

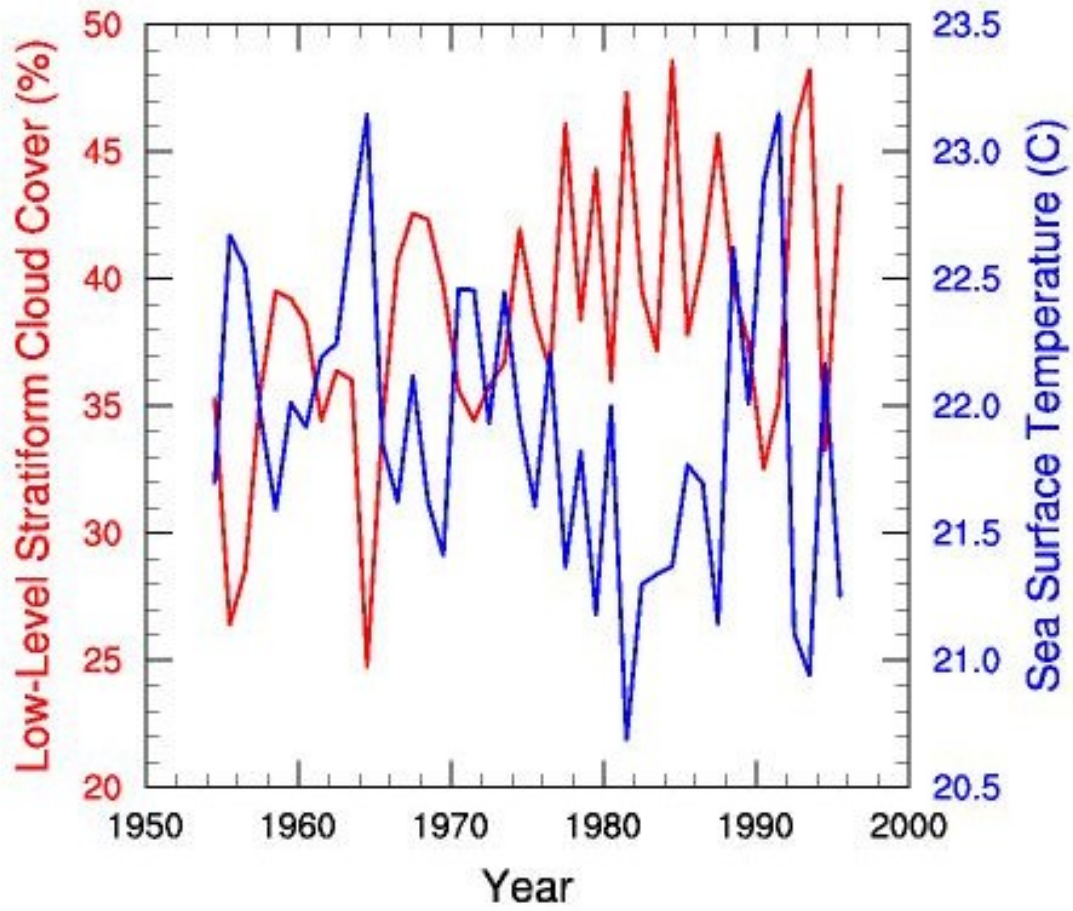
Possible feedbacks between plankton, clouds, and the ocean mixed layer

Joel Norris

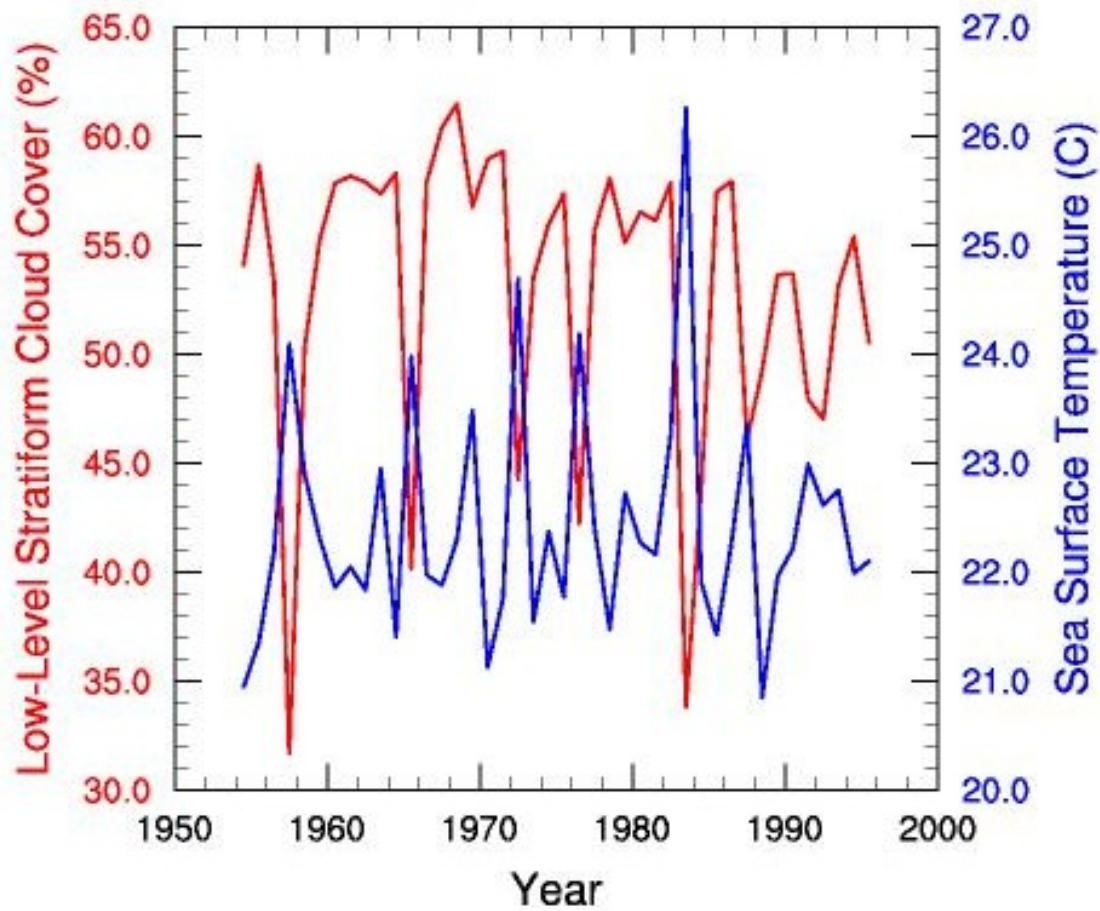
Scripps Institution of Oceanography

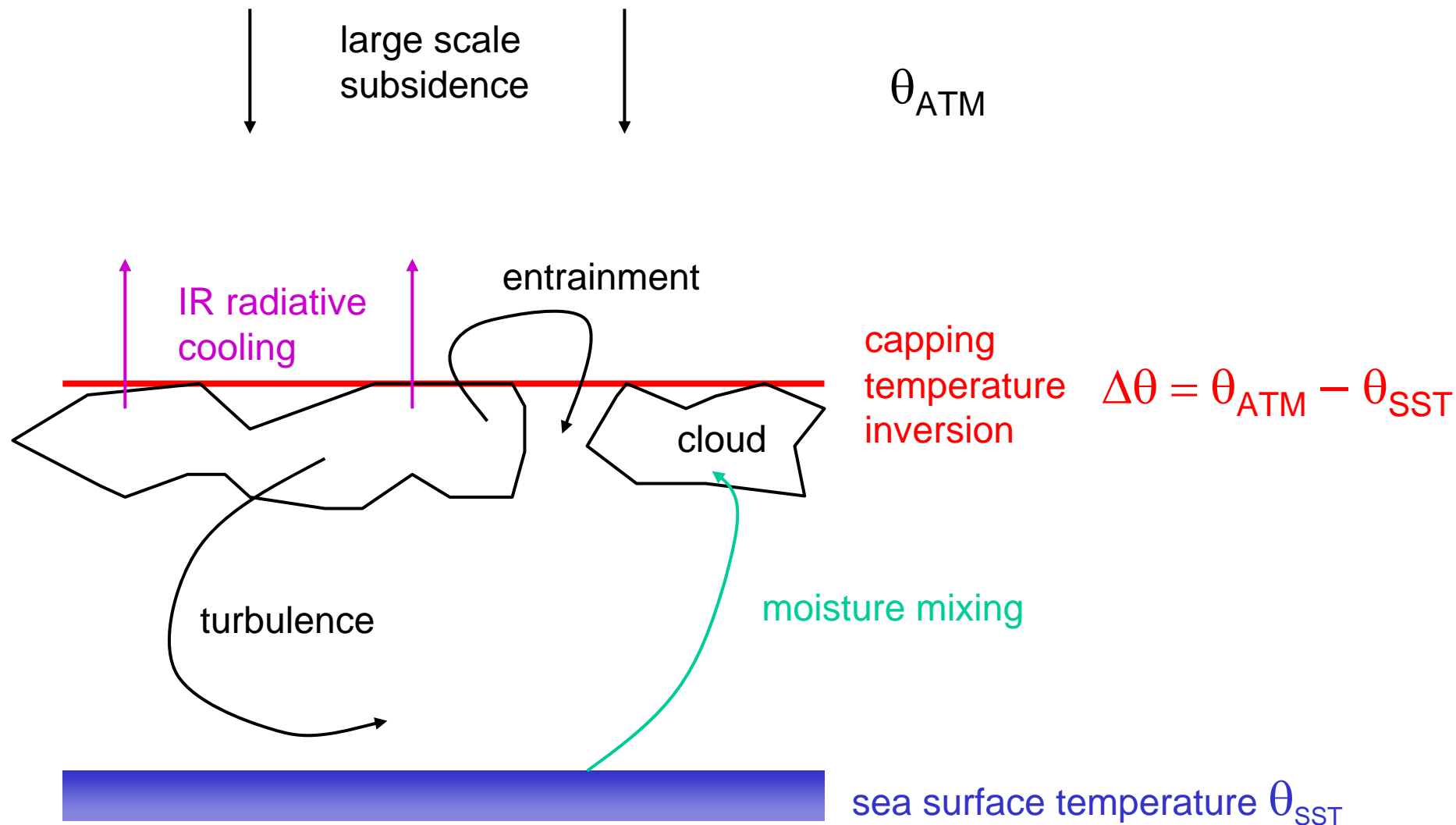
April 18, 2001

June-August 30-40N 160-180W



June-August 0-10S 80-100W

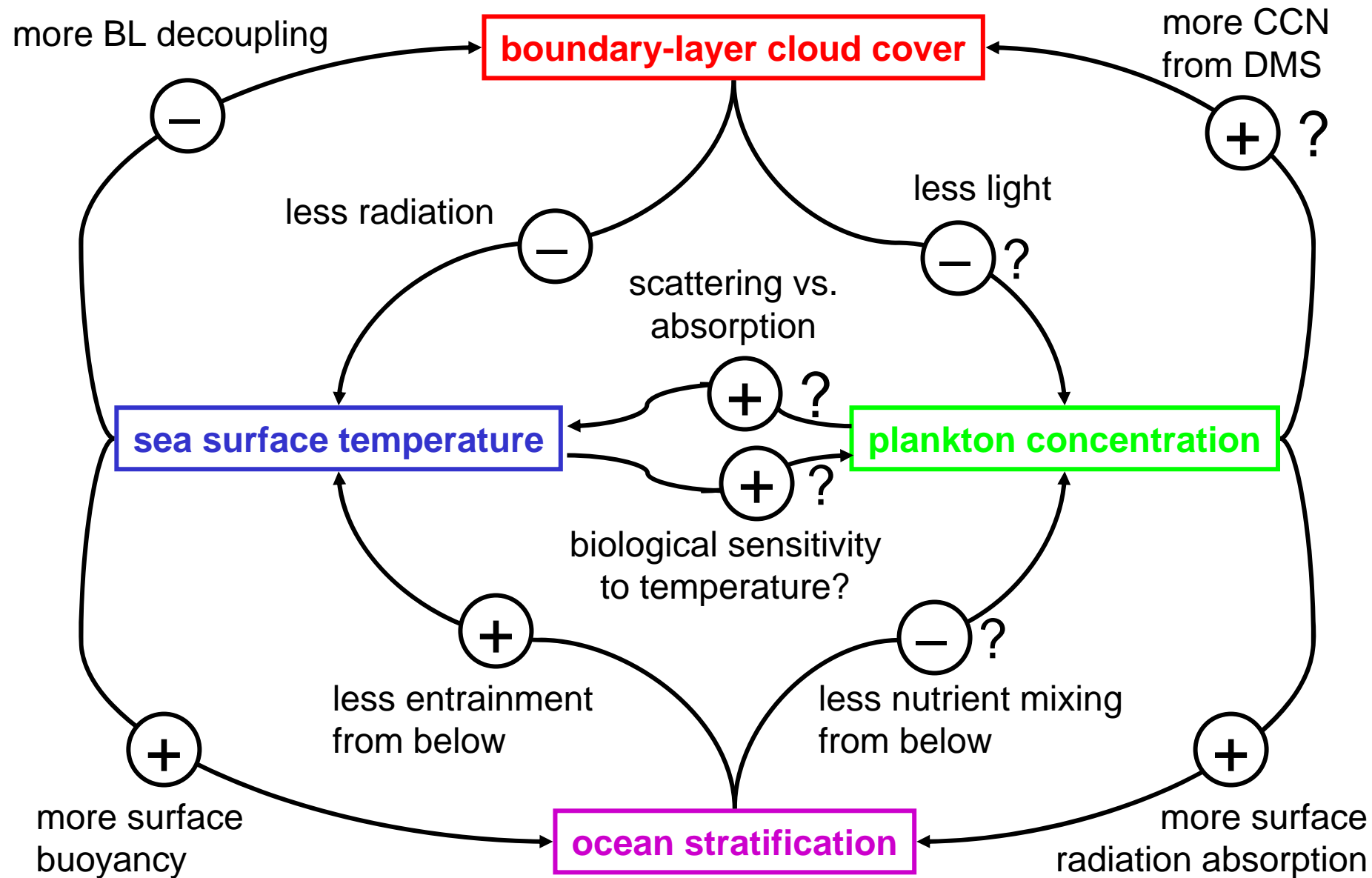




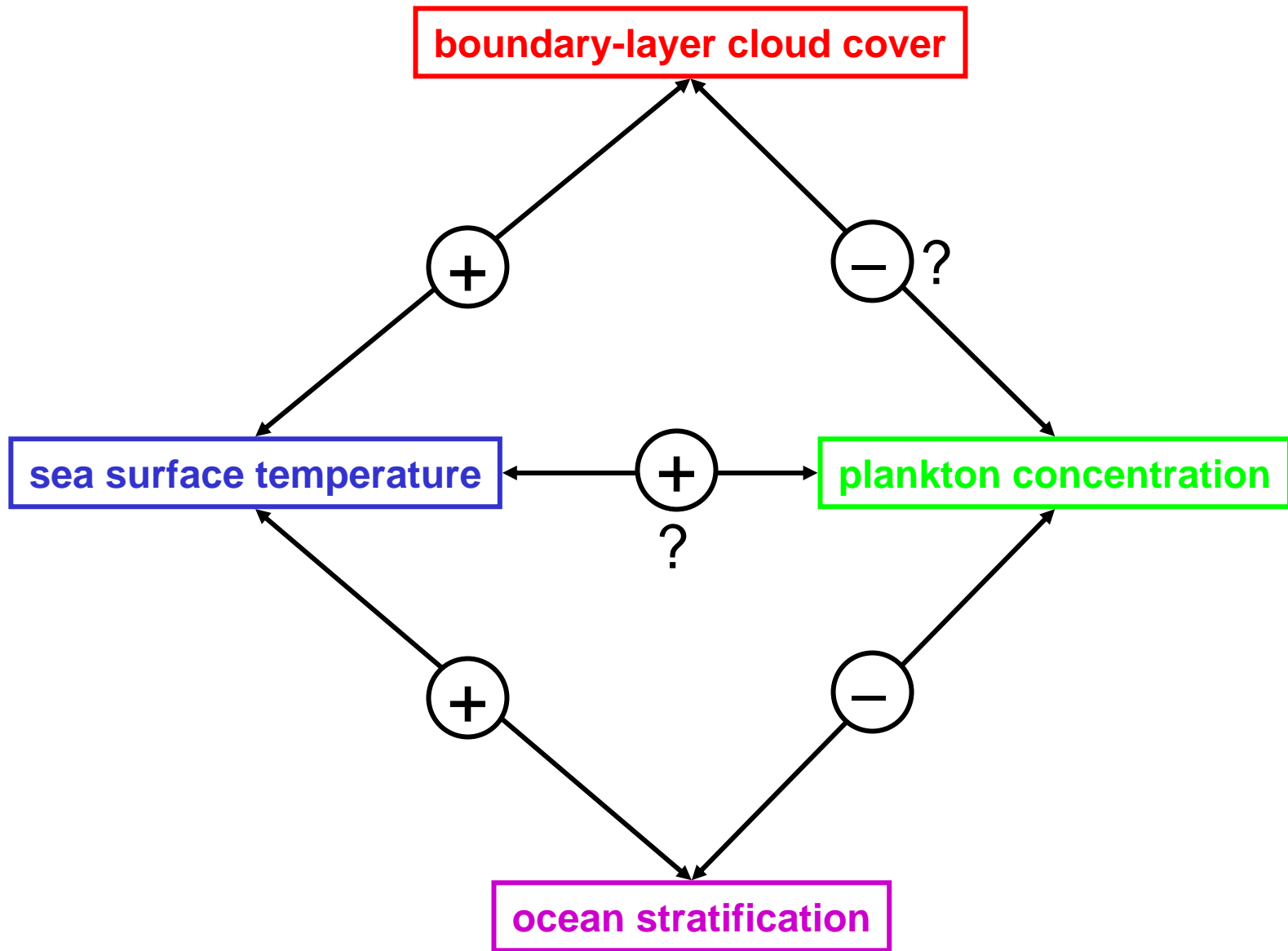
Impact of SST changes

- Increased SST \Rightarrow decreased $\Delta\theta$
- decreased $\Delta\theta \Rightarrow$ increased entrainment
- increased entrainment \Rightarrow deeper atmospheric BL
- deeper atmospheric BL \Rightarrow increased decoupling
- increased decoupling \Rightarrow less moisture mixing
- less moisture mixing \Rightarrow less cloud cover

Local Forcings



Local Feedbacks



Marine biota may have a net stabilizing influence on the climate system

Caveats

- Microphysical effects on cloudiness are likely small compared to macrophysical effects
- Anthropogenic CCN dominates over much of the global ocean

But...

- Perhaps plankton, SST, and clouds are indirectly connected through ocean mixed layer stratification