

Dcpam5 ベンチマーク計算

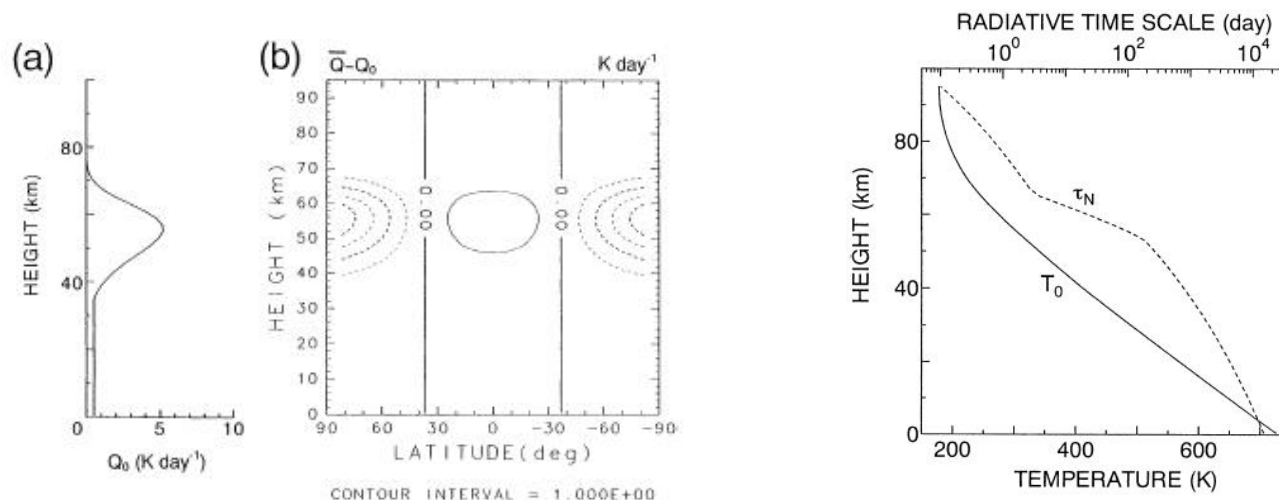
簡単金星大気数値実験

Yamamoto, M., Takahashi, M., 2003:

The fully developed superrotation simulated by a general circulation model of a Venus-like atmosphere. *J. Atmos. Sci.*, 60, 561--574.

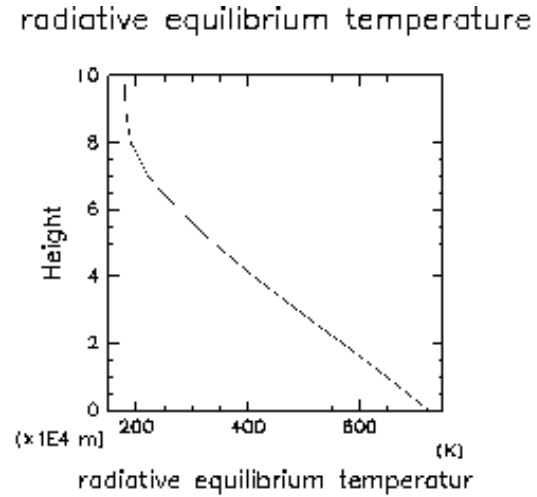
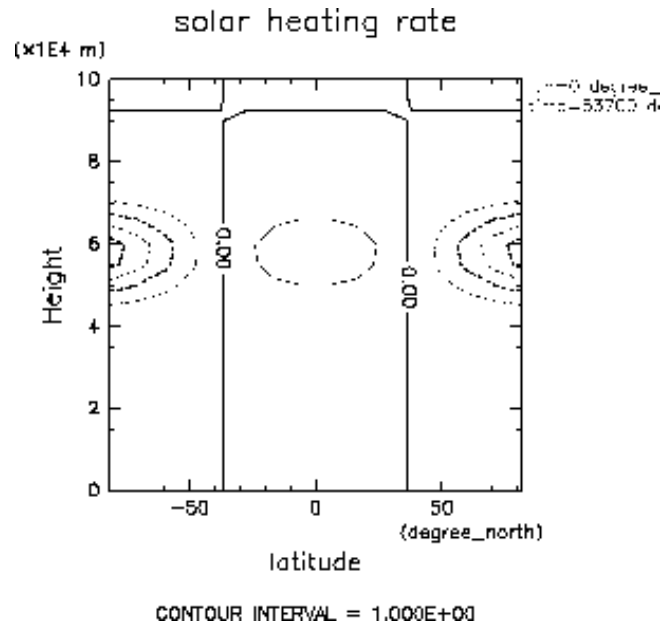
モデル設定

- 回転球面プリミティブモデル、解像度：T10L50
- 各物理定数は金星大気の値を使用
- 軸対称な加熱冷却を大気中層に
- ニュートン冷却で基本場の温度へ緩和
- 渦鉛直拡散係数一定
- 表面での抵抗はレイリー摩擦タイプ



(Yamamoto, M., Takahashi, M., 2003)

モデル設定

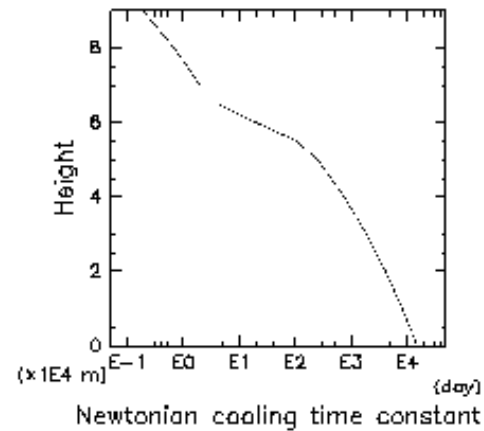


lon=0 degree east
lat=0.004 degree north
time=63700 day

General circulation model SD10-06-10

Model parameters: time 70000, height 0

Newtonian cooling time constant

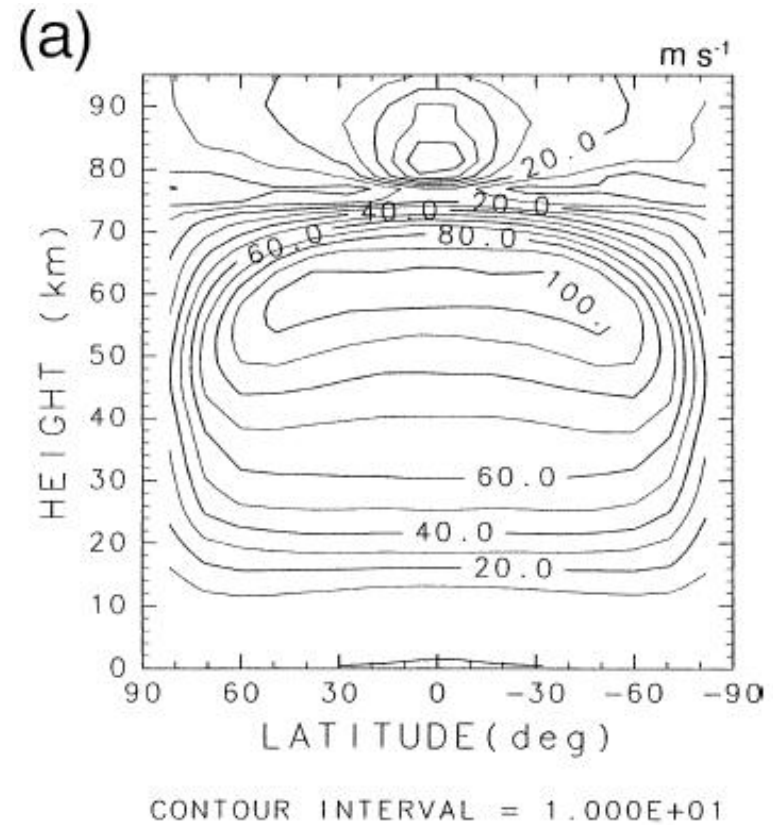
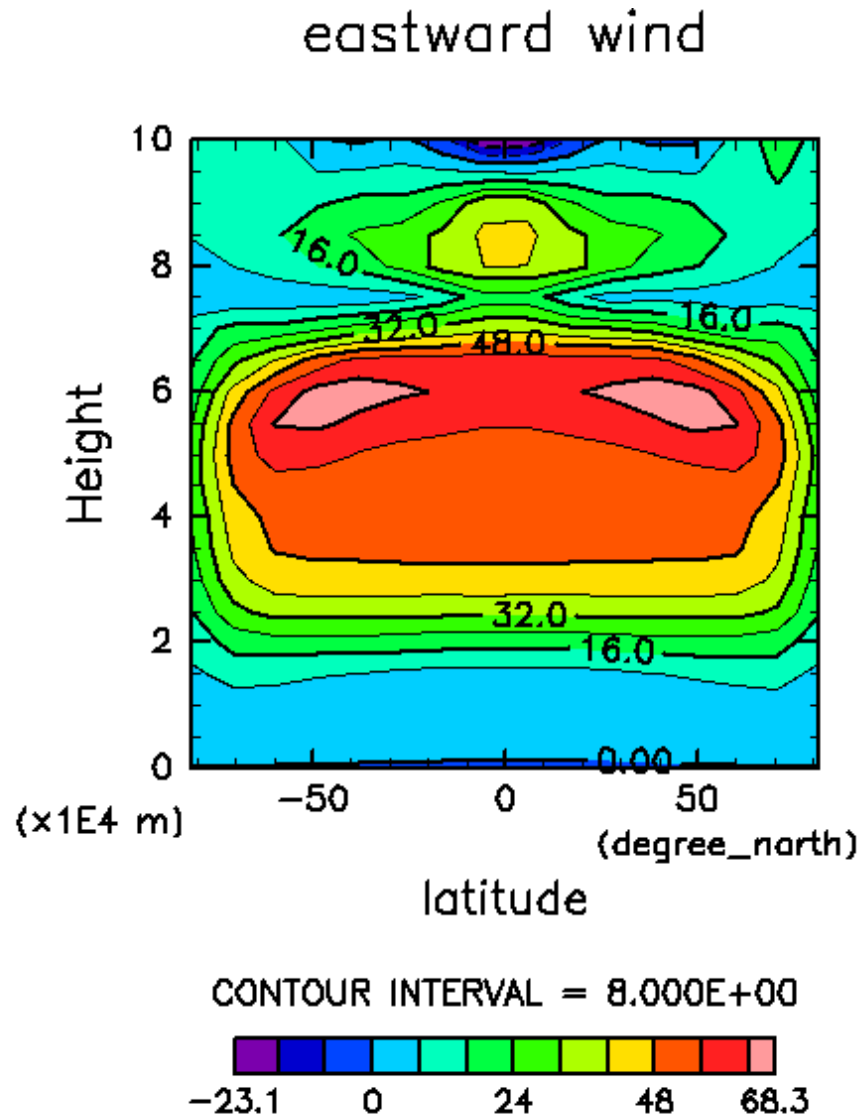


lon=0 degree east
lat=0.004 degree north
time=63700 day

General circulation model SD10-06-10

Model parameters: time 70000, height 0

带状平均流分布



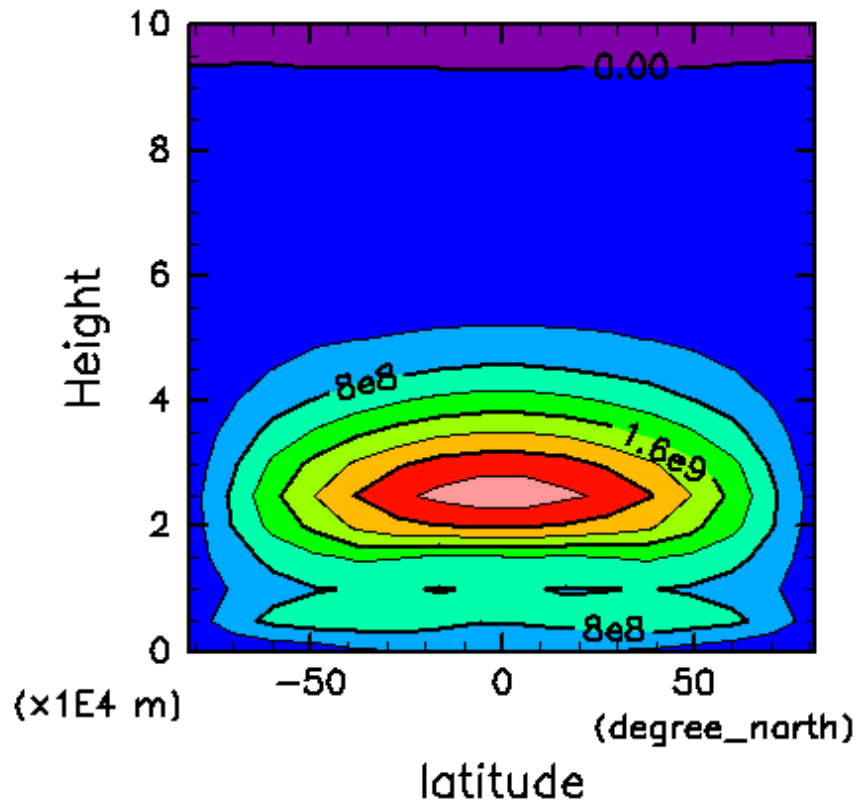
(Yamamoto, M., Takahashi, M., 2003)

(mean) lon:0..348.75
(mean) time:60500..70500

U.nc@U,time=60500:70500

角運動量分布

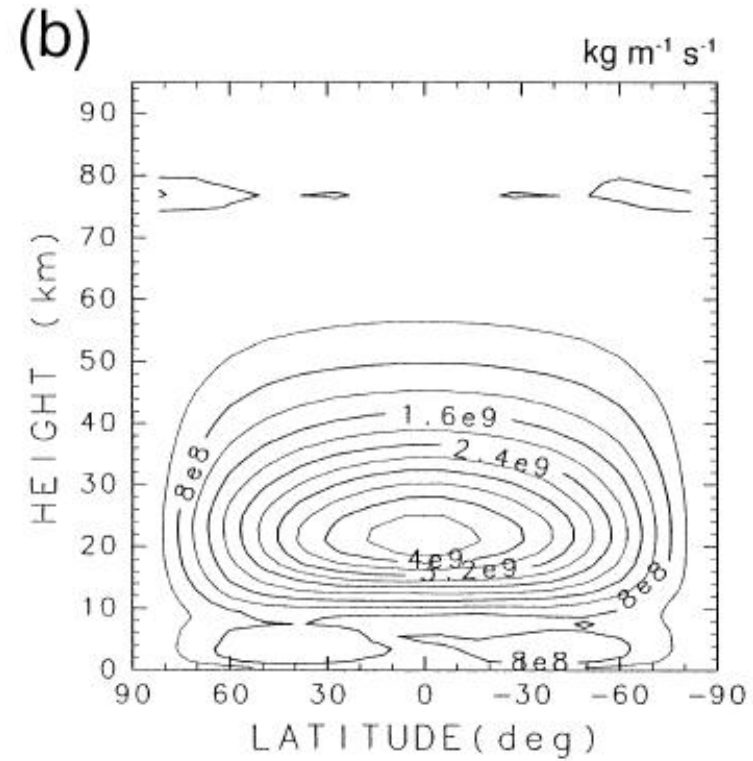
angular momentum density



CONTOUR INTERVAL = 4.000E+08



(mean) lon:0..348.75
(mean) time:60500..70500



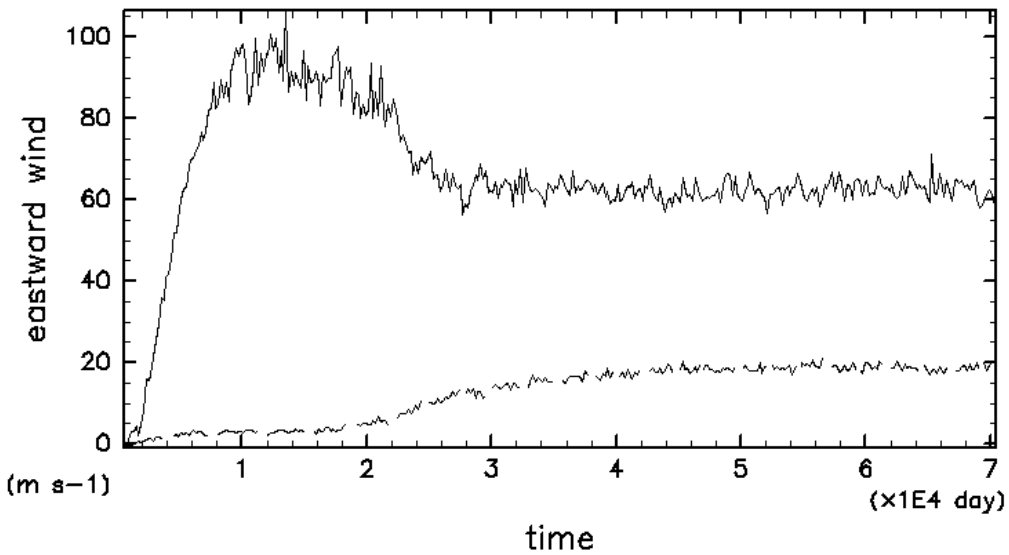
CONTOUR INTERVAL = 4.000E+08

(Yamamoto, M., Takahashi, M., 2003)

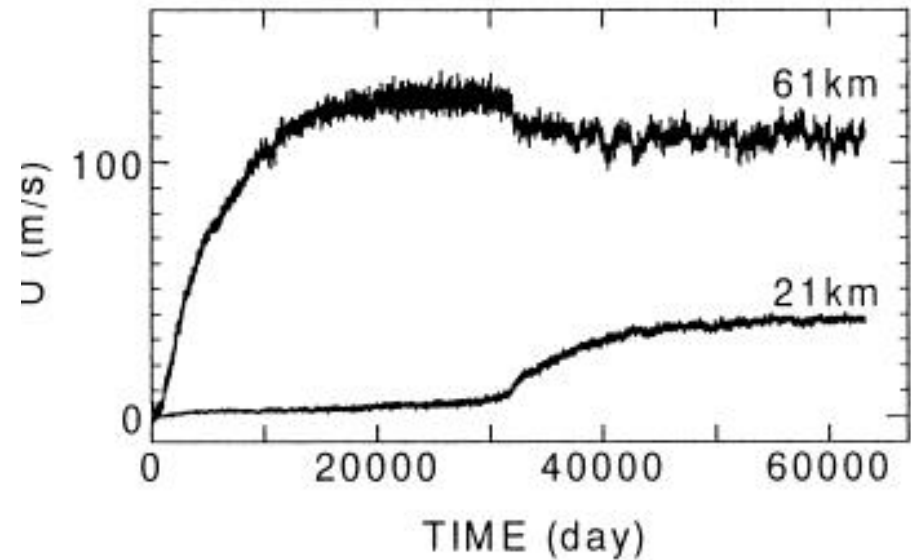
Am.nc@Am,time=60500:70500

帯状平均流の時間発展

eastward wind



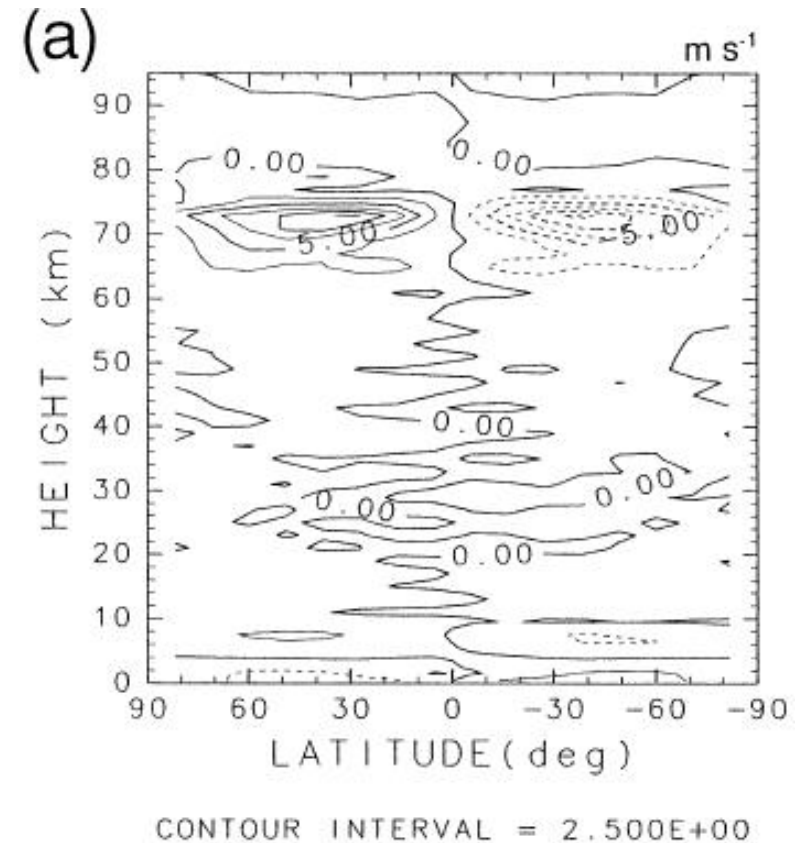
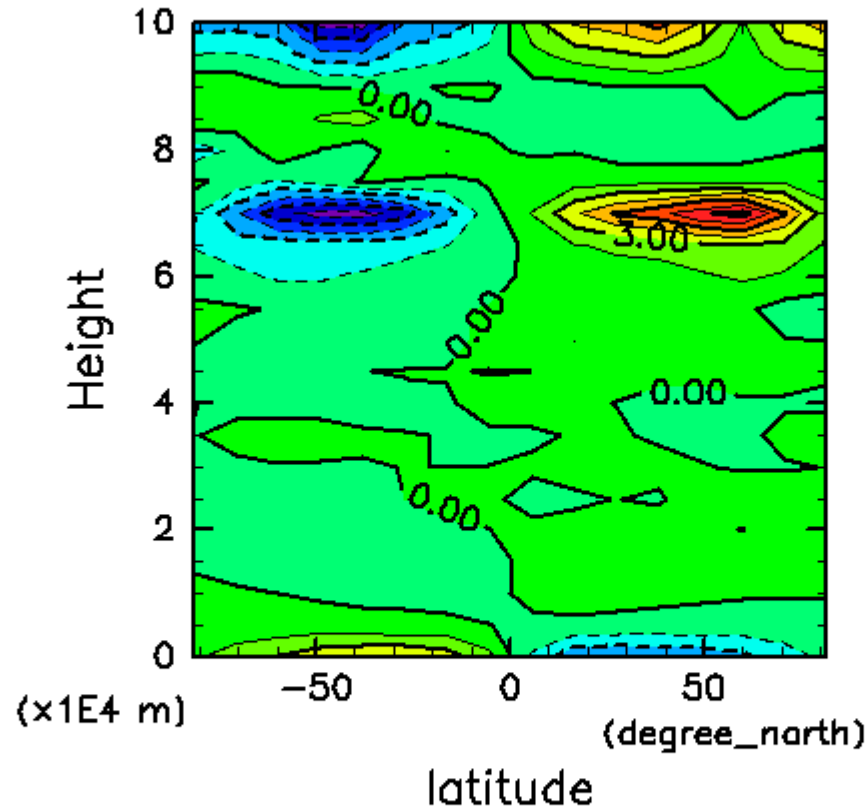
lat=-5.45204 degree_north
Height=60000 m
(mean) lon:0.348.75



(Yamamoto, M., Takahashi, M., 2003)

带状平均子午面循環

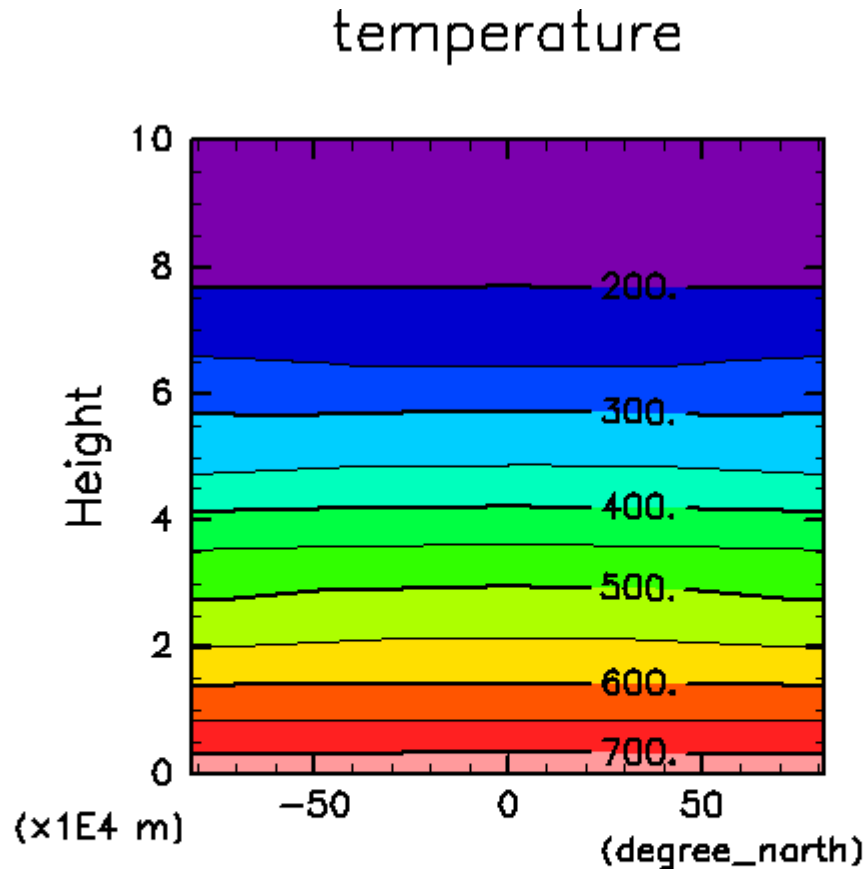
northward wind



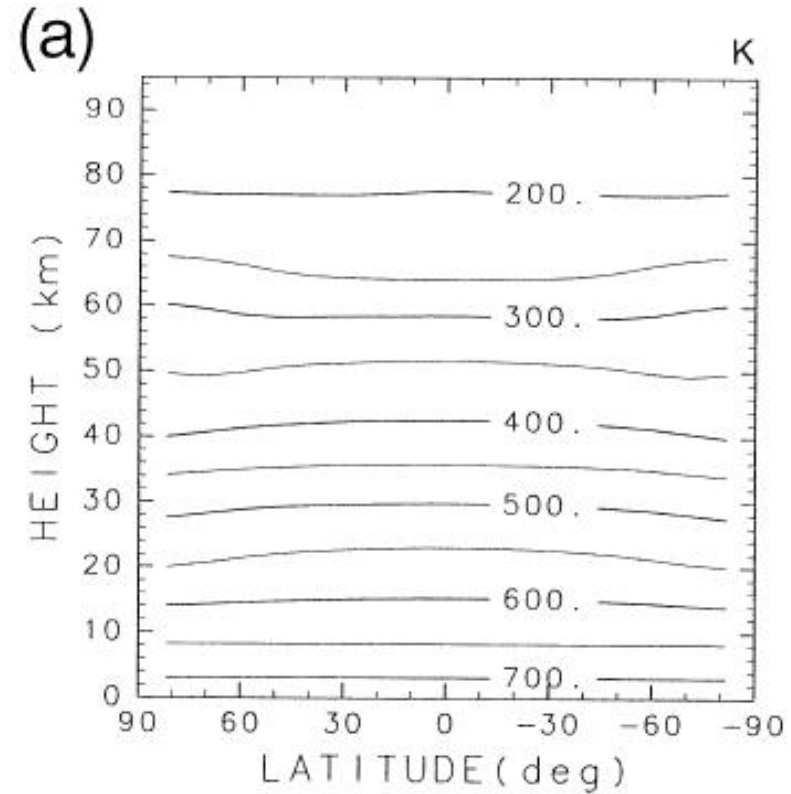
(Yamamoto, M., Takahashi, M., 2003)

(mean) lon:0..348.75
(mean) time:60500..70500

带状平均温度分布



CONTOUR INTERVAL = 5.000E+01



CONTOUR INTERVAL = 5.000E+01

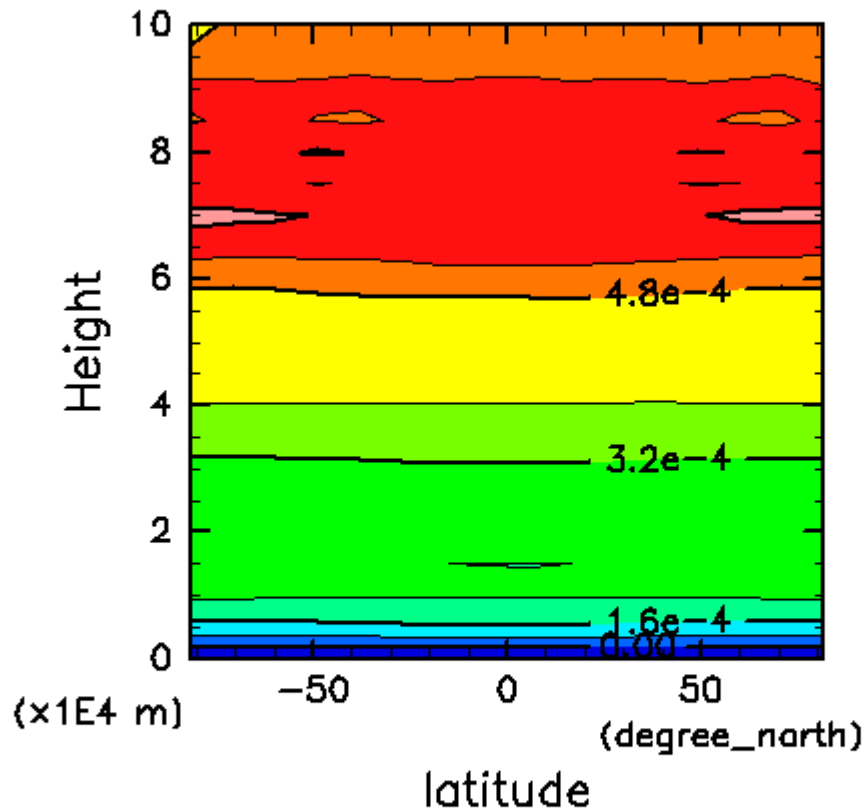
(Yamamoto, M., Takahashi, M., 2003)

(mean) lon:0..348.75
(mean) time:60500..70500

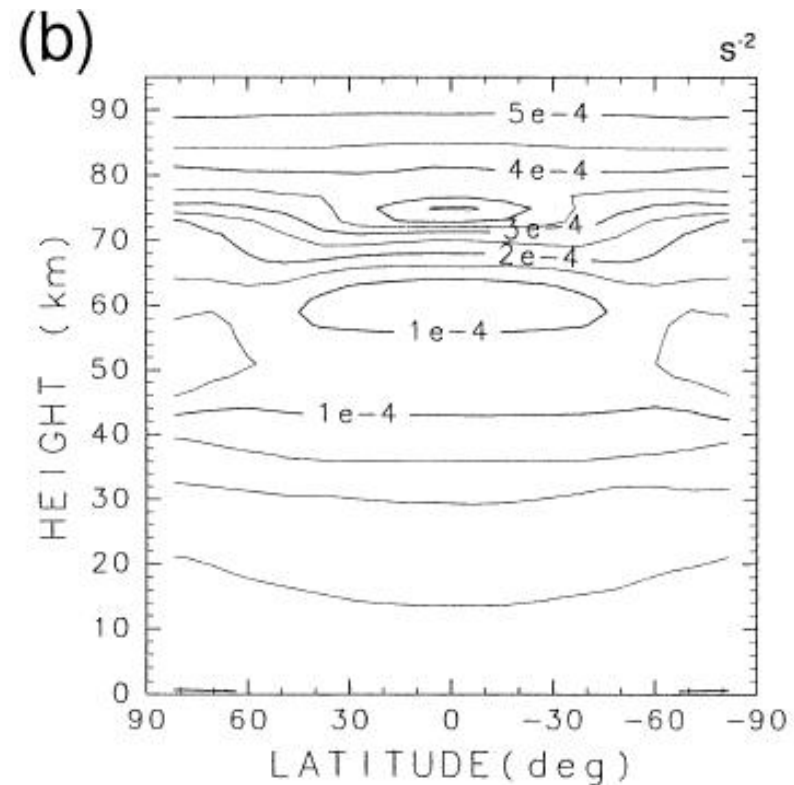
Temp.nc@Temp,time=60500:70500

静的安定度

Brunt–Vaisala frequency squared



CONTOUR INTERVAL = 8.0000×10^{-5}



CONTOUR INTERVAL = 5.0000×10^{-5}

(Yamamoto, M., Takahashi, M., 2003)

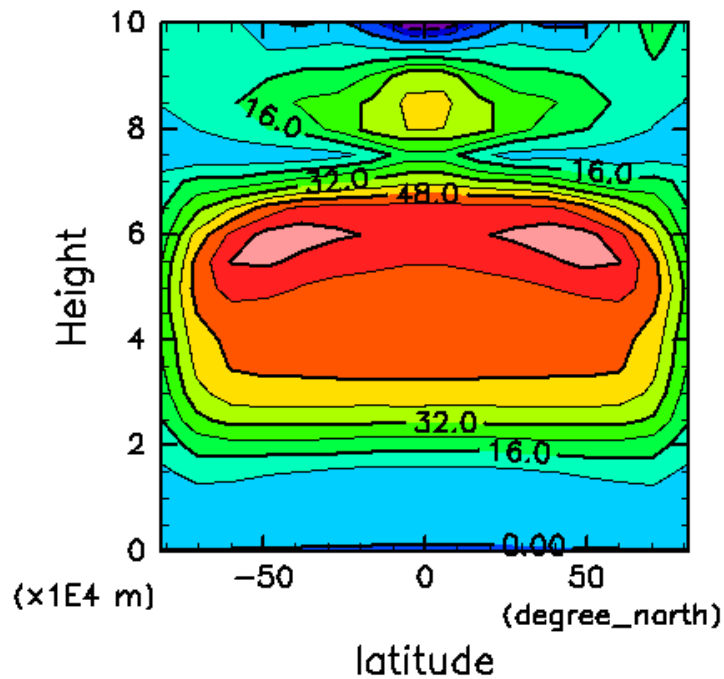
(mean) lon:0..348.75

(mean) time:60500..70500

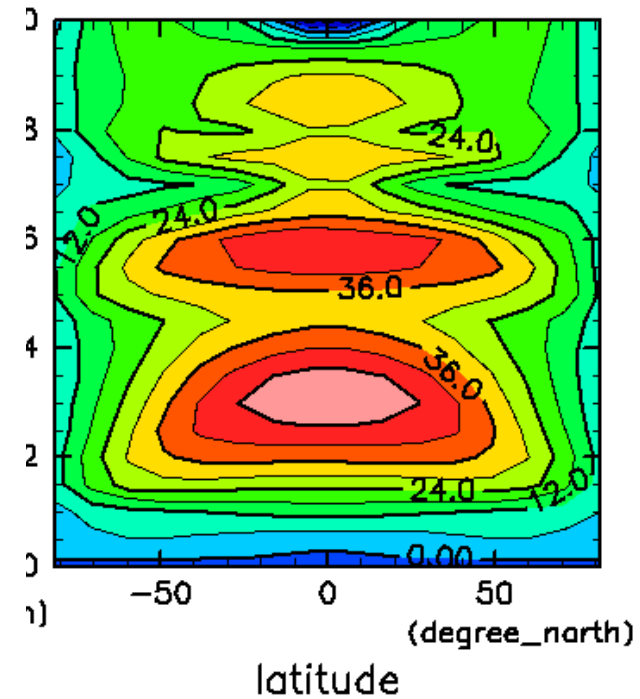
BVFreq.nc@BVFreq,time=60500:70500

鉛直格子点の違い

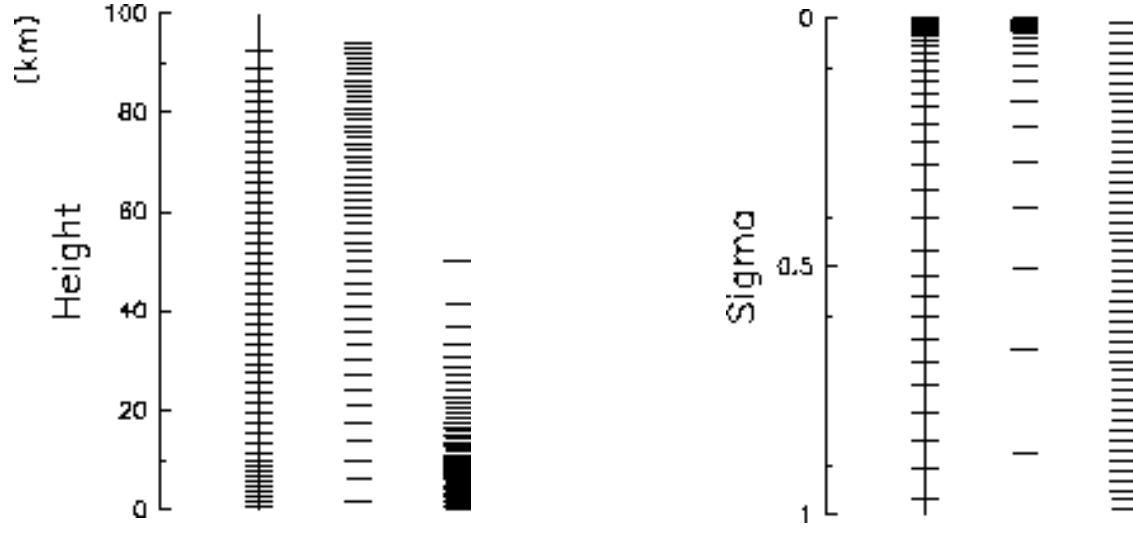
eastward wind



eastward wind

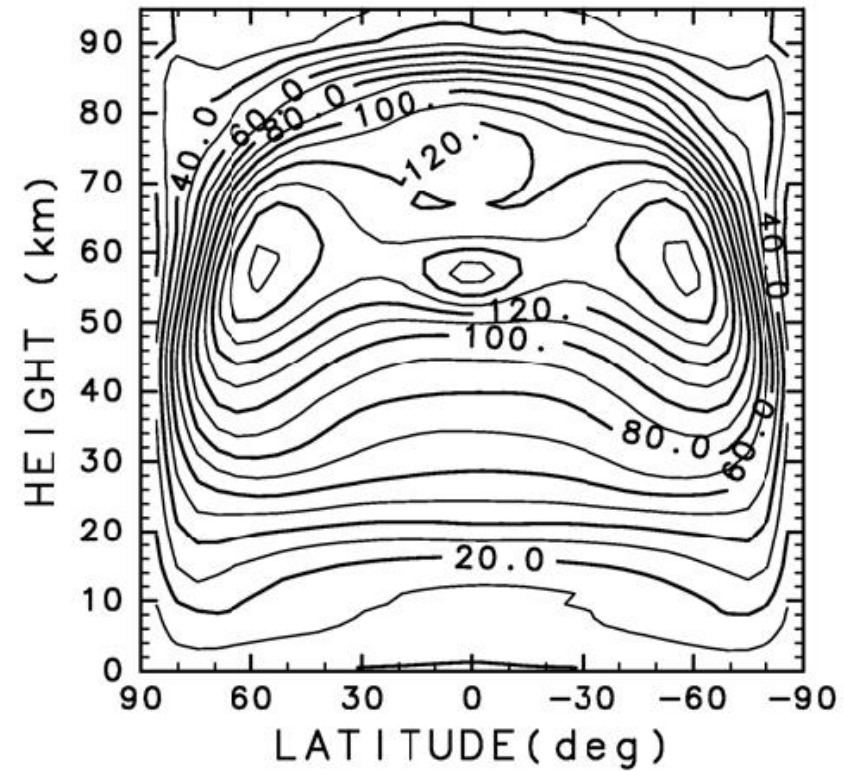
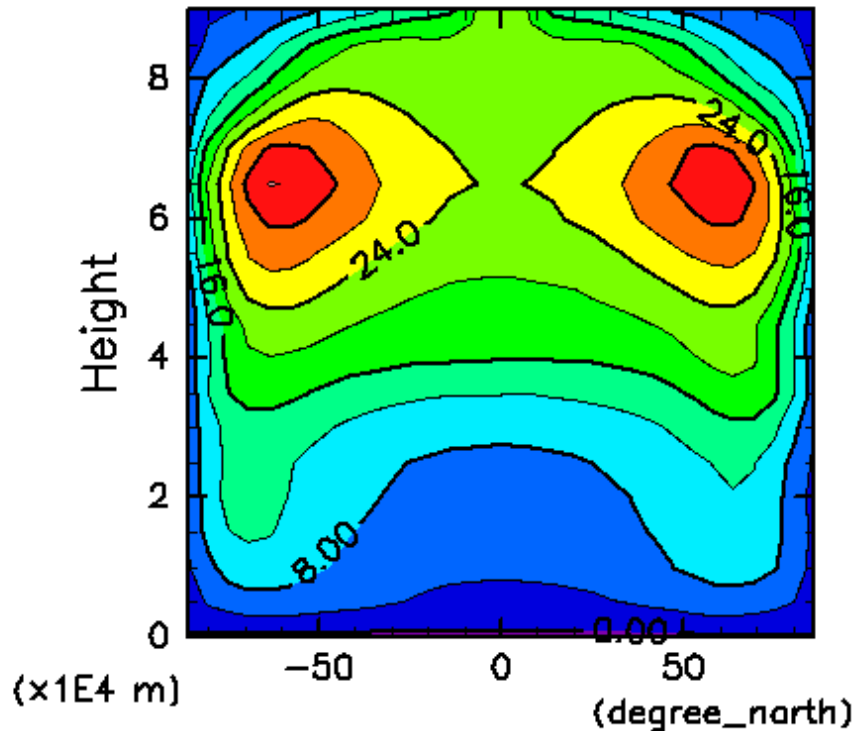


鉛直格子の違い



T21L50 の場合

eastward wind



CONTOUR INTERVAL = 4.000E+00



(mean) lon:0..354.375
(mean) time:35100..37500

U.nc@U,time=35000:40000,Height=D:90000

参考文献

高橋 芳幸, 森川 靖大, 石渡 正樹, 納多 哲史, 佐々木 洋平, 小高 正嗣, 西澤 誠也, 石岡 圭一, 竹広 真一, 中島 健介, 堀之内 武, 林 祥介, DCPAM 開発グループ, 2009: 惑星大気モデル DCPAM,

<http://www.gfd-dennou.org/library/dcpam/>, 地球流体電脳倶楽部.

Yamamoto, M., Takahashi, M., 2003: The fully developed superrotation simulated by a general circulation model of a Venus-like atmosphere. *J. Atmos. Sci.*, 60, 561–574.