隨機擾動參數趨勢法在氣象局全球系集預報系統之應用
Using Stochastically Perturbed Parametrization Tendencies Scheme(SPPT) in CWB/GEPS
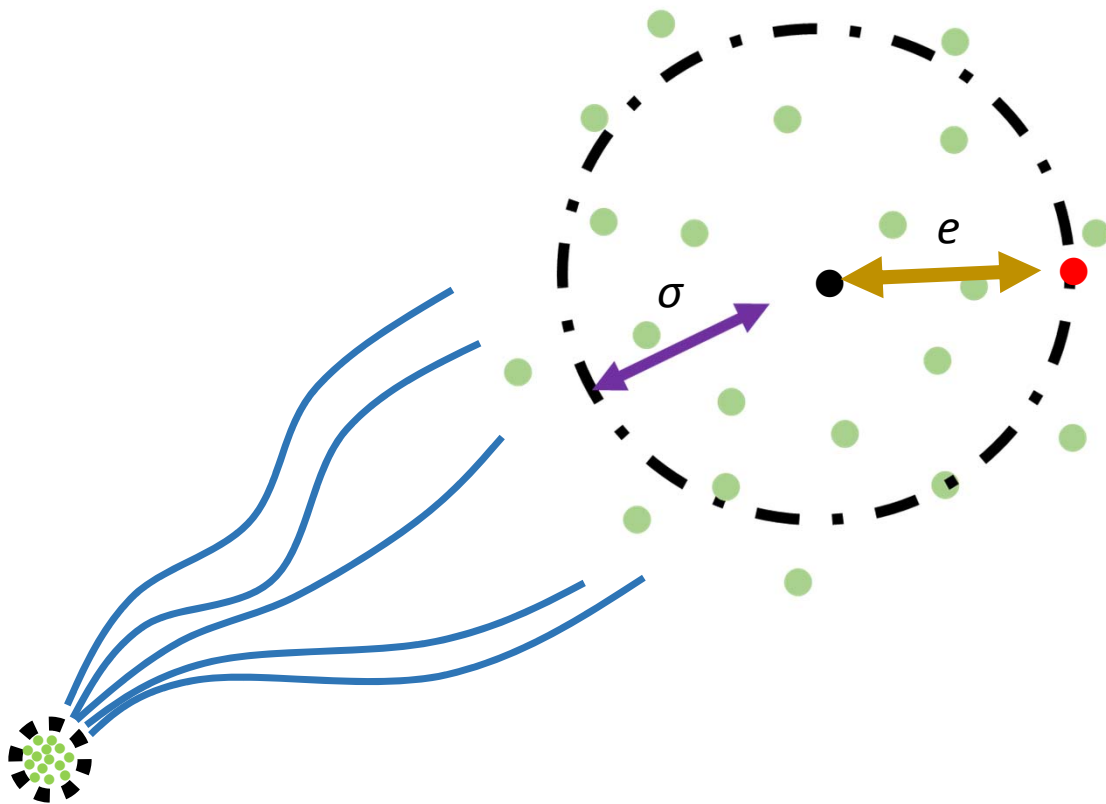
Chong-Wei, Huang
John Chien-Han Tseng

Ensemble reliability

● = Ensemble Mean
● = Observation
● = Ensemble Member
e = Error
σ = Spread

Stochastically Perturbed Parametrization Tendencies Scheme (SPPT)
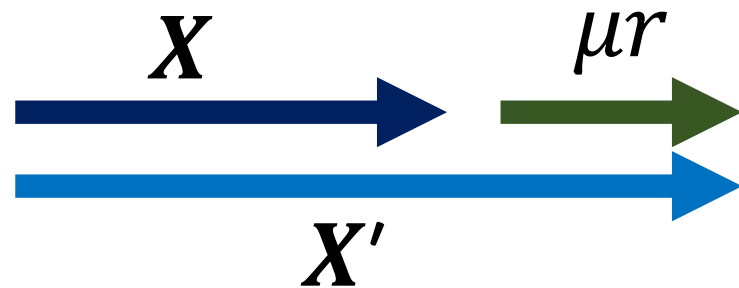
Adding on Physic Tendencies

$$X'=(1+\mu r)X$$

$X=[X_U,X_V,X_T,X_Q]$
  Tendencies

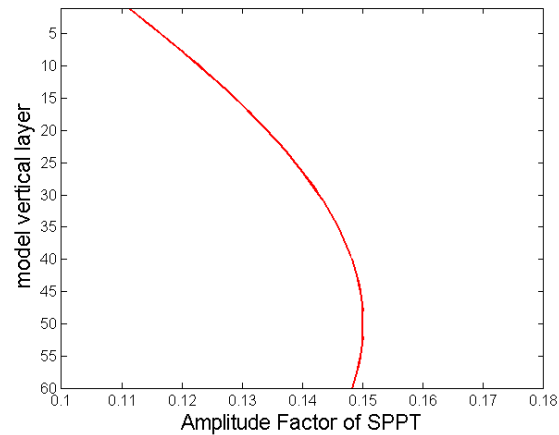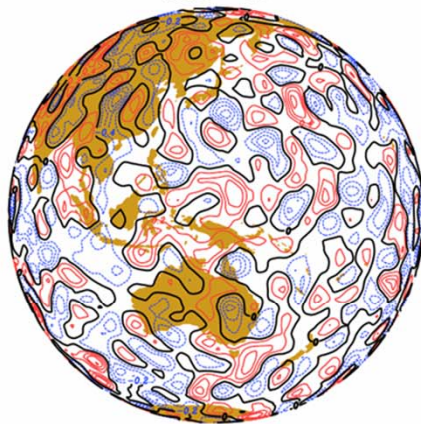$r=[-1,+1]$
  Random parametrization

$\mu=$ Vertical amplitude
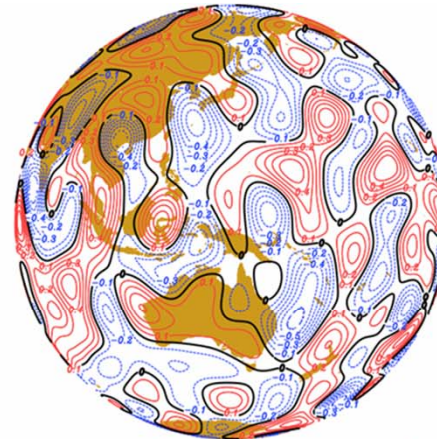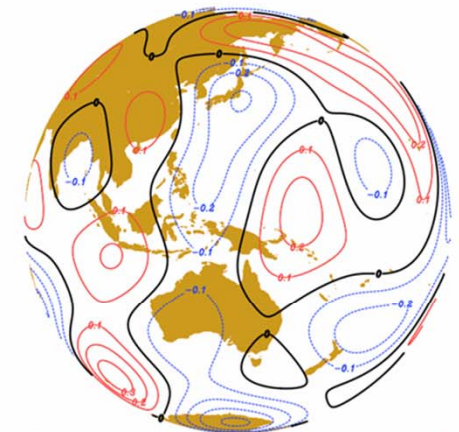
Pattern of SPPT

- The SPPT is the foundation stone of other stochastic physics processes like SHUM, SKEB, VC, etc.

horizontal scale ~ 500 km
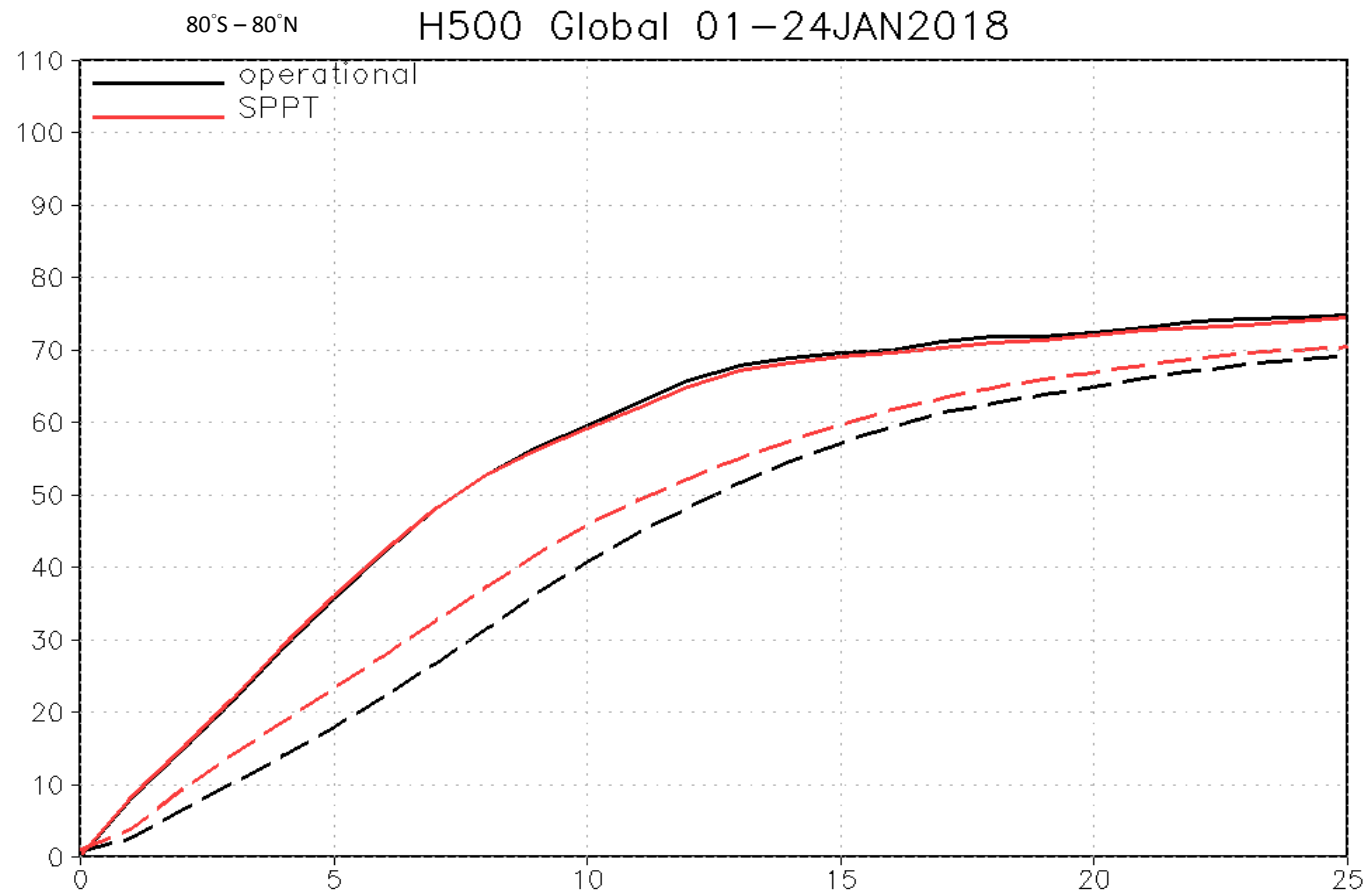decorrelation time: 6hrs
amplitude factor ~ 0.15

horizontal scale ~ 1000 km
decorrelation time: 72 hrs
amplitude factor ~ 0.05

horizontal scale ~ 2000 km
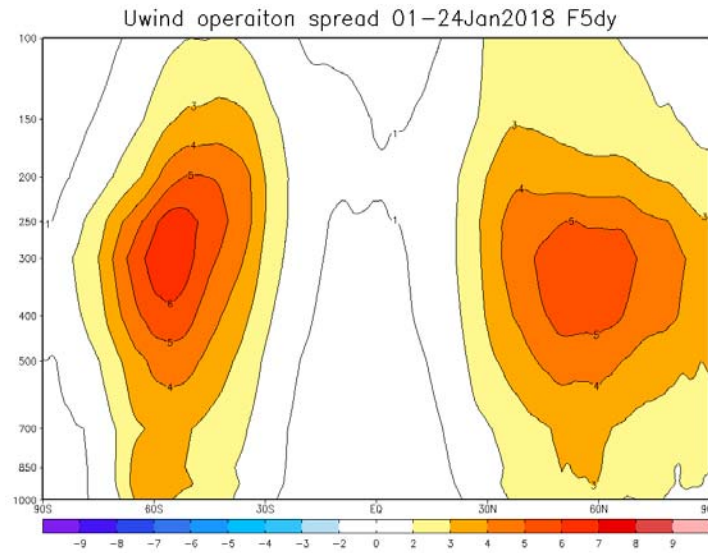decorrelation time: 720 hrs
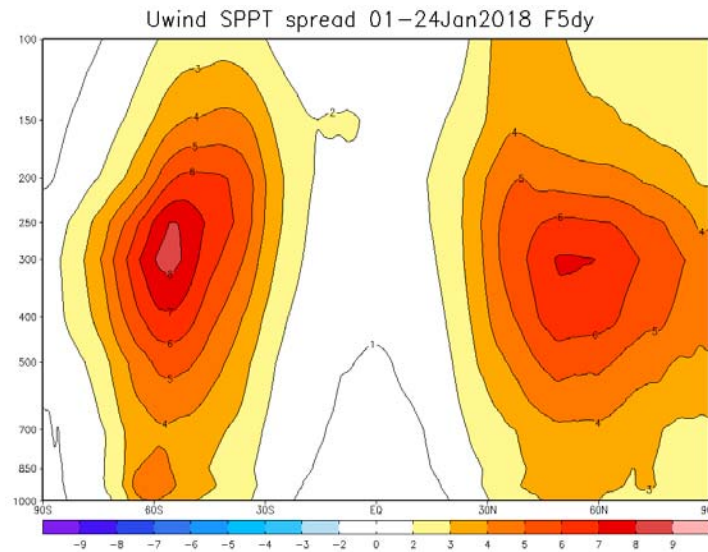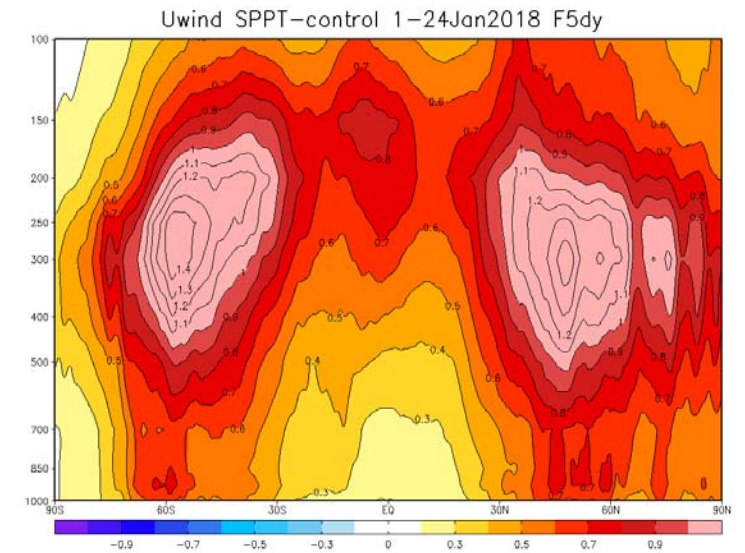amplitude factor ~ 0.015

SPPT experiment

H500 Global 01–24JAN2018

80°S – 80°N

5Days Spread

Operation

Different

SPPT

spread growth

5day	10day	15day

Uwind SPPT-control 1-24Jan2018 F5dy

Uwind SPPT-control 1-24Jan2018 F10dy
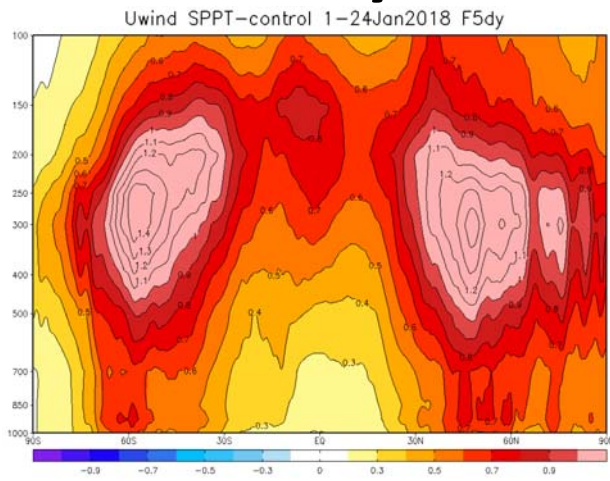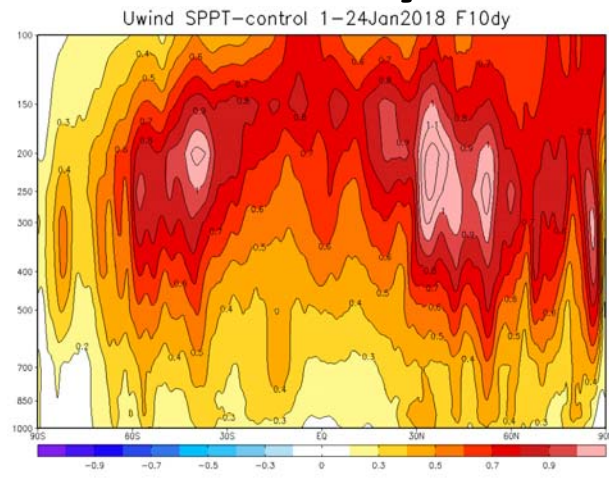
Uwind SPPT-control 1-24Jan2018 F15dy
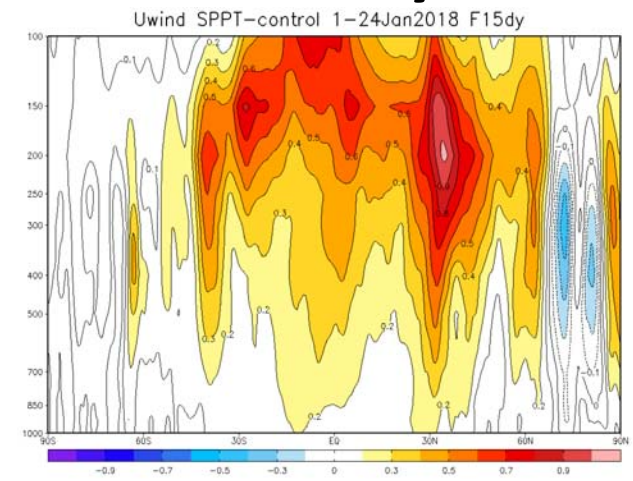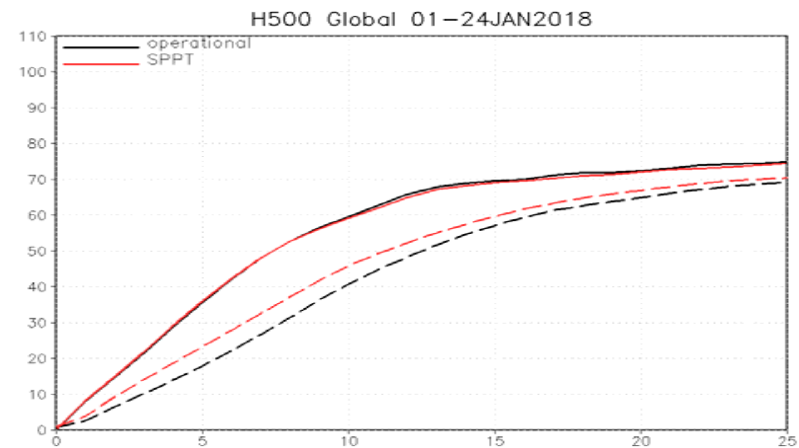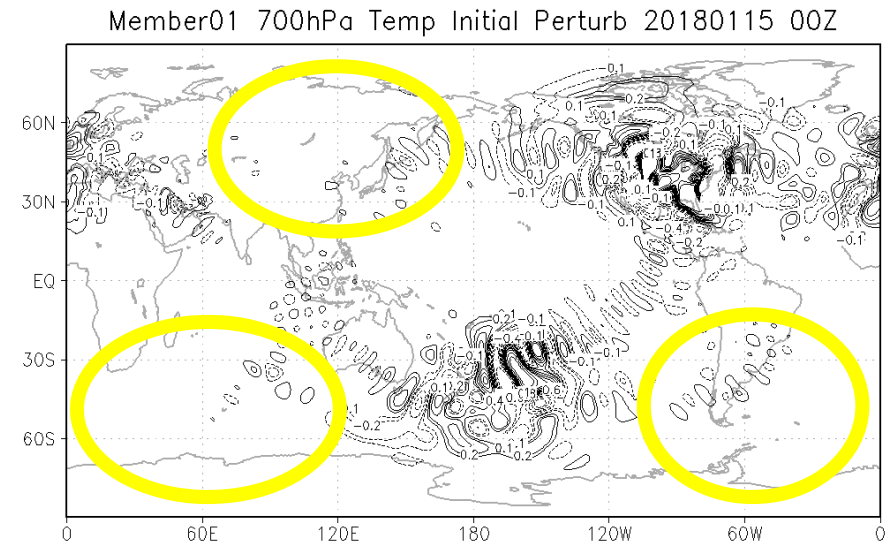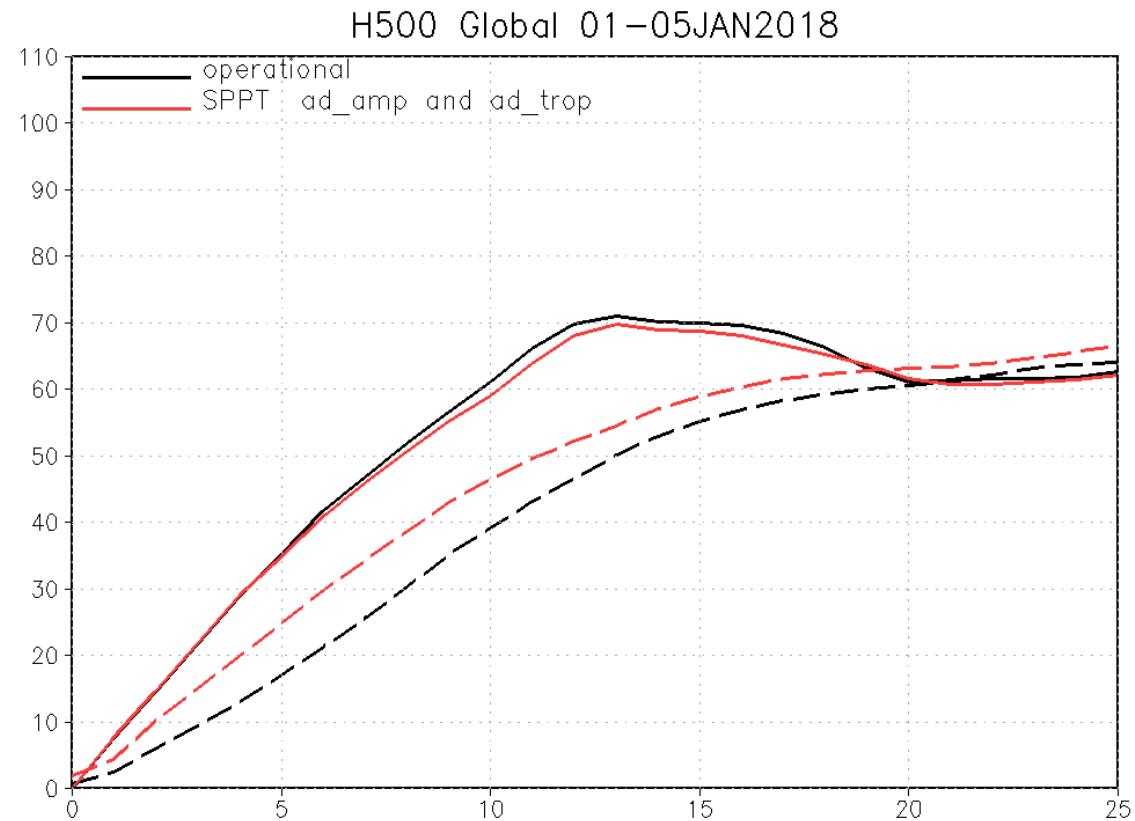
Future work

- Initial perturb well-distributed

- Let Spread approach RMSE

- Adding Tropical Spread

Thanks!!!

Initial Perturb Double of Amplitude

H500 Global 01−05JAN2018

spread growth structure

Spread growth