

E3SM Coupled Model Biases: Impacts on Cryosphere Campaign

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Background (1)

- E3SM would like to better understand:
 - the impacts of ice sheets on the climate system
 - the impact of the climate system on ice sheets
- Ice sheet evolution is controlled by:
 - ice sheet dynamics (SciDAC's problem)
 - climate forcing (E3SM's problem)

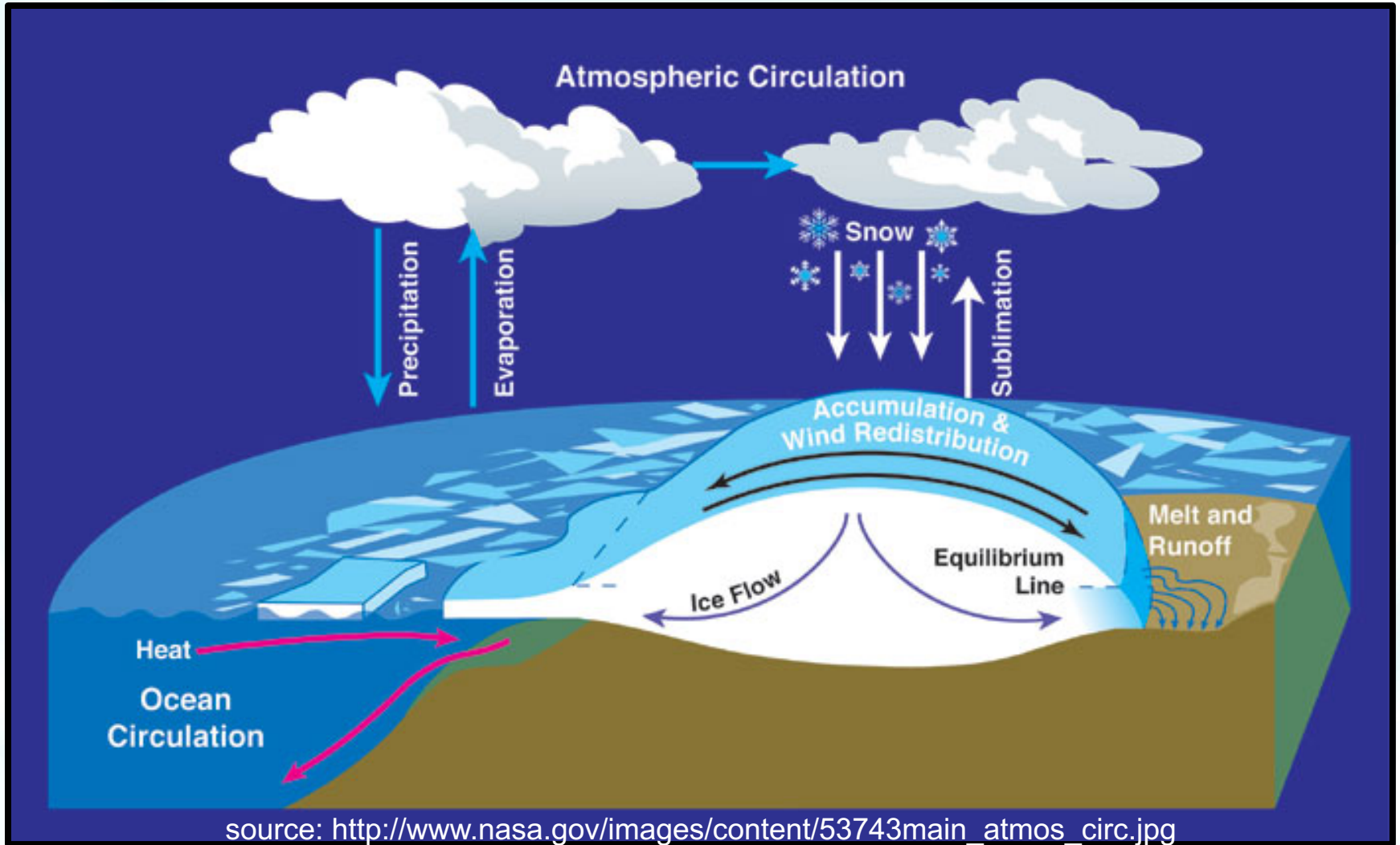
Background (2)

Model biases could limit our ability to realize primary Cryosphere Campaign goals, e.g. too much (little) warm ocean access to cont. shelves => too much (little) ice shelf melt => unrealistic ice shelf / sheet retreat (advance)

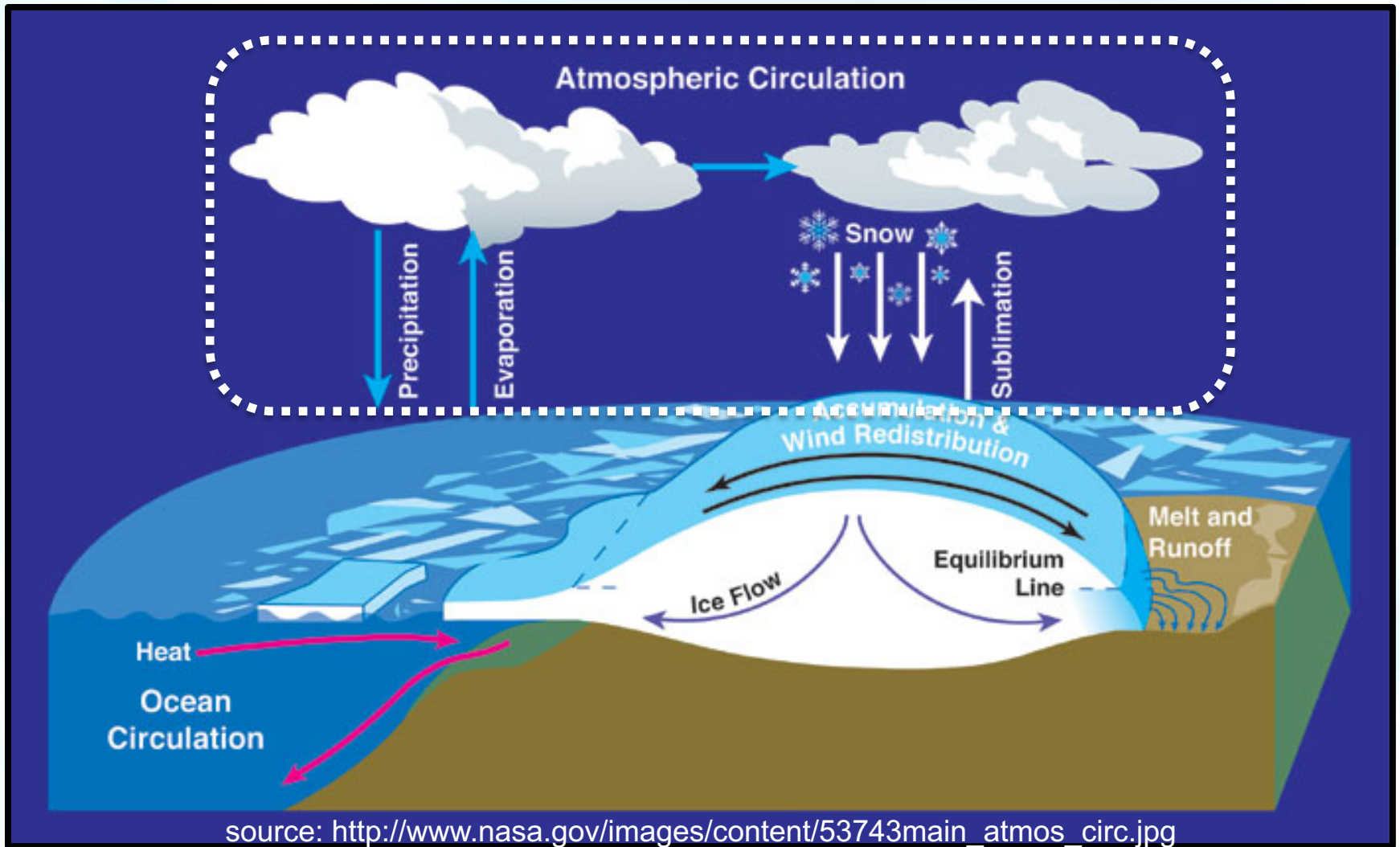
Warm ocean and its access to cont. shelves is controlled by:

- ocean state, water mass transformation, mixing, ventilation
- global, regional, and local ocean circulation
- up / down-welling (wind stress curl)
- numerous other coupled climate factors

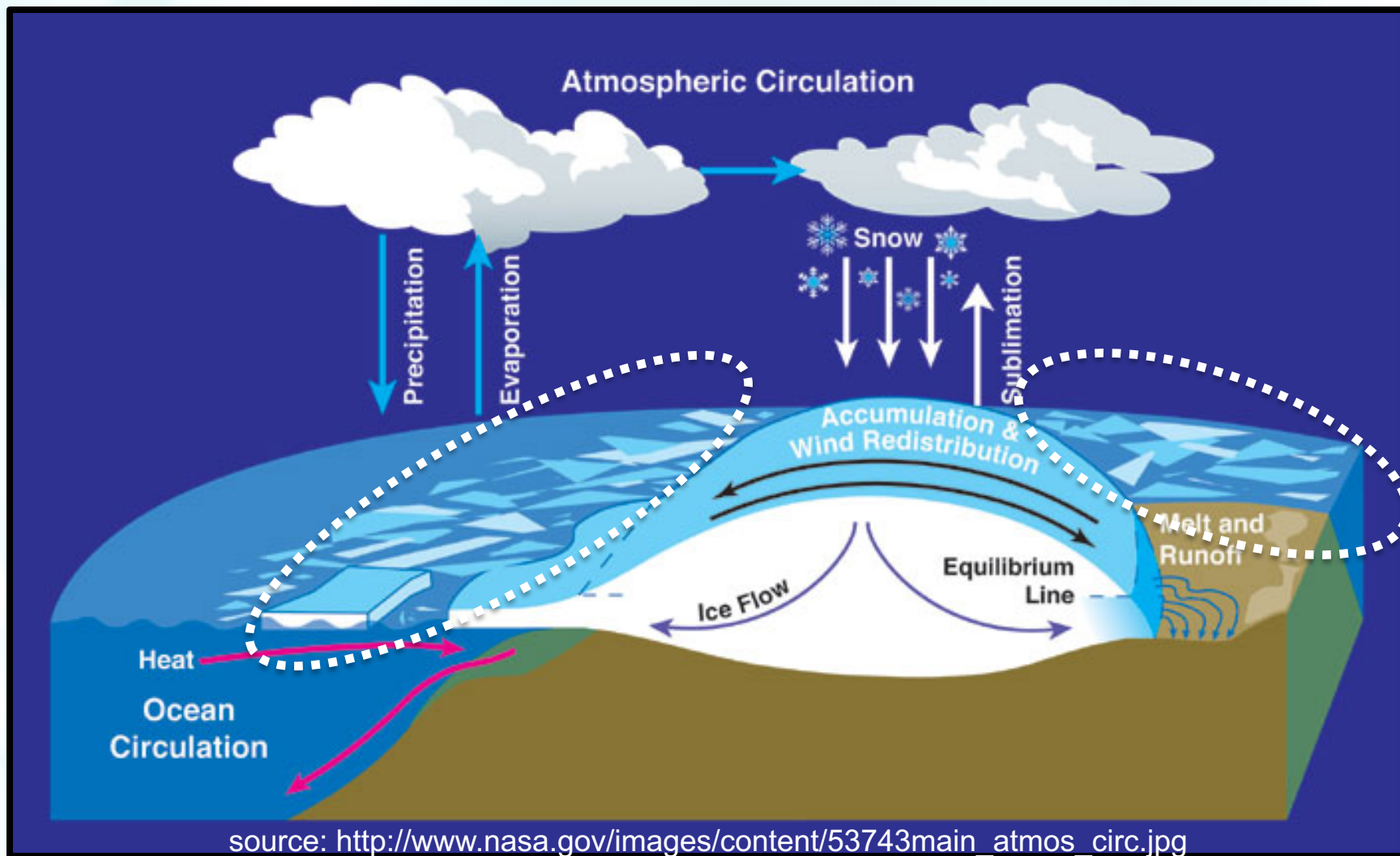
Antarctic Ice Sheet and Climate Interactions



Atmosphere



Sea Ice



Ocean

