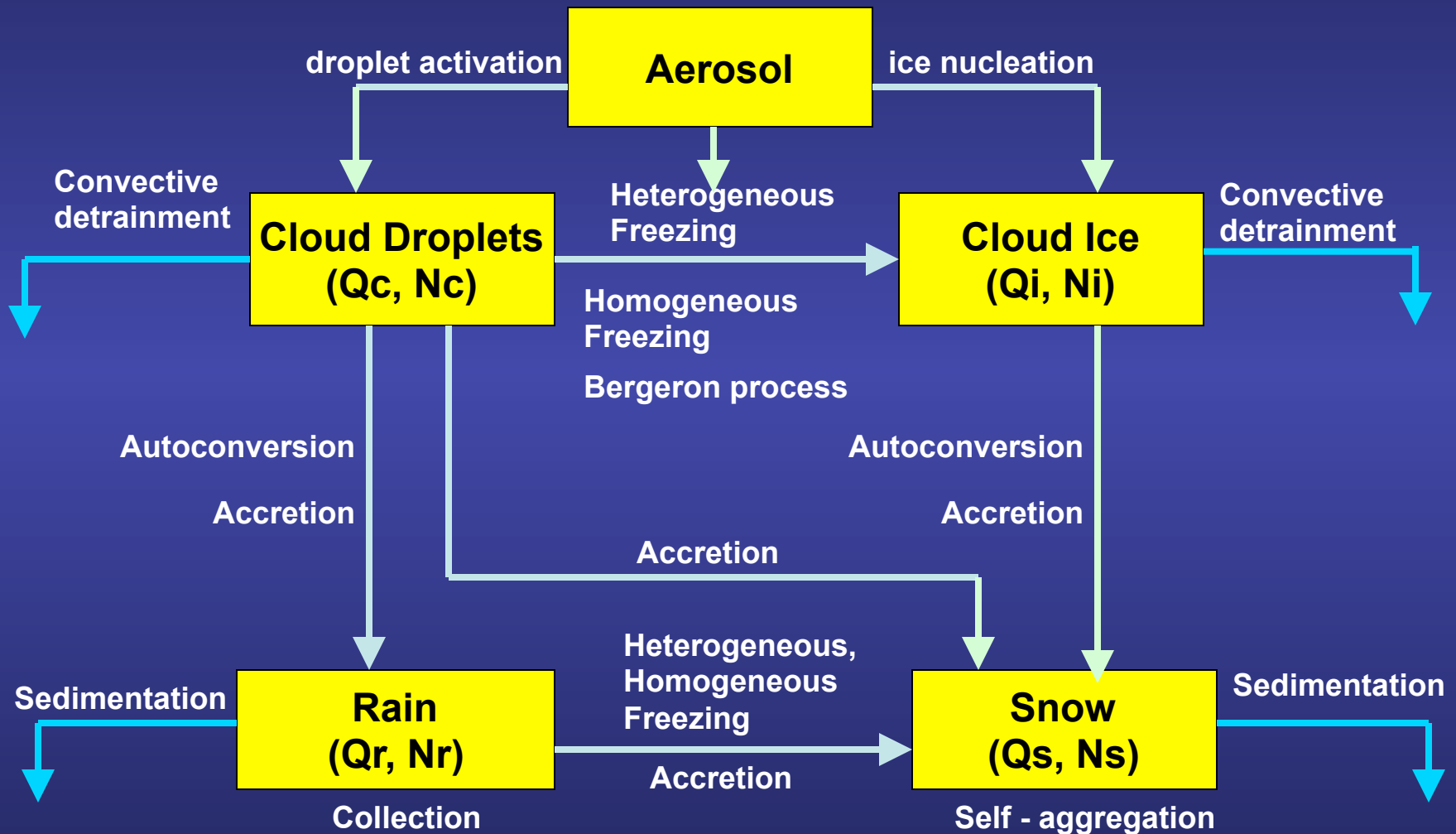


Convective Microphysics Parameterization

Motivation

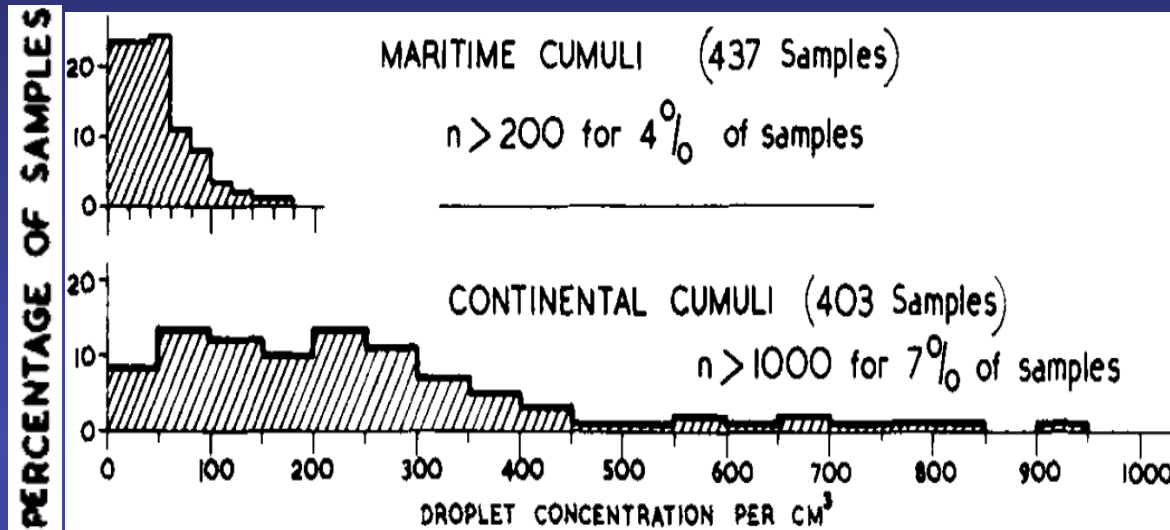
- More realistically describe microphysical processes in convection parameterization
- Better treat convective and stratiform cloud interactions
- Better treat convective cloud-aerosol interactions

Processes Considered for Convective Microphysics



Cloud droplet number concentration

OBS



From Squires, 1958, *Tellus*

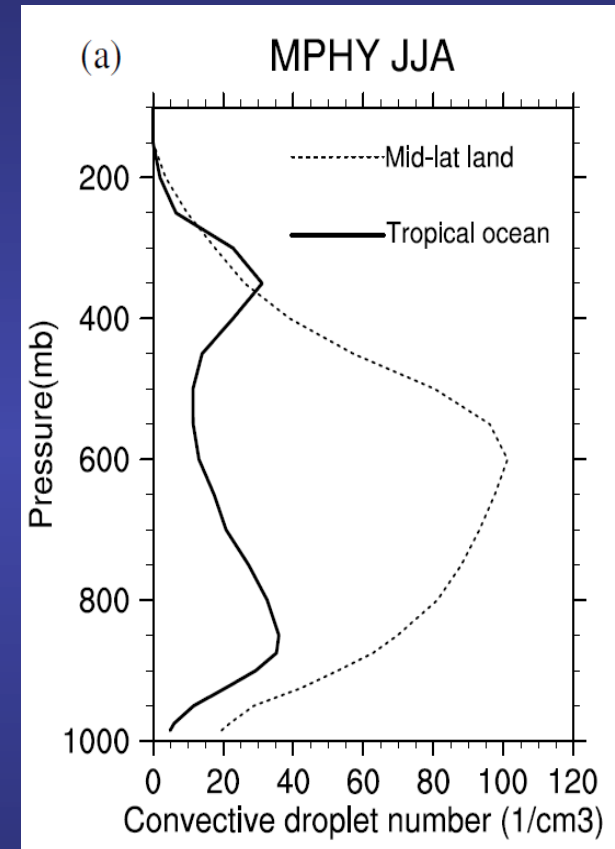
Maritime cumuli:

20~60 per cm³ (Wood et al., 2011)

Continental cumuli:

50~300 per cm³ or even higher

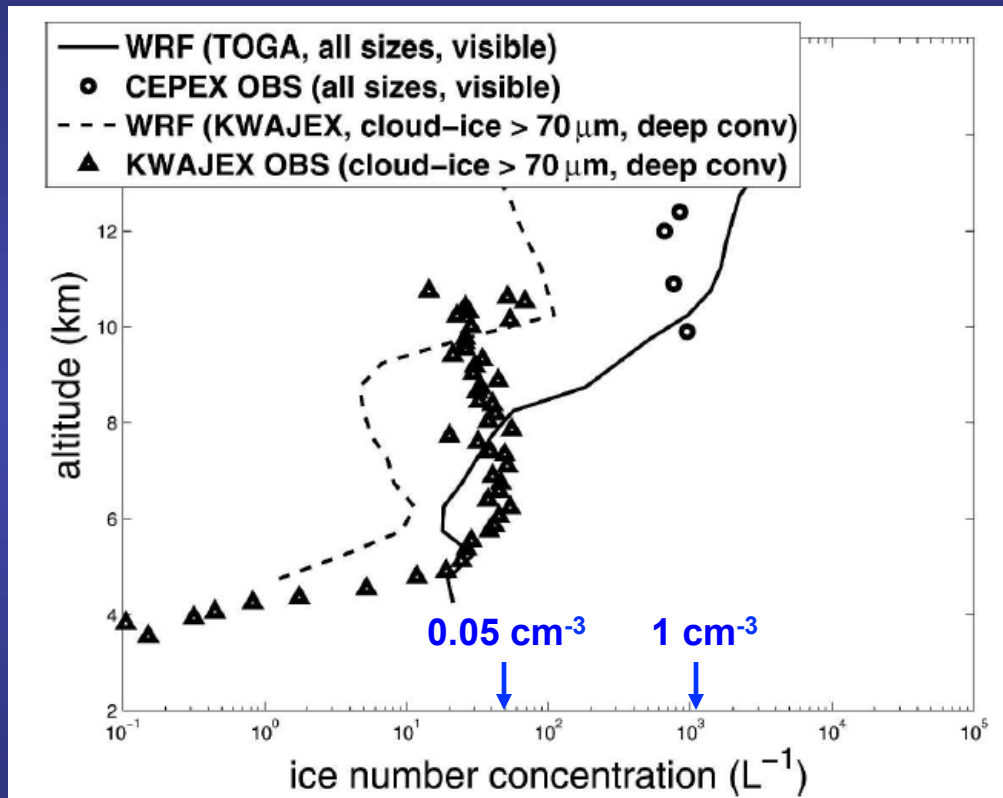
CAM5



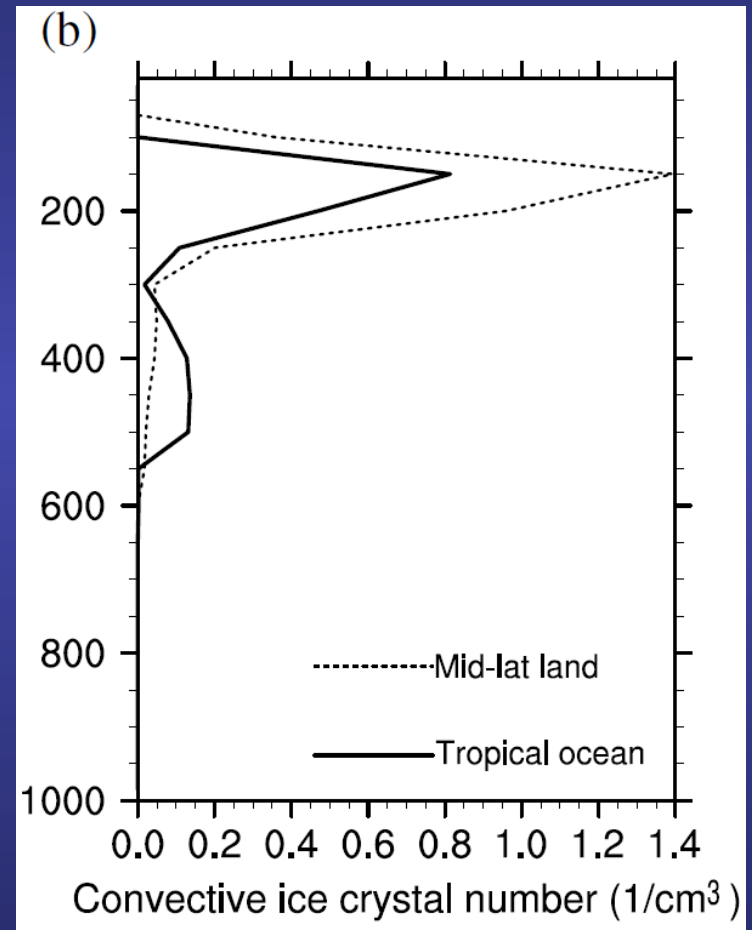
Song and Zhang, 2012, *J. Climate*

Cloud ice crystal number concentration

OBS

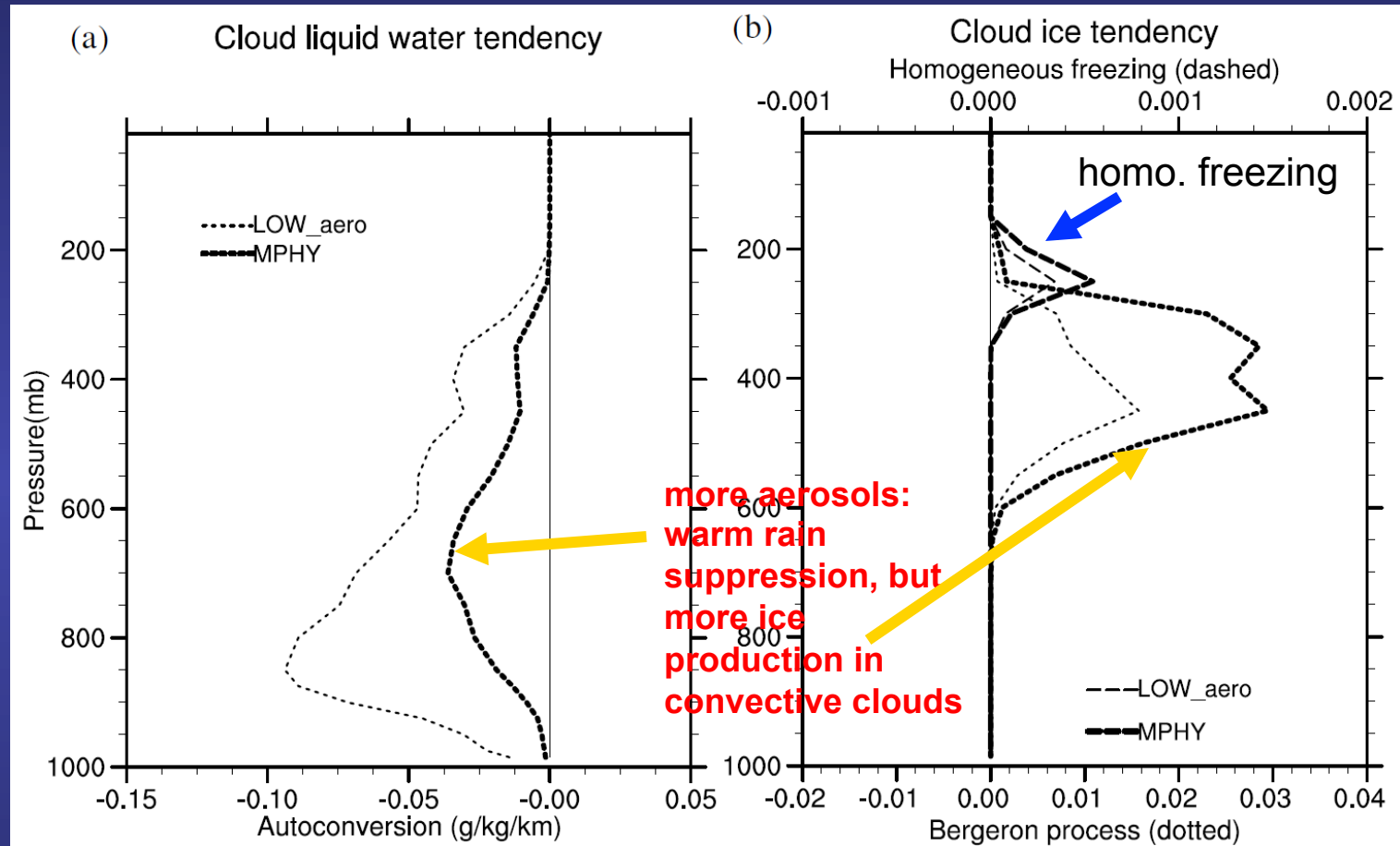


CAM5



CEPEX OBS: Central Equatorial Pacific Experiment,
 KWAJEX OBS: Kwajalein Experiment,
 WRF: WRF simulations,
 From Phillips et al. 2007, *J. Atmos. Sci.*

Response to aerosol concentration change



MPHY: climatological aerosol distribution

LOW_aero: aerosol concentration is reduced by a factor of 10