

1

Supplementary Figure

2

Figure Captions

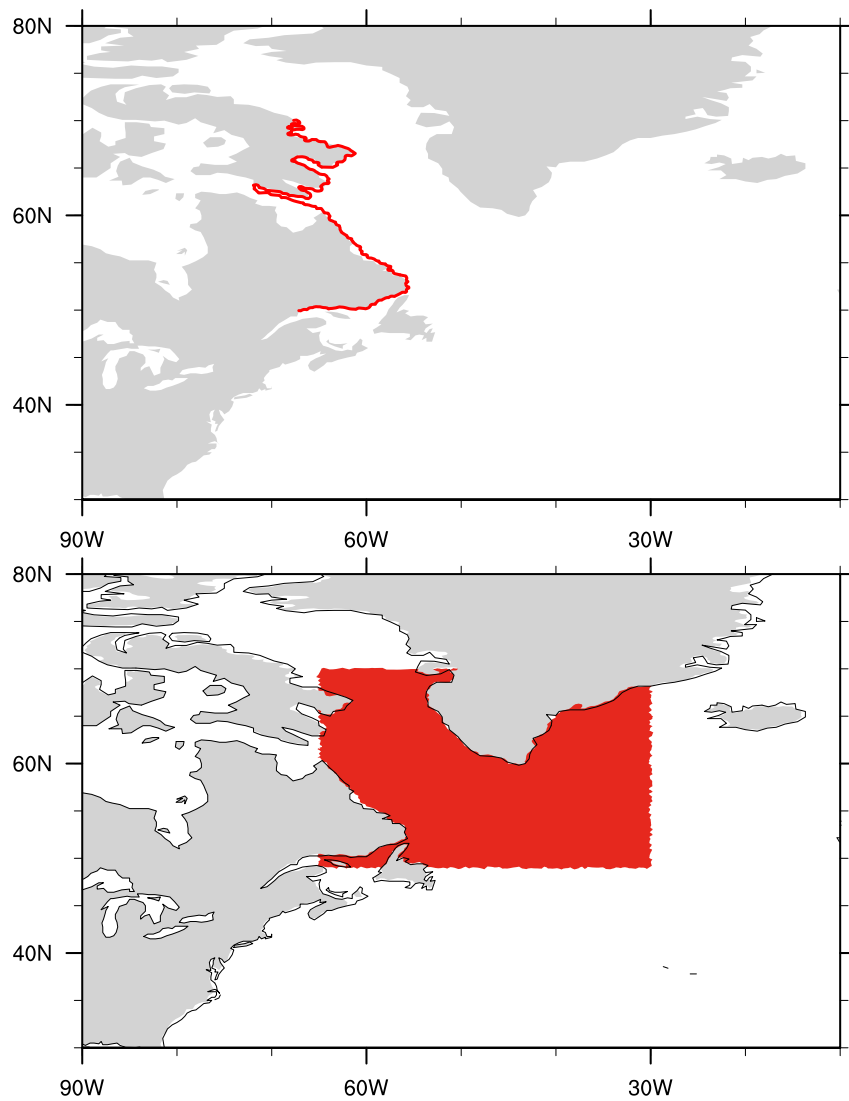
FIG. S1. Two regions of freshwater flux.

FIG. S2. Simulated boreal winter mixed layer depth under pre-industrial states in low and high resolution models. Units are m.

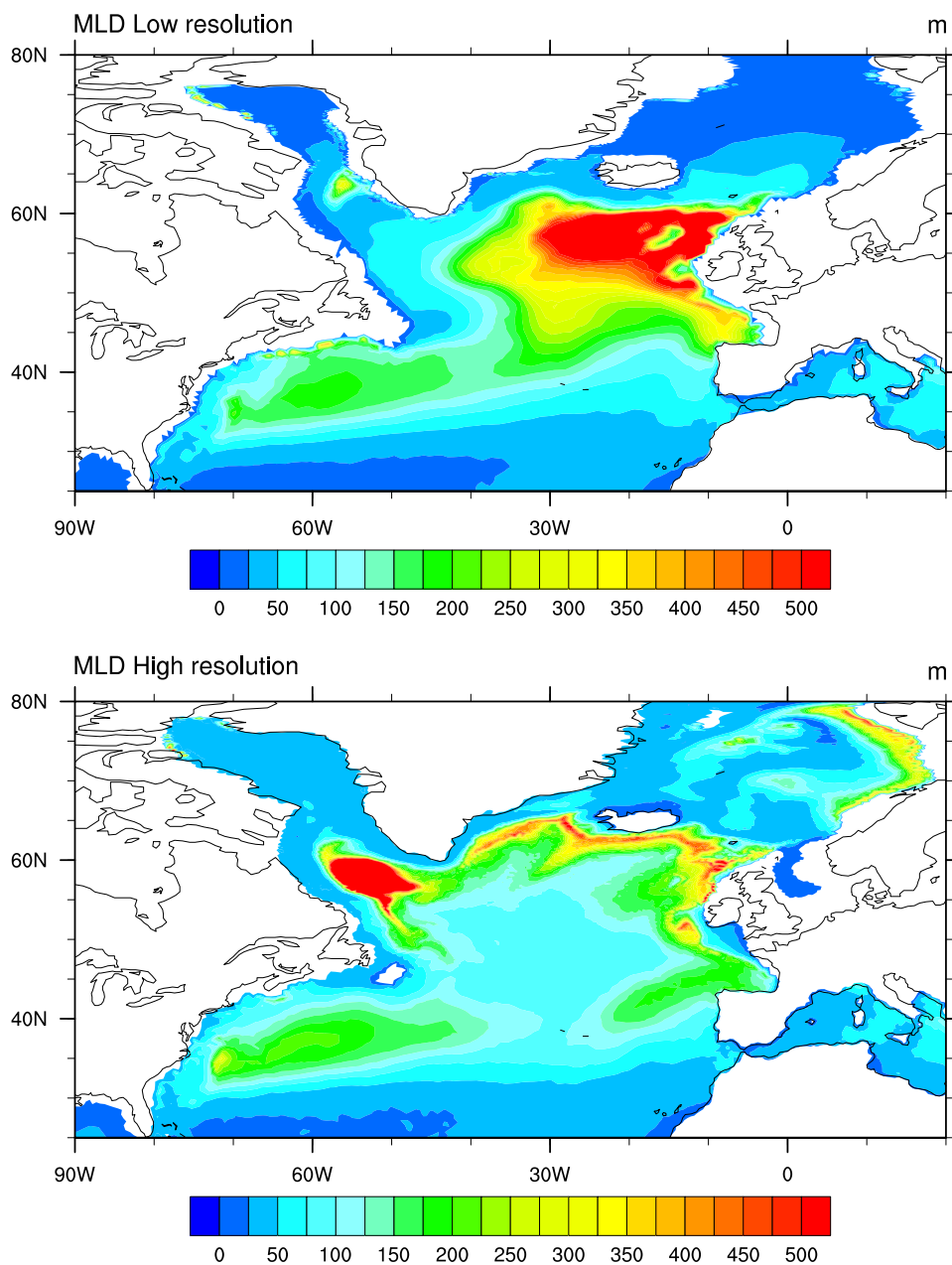
FIG. S3. Composite map of mixed layer depth and NAO index for pre-industrial control experiments in (left) low and (right) high resolution model. It is calculated by averaging mixed layer depth anomalies (departure from the annual mean state) during years when the NAO index exceeds one standard deviation. Units are m.

FIG. S4. Composite map of (latent + sensible) heat flux (positive downward) and NAO index for pre-industrial control experiments in (left) low and (right) high resolution model. It is calculated by averaging heat flux anomalies (departure from the annual mean state) during years when the NAO index exceeds one standard deviation. Units are W/m^2 .

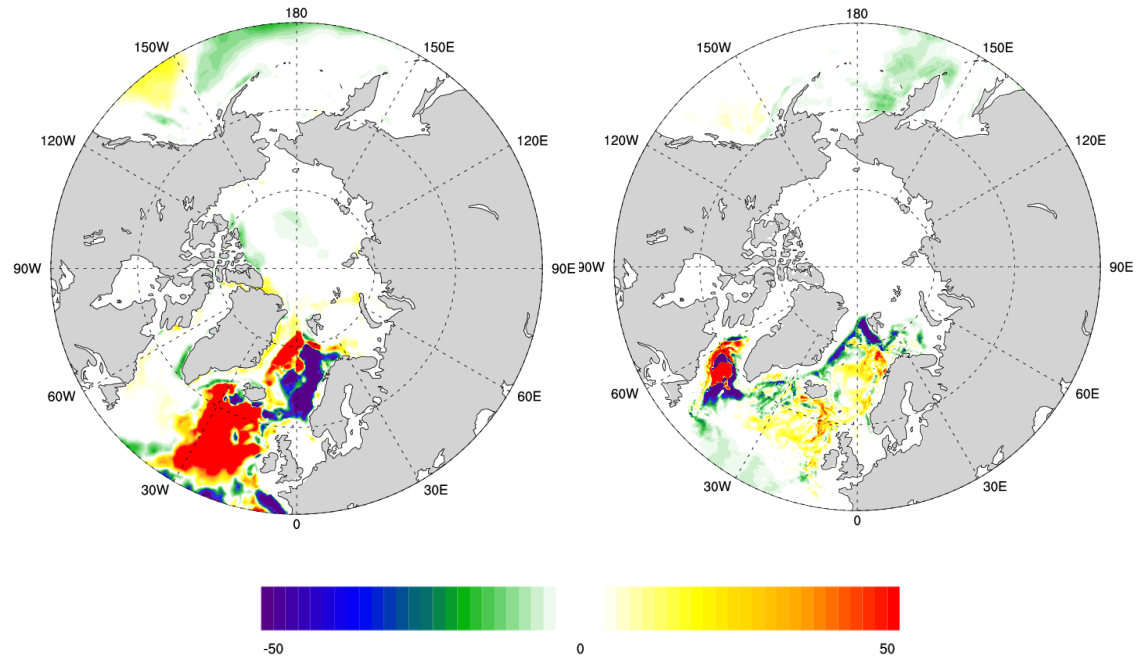
4 **Figures**



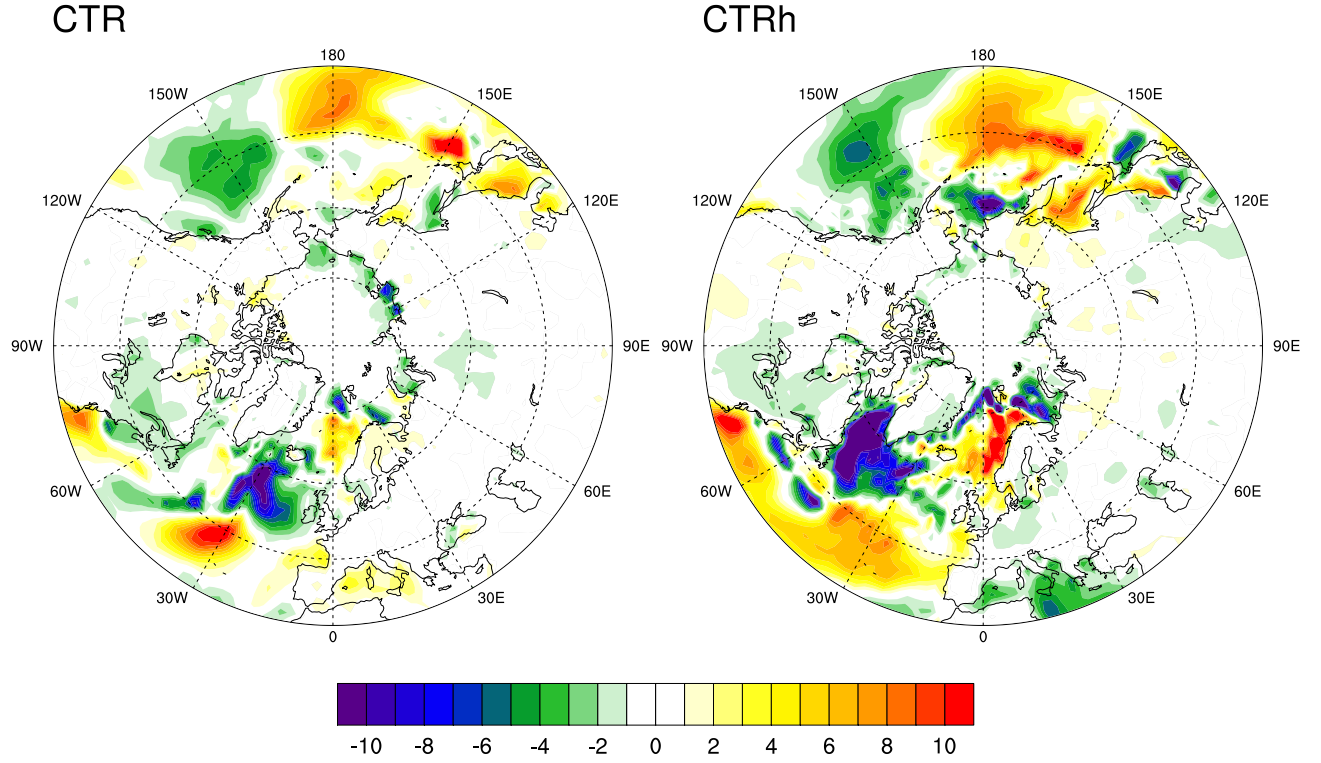
Supplementary Figure S1. Two regions of freshwater flux.



Supplementary Figure S2. Simulated boreal winter mixed layer depth under pre-industrial states in low and high resolution models. Units are m.



Supplementary Figure S3. Composite map of mixed layer depth and NAO index for pre-industrial control experiments in (left) low and (right) high resolution model. It is calculated by averaging mixed layer depth anomalies (departure from the annual mean state) during years when the NAO index exceeds one standard deviation. Units are m.



Supplementary Figure S4. Composite map of (latent + sensible) heat flux (positive downward) and NAO index for pre-industrial control experiments in (left) low and (right) high resolution model. It is calculated by averaging heat flux anomalies (departure from the annual mean state) during years when the NAO index exceeds one standard deviation. Units are W/m^2 .