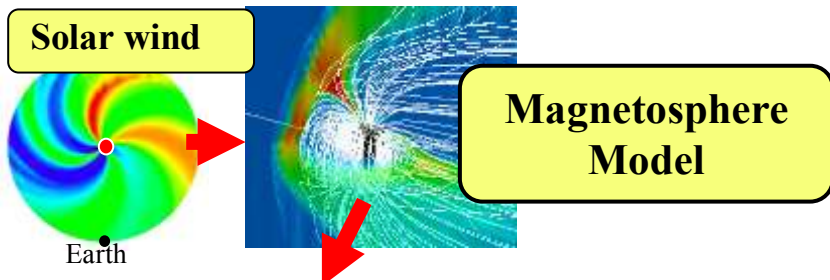


(コメント)

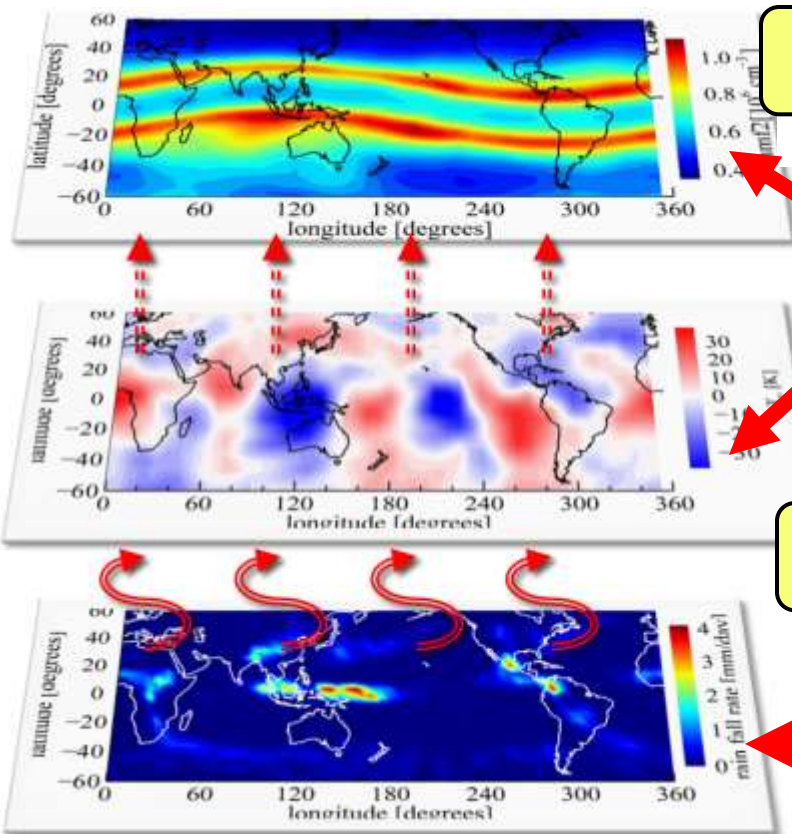
高精度大気圏-電離圏モデルの開発

○品川 裕之(NICT), 陣 英克(NICT),
三好 勉信(九大), 藤原 均(成蹊大)

全大気圏-電離圏結合モデル(GAIA)



前中期計画(H18~H22)で開発
今中期計画で高精度化



Ionosphere Model

Dynamo Model

Whole Atmosphere Model

JMA Reanalysis Data

Atmosphere Vertical Connection

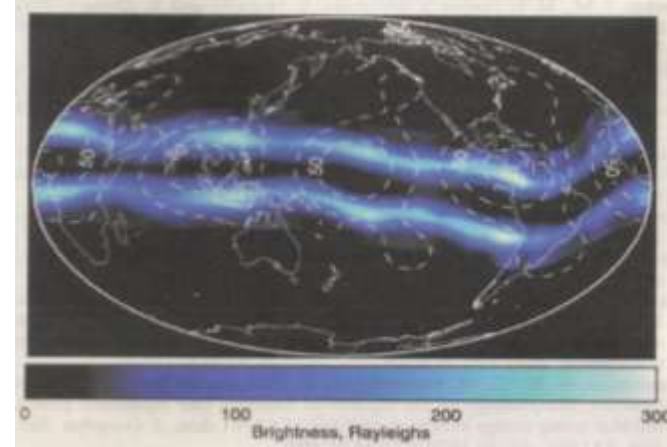


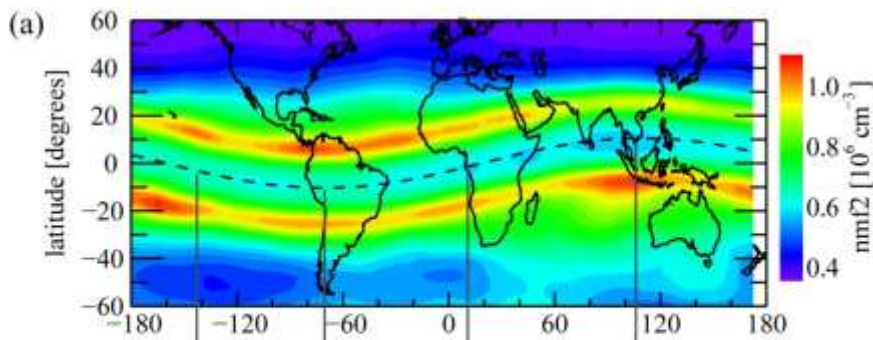
IMAGE observation
[Immel et al., 2006]

wave propagation
and interaction

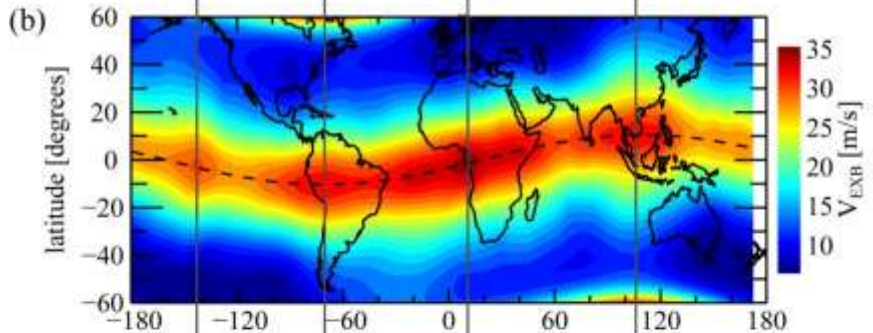


[Jin et al., JGR, 2011]

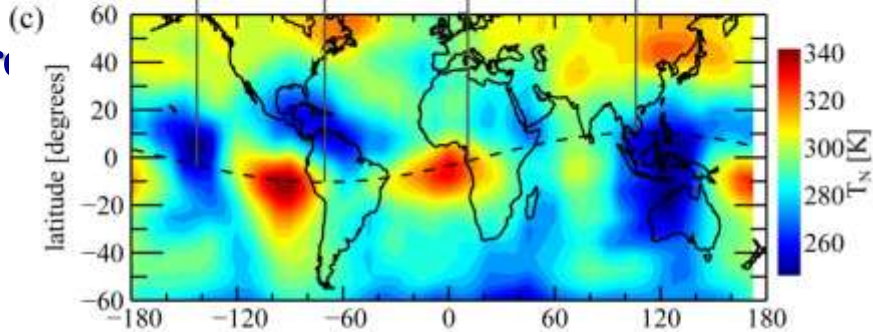
**Ionosphere
nmf2 @15LT**



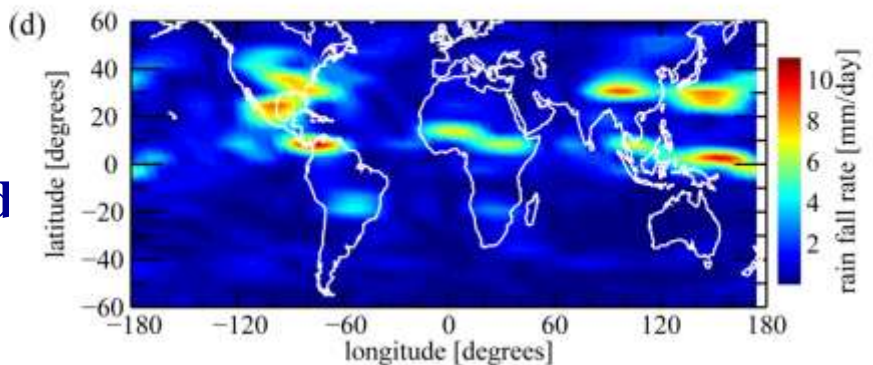
**Ionosphere
upward V_{EXB}
300km, 11LT**



**Thermosphere
 T_n
110km, 11LT**



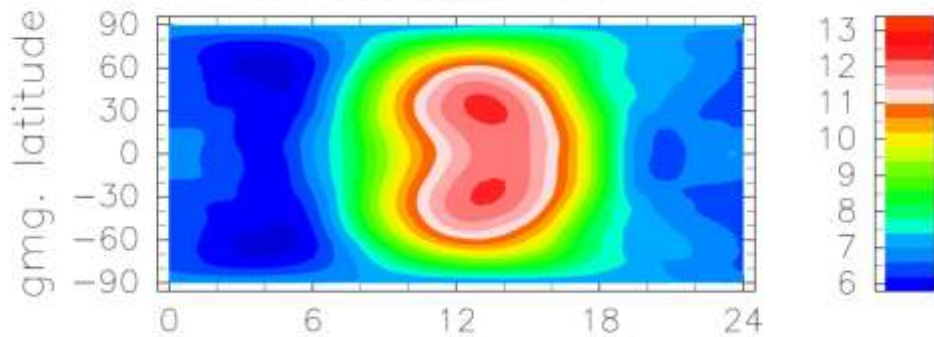
**Troposphere
rainfall rate
on the ground**



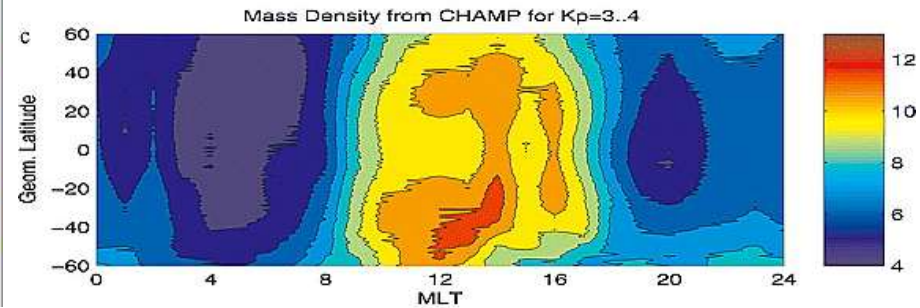
Neutral Mass Density Anomaly

GAIA simulation

(a) Density; 400km

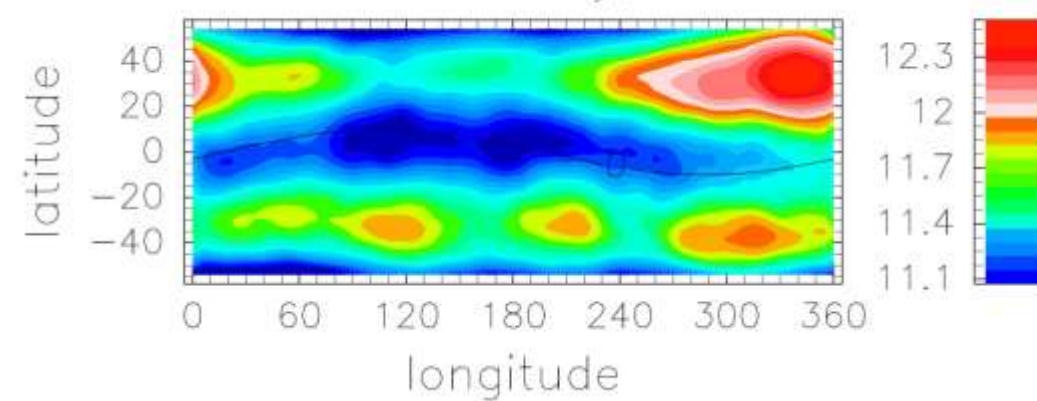


CHAMP observation



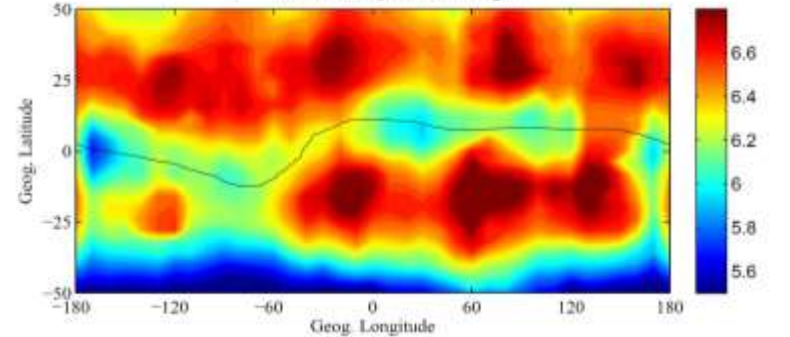
[Liu et al., 2005]

Neutral Density; 400km



[Miyoshi et al., 2012]

b Neutral density at 400 km height

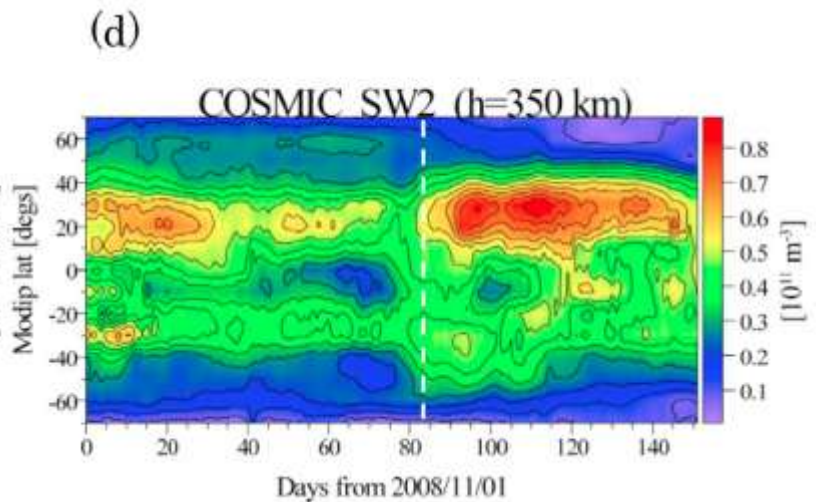
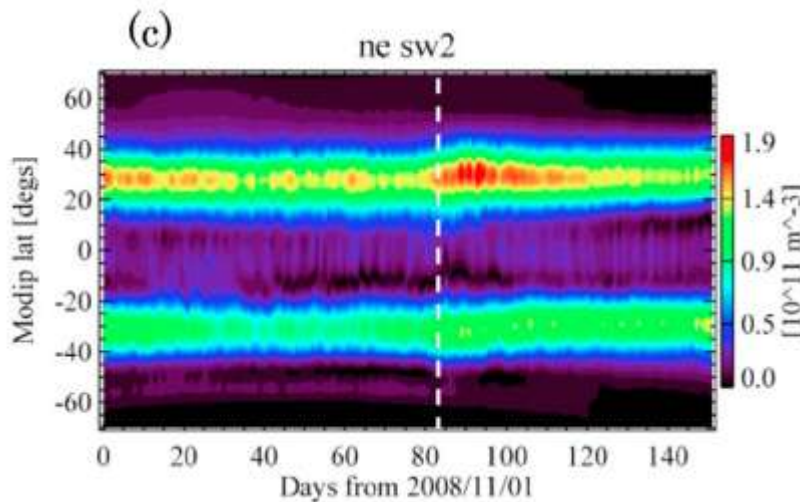
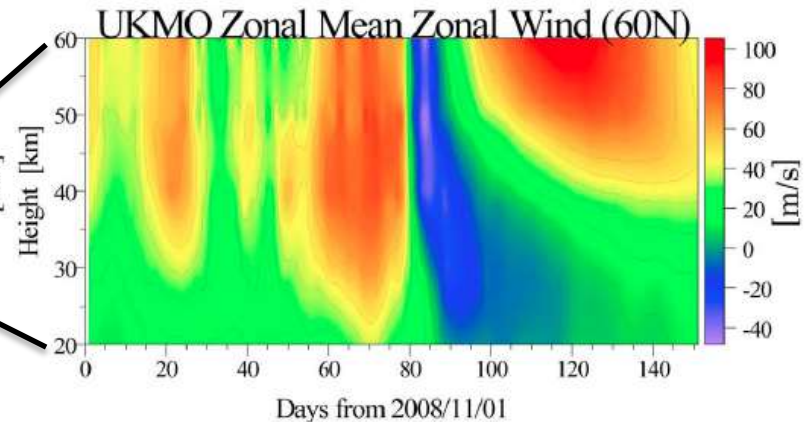
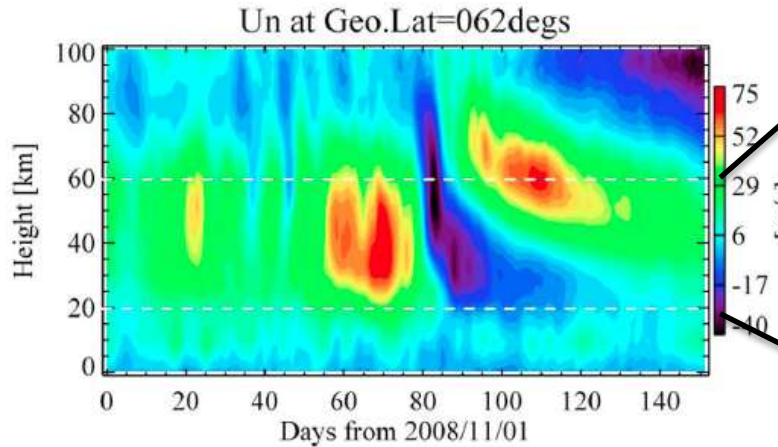


[Liu et al., 2010]

Effects of Stratospheric Sudden Warming on the atmosphere and ionosphere

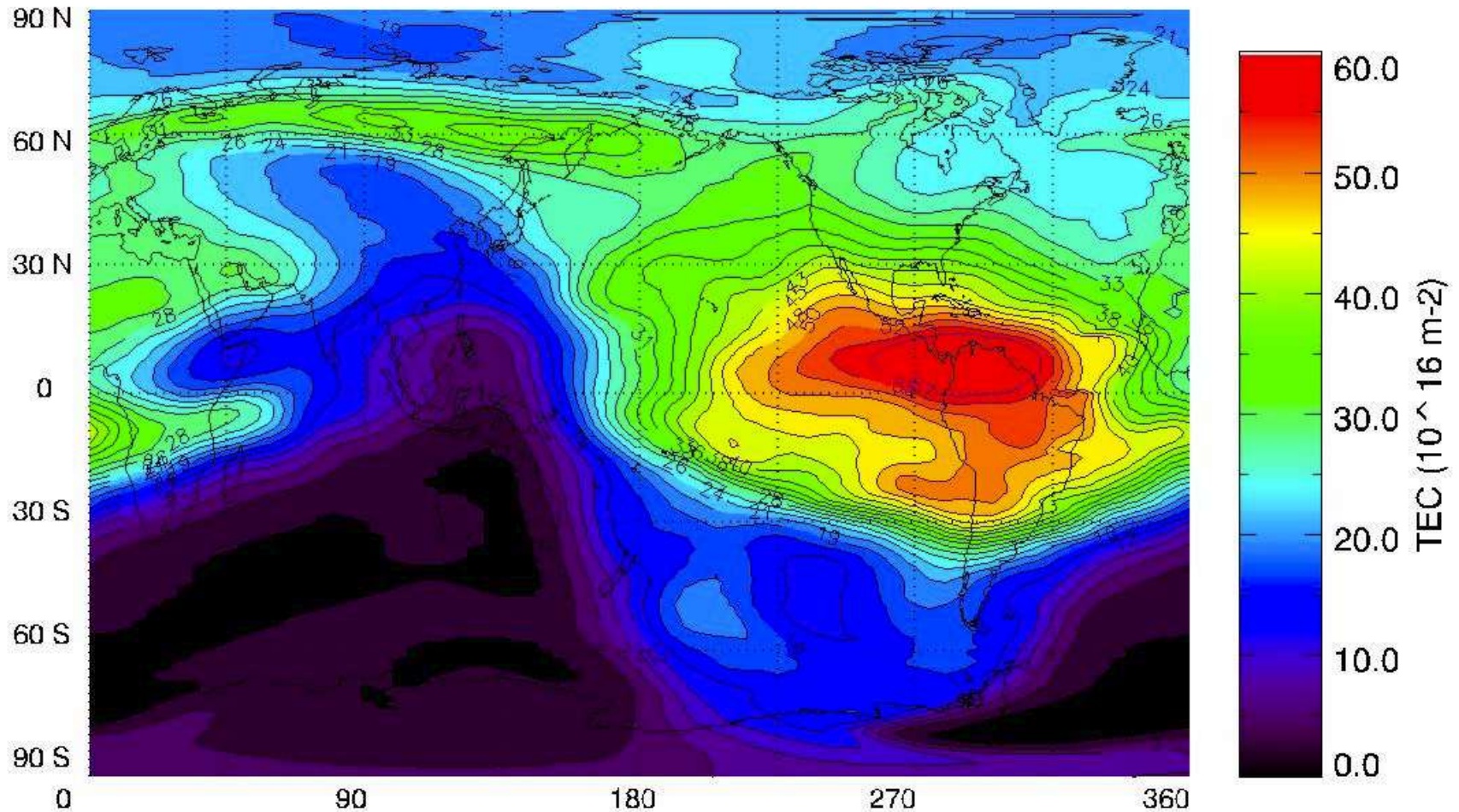
Simulation

Observation



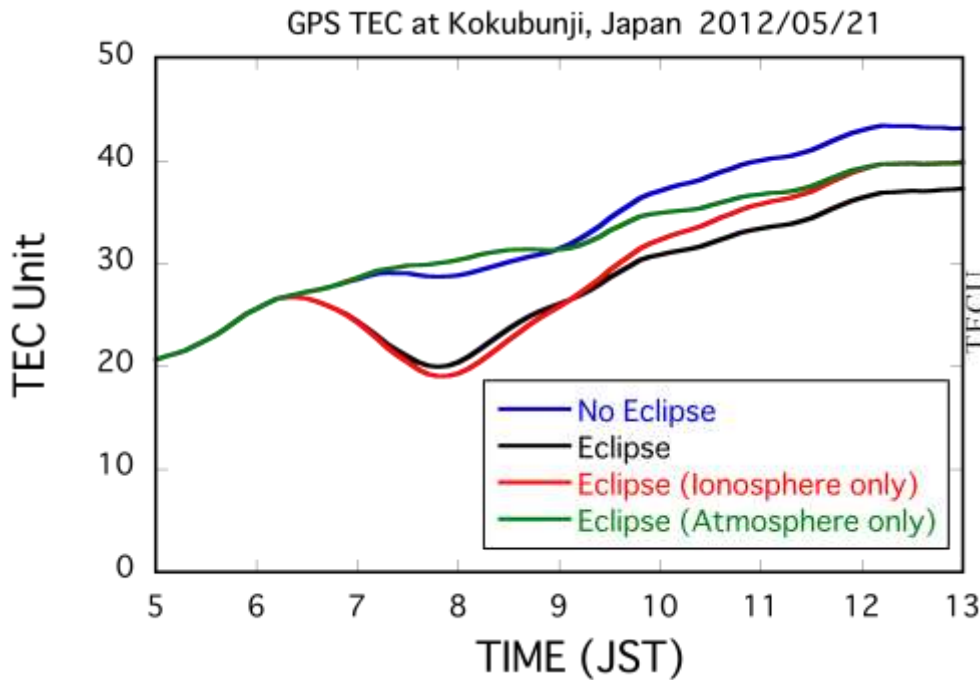
Annular Solar Eclipse on May 20-21, 2012

IONOSPHERIC TEC MAP 2012/05/20 20h 00m UT

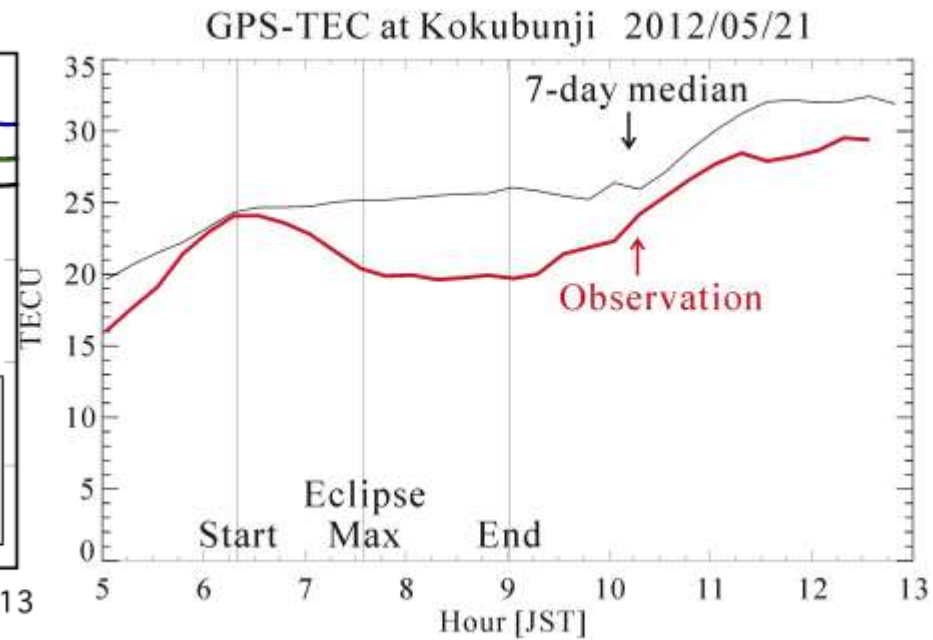


Annular Solar Eclipse on May 20-21, 2012

– Comparison with TEC observations



Simulation



Observation (TEC)

New Supercomputer at NICT

Introduced Nov. 1, 2012

Hitachi SR16000/M1

- ・OS起動用ノード 2ノード
- ・演算ノード 28ノード

ノード単体

コア数 : 32 (8コア × 4プロセッサ)

理論演算性能 : 980.48 GF

主記憶容量 : 128GB

演算ノード全体(28ノード)

コア数 : 896

理論演算性能 : 27.45344 TF

主記憶容量 : 3.584TB



電離圏モデル開発

| | 現行モデル | 次世代モデル |
|--------------------|--|-------------------------------|
| 空間分解能 | 緯度1°, 経度5° 高度10km~100km | 緯度0.3°, 経度0.3° 高度3km~100km |
| 格子系 | 球座標 | 基本は磁力線座標 |
| 高度領域 | 0~3000km | 0~数万km位 |
| イオン種類 | O^+ , H^+ , O_2^+ , N_2^+ , NO^+ | Minor ion含む 10種程度 |
| 磁場モデル | Tilted dipole | IGRF |
| 極域入力 (電位、電離・加熱) | 磁気圏モデル | 磁気圏モデル、経験モデル、観測等 |
| 下部電離圏 (<100km) | 近似的 | 光化学反応など 精密化 |