Comparison of the GMI Met Fields Important in Wet Deposition

GMI Science Team Meeting

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Types of Wet Deposition

- Rain Out
- Wash Out
- Convective Scavenging

Rain Out

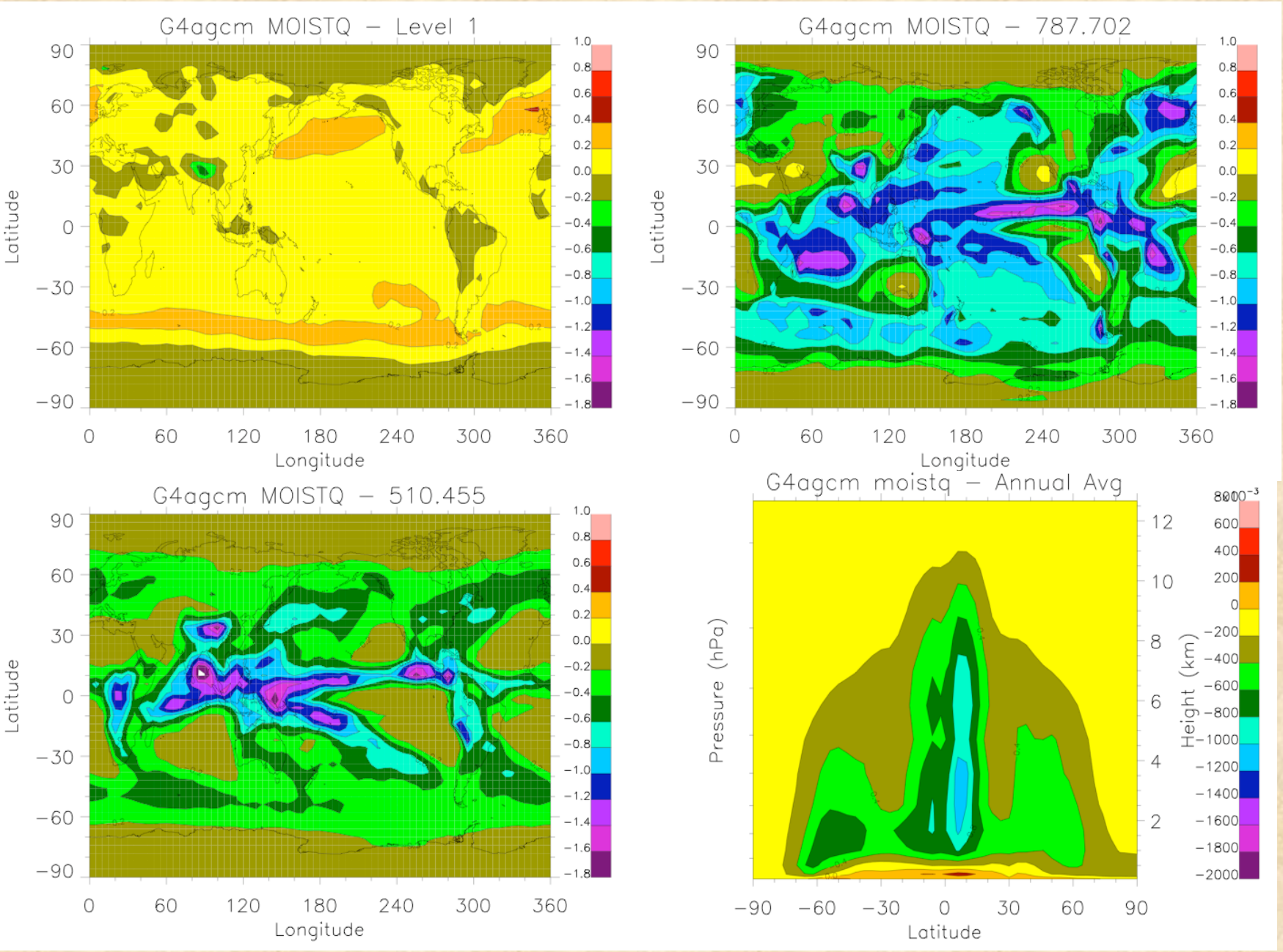
- Occurs in grid boxes where precipitation is forming (moistq <= -1e-10)
- Different efficiency between convective and stratoform
- Allows for differing efficiency for different species

Wash Out

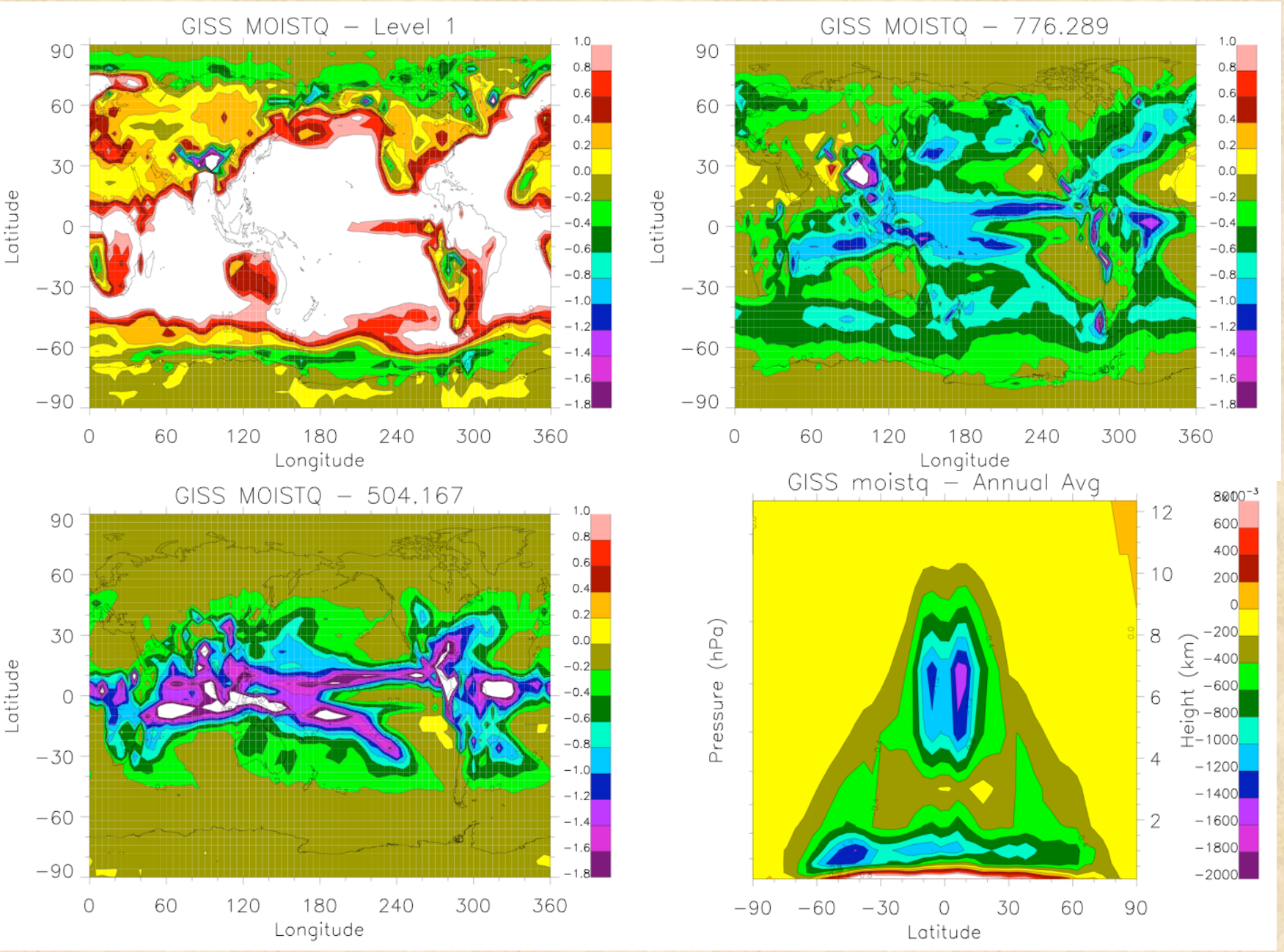
- Only occurs in a grid box where
  - Precipitation is not forming
  - Precipitation is entering the box top
  - Temperature is 268K or above
- Allows for re-evaporation below cloud

The Most Important Met field for Rain out/Wash out is “moistq”

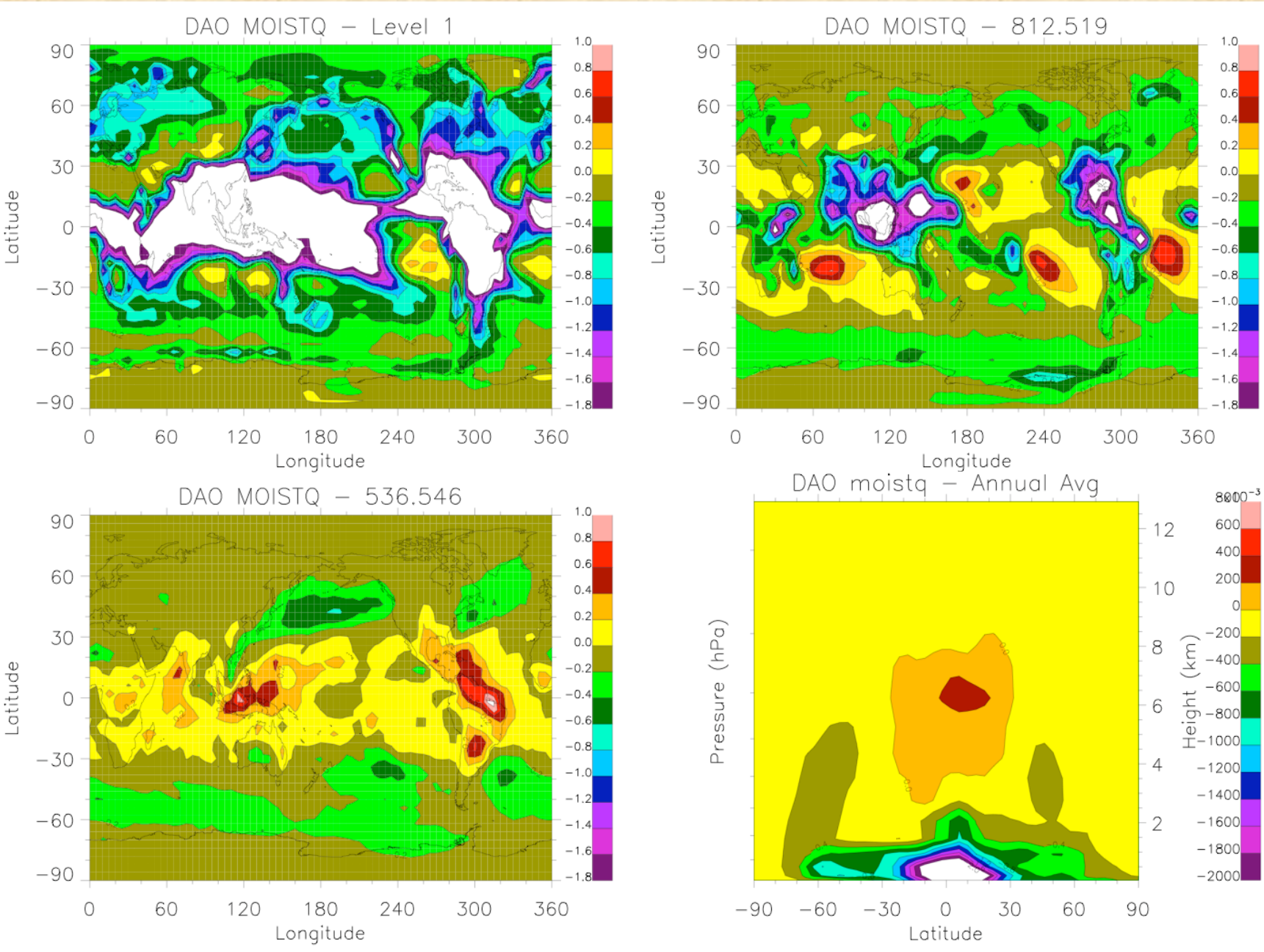
Annual Average Moistq - G4agcm



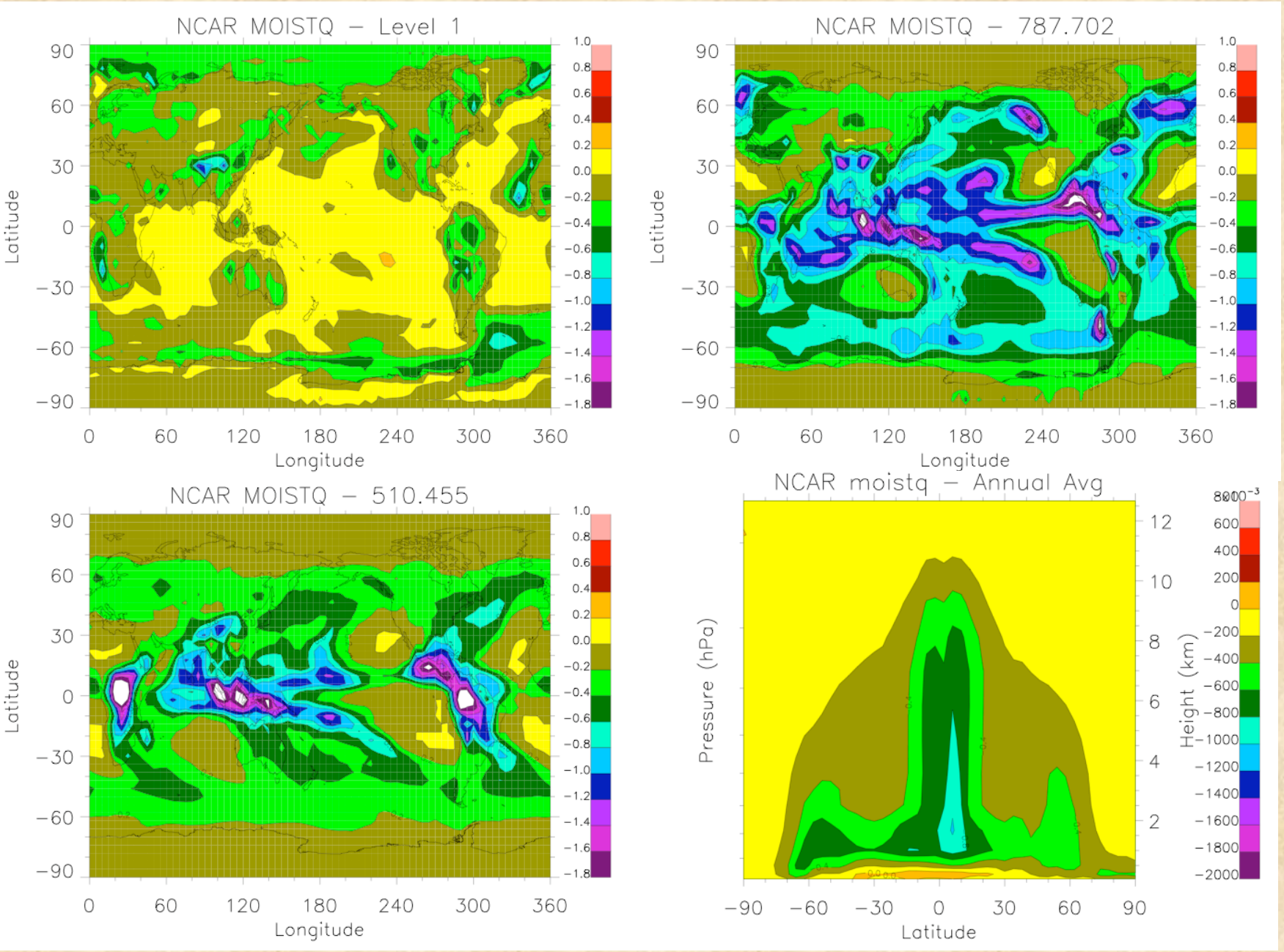
Annual Average Moistq - GISS



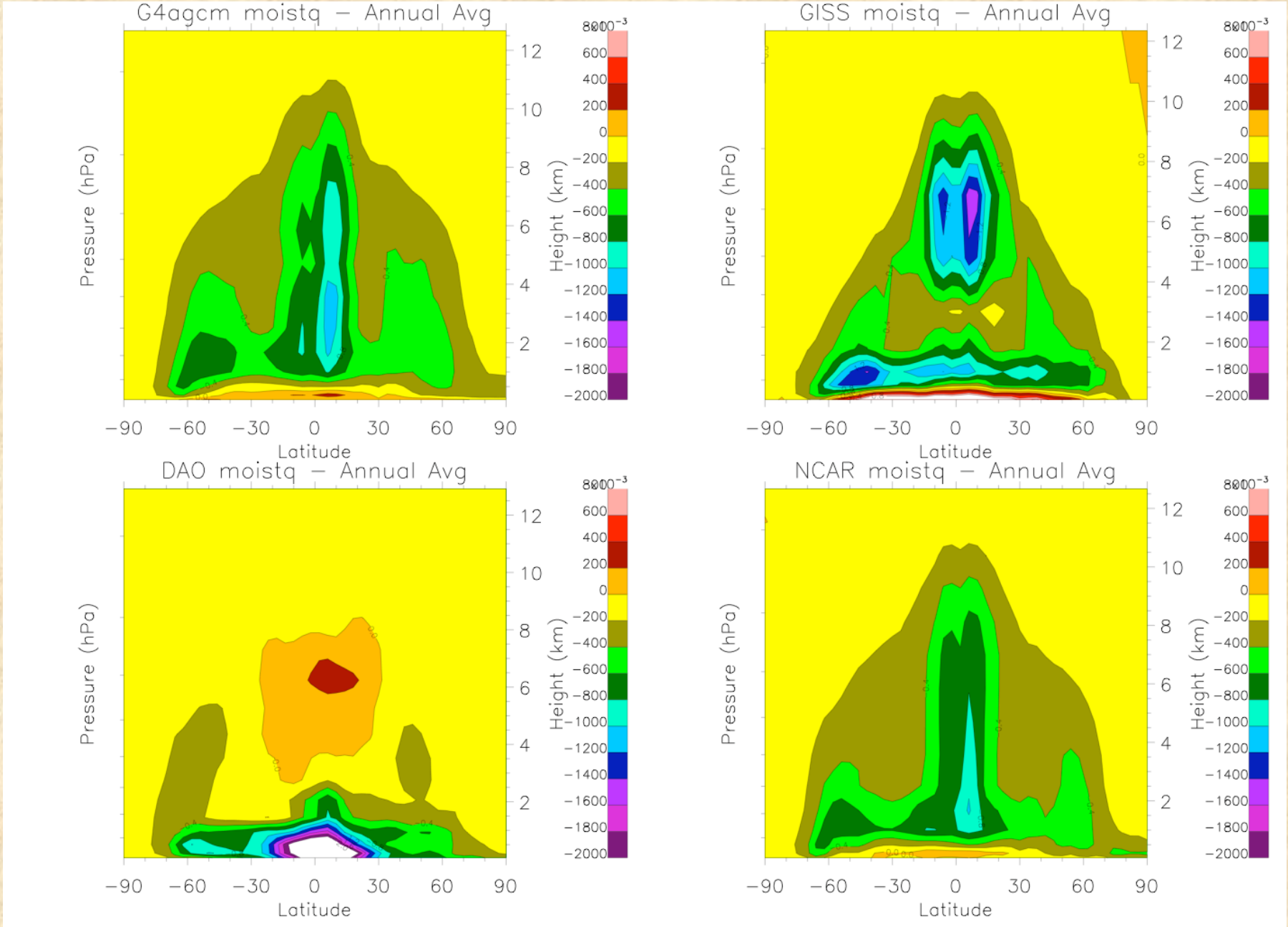
Annual Average Moistq - DAO



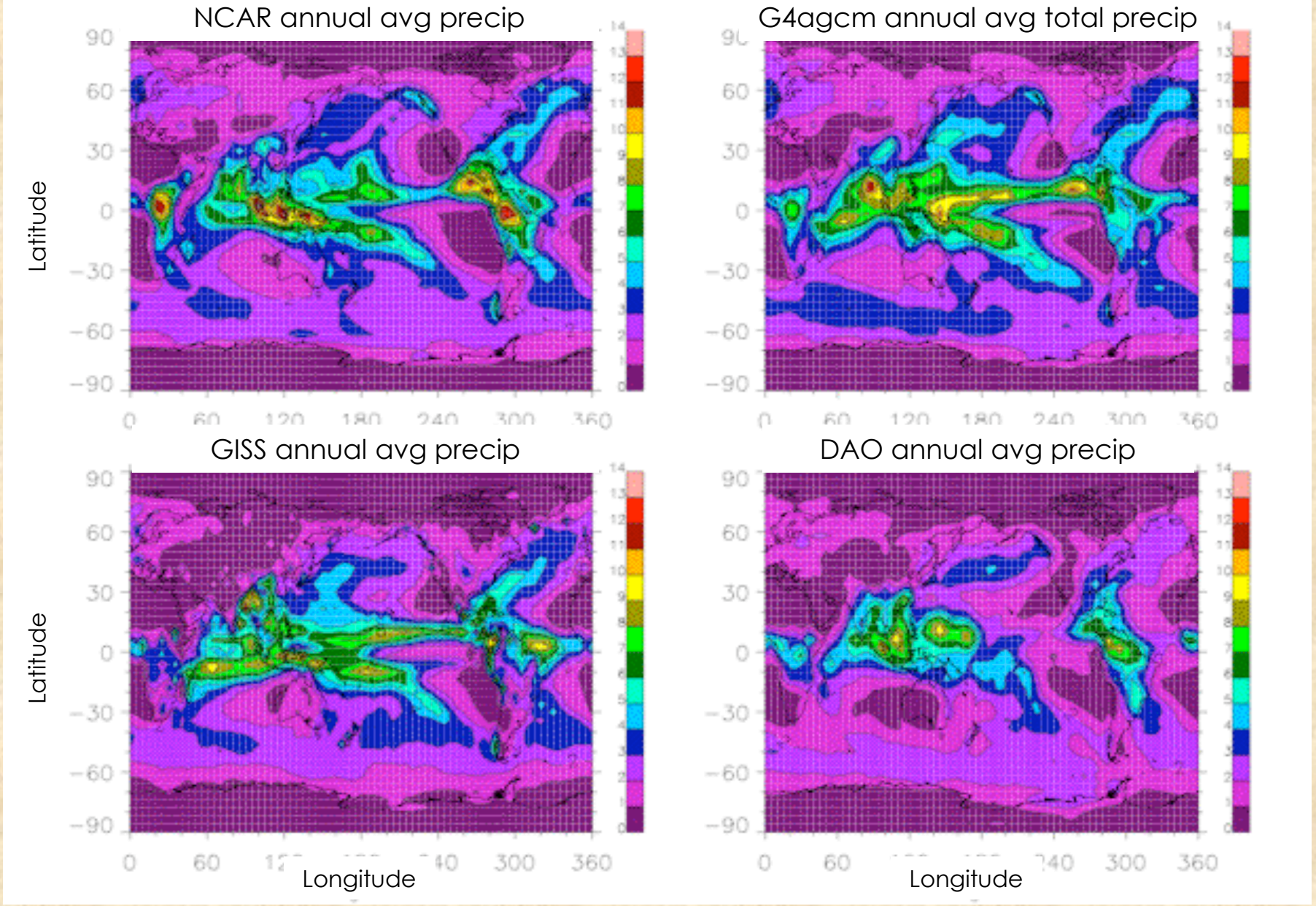
Annual Average Moistq - NCAR

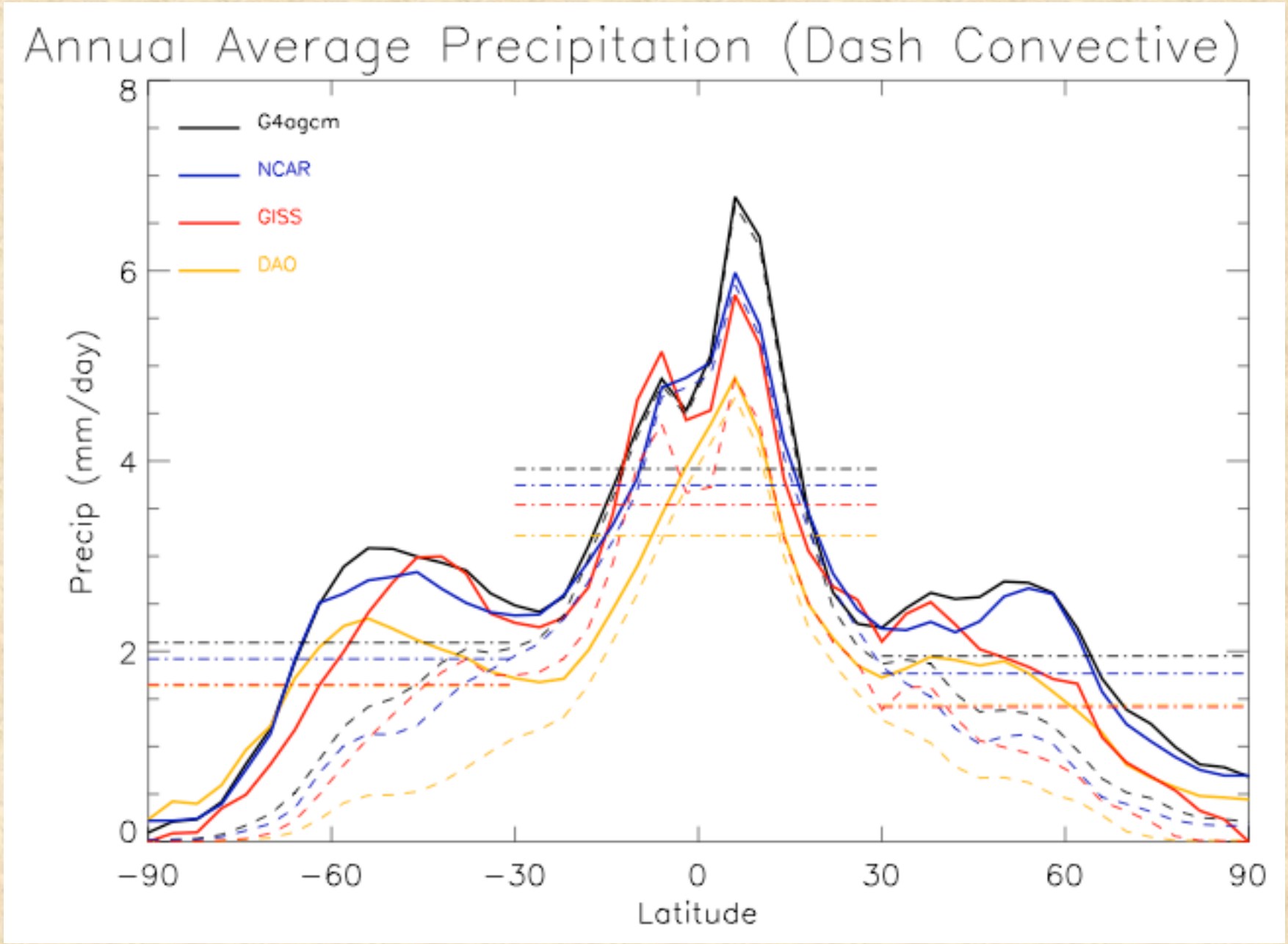


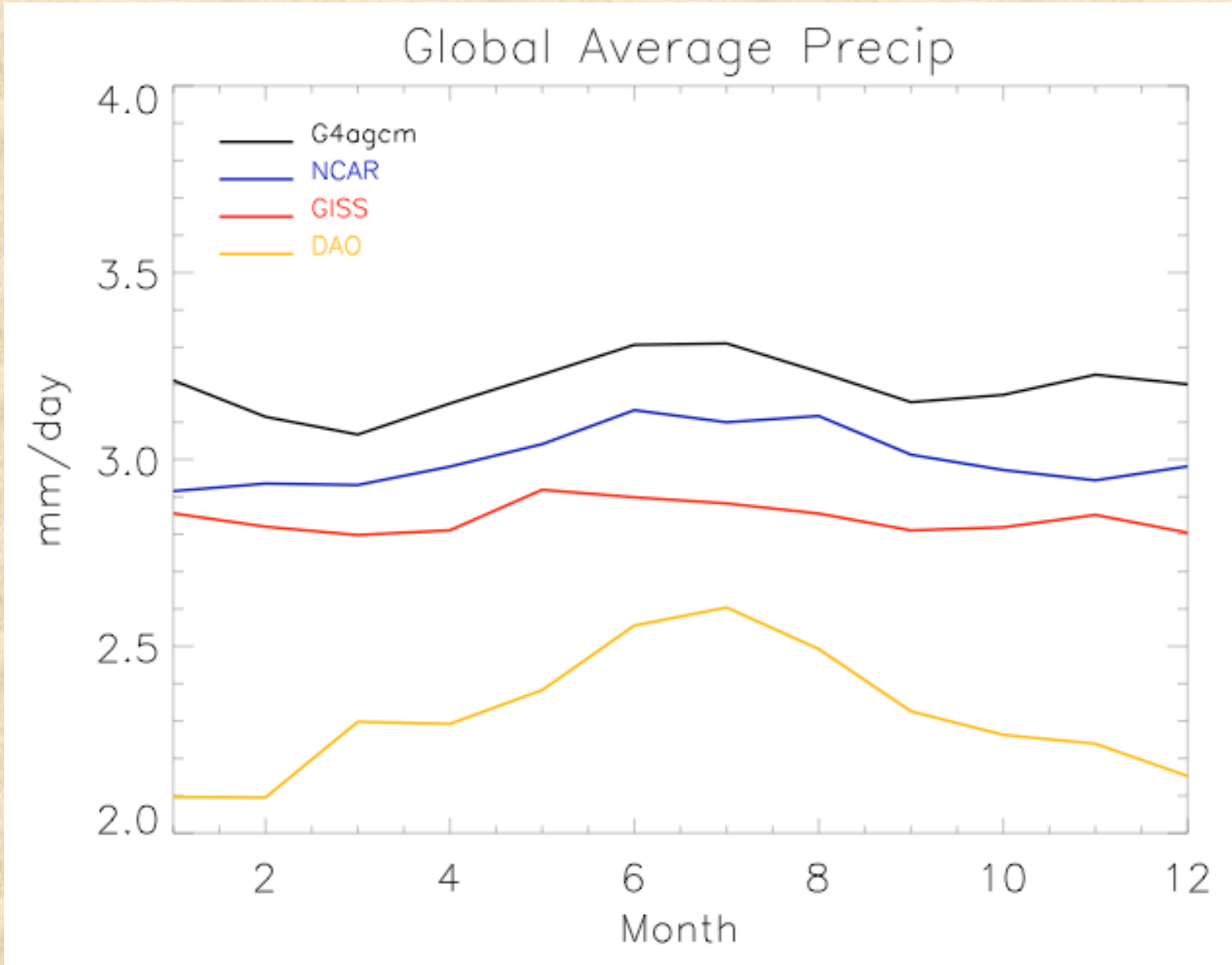
Annual Average Moistq - Comparison



Annual Average Precipitation




Annual Average Precipitation (Dash Convective)
G4agcm
NCAR
GISS
DAO
Precip (mm/day)
8
6
4
2
0
−90
−60
−30
0
30
60
90
Latitude

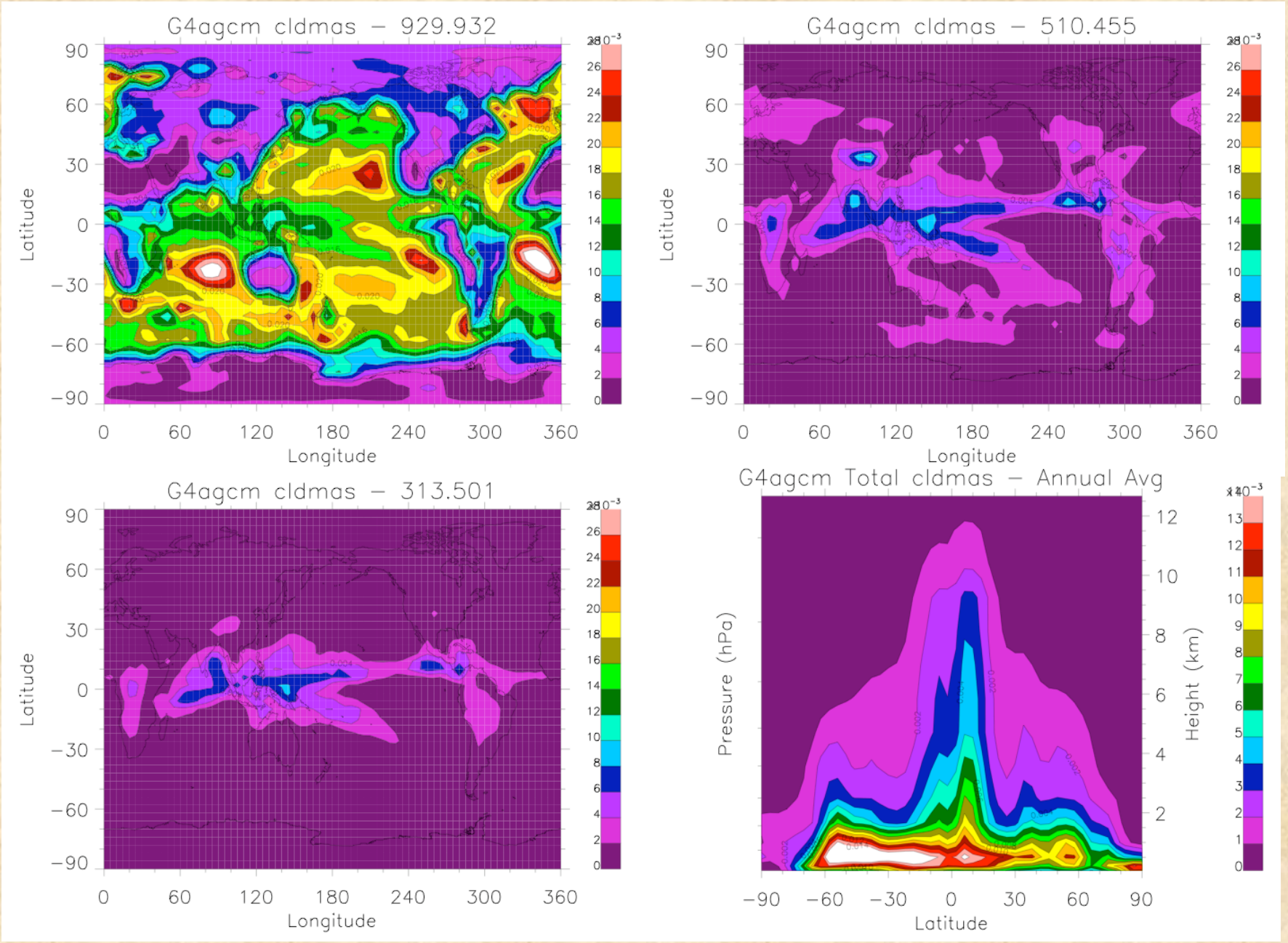

Global Average Precip
4.0
3.5
3.0
2.5
2.0
mm/day
G4agcm
NCAR
GISS
DAO
2
4
6
8
10
12
Month

Convective Scavenging

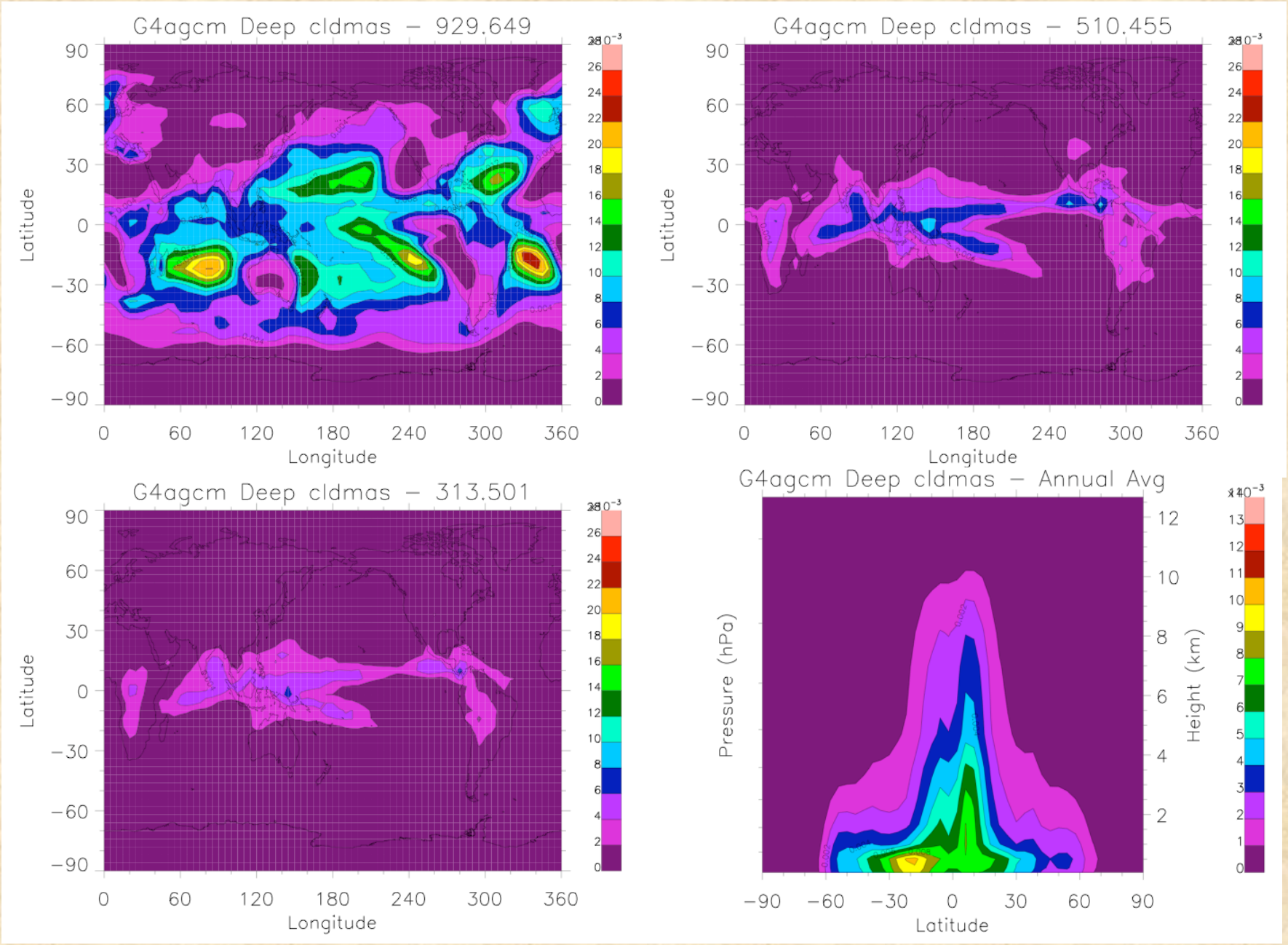
- Done in convective transport routine
- Proportional to upward convective flux
- Different between land and ocean/ice
- For G4agcm the preferred is to apply only to deep convection upward flux

The Most Important Met field for Scavenging is “cldmas”

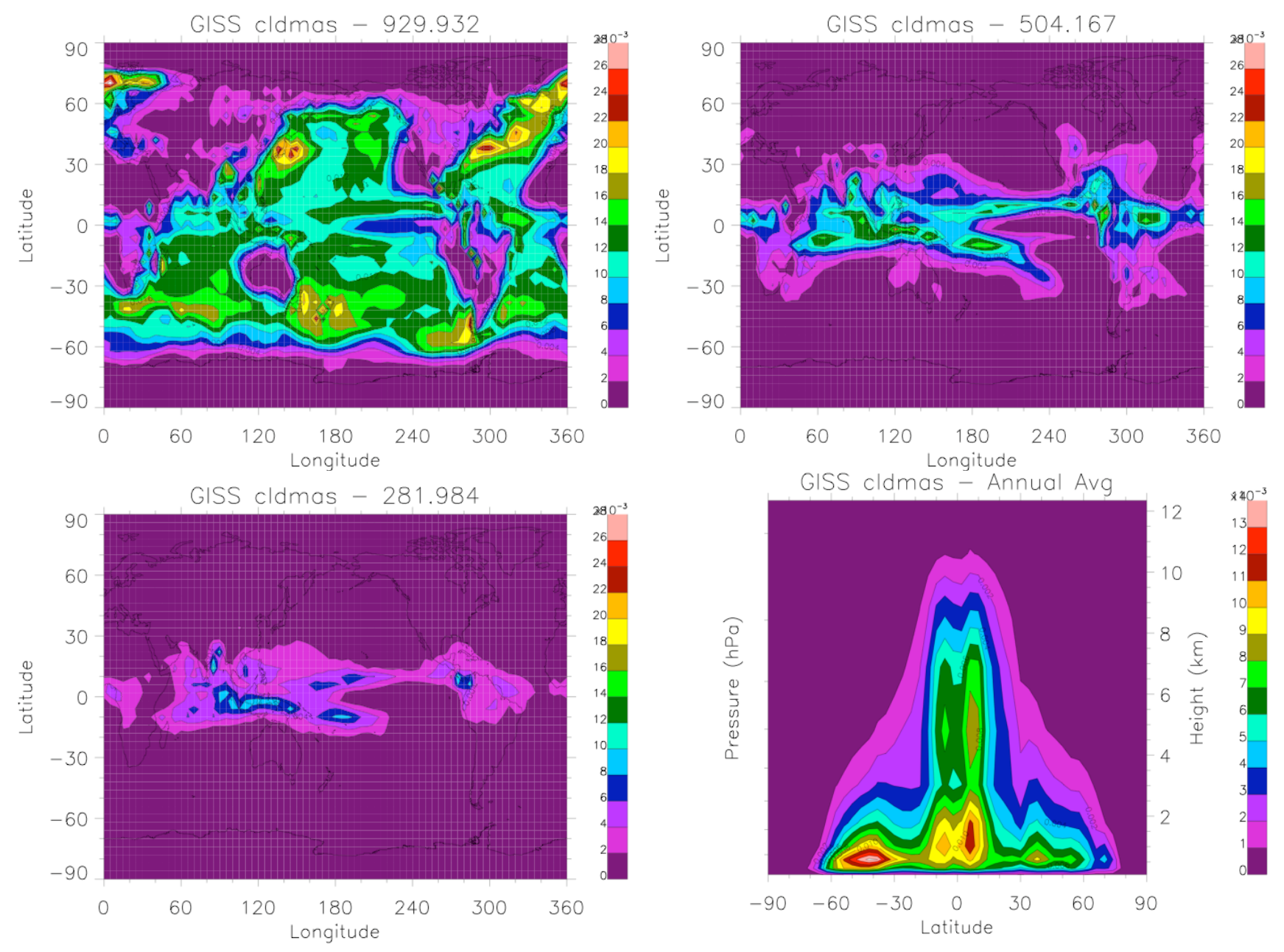
Annual Average Cloud Mass Flux - G4agcm



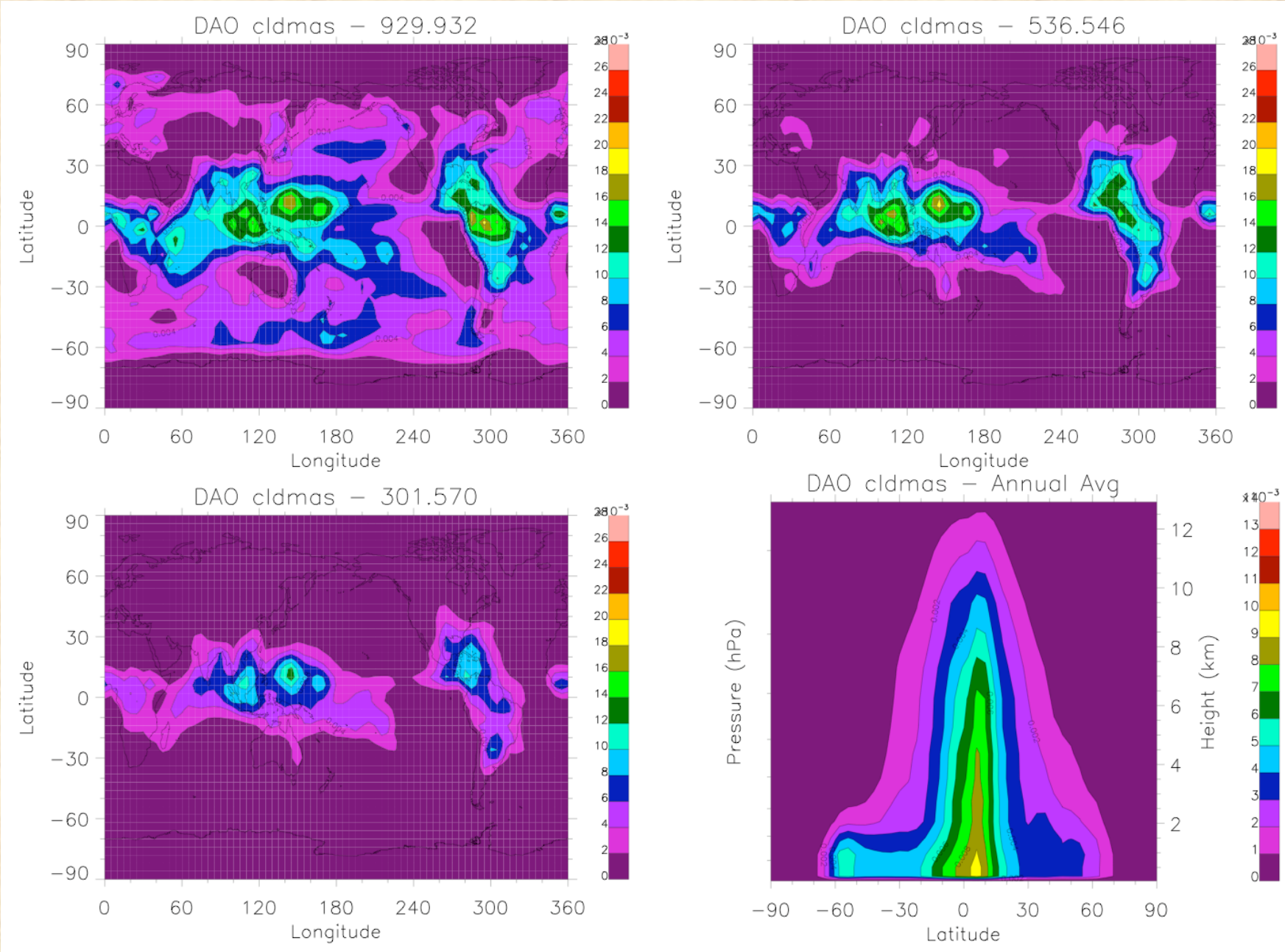
Annual Average Deep Cloud Mass Flux - G4agcm



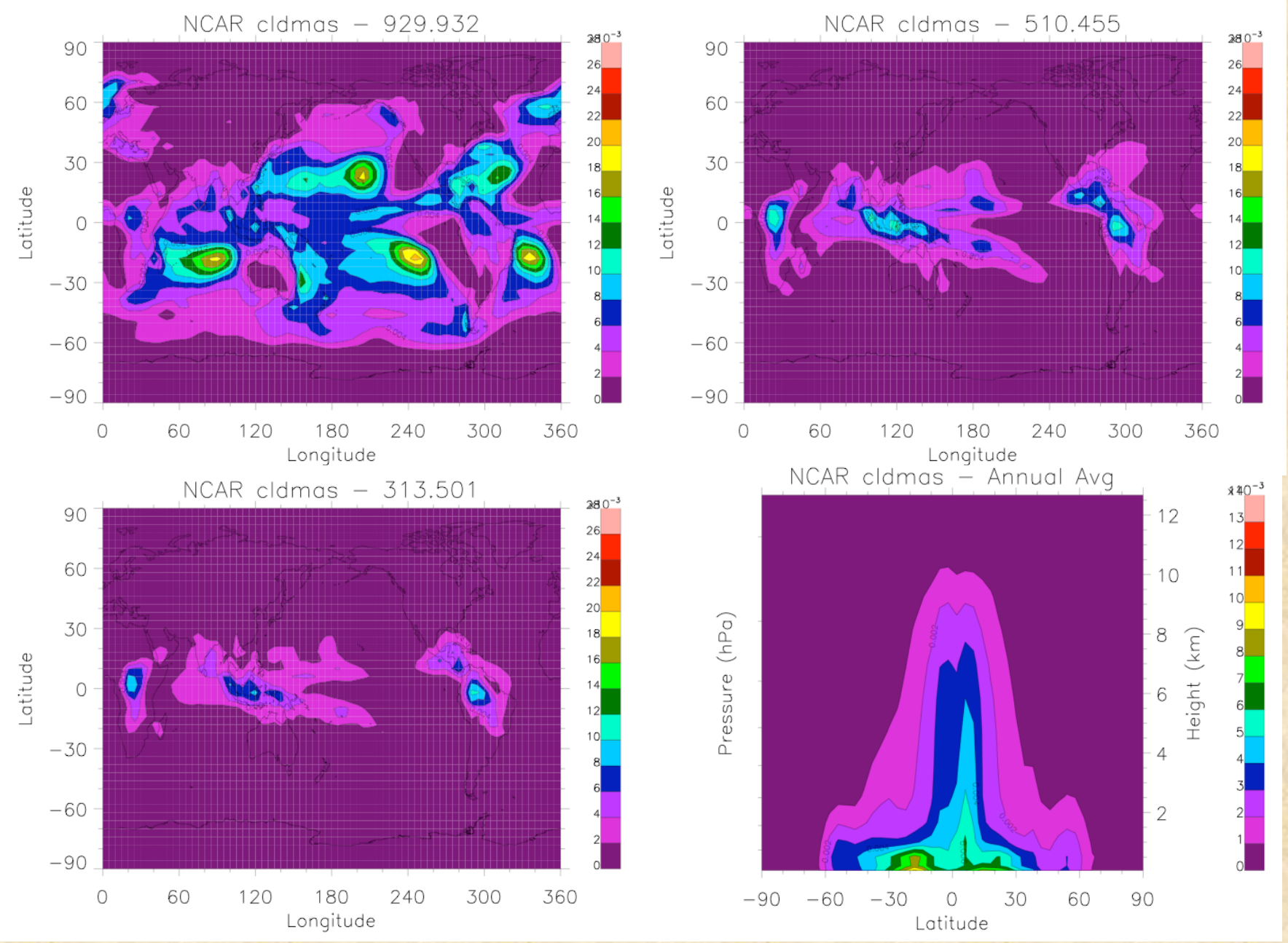
Annual Average Cloud Mass Flux - GISS



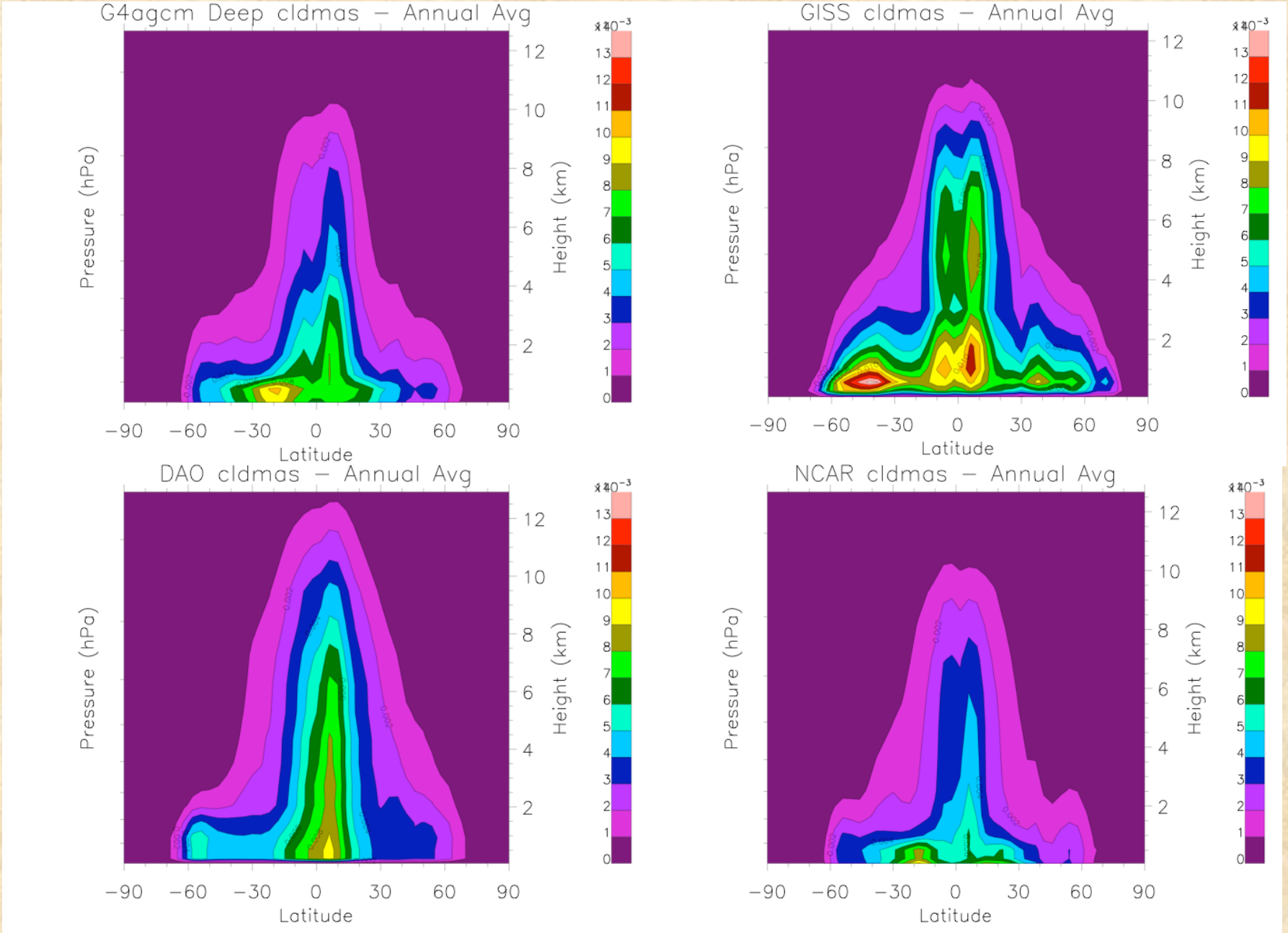
Annual Average Cloud Mass Flux - DAO



Annual Average Cloud Mass Flux - NCAR



Annual Average Cloud Mass Flux - Comparison



Summary

- DAO precip pattern much different than others
- G4agcm has more precip than others (global avg 3.2, NCAR 3.0, GISS 2.8, DAO 2.3)
- GISS has higher cloud mass flux