

Beginning of a month

1-month assimilation window

End of the month

$$x_b = \begin{pmatrix} x_b^{atm} \\ x_b^{lnd} \\ x_b^{ice} \\ x_b^{river} \\ x_b^{ocn} \end{pmatrix}$$

E3SMv2

$$y_b^{ocn} = \begin{pmatrix} \bar{T}_b^m \\ \bar{S}_b^m \end{pmatrix}$$

$$y_{obs}^{ocn} = \begin{pmatrix} \bar{T}_{obs}^m \\ \bar{S}_{obs}^m \end{pmatrix}$$

Analysis Step:

$$x_a^{ocn} = x_b^{ocn} + x'_a$$

DRP-4DVar

$$y'_{obs} = y_{obs}^{ocn} - y_b^{ocn}$$

Forecast Step:

$$x_a = \begin{pmatrix} x_b^{atm} \\ x_b^{lnd} \\ x_b^{ice} \\ x_b^{river} \\ x_a^{ocn} \end{pmatrix}$$

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x_b for next month