Code for Graversen et al., Comm. Earth Env.. 2025
All code needed for the main manuscript and most of that for the supplementary information is included. The code can be find in GraverseEtAl25.tar

Temperature persistence
Fig1, Fig5 and FigS1
temperature persistence is based on surface-air temperature (SAT) fields of six-hourly resolution.

Trend
Trends are based on difference between two 15 year periods

SAT_spatialRunMean.sh
Uses: SpaceRunMean.py and tools_prep.py
-- 2D-smoothing of the SAT field over latitude and an equal distance in longitude.

SAT_Climatology.sh
Input files from: SAT_spatialRunMean.sh
-- Calculate 5-year running-mean daily climatology.

WeathVar.py
Input files from: SAT_Climatology.sh
-- Calculate running mean of climatology and anomalies. Save in latitude bands.

WeathVar_PersAnom_MC.sh
Uses: WeathVar_PersAnom_MC.py and WeathVar_PersAnom_MCcollect.py
Input data from: WeathVar.py and WarmArctic.py
-- Calculate statistical significance of temperature persistence as shown in Fig5

PersAnom.Fig1.FigS1:
Input files from: WeathVar.py and WeathVar_PersAnom_MC.sh
-- Calculate trends in weather persistence and plot Fig1 and FigS1.

Arctic extreme events
Composite difference between 3-month warm and cold Arctic events.

WarmArctic.py
Input files from: Climatology_MM.sh
-- Calculate 3-month warm and cold Arctic (north of 60 N) events

WeathVar_PersAnomExt_MC.sh
Uses: WeathVar_PersAnomExt_MC.py and WeathVar_PersAnomExt_MCcollect.py
Input data from: WeathVar.py and WarmArctic.py
-- Calculate statistical significance of temperature persistence as shown in Fig5

Fig1PersAnomArcticExt.Fig5.py
Input files from: WeathVar.py, WarmArctic.py, and WeathVar_PersAnomExt_MC.sh
-- Calculate composite difference of 3-month warm and cold Arctic events of temperature persistence, and plot Fig. 5

Surface-air temperature (SAT), zonal mass flux (uM), and geopotential height at 500 hPa (Z)
Fig2, Fig4, and FigS3

uMmm.sh
-- Calculate a mass-flus correction of uM and provide monthly data

Climatology_MM.sh
Input files from: uMmm.sh
-- Calculate 5-year running-mean and all-year monthly climatologies.

Trends
Trends are based on difference between two 15 year periods.

Trend.Fig2.FigS3.py
Input files from: Climatology_MM.sh
-- Calculate trends in SAT, uM, and Z and plot Fig2 and FigS3.

Arctic extreme events
Composite difference between 3-month warm and cold Arctic events.

ArcticExt.Fig4
Input files from: Climaology_MM.sh
-- Calculate composite difference over 3-month Arctic warm and cold events and plot Fig4.

Spatial correlation of temperature persistence and M
Fig3

Fig3.py
Input data from: PersAnom.Fig1.FigS1.py, PersAnomArcticExt.Fig5.py,
Trend.Fig2.FigS3.py, and ArcricExt.Fig4.py
-- Calculate spatial correlation between trends and composite differences of temperature persistence and uM, and plot Fig3

Day-lag composites of temperature persistence, uM and dZ500
Fig6
Composites difference is over 3-month Arctic warm versus cold events.
dZ500 difference between Arctic and mid-latitude 500 hPa geopotential height.

uMdm.sh
-- Calculate a mass-flus correction of uM and provide daily data

Climatology_DM.sh
Input files from: uMdm.sh
-- Calculate 5-year running-mean daily climatologies for uM and Z.

WeathVar.uM.Z.py
Input files from: Climatology_DM.sh
-- Calculate running mean of climatology and anomalies of uM and Z. Save in latitude bands.

Weath_PersAnomExtRoll.sh
Uses: Weath_PersAnomExtRoll.py and Weath_PersAnomExtRollcollect.py
Input files from: WeathVar.py and WarmArctic.py
-- Calculate temperature persistence over a 90 day period shifting relative to first day of Arctic

warm and cold 3-month events. The calculation is accomplished for days 130 days before and after day zero (first day of events). The lag day is the last day of the 90-day period over which anomalies are calculated.

Weath_PersAnomExtRoll_MC2.sh
Uses: BS_MC.py, Weath_PersAnomExtRoll_MC2.py, and Weath_PersAnomExtRoll_MCcollect2.py
Input data from: WeathVar.py and WarmArctic.py
-- Calculate statistical significance of temperature persistence as shown in Fig6

Weath_uMExt_MC.sh
Uses: Weath_uMExt_MC.py and Weath_uMExt_Mccollect.py
Input data from: WeathVar.uM.Z.py and WarmArctic.py
-- Calculate statistical significance of uM as shown in Fig6.

ExtRolling_Fig6.py
Input files from: Weath_PersAnomExtRoll.sh,
Input files significance: Weath_PersAnomExtRoll_MC2.sh and Weath_uMExt_MC.sh
-- Calculate uM and dZ500 relative to first day of Arctic warm and cold 3-month events. The calculation is accomplished for days 130 days before and after day zero (first day of events). Plot Fig6.

Day-lag regressions, of temperature persistence, uM and dZ500
Fig7
regressions and outo-regression of dZ500 on temperature persistence, uM and dZ500.

PersAnom_Regress.sh
Uses: PersAnom_Regress.py and PersAnom_RegressCollect.py
Input files from: WeathVar.py and WarmArctic.py
-- Calculate regression of dZ500 on temperature persistence as a function of a time lag in days.

PersAnom_Regress_MC2.py
Input data from: WeathVar.py WeathVar.uM.Z.py, and WarmArctic.py
-- Calculate statistical significance of temperature persistence and uM as shown in Fig7.

ExtRollingRegress_Fig7.py
Input files from: PersAnom_Regress.sh
Input files significance: PersAnom_Regress_MC2.py
-- Calculate regression of dZ500 on uM and auto-regression of dZ500 as a function of a time lag in days. Plot Fig7.