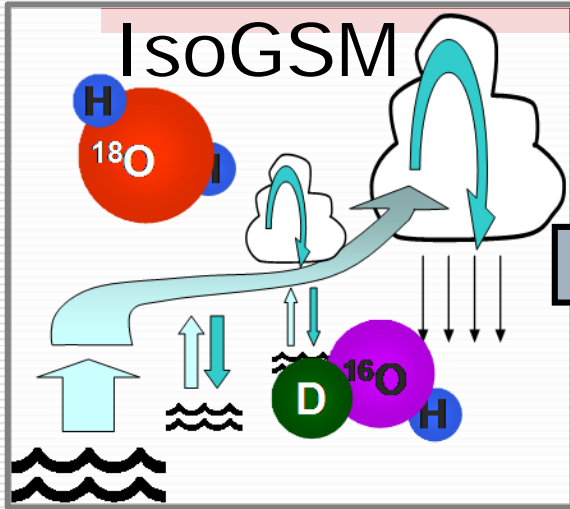


Roadmap toward Data assimilation for isotopes

Kei yoshimura

Objective Analysis for Stable Isotopes (Isotope Reanalysis)

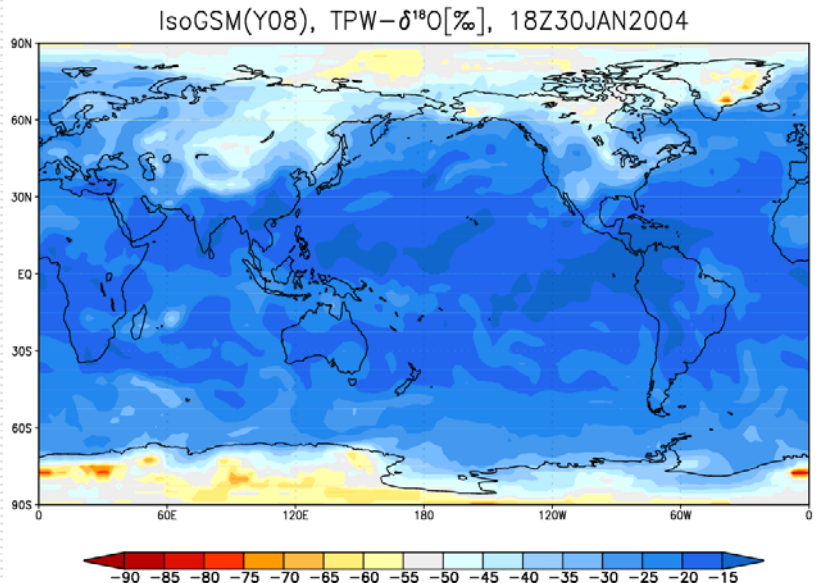


$$\mathbf{X} = [\mathbf{x}_1 \quad \dots \quad \mathbf{x}_m], \quad \delta\mathbf{X} = \mathbf{X} - \bar{\mathbf{X}}$$

$$\mathbf{K} = \delta\mathbf{X}_f \mathbf{U} \mathbf{D}^{-1} \mathbf{U}^T (\mathbf{H} \delta\mathbf{X}_f)^T \mathbf{R}^{-1}$$

$$\mathbf{X}_a = \bar{\mathbf{X}}_f + \mathbf{K} (\mathbf{y}_o - \overline{H(\mathbf{X}_f)}) + \delta\mathbf{X}_a$$

LETKF



- Merits:
- ✓ First global 4D analyses for vapor isotopes.
 - ✓ Accurate Precip. isotopes in fine resolution.
 - ✓ Possibility of improvement on other dynamical fields.

Framework of Isotope Reanalysis

Ensemble Forecasting

