Figure S1.

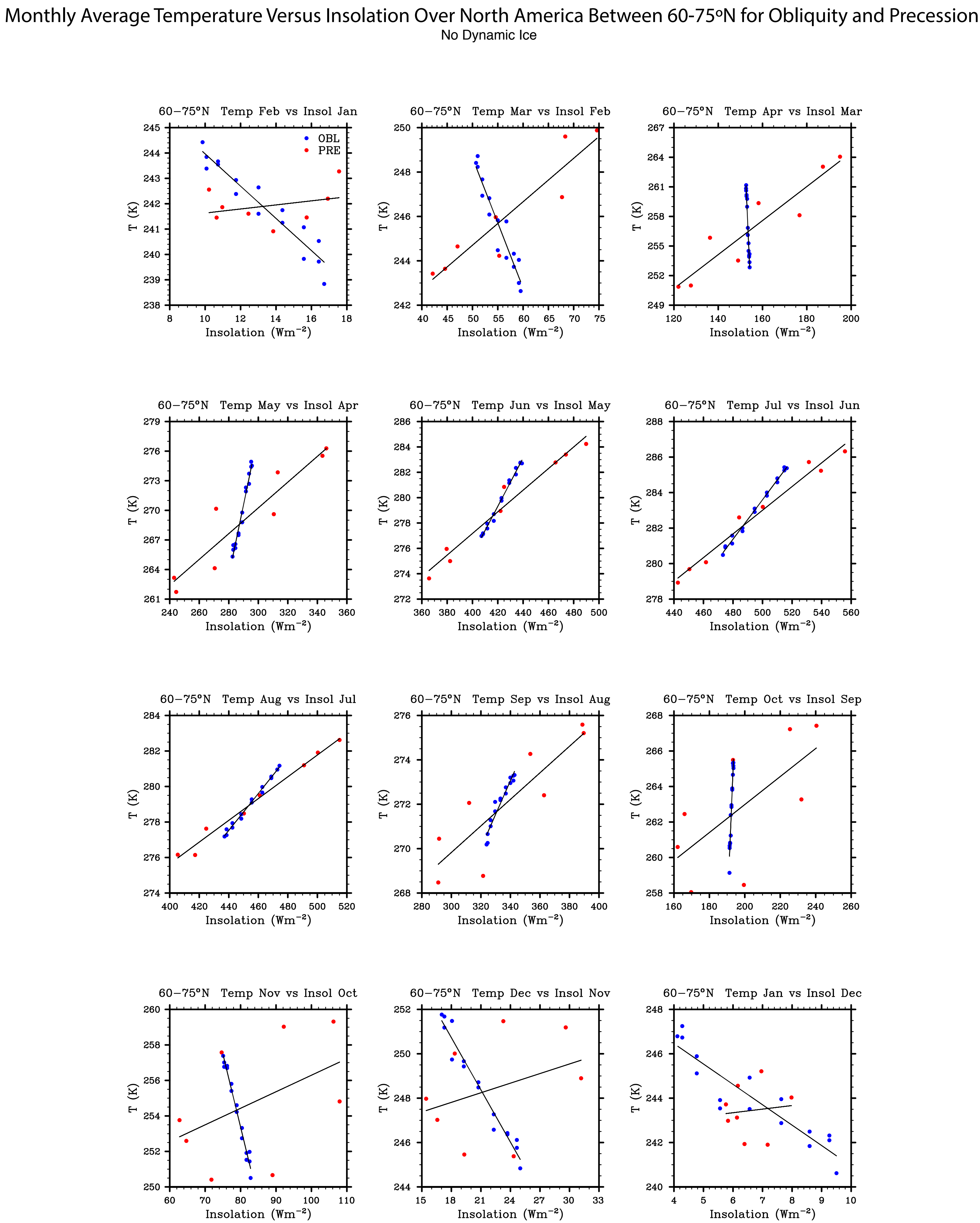
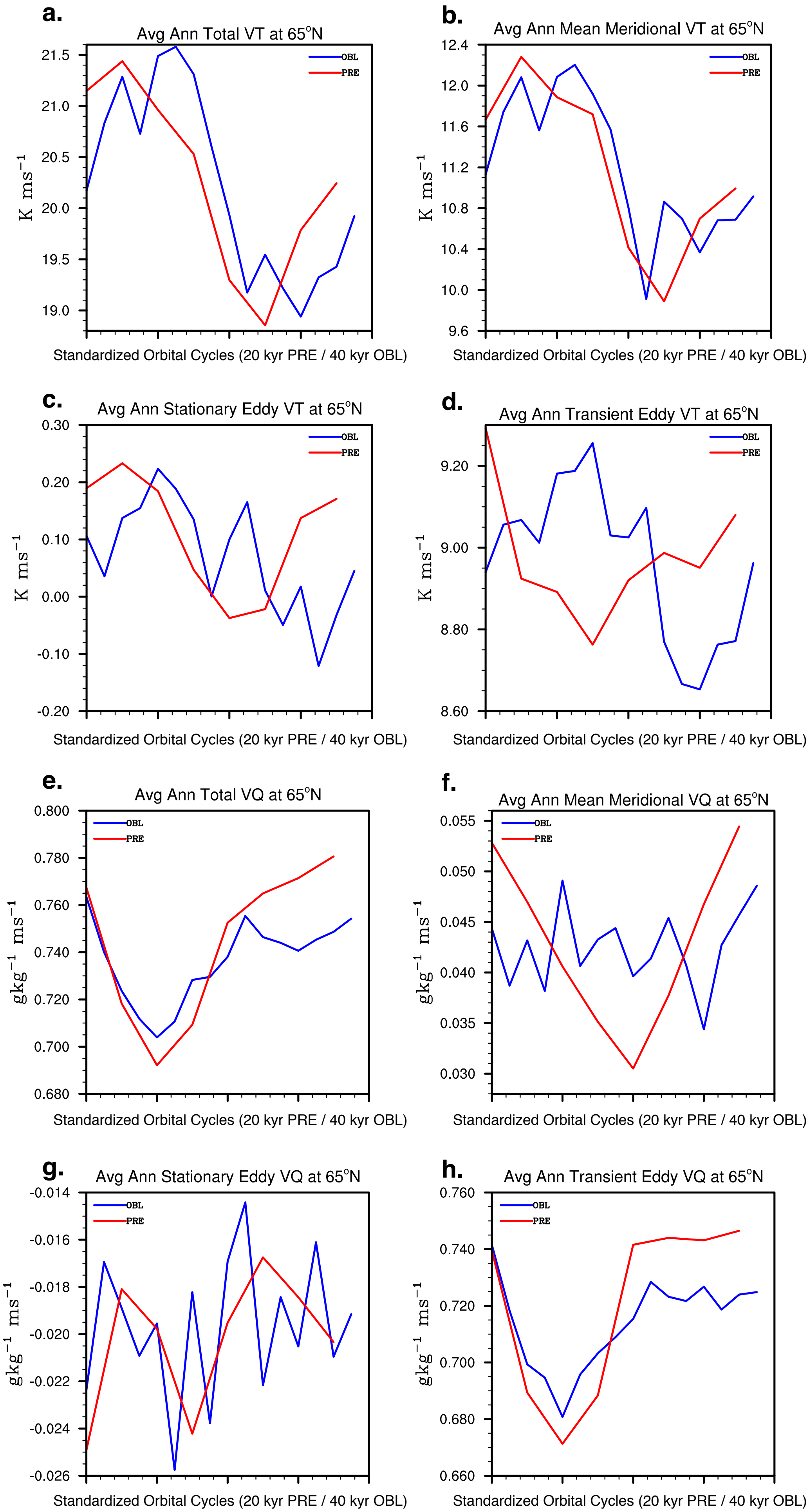

Monthly Average Temperature Versus Insolation Over North America Between 60-75ºN for Obliquity and Precession
No Dynamic Ice
60−75°N Temp Feb vs Insol Jan
60−75°N Temp Mar vs Insol Feb
60−75°N Temp Apr vs Insol Mar
60−75°N Temp May vs Insol Apr
60−75°N Temp Jun vs Insol May
60−75°N Temp Jul vs Insol Jun
60−75°N Temp Aug vs Insol Jul
60−75°N Temp Sep vs Insol Aug
60−75°N Temp Oct vs Insol Sep
60−75°N Temp Nov vs Insol Oct
60−75°N Temp Dec vs Insol Nov
60−75°N Temp Jan vs Insol Dec
OBL
PRE
T (K)
Insolation (Wm−2)

Figure S2.

Annual Average Northward Heat Flux (VT) and Moisture Flux (VQ) Accross 65ºN for Obliquity and Precession

No Dynamic Ice



Supplementary Material

Figure S1. The correlation between monthly temperature and monthly insolation with a 1-month lag for the temperature response. The negative correlation between obliquity insolation forcing and temperature in the winter months is due to the overpowering annual insolation signal. Also, the large temperature range in the spring and fall without a large change in insolation is due to ocean and vegetation feedbacks.

Figure S2. The global annual-average northward heat (VT) and moisture (VQ) flux across 65°N separated into mean-meridional, stationary eddy, and transient eddy components. The total heat flux (S2a) response is almost identical for obliquity and precession. While there are some differences in the transient eddy heat flux (S2d), the variations are small and completely masked by the other heat flux transport terms.

There is a greater difference in the moisture flux between obliquity and precession, mainly due to the transient eddy component (S2h). Still, the differences are rather minimal, especially compared to the mid-latitude flux. It is possible that that greater moisture flux in response to precession during summer perihelion slows the rate of ice retreat. However, studies, including our own, suggest that ablation is more important than accumulation for determining ice sheet mass balance (Ruddiman, 2006).

References

Ruddiman, W. F.: Orbital changes and climate, Quaternary Sci. Rev., 25, 3092–3112, doi:http://dx.doi.org/10.1016/j.quascirev.2006.09.001, 2006.