Supporting Information for

Impacts of Observed Extreme Antarctic Sea Ice Conditions on the Southern Hemisphere Atmosphere

Zhu Zhu [1,2] and Mirong Song [1,3,*]

[1] *State Key Laboratory of Numerical Modeling for Atmospheric Sciences and Geophysical Fluid Dynamics, Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing 100029, China*

[2] *College of Earth and Planetary Sciences, University of Chinese Academy of Sciences, Beijing 100049, China*

[3] *Southern Marine Science and Engineering Guangdong Laboratory (Zhuhai), Zhuhai 519080, China*

* *Correspondence: songmirong@lasg.iap.ac.cn*

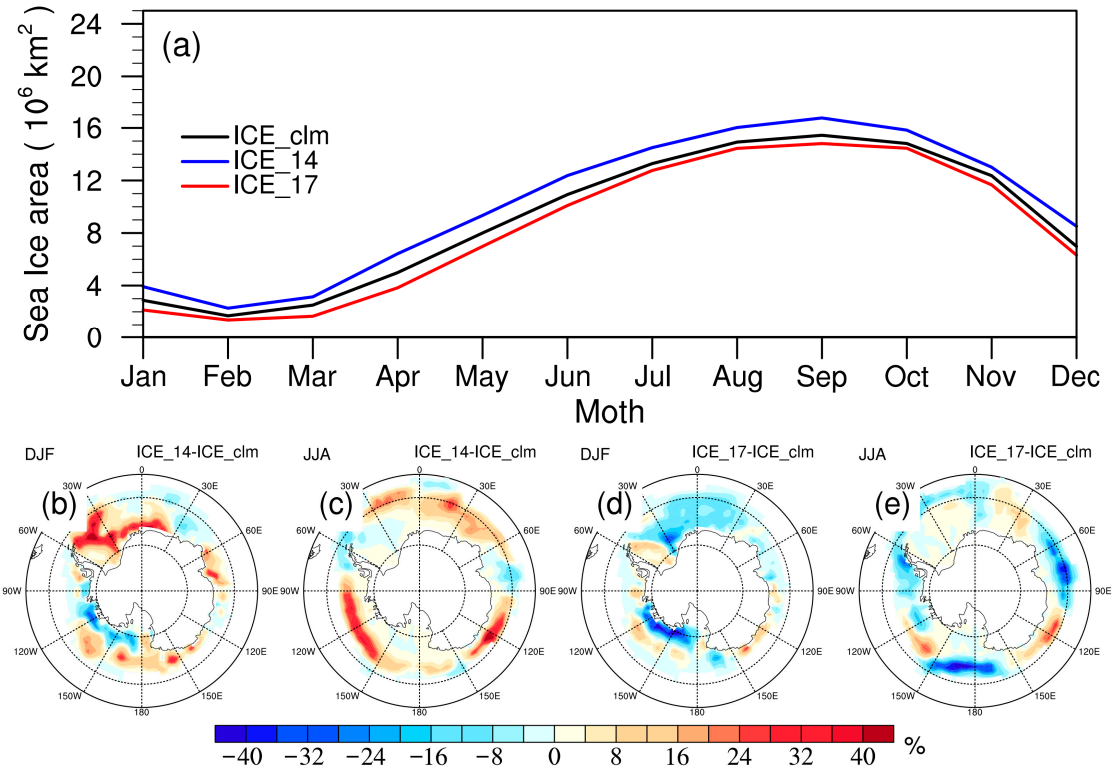

Figure S1. Seasonal cycle of prescribed Antarctic sea ice area and difference of sea ice concentration between sensitivity experiments and control run. (a) Seasonal cycle of Antarctic sea ice area prescribed in ICE_2014, ICE_2017 and ICE_clm. Difference of Antarctic sea ice forcing between ICE_2014 and ICE_clm in (b) summer and (c) winter. Difference of Antarctic sea ice forcing between ICE_2017 and ICE_clm in (d) summer and (e) winter.

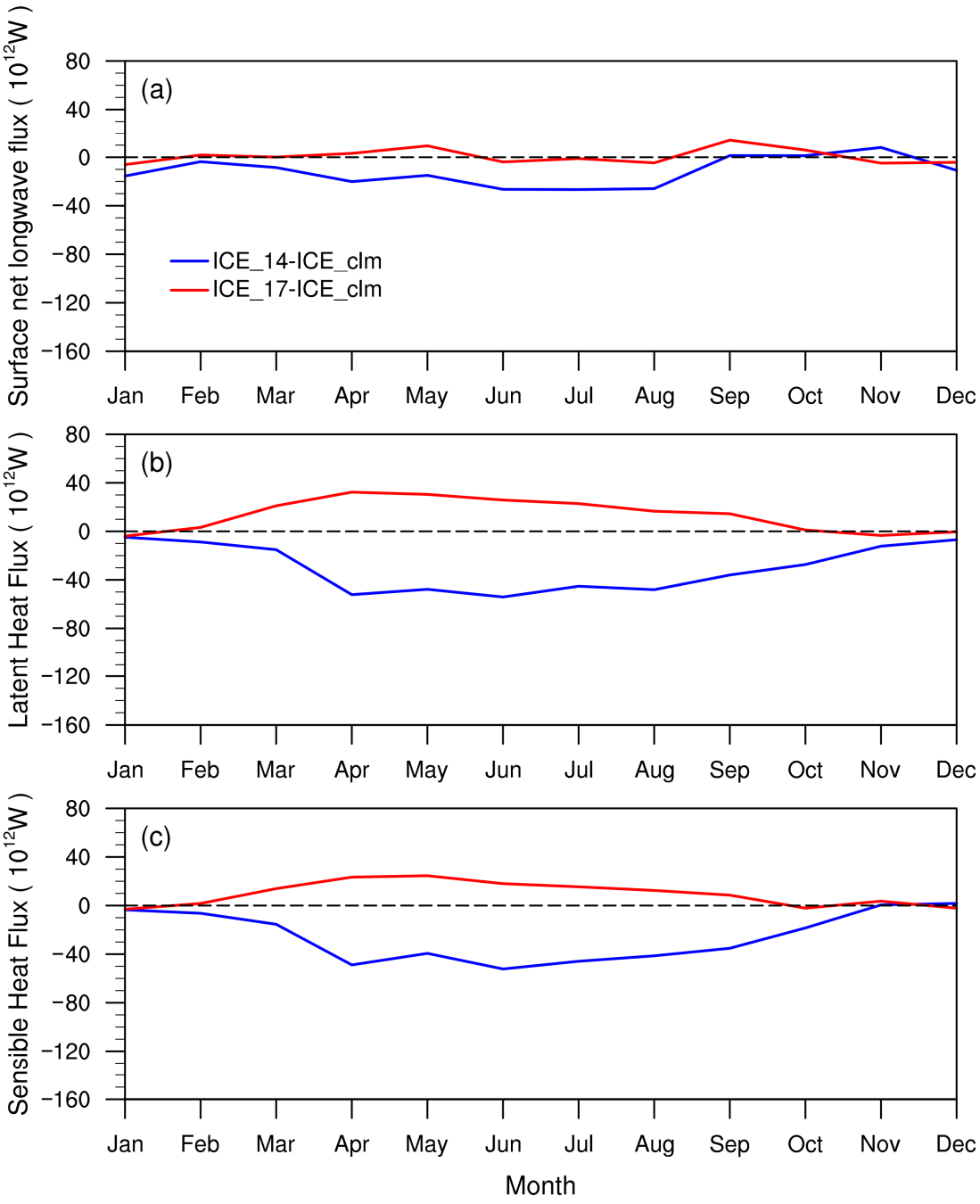

Figure S2. Changes in the surface heat flux due to changes in Antarctic sea ice. Difference of sum of (a) surface net longwave heat flux, (b) latent heat flux and (c) sensible heat flux over all grids where sea ice changes between ICE_2014 and ICE_clm (blue line) and ICE_2017 and ICE_clm (red line).

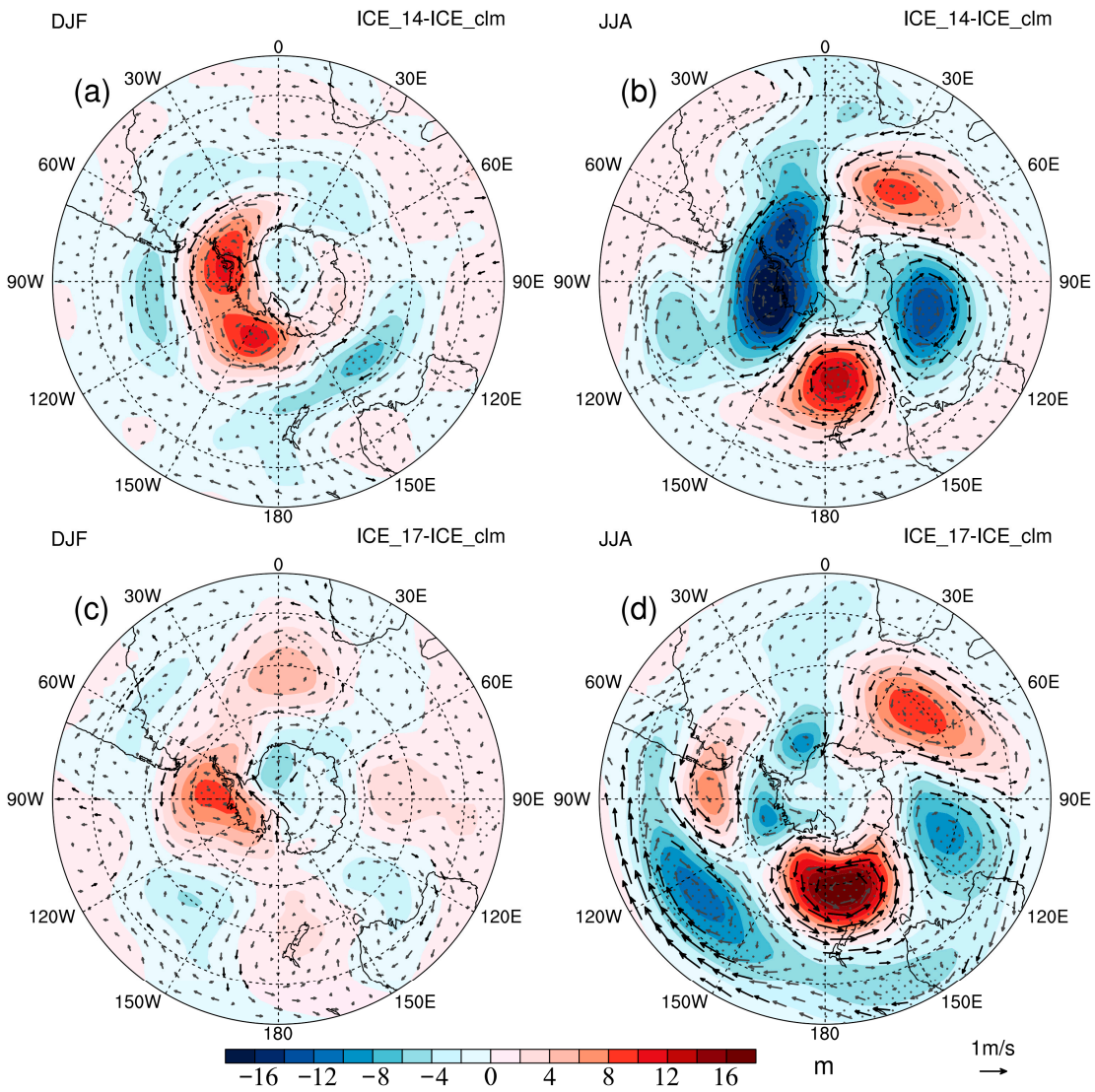

Figure S3. Changes in geopotential height and winds at 500hPa due to changes in Antarctic sea ice. Differences between ICE_2014 and ICE_clm in (a) summer and (b) winter. Differences between ICE_2017 and ICE_clm in (c) summer and (d) winter. Dotted areas indicate statistically significant at 95% confidence level.

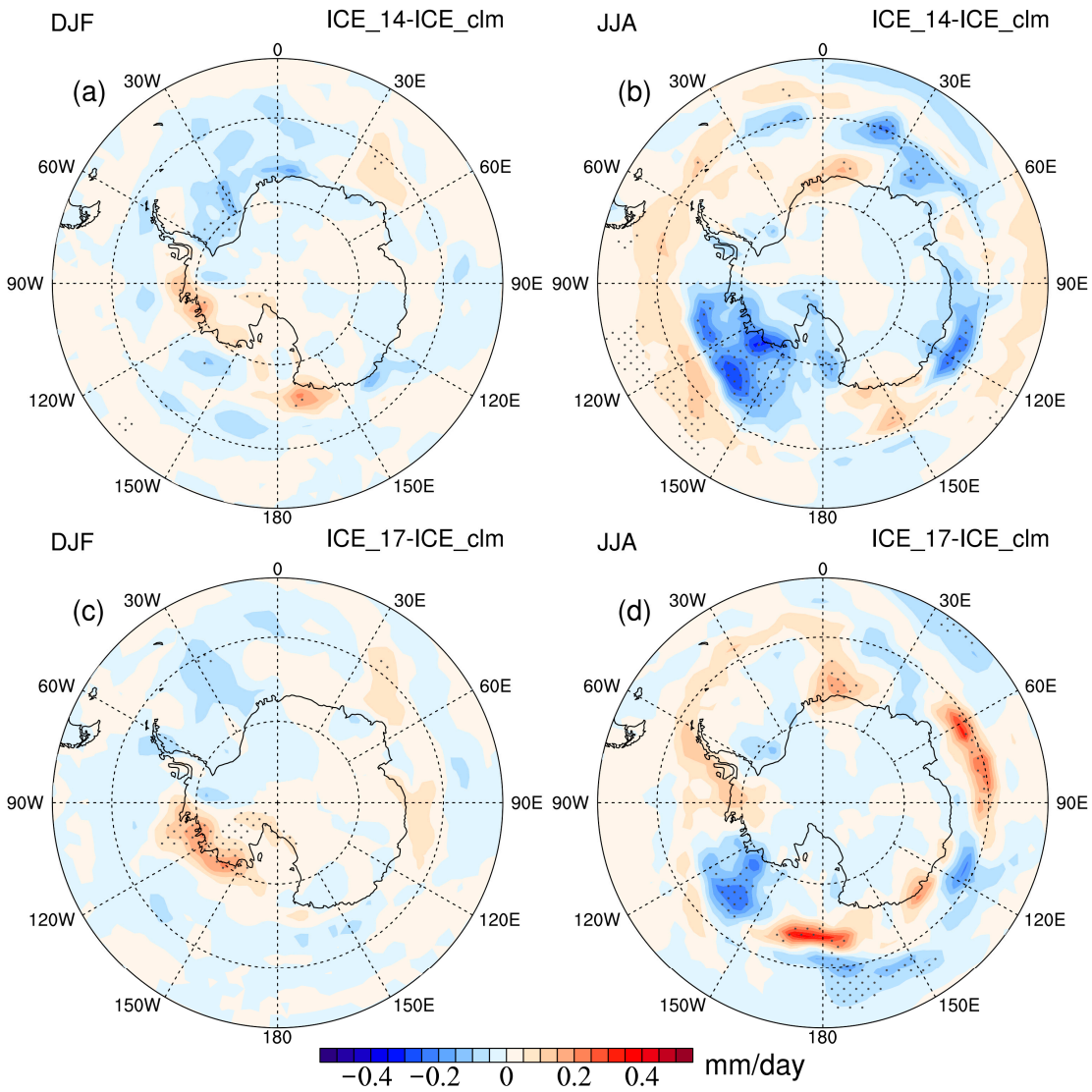

Figure S4. Changes in snowfall due to changes in Antarctic sea ice. Differences between ICE_2014 and ICE_clm in (a) summer and (b) in winter. Differences between ICE_2017 and ICE_clm in (c) summer and (d) in winter. Dotted areas indicate statistically significant at 95% confidence level.