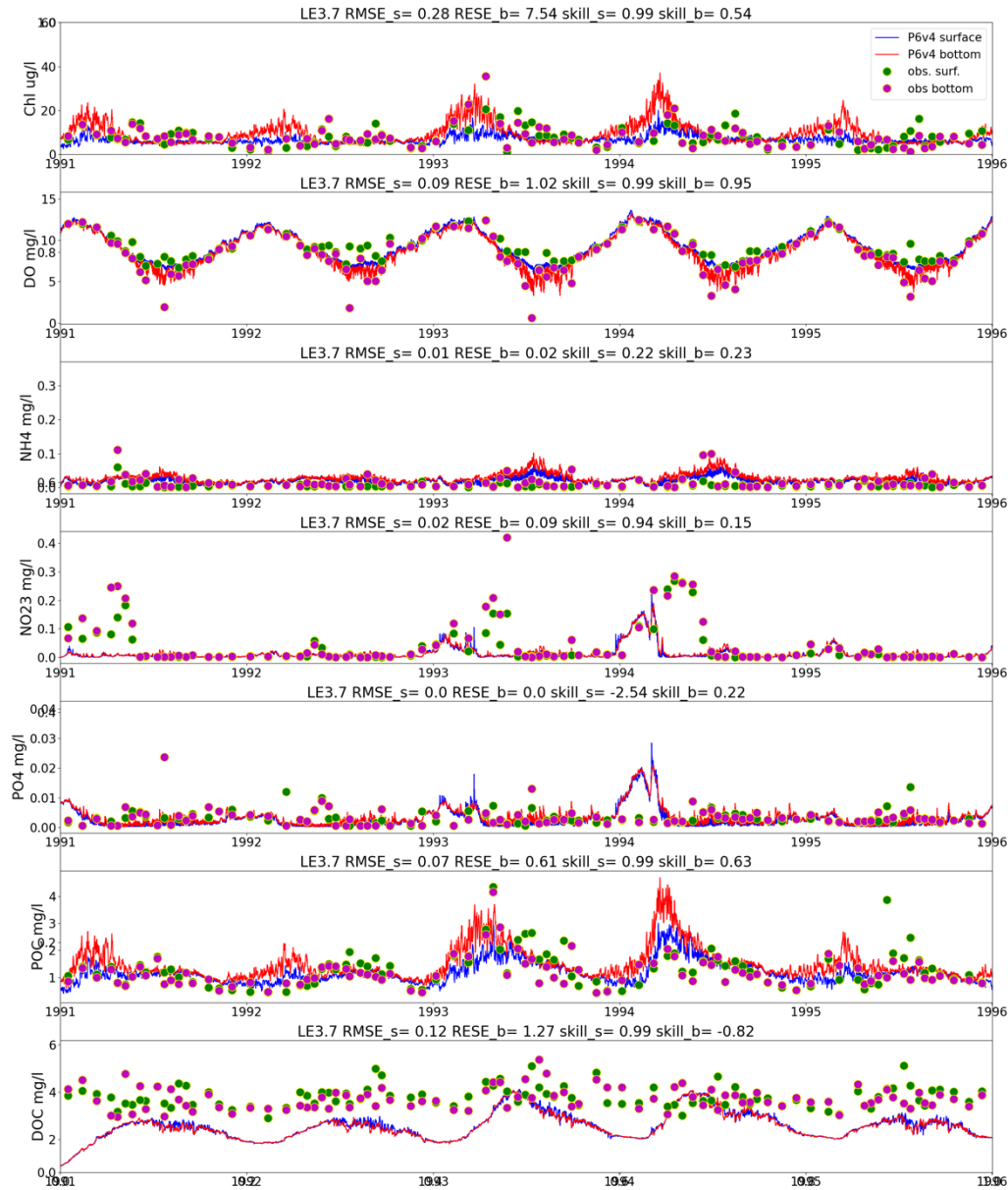
Marge bay grid and Rappahannock River grid



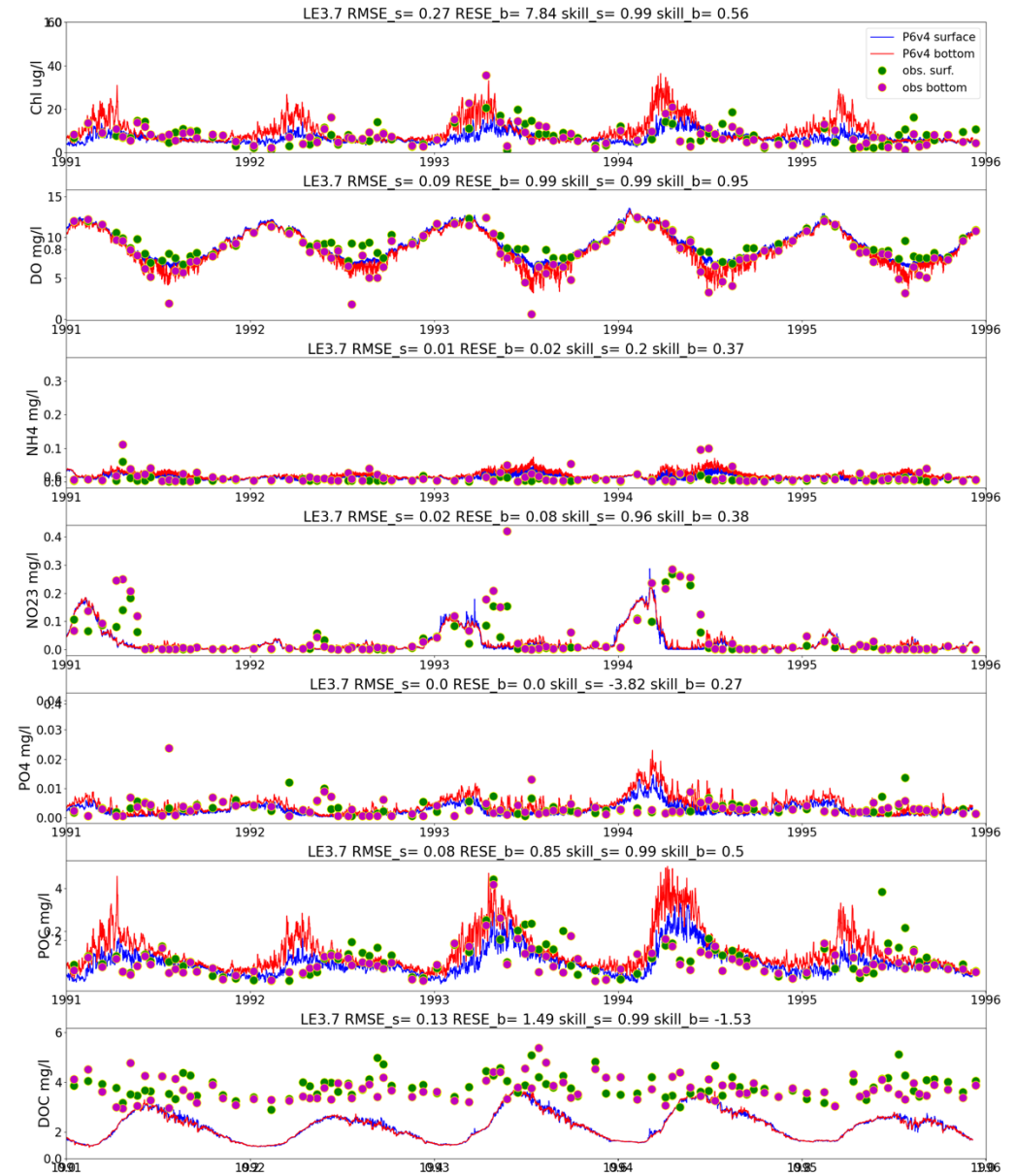
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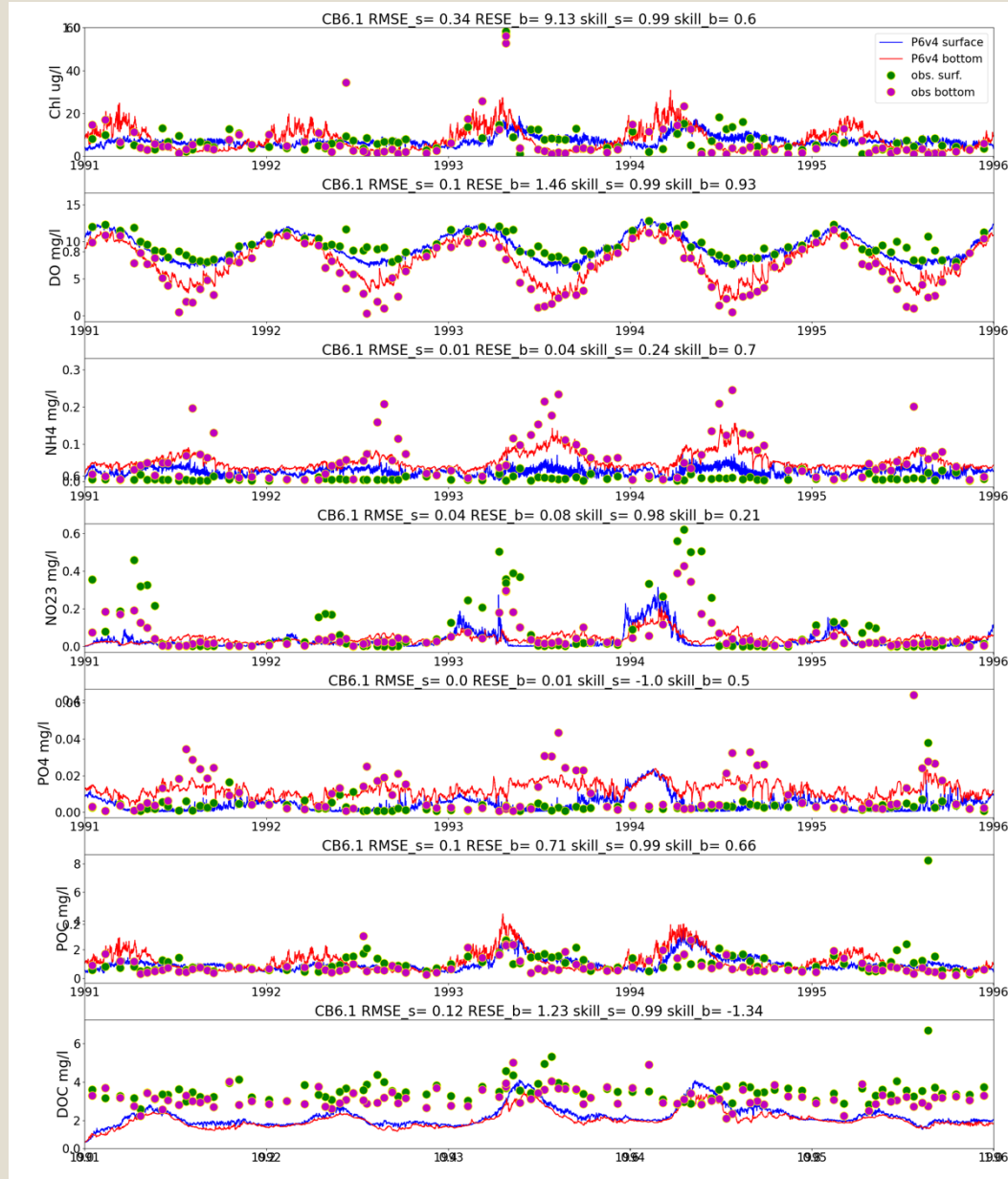
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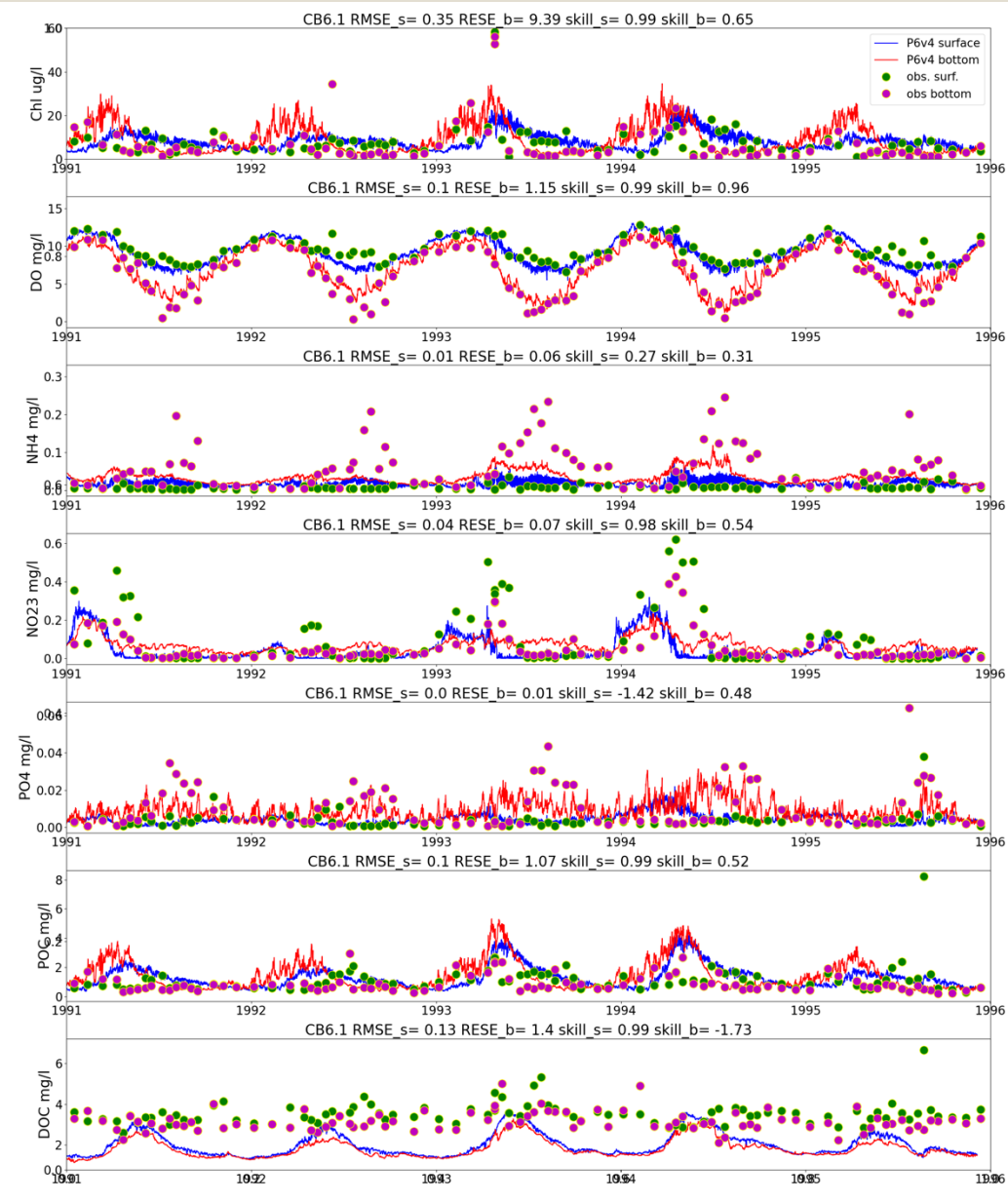
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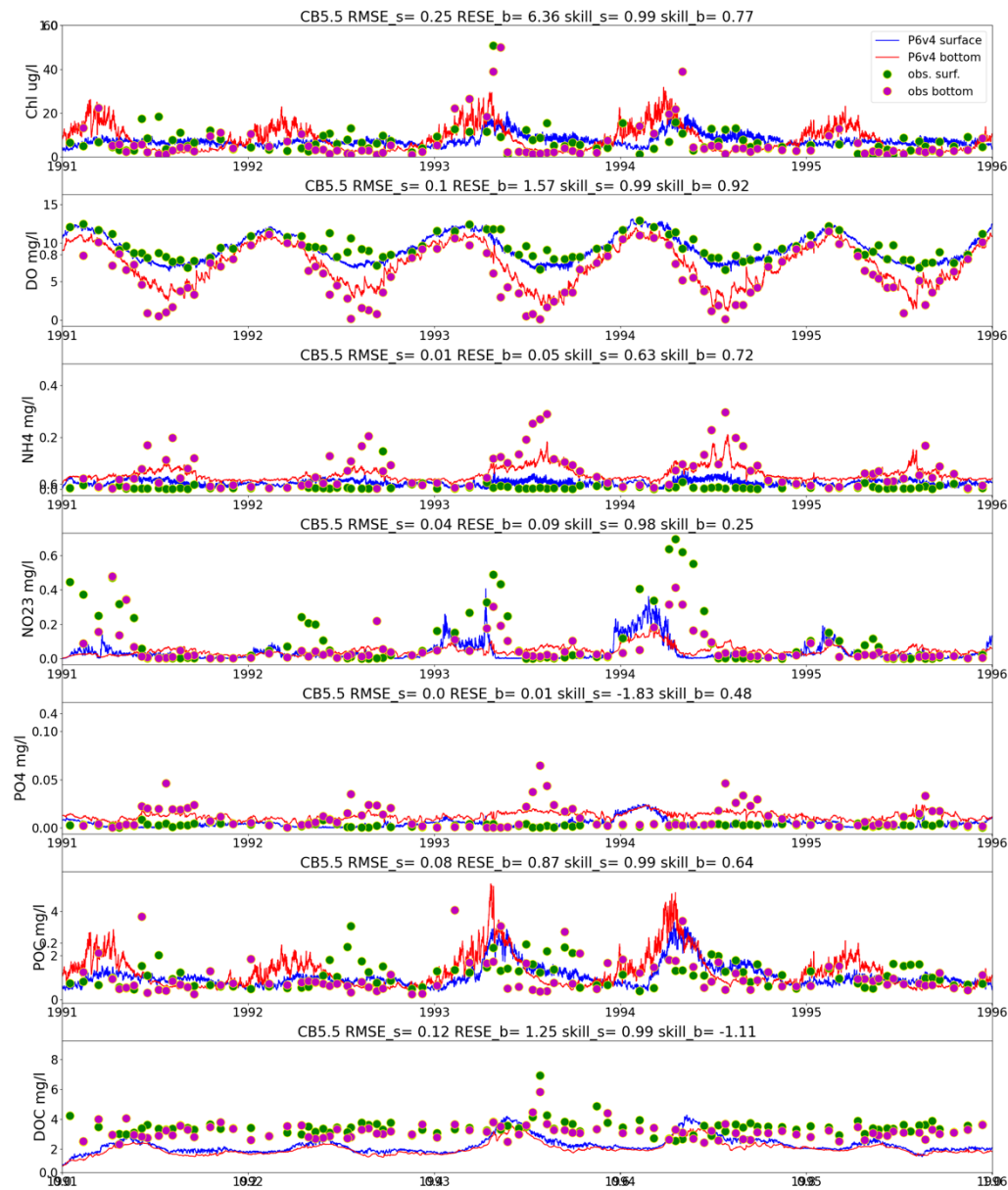
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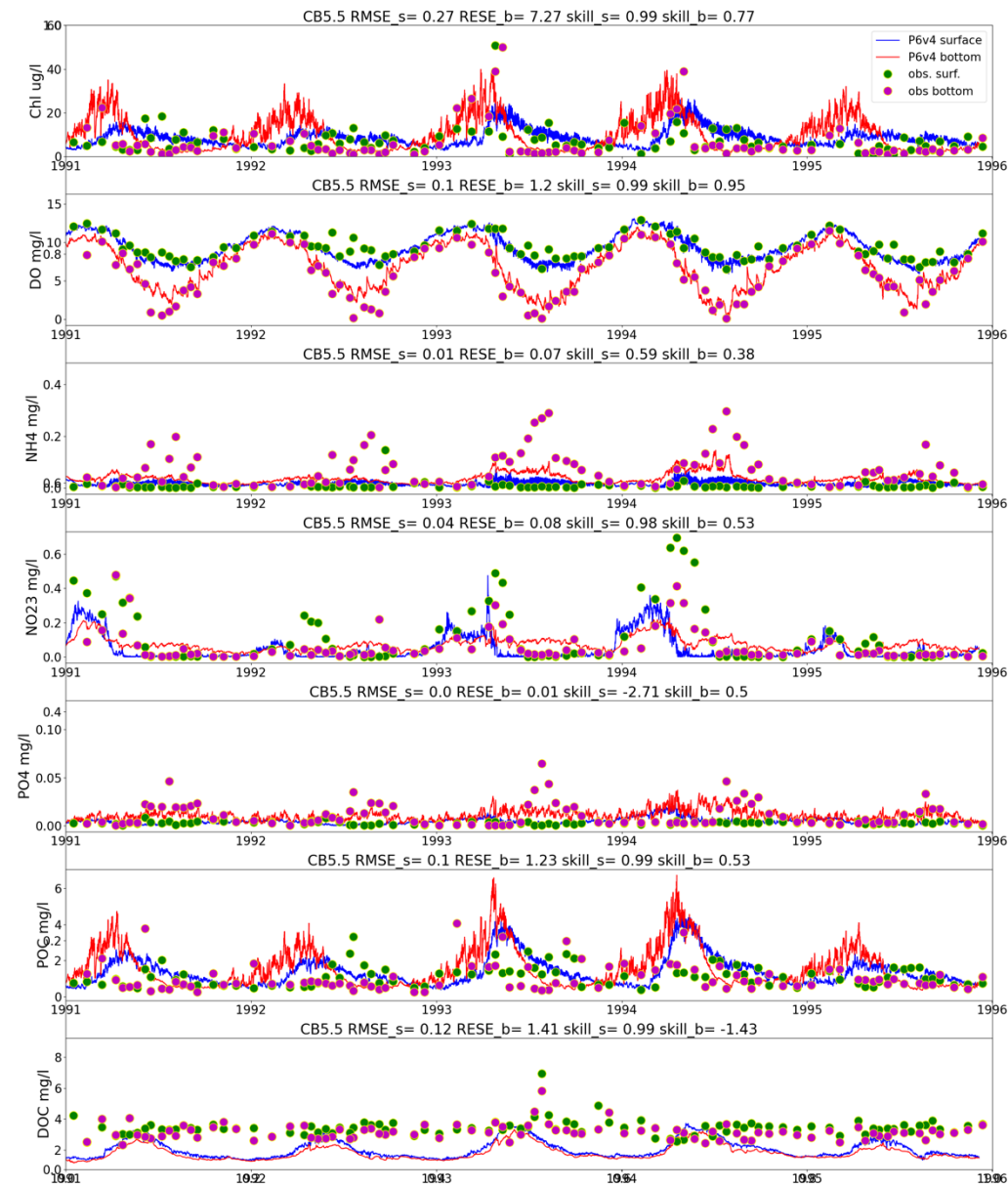
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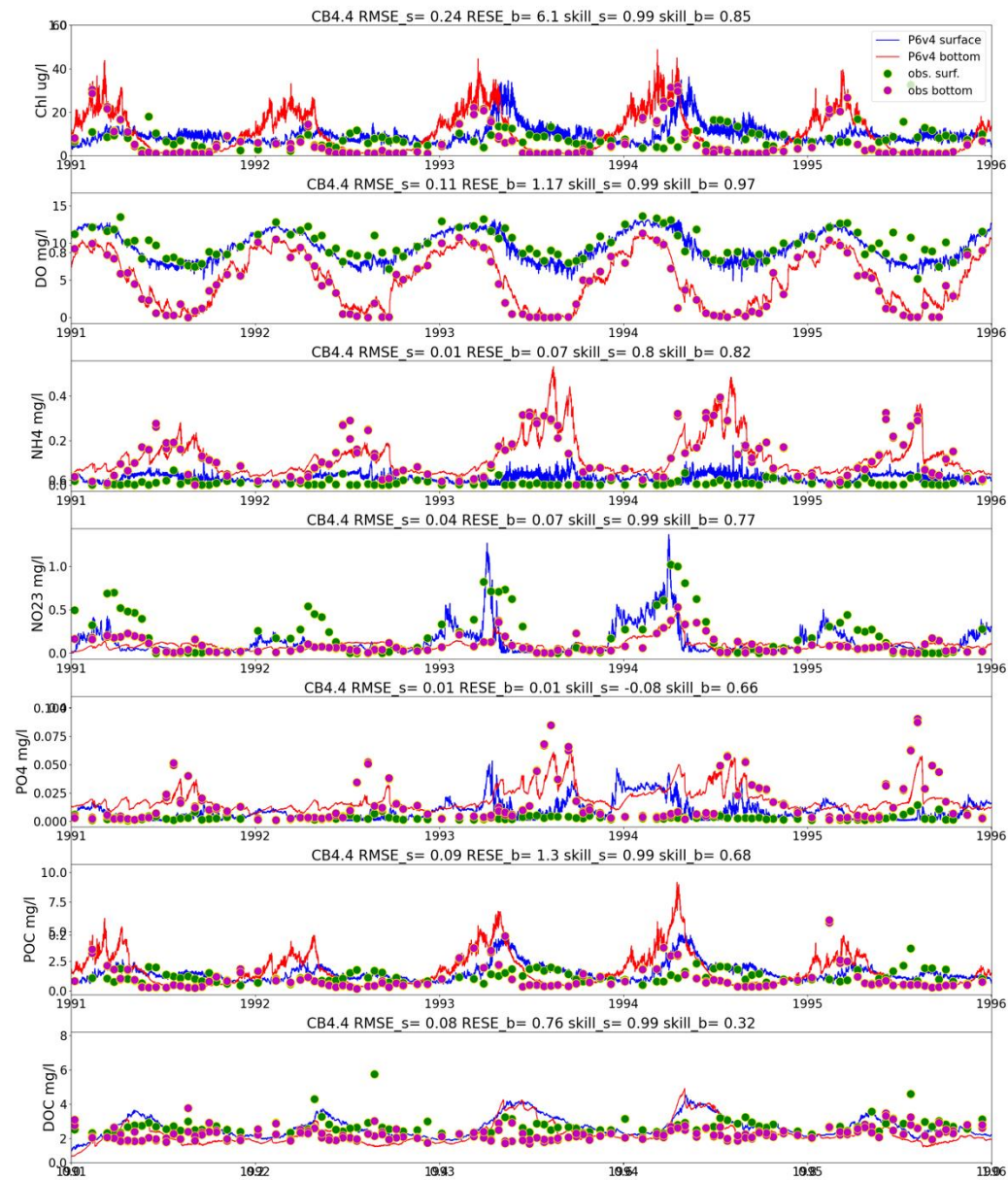
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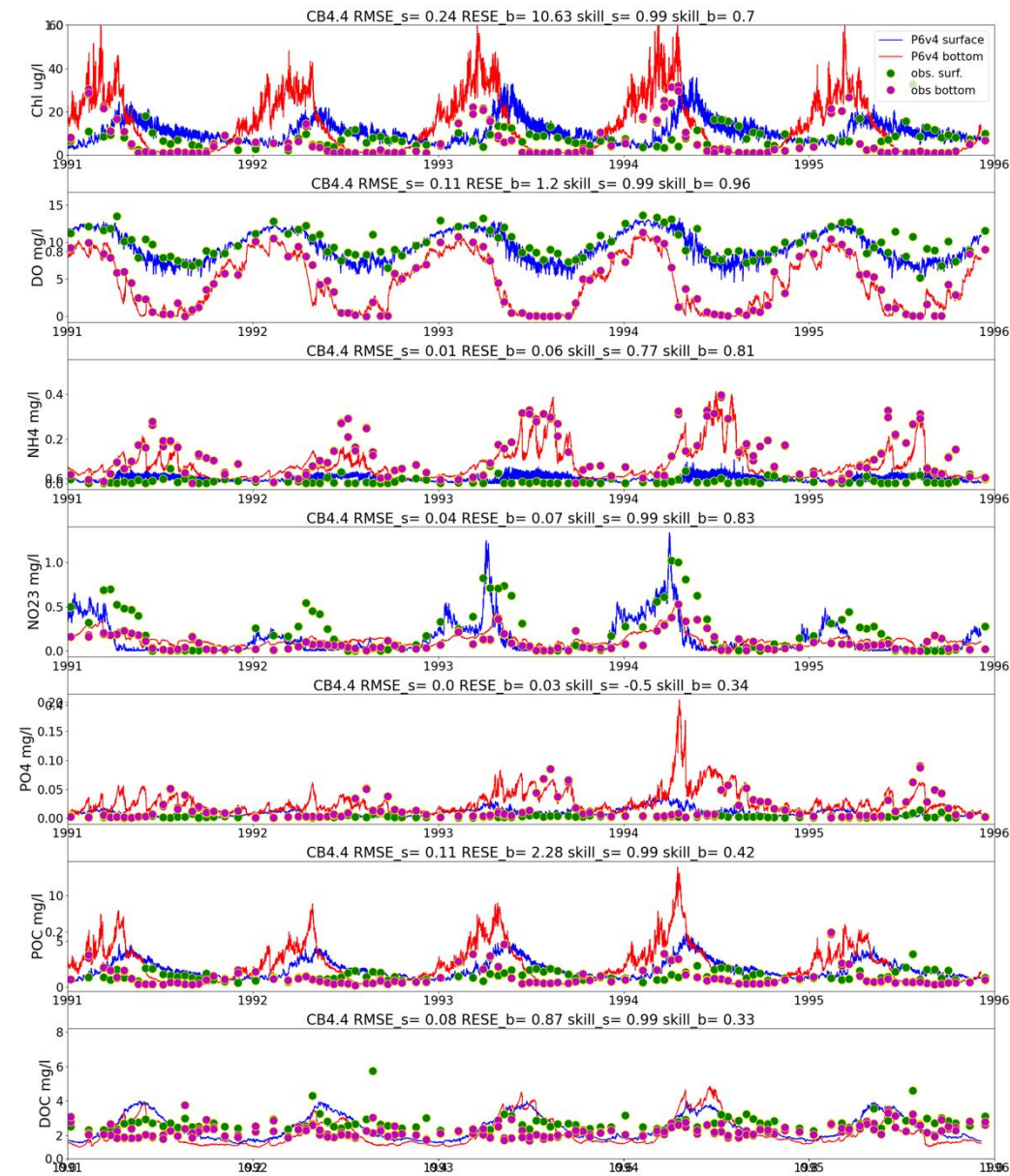
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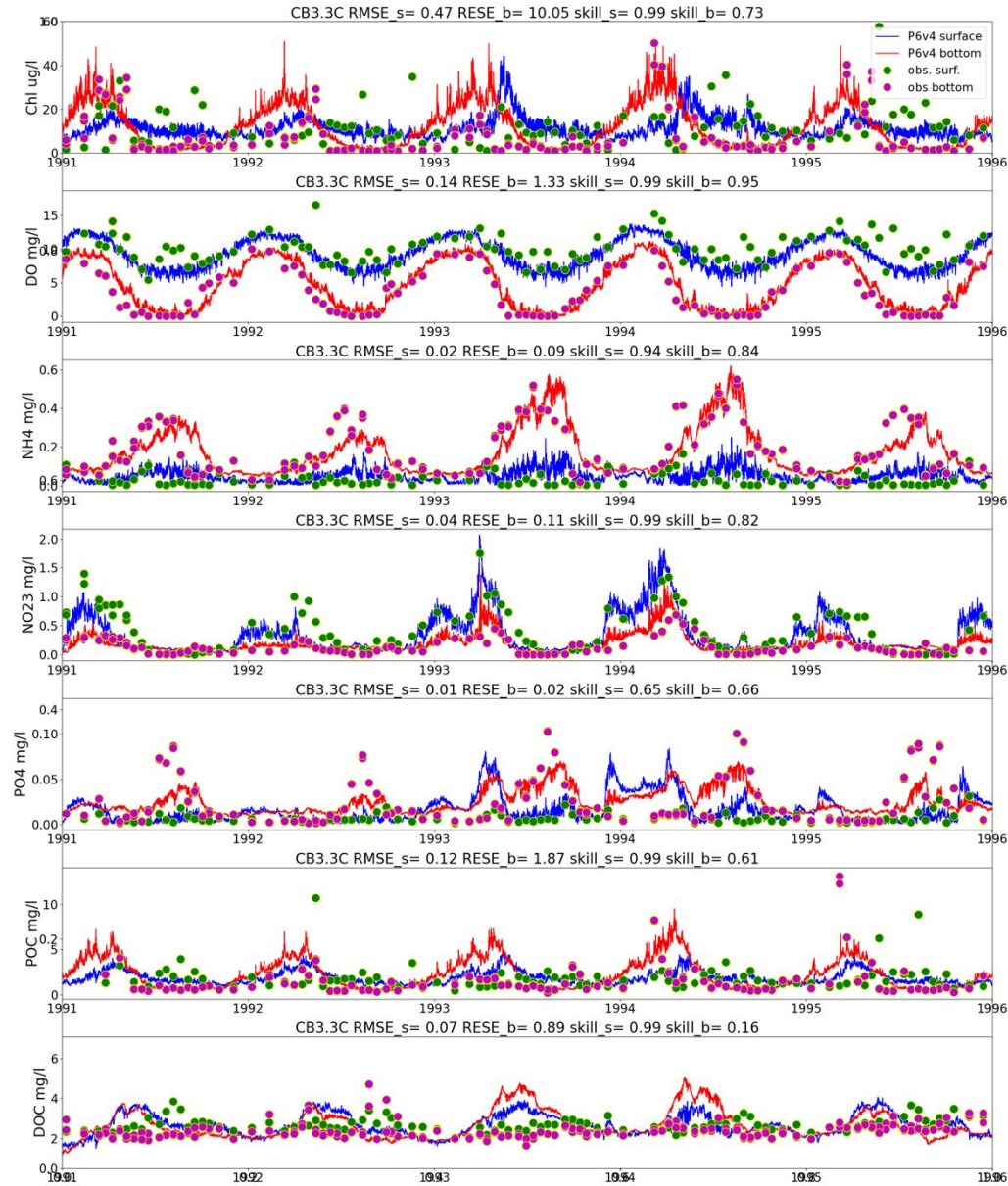
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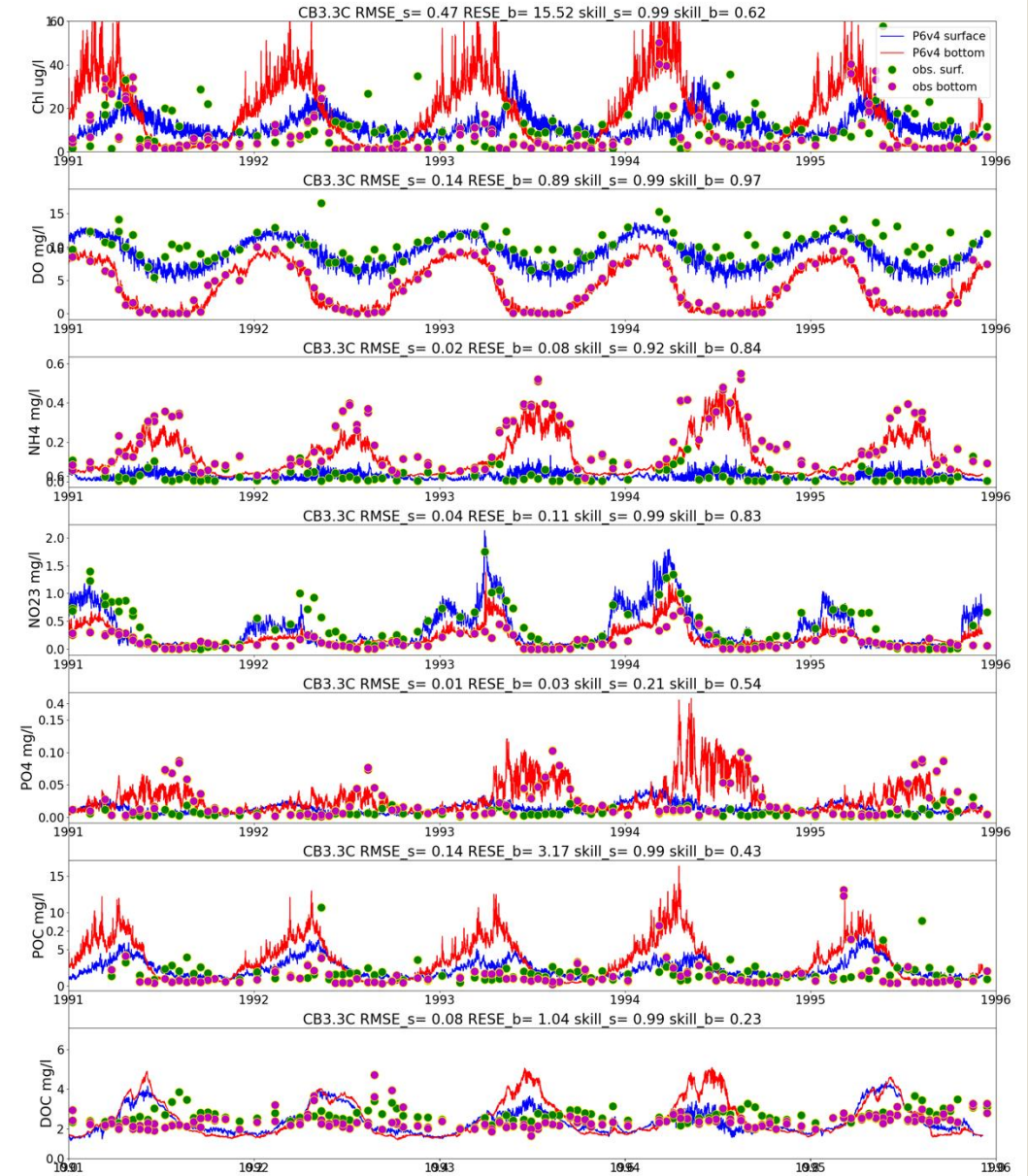
Current MBM Results



New Rapp. model results



Current MBM Results



Summary and next step

The updated Rappahannock River model improves water quality simulations compared to the previous version.

Differences between the Rappahannock River model and MBM at mainstem stations suggest that processes within the Rappahannock River also influence conditions in the mainstem.

Next steps: Further model calibration and documentation.