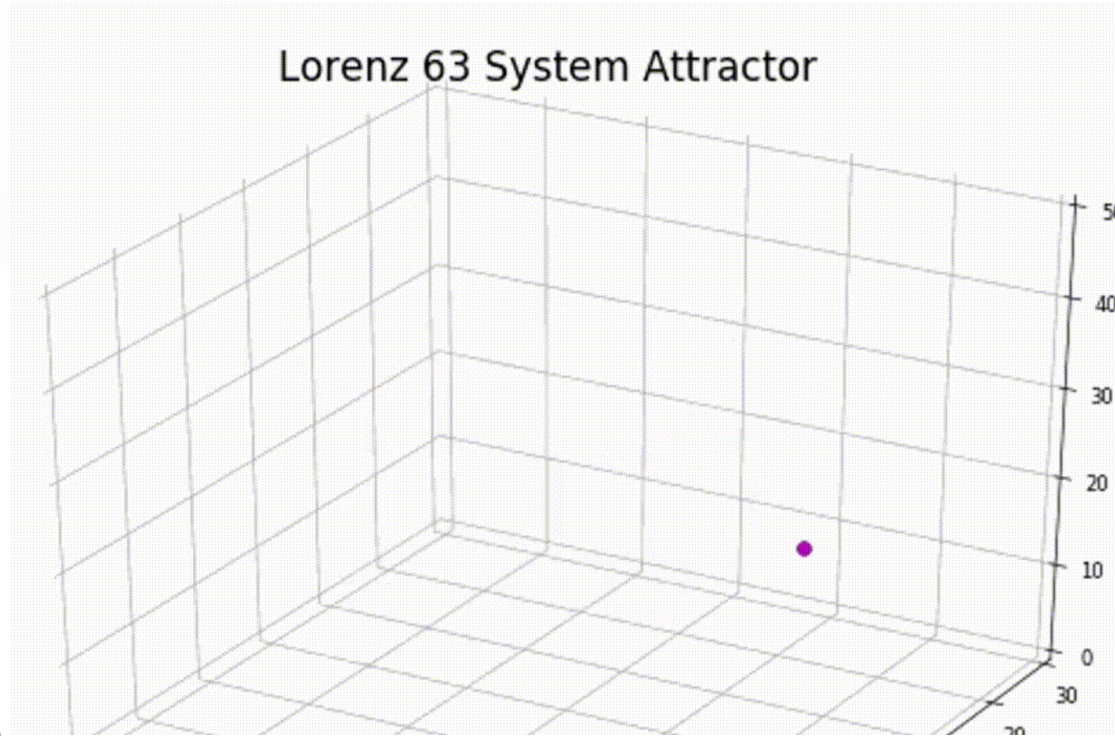
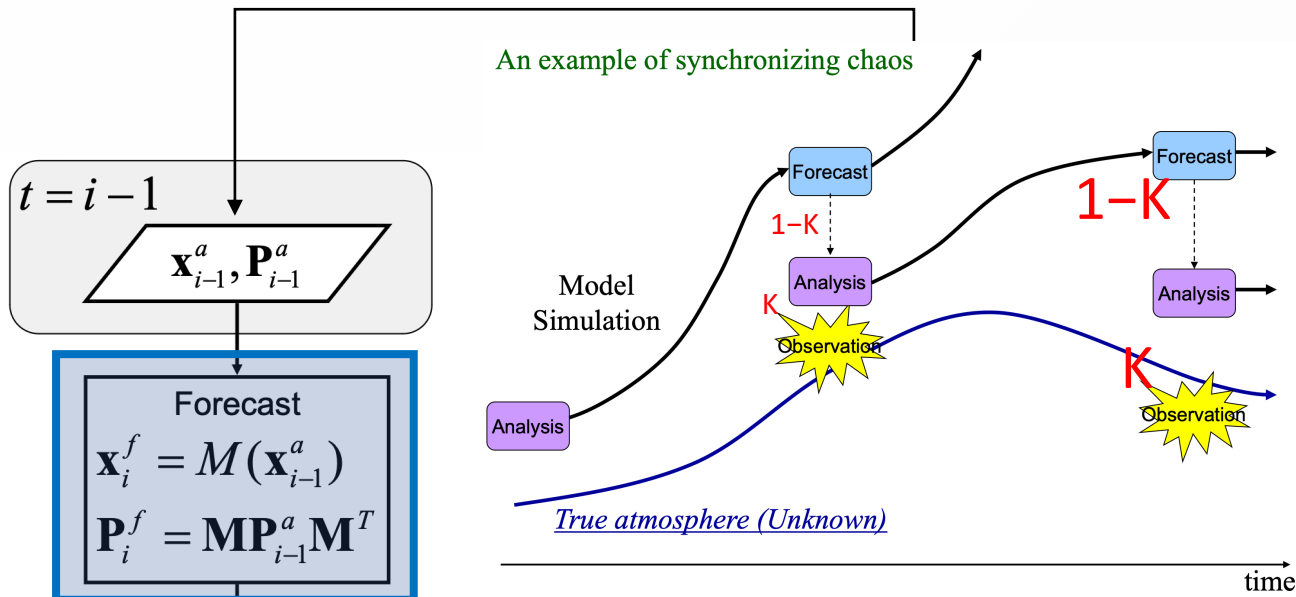
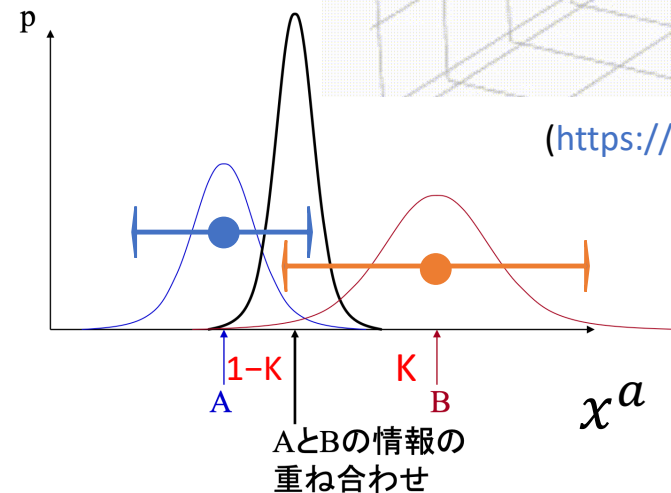


SG-01[データ同化] | データ同化とは？



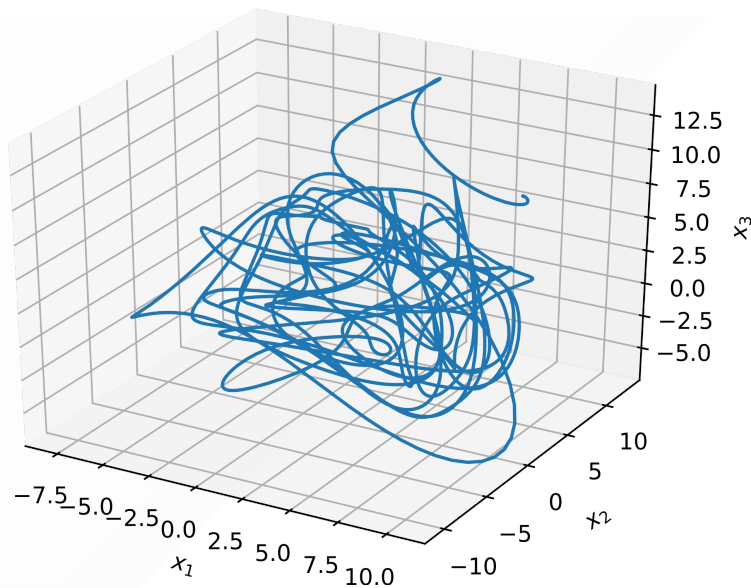
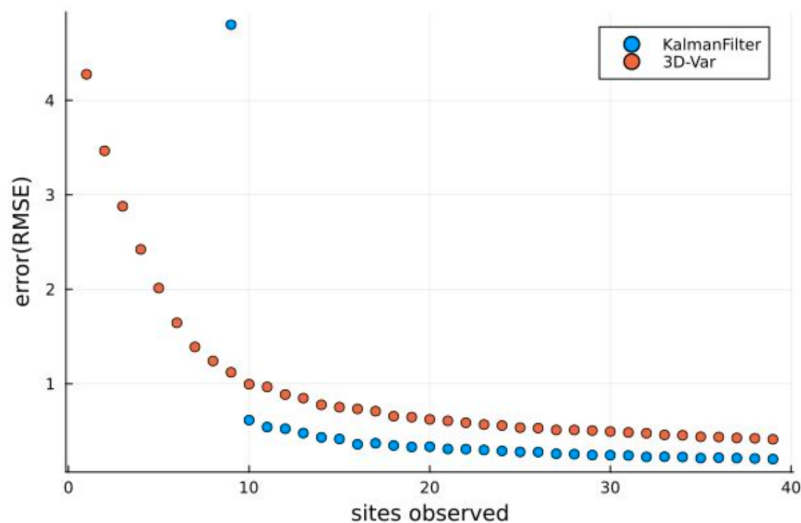
(<https://youtu.be/U1YvEQIHB7E?si=BsZPn9P6ZRSQ-vch>)



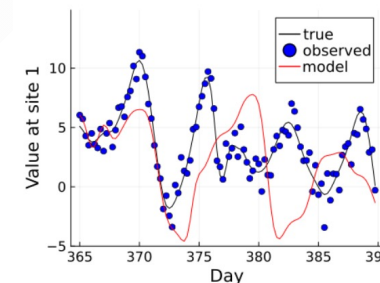
$$\mathbf{x}^a = K\mathbf{y}^o + (1 - KH)\mathbf{x}^f$$

SG-01[データ同化] | 前期の活動

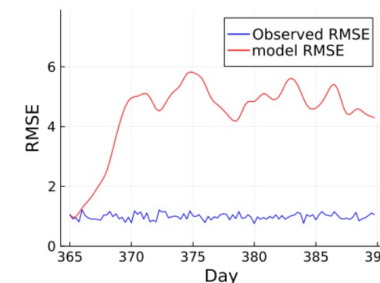
Lorenz 96 モデル: $\frac{dX_j}{dt} = (X_{j+1} - X_{j-2}) X_{j-1} - X_j + F, \quad (j = 1, 2, \dots, J = 40)$



モデルを過信した場合 ($K = 0$ の場合)

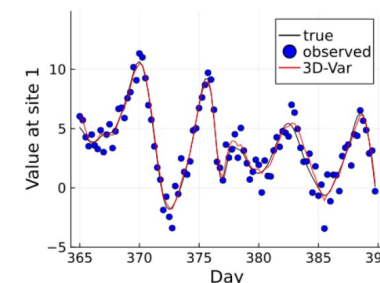


(図1) 第一成分の軌道の比較

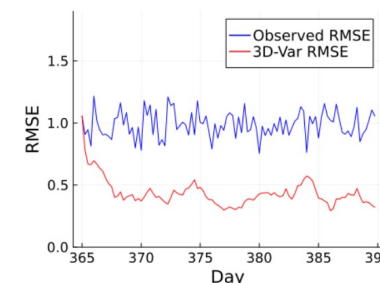


(図2) 真値からの誤差 (RMSE)

3D-Var の場合

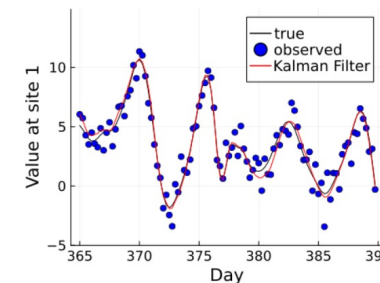


(図3) 3D-Var での第一成分の軌道の比較

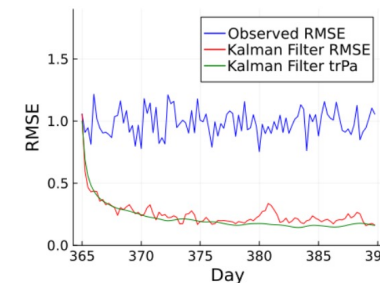


(図4) 3D-Var での真値からの誤差

Kalman Filter の場合



(図5) KF での第一成分の軌道の比較



(図6) KF での真値からの誤差

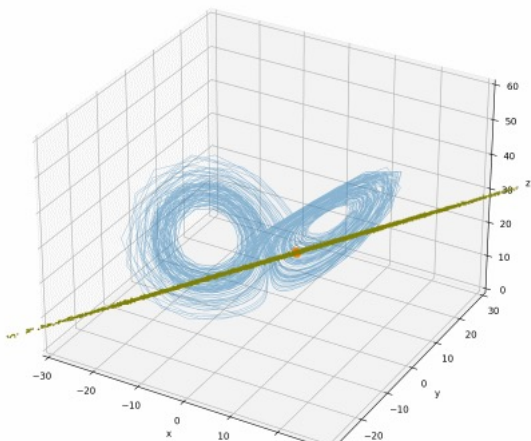
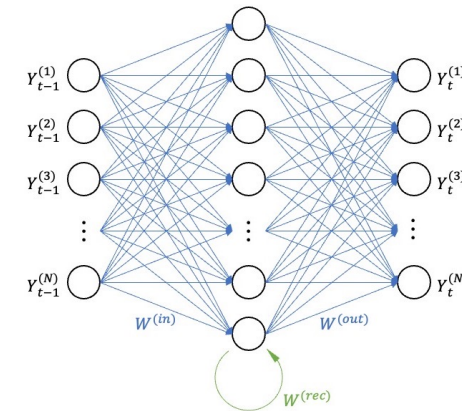
データ同化手法	Kalman Filter	3D-Var	ETKF (m=40)	ETKF (m=15)
RMSE	0.2115	0.4008	0.1835	0.1933
実行時間 [秒]	0.5275	0.2750	3.5551	0.9922
安定化パラメータ	$\alpha = 1.1$	$\beta = 0.25$	$\alpha = 1.02$, loc 無	$\alpha = 1.04$, $l = 9$

SG-01[データ同化] | 後期の活動

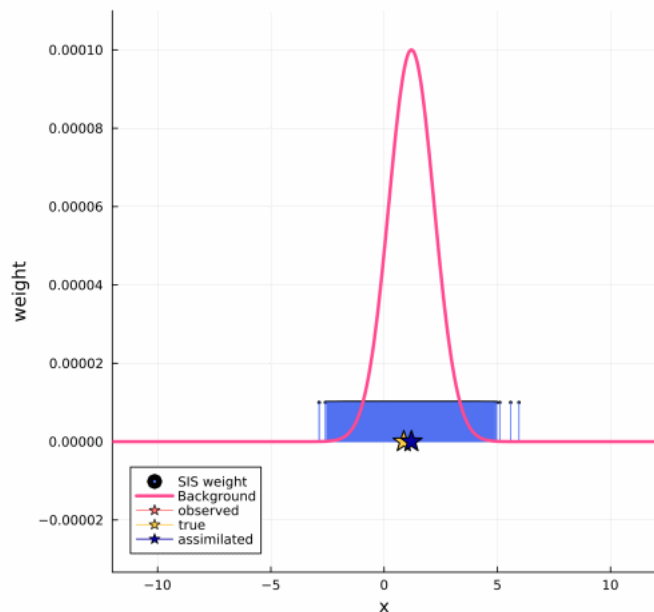
Recurrent Neural Network

$$\vec{h}_t = \text{sigmoid}(W^{(in)}\vec{x}_t + W^{(rec)}\vec{h}_{t-1} + \vec{b}^{(rec)})$$

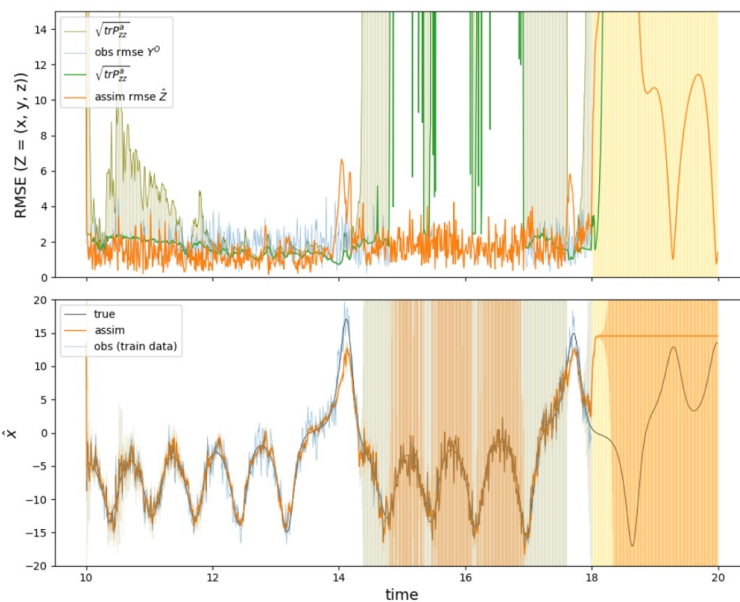
$$\vec{z}_t = 3 \tanh(W^{(out)}\vec{h}_t + \vec{b}^{(out)})$$



time = 365.00; SIS



Mz 法 (train: 1.80, test: 12.5)



My 法 (train: 1.59, test: 14.9)

