Supplement of

Arctic Ocean Simulations in the CMIP6 Ocean Model Intercomparison Project (OMIP)

Qi Shu\textsuperscript{1,2,3}, Qiang Wang\textsuperscript{4}, Chuncheng Guo\textsuperscript{5}, Zhenya Song\textsuperscript{1,2,3}, Shizhu Wang\textsuperscript{1,2,3}, Yan He\textsuperscript{1,2,3}, Fangli Qiao\textsuperscript{1,2,3}

\textsuperscript{1}First Institute of Oceanography, and Key Laboratory of Marine Science and Numerical Modeling, Ministry of Natural Resources, Qingdao, 266061, China
\textsuperscript{2}Laboratory for Regional Oceanography and Numerical Modeling, Pilot National Laboratory for Marine Science and Technology, Qingdao, 266067, China
\textsuperscript{3}Shandong Key Laboratory of Marine Science and Numerical Modeling, Qingdao, 266061, China
\textsuperscript{4}Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research (AWI), Bremerhaven, 27570, Germany
\textsuperscript{5}NORCE Norwegian Research Centre, Bjerknes Centre for Climate Research, Bergen, 5007, Norway

Correspondence to: Qi Shu (shuqi@fio.org.cn)
Figure S1. Potential temperature (unit: °C) along section S (Fig. 1) from the PHC3.0 climatology and OMIP-1 models averaged from 1971 to 2000. Black line is the 0 °C isotherm.
Figure S2. Potential temperature (unit: °C) along section S (Fig. 1) from the PHC3.0 climatology and OMIP-2 models averaged from 1971 to 2000. Black line is the 0 °C isotherm.
Figure S3. Liquid freshwater column (unit: m) from PHC3.0 climatology and OMIP-1 models averaged over 1971 to 2000.
Figure S4. Liquid freshwater column (unit: m) from PHC3.0 climatology and OMIP-2 models averaged over 1971 to 2000.
Figure S5. Hovmöller diagram of basin-mean potential temperature (unit: °C) for the Eurasian Basin from OMIP-1 models.
Figure S6. Hovmöller diagram of basin-mean potential temperature (unit: °C) for the Eurasian Basin from OMIP-2 models.
Figure S7. Cold season (November-May) mixed layer depth (unit: m) from OMIP-1 and observations (dots). The average period for OMIP-1 is from 1979 to 2009 and the observations are based on the period of 1979 to 2012.
Figure S8. Cold season (November-May) mixed layer depth (unit: m) from OMIP-2 and observations (dots). The average period for OMIP-2 is from 1979 to 2012 and the observations are based on the period of 1979 to 2012.
Figure S9. Cold halocline base depth (unit: m) from PHC3.0 climatology and OMIP-1 models average over 1971 to 2000.
Figure S10. Cold halocline base depth (unit: m) from PHC3.0 climatology and OMIP-2 models average over 1971 to 2000.
Figure S11. Ocean volume, heat, and liquid freshwater transport anomalies through the Bering Strait (BS), Barents Sea Opening (BSO), Fram Strait (FS), and Davis Strait (DS) in OMIP-1.
Figure S12. Ocean volume, heat, and liquid freshwater transport anomalies through the Bering Strait (BS), Barents Sea Opening (BSO), Fram Strait (FS), and Davis Strait (DS) in OMIP-2.