多波長マイクロ波放射計データを用いた水物質リトリーバルの研究

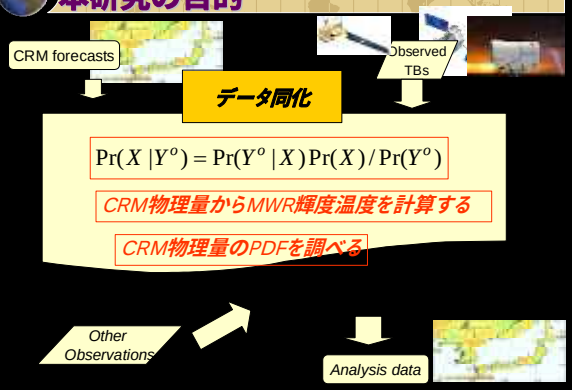
Feb. 28, 2008

2007年度CEReS 共同利用研究会

多波長マイクロ波放射計データを用いた
水物質リトリーバルの研究：

マイクロ波放射計データの非静力雲解像
モデルへの同化法の開発

本研究の目的



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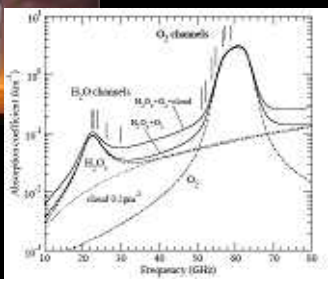
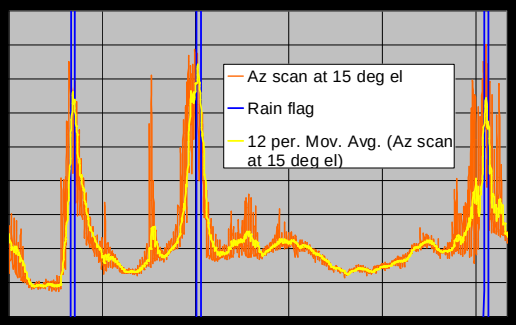
  - アンサンブル予報の方法
  - 物理量のPDF
- 同化スキームの開発
- まとめ

MWR輝度温度の観測オペレータ

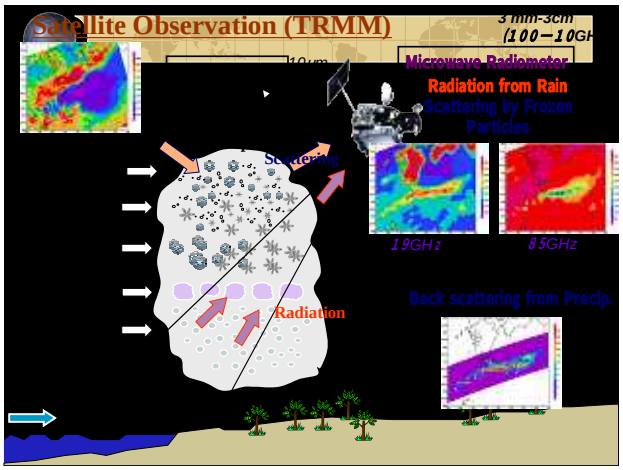
地上型MWR



時間的に高頻度、但し降水時には高温度



Satellite Observation (TRMM)



放射伝達計算モデル

Radiative Transfer Code (Liu,1998)

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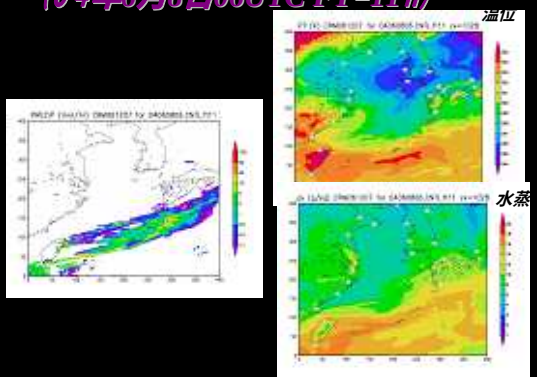
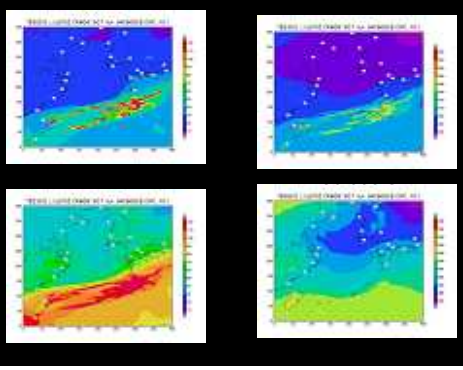
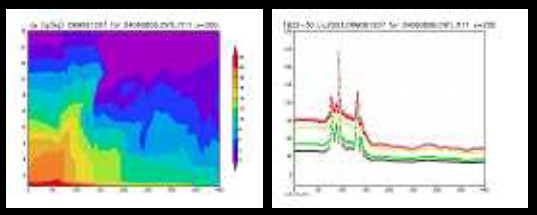
RTM計算に用いたCRMの物理量 (04年6月8日06UTC FT=11h)



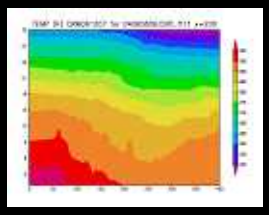
RTM計算結果

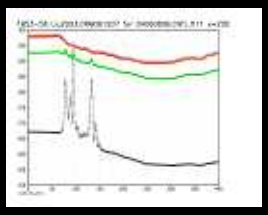


水蒸気プロファイルとTB22-30の比較



気温プロファイルとTB53-58の比較

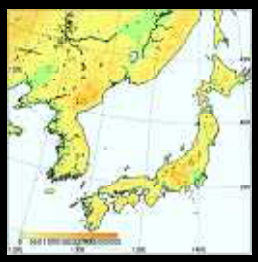


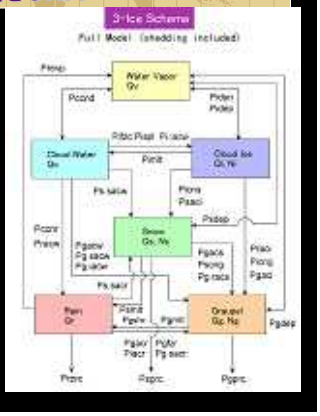


CRM物理量のアンサンブル予報誤差分布と共分散

用いたCRM

JMANHM (Saito et al,2001)

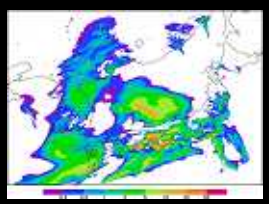


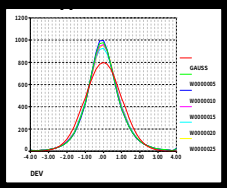


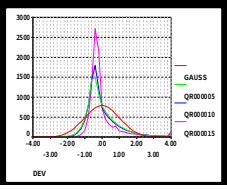
アンサンブル予報の方法 (Mitchell et al, 2002)

正規化したW, QRの頻度分布(全域)

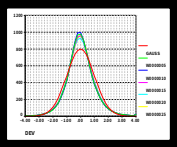
CRM.heito.20050520 ENS12
(03/1/26/21UTC FT=4h)

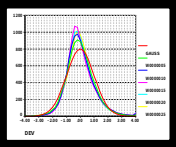


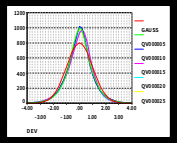


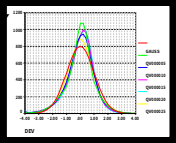


W, Qvの頻度分布(全域,降水強度>3mm/h) CRM.heito.20050520 ENS12 (03/1/26/21UTC FT=4h)

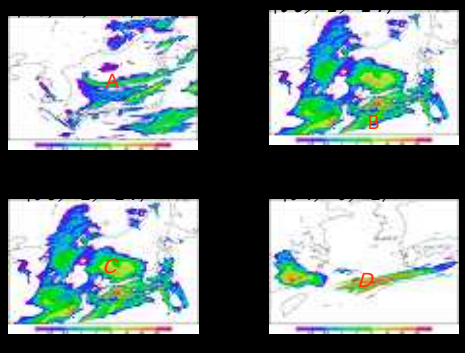




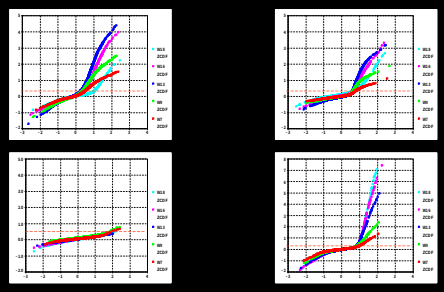




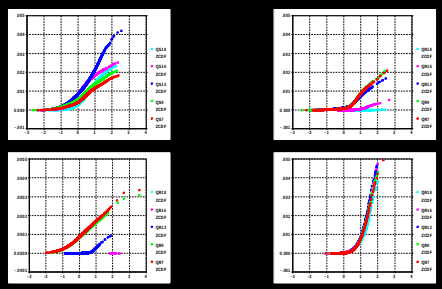
対象とする事例



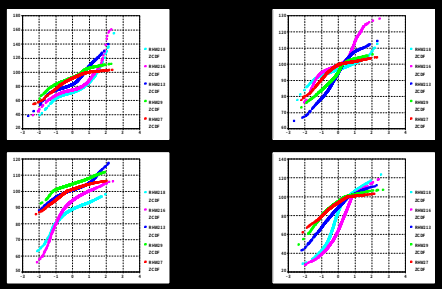
W対Z(CFD) @ 地点A-D (但し高度~0.5,1,2,3,4 km)



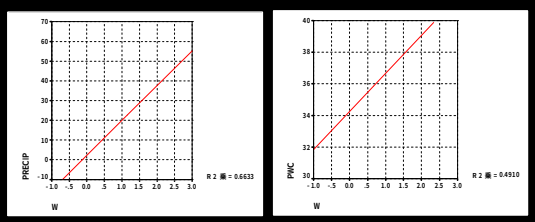
降水物理量対Z(CDF)@地点A-D (但し高度~0.5,1,2,3,4 km)



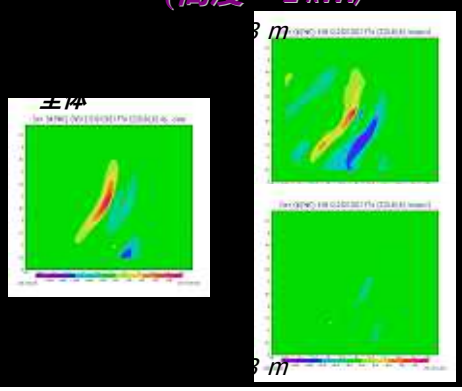
RHW2対Z(CDF)@地点A-D (但し高度~0.5,1,2,3,4 km)



W対降水強度,PWCの共分散 地点B (高度～1 km)



W対PWCの相関空間分布@地点B (高度～1 km)



同化スキムの開発

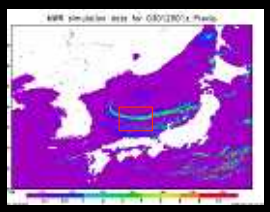
Ensemble Kalman Filter (EnKF)

解析実験 (Gaussian Sum Filter)

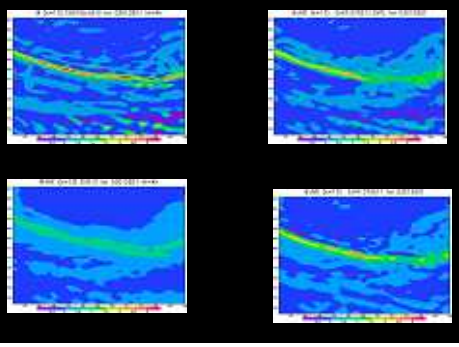
アンサンブル平方根フィルター (EnSRF)
Snyder & Zhang(2003)

解析実験の対象事例

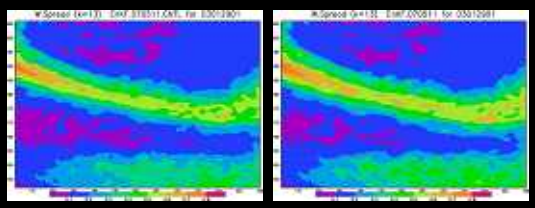
Simulated Precip data
for 03/1/29/01UTC:
CRM control +
perturbation (1/28/21UTC)+
Noise (50%)



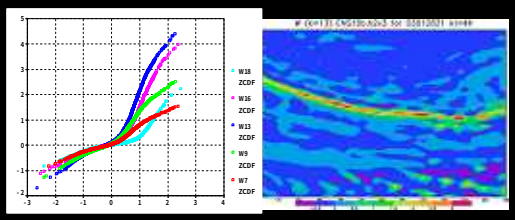
鉛直速度のアンサンブル平均 (lev=2110m)
(01UTC Jan. 29, 2003)



鉛直速度のアンサンブルのスプレッド (lev=2110m) (01UTC Jan. 29, 2003)



降水域では分散の大きなクラスの重みが大きくなる効果



まとめ