Supplement of

Evaluation of Total Column Water Vapour Products from Reanalyses and Satellite Observations within the GEWEX Water Vapor Assessment

Trent et al.

Correspondence: Tim Trent (t.trent@le.ac.uk)
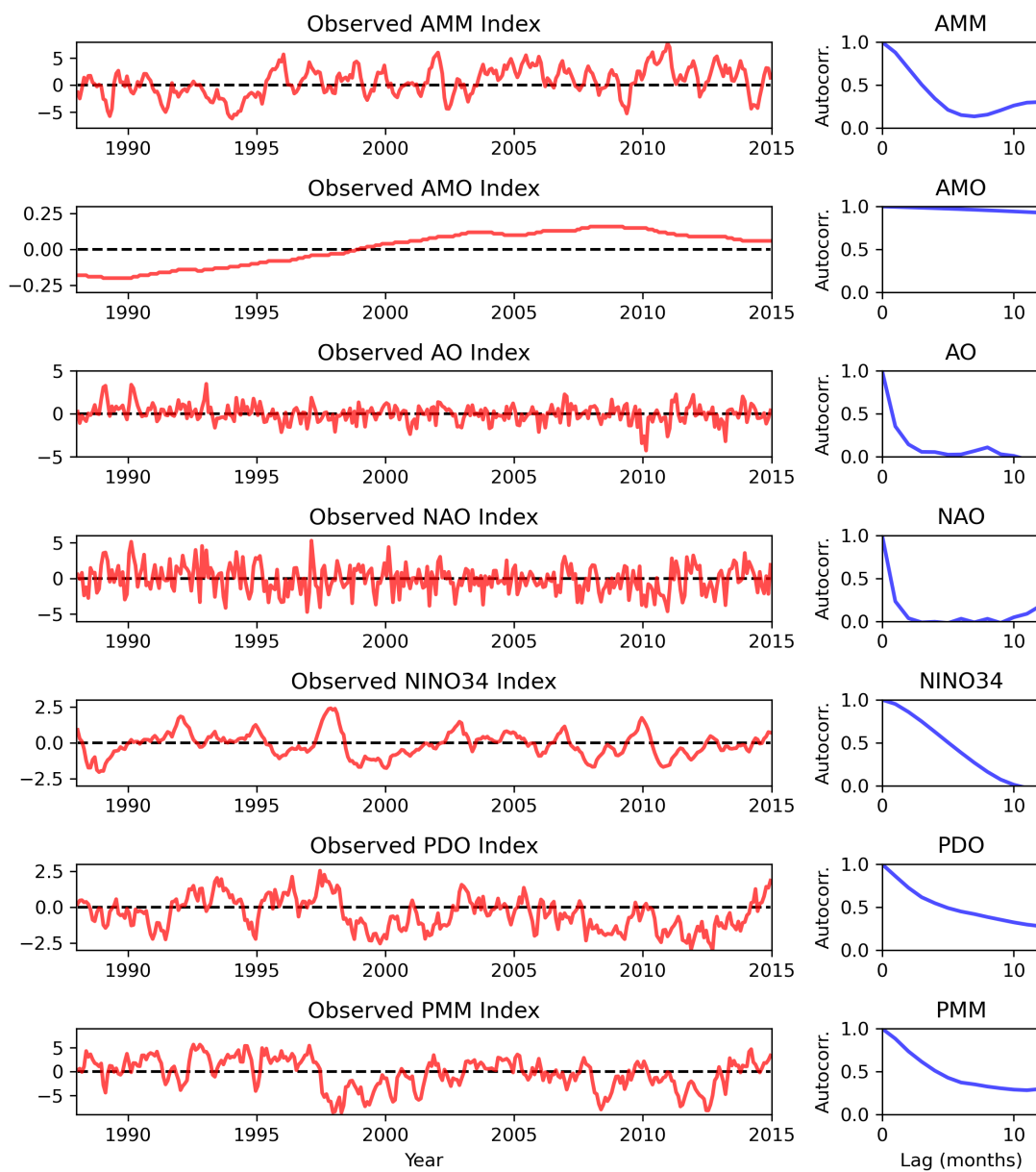
Figure S1: Time series of the different climate indices listed in Table B1 (main text) between January 1988 and December 2014. The corresponding autocorrelation coefficients for lag times between 0 and 12 months are shown to the right-hand-side of each time series.
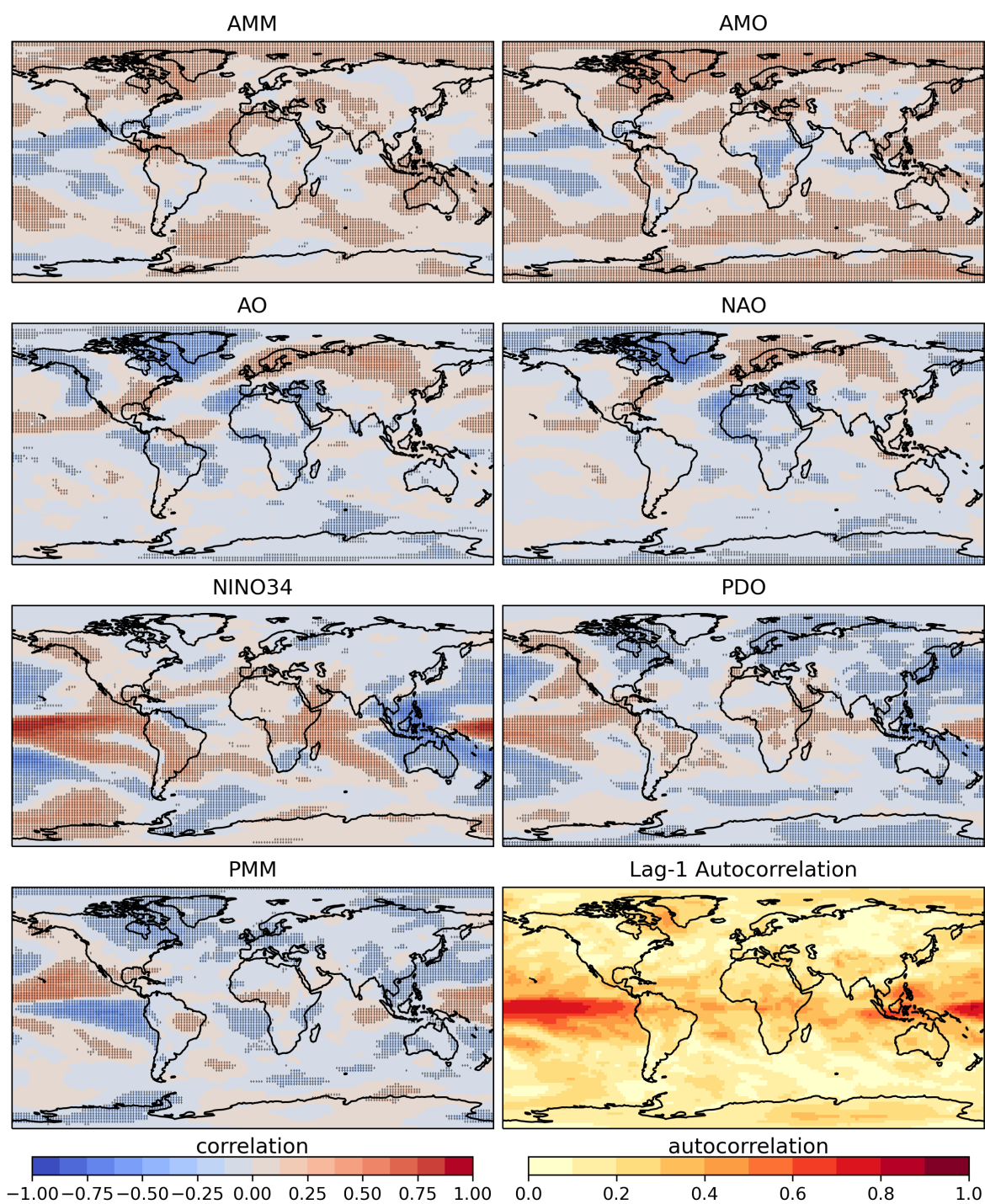
Figure S2: Global maps of the correlation between MERRA2 total column water vapour (TCWV) and Atlantic Meridional Mode (AMM), Atlantic Multidecadal Oscillation (AMO), Arctic Oscillation (AO), North Atlantic Oscillation (NAO), El Niño Southern Oscillation Index 3.4 (NINO3.4), Pacific Decadal Oscillation (PDO) and Pacific Meridional Mode (PMM) climate indices. The bottom right-hand figure shows the lag-1 autocorrelation for MERRA2. The hatching indicates areas where the correlation is within the 95% confidence level.
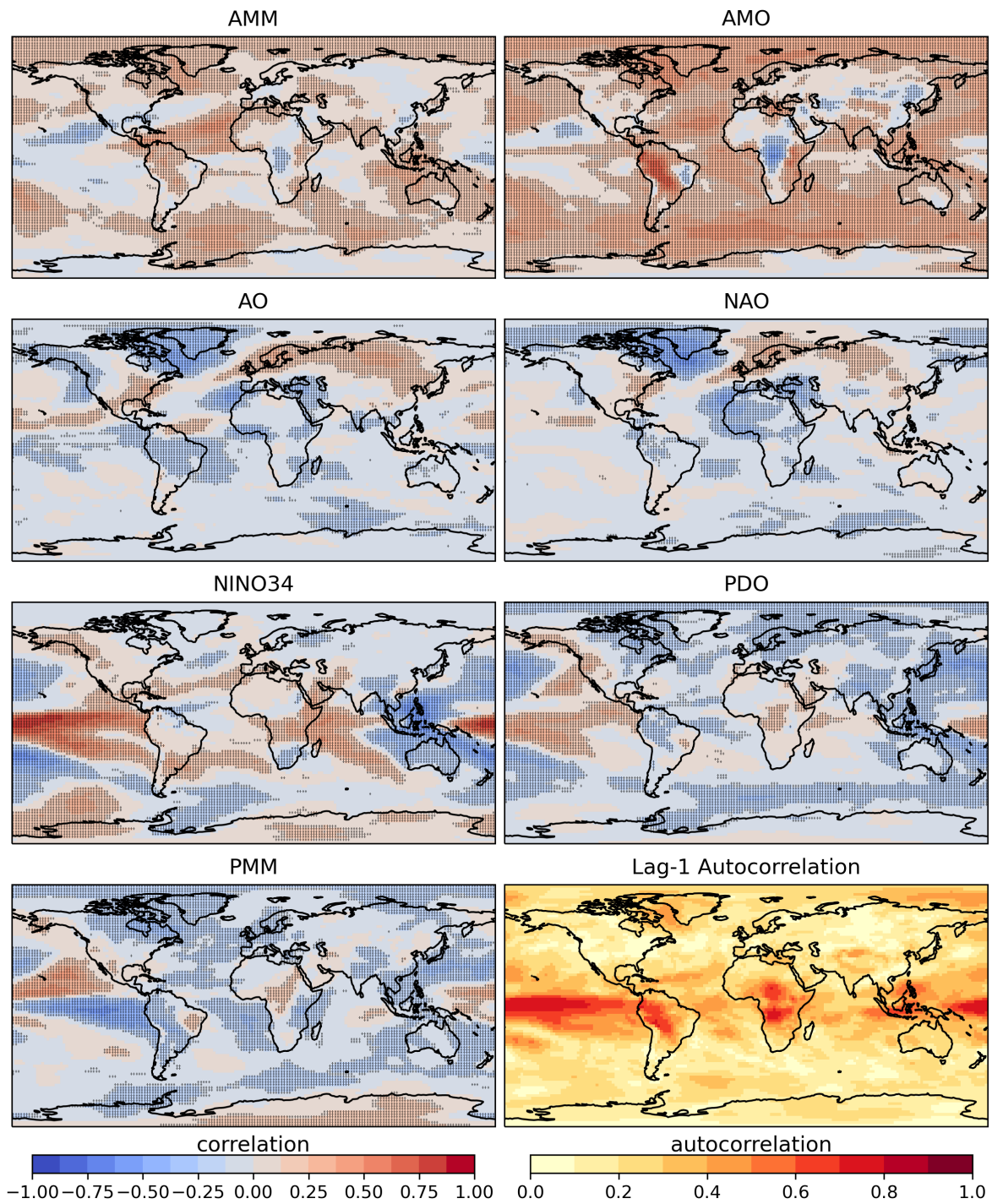
Figure S3: Global maps of the correlation between MERRA total column water vapour (TCWV) and Atlantic Meridional Mode (AMM), Atlantic Multidecadal Oscillation (AMO), Arctic Oscillation (AO), North Atlantic Oscillation (NAO), El Niño Southern Oscillation Index 3.4 (NINO3.4), Pacific Decadal Oscillation (PDO) and Pacific Meridional Mode (PMM) climate indices. The bottom right-hand figure shows the lag-1 autocorrelation for MERRA. The hatching indicates areas where the correlation is within the 95% confidence level.
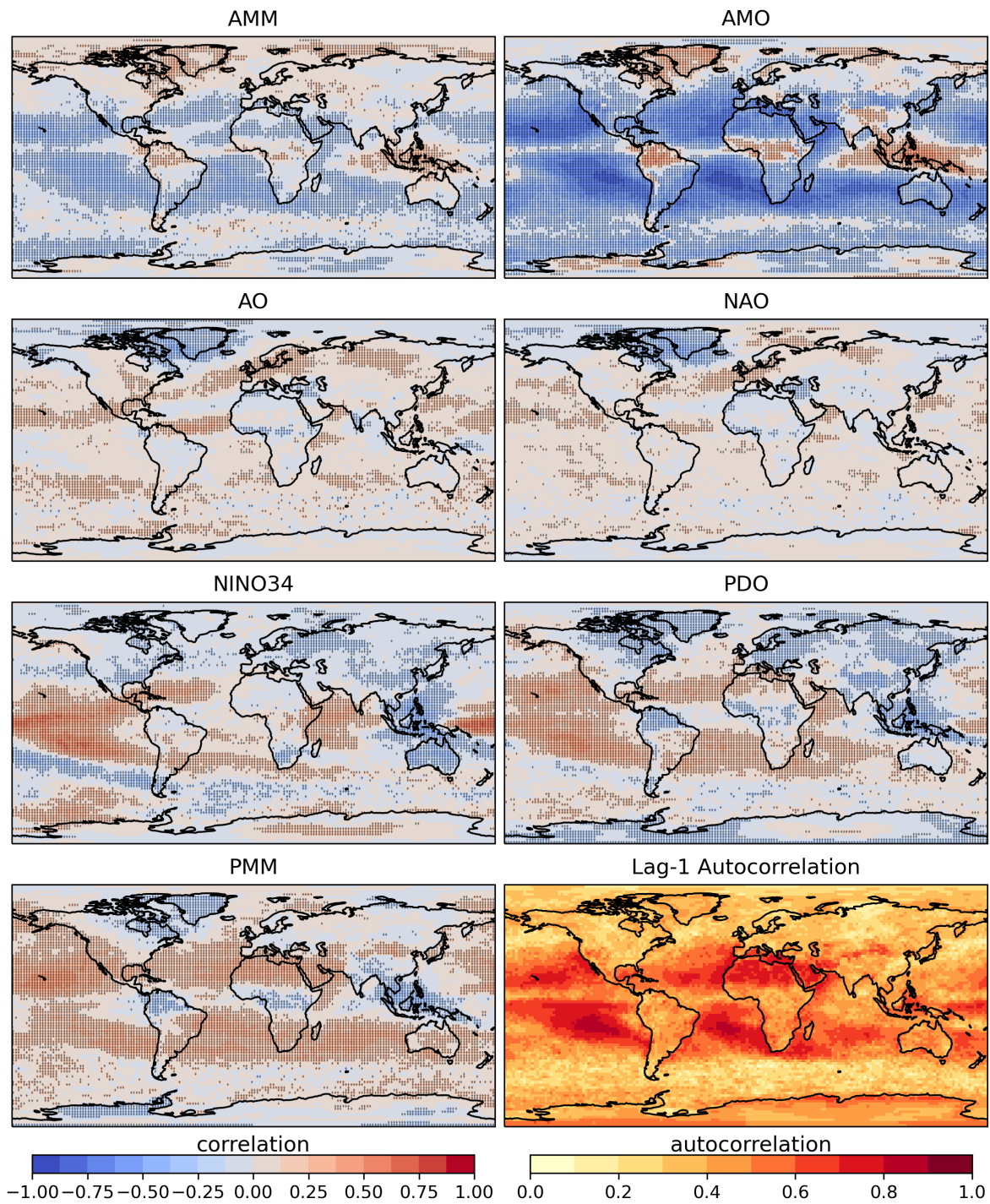
*Figure S4: Global maps of the correlation between NNHIRS total column water vapour (TCWV) and Atlantic Meridional Mode (AMM), Atlantic Multidecadal Oscillation (AMO), Arctic Oscillation (AO), North Atlantic Oscillation (NAO), El Niño Southern Oscillation Index 3.4 (NINO3.4), Pacific Decadal Oscillation (PDO) and Pacific Meridional Mode (PMM) climate indices. The bottom right-hand figure shows the lag-1 autocorrelation for **HIRS NASA NNHIRS**. The hatching indicates areas where the correlation is within the 95% confidence level.*
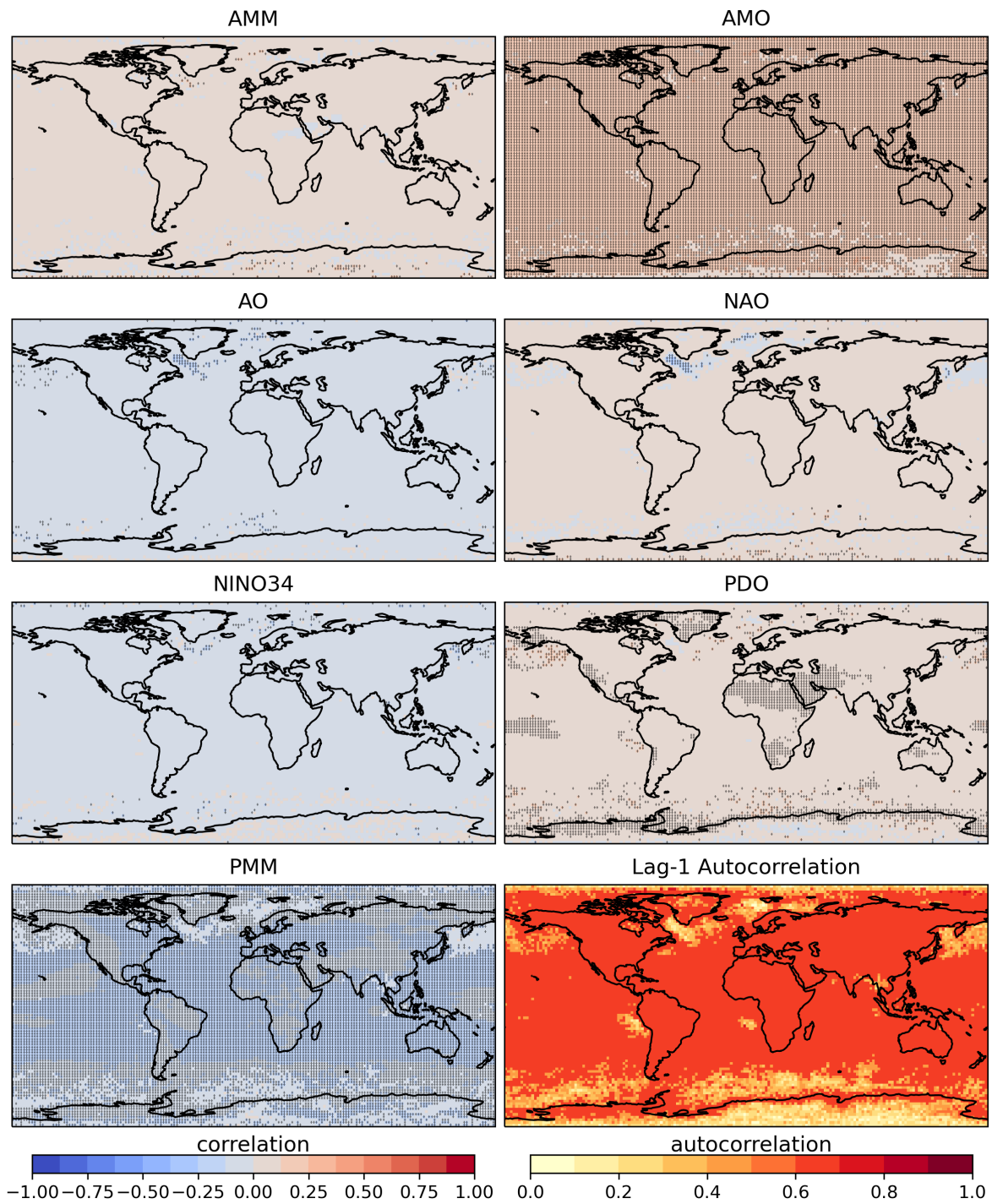
*Figure S5: Global maps of the correlation between NNHIRS total column water vapour (TCWV) and Atlantic Meridional Mode (AMM), Atlantic Multidecadal Oscillation (AMO), Arctic Oscillation (AO), North Atlantic Oscillation (NAO), El Niño Southern Oscillation Index 3.4 (NINO3.4), Pacific Decadal Oscillation (PDO) and Pacific Meridional Mode (PMM) climate indices. The bottom right-hand figure shows the lag-1 autocorrelation for **HIRS UWHIRS V2.5R2**. The hatching indicates areas where the correlation is within the 95% confidence level.*
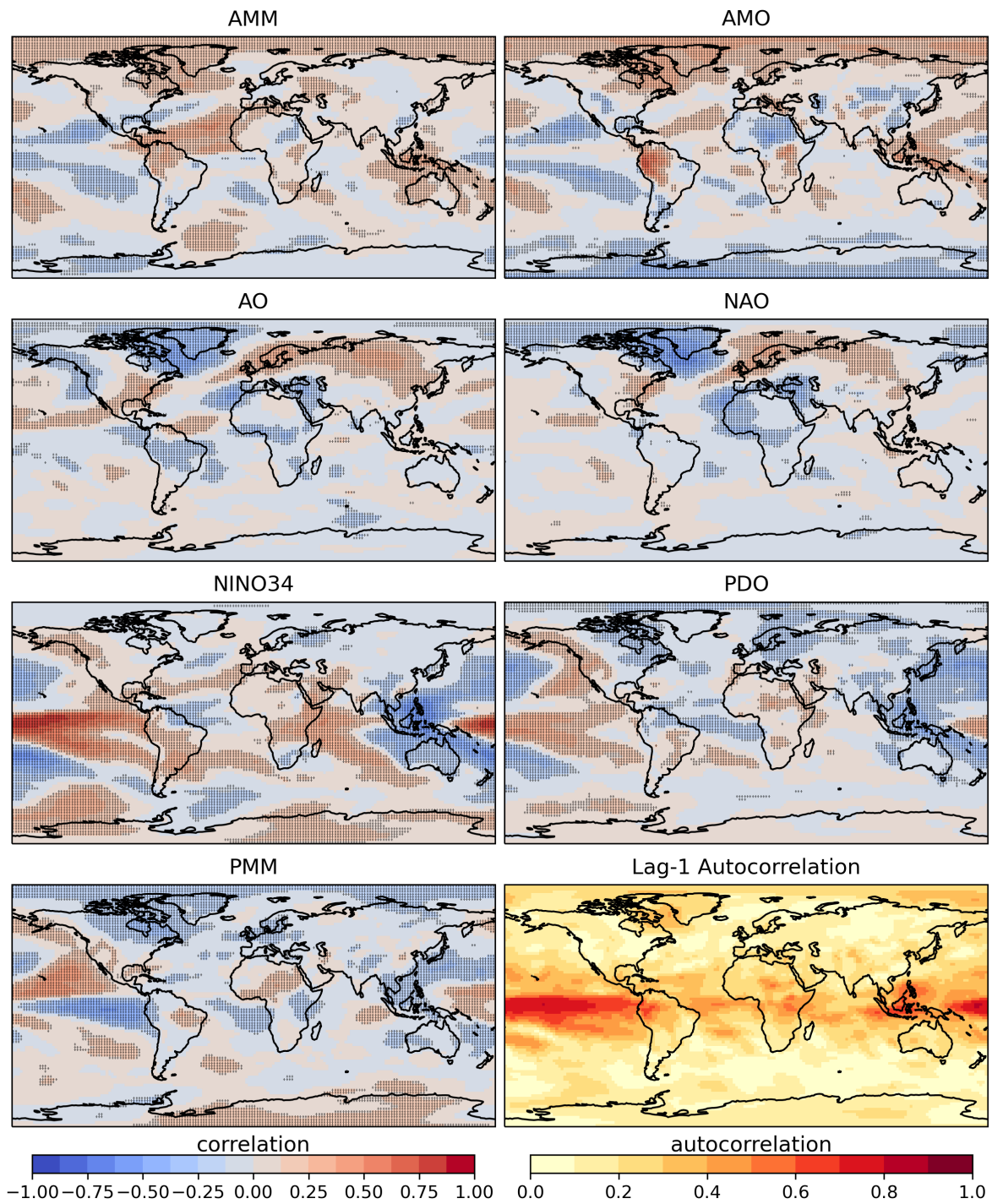
*Figure S6: Global maps of the correlation between NNHIRS total column water vapour (TCWV) and Atlantic Meridional Mode (AMM), Atlantic Multidecadal Oscillation (AMO), Arctic Oscillation (AO), North Atlantic Oscillation (NAO), El Niño Southern Oscillation Index 3.4 (NINO3.4), Pacific Decadal Oscillation (PDO) and Pacific Meridional Mode (PMM) climate indices. The bottom right-hand figure shows the lag-1 autocorrelation for **ERA Interim**. The hatching indicates areas where the correlation is within the 95% confidence level.*
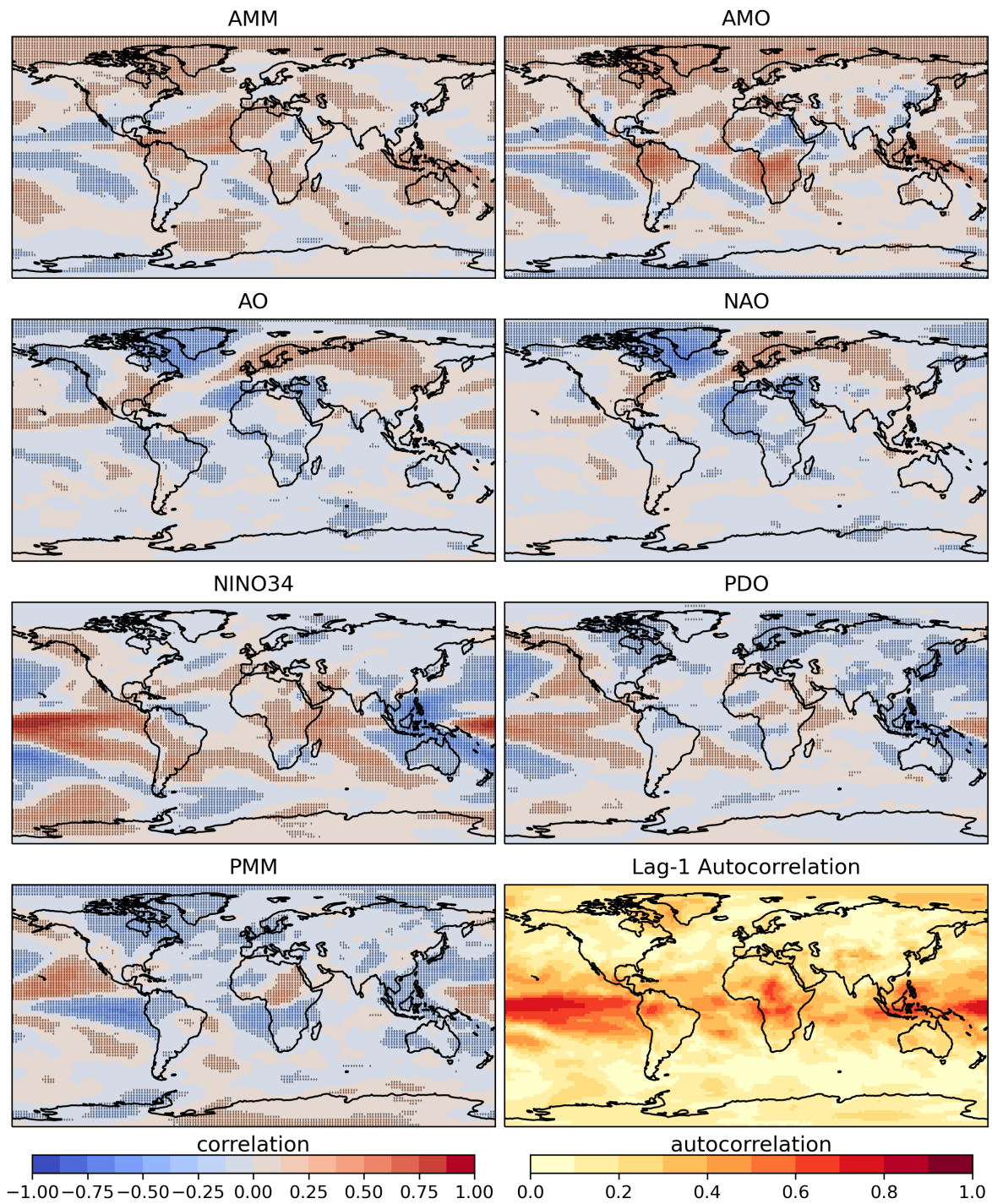
*Figure S7: Global maps of the correlation between NNHIRS total column water vapour (TCWV) and Atlantic Meridional Mode (AMM), Atlantic Multidecadal Oscillation (AMO), Arctic Oscillation (AO), North Atlantic Oscillation (NAO), El Niño Southern Oscillation Index 3.4 (NINO3.4), Pacific Decadal Oscillation (PDO) and Pacific Meridional Mode (PMM) climate indices. The bottom right-hand figure shows the lag-1 autocorrelation for **JRA55**. The hatching indicates areas where the correlation is within the 95% confidence level.*
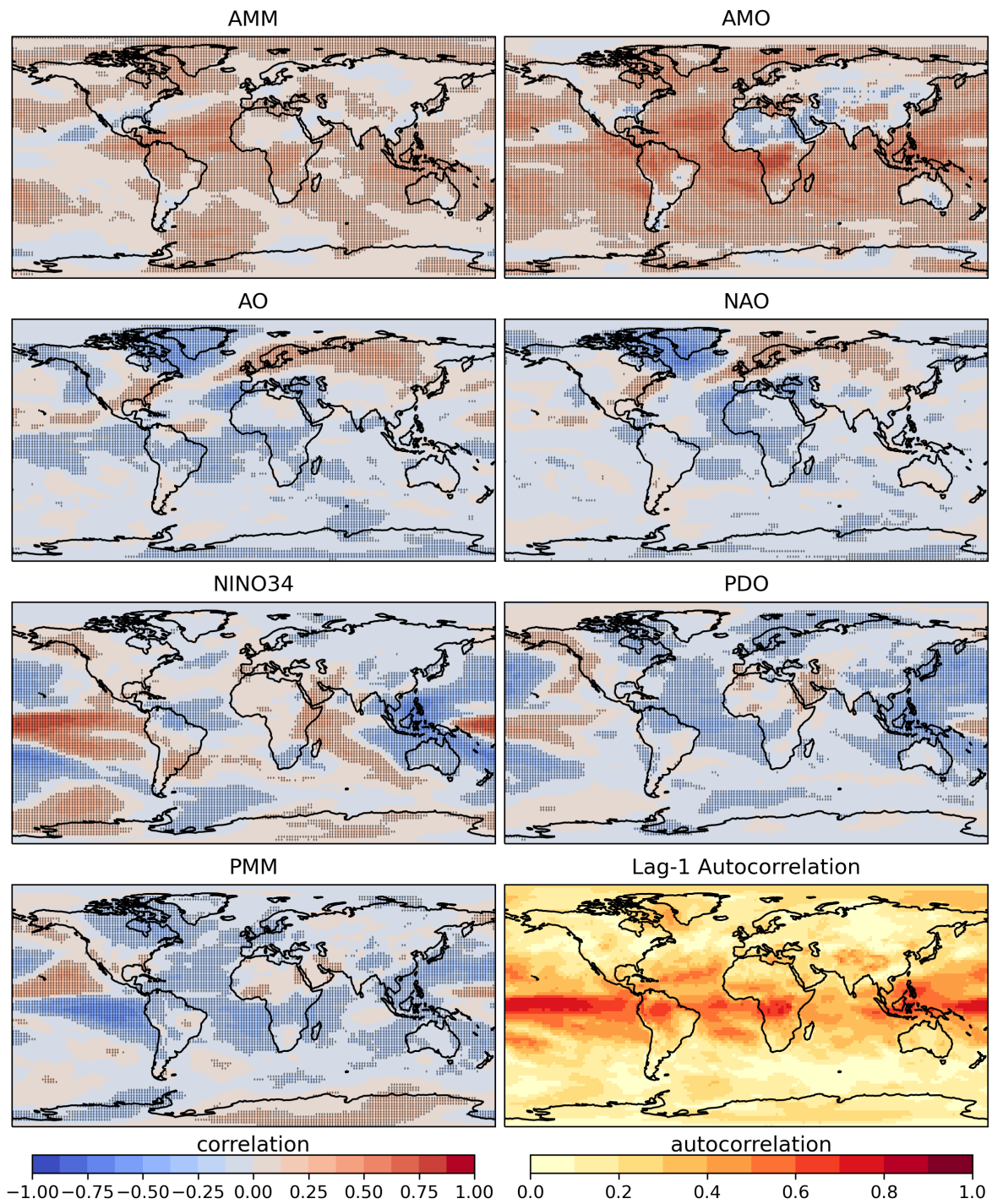
*Figure S8: Global maps of the correlation between NNHIRS total column water vapour (TCWV) and Atlantic Meridional Mode (AMM), Atlantic Multidecadal Oscillation (AMO), Arctic Oscillation (AO), North Atlantic Oscillation (NAO), El Niño Southern Oscillation Index 3.4 (NINO3.4), Pacific Decadal Oscillation (PDO) and Pacific Meridional Mode (PMM) climate indices. The bottom right-hand figure shows the lag-1 autocorrelation for **NCEP CFSR/CFSv2**. The hatching indicates areas where the correlation is within the 95% confidence level.*
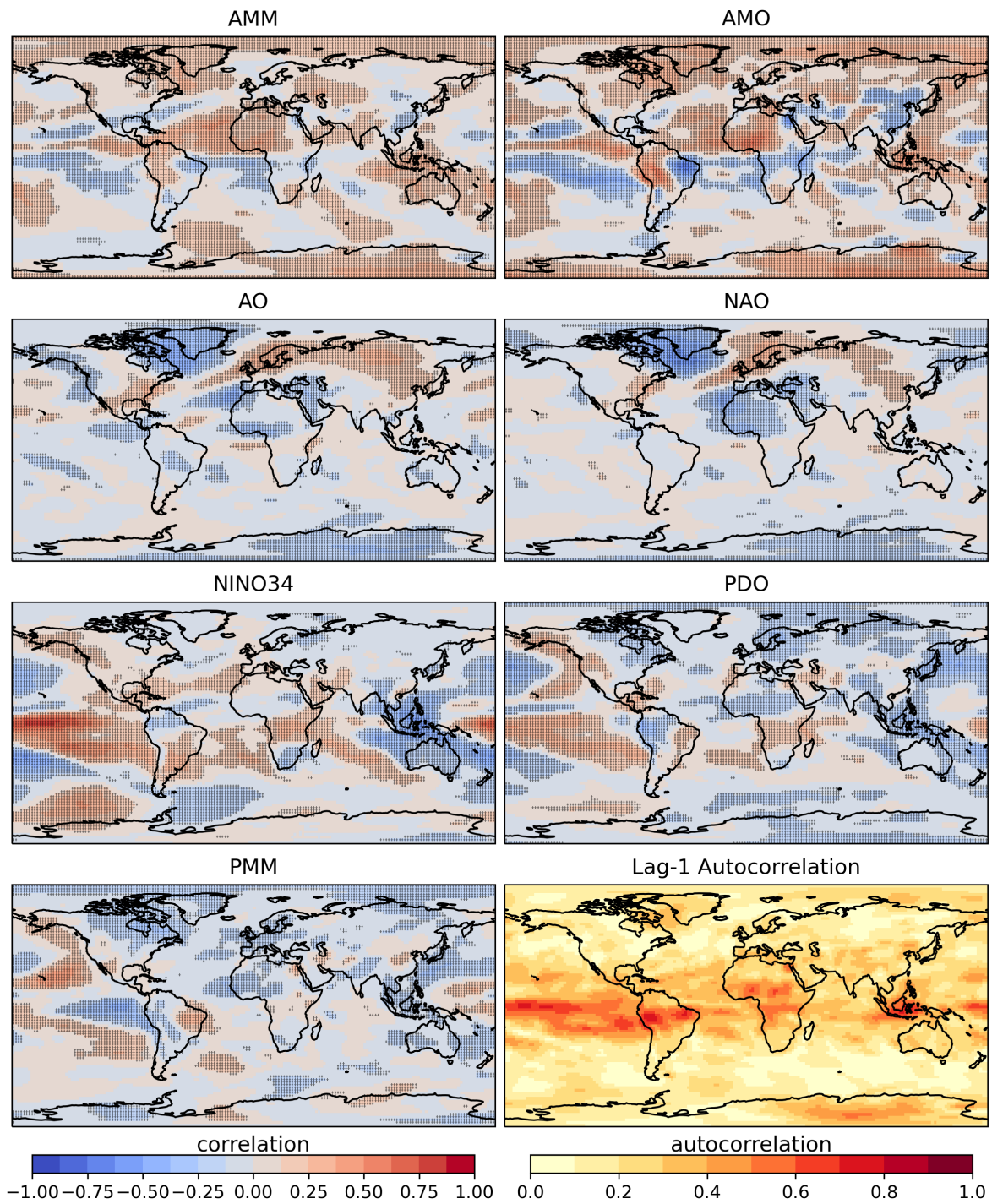
*Figure S9: Global maps of the correlation between NNHIRS total column water vapour (TCWV) and Atlantic Meridional Mode (AMM), Atlantic Multidecadal Oscillation (AMO), Arctic Oscillation (AO), North Atlantic Oscillation (NAO), El Niño Southern Oscillation Index 3.4 (NINO3.4), Pacific Decadal Oscillation (PDO) and Pacific Meridional Mode (PMM) climate indices. The bottom right-hand figure shows the lag-1 autocorrelation for **NCEP-DOE 2**. The hatching indicates areas where the correlation is within the 95% confidence level.*
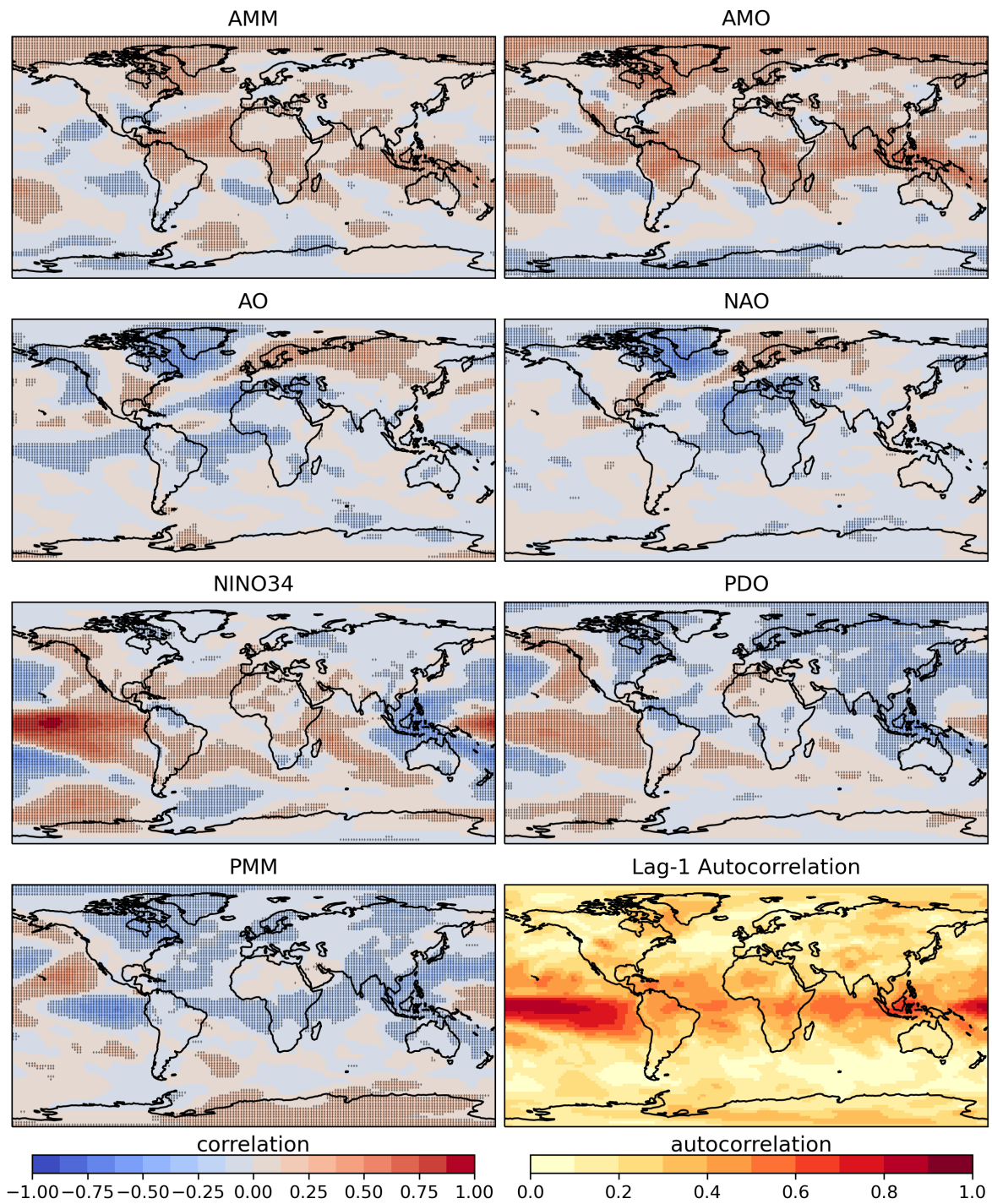
*Figure S10: Global maps of the correlation between NNHIRS total column water vapour (TCWV) and Atlantic Meridional Mode (AMM), Atlantic Multidecadal Oscillation (AMO), Arctic Oscillation (AO), North Atlantic Oscillation (NAO), El Niño Southern Oscillation Index 3.4 (NINO3.4), Pacific Decadal Oscillation (PDO) and Pacific Meridional Mode (PMM) climate indices. The bottom right-hand figure shows the lag-1 autocorrelation for **NOAA 20CR V2C**. The hatching indicates areas where the correlation is within the 95% confidence level.*
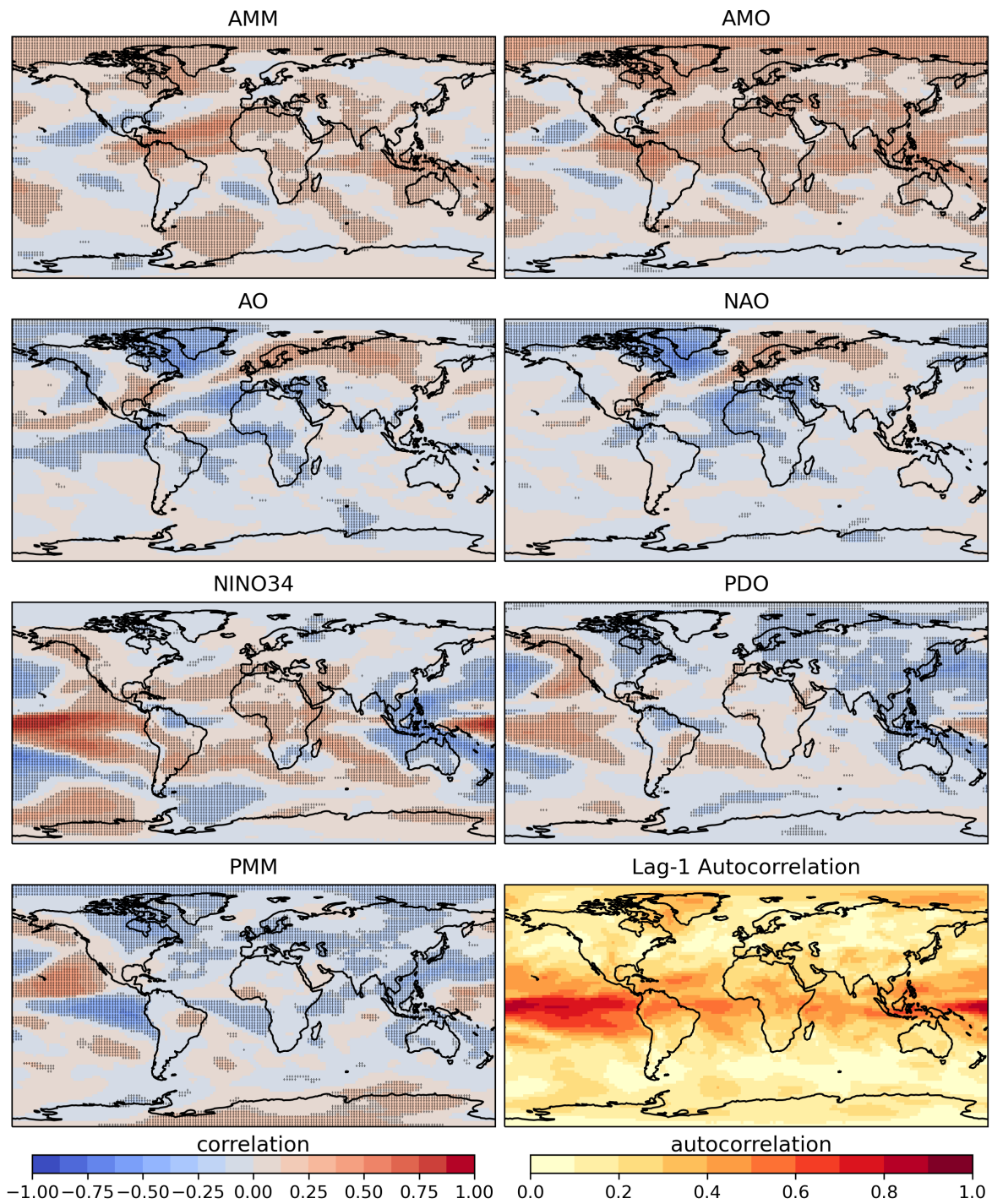
*Figure S11: Global maps of the correlation between NNHIRS total column water vapour (TCWV) and Atlantic Meridional Mode (AMM), Atlantic Multidecadal Oscillation (AMO), Arctic Oscillation (AO), North Atlantic Oscillation (NAO), El Niño Southern Oscillation Index 3.4 (NINO3.4), Pacific Decadal Oscillation (PDO) and Pacific Meridional Mode (PMM) climate indices. The bottom right-hand figure shows the lag-1 autocorrelation for **NOAA 20CR V3**. The hatching indicates areas where the correlation is within the 95% confidence level.*
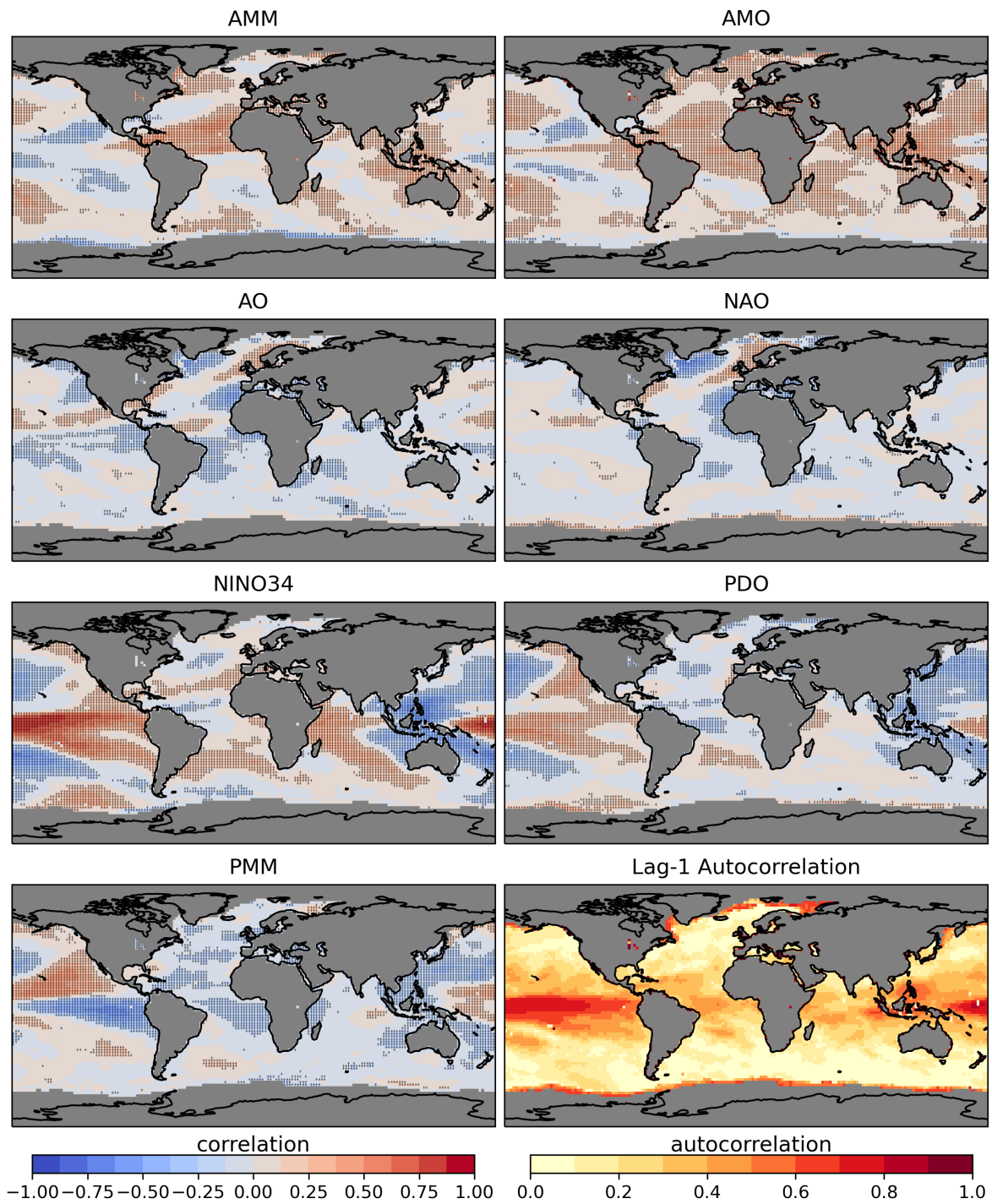
*Figure S12: Global maps of the correlation between NNHIRS total column water vapour (TCWV) and Atlantic Meridional Mode (AMM), Atlantic Multidecadal Oscillation (AMO), Arctic Oscillation (AO), North Atlantic Oscillation (NAO), El Niño Southern Oscillation Index 3.4 (NINO3.4), Pacific Decadal Oscillation (PDO) and Pacific Meridional Mode (PMM) climate indices. The bottom right-hand figure shows the lag-1 autocorrelation for **REMSS V7**. The hatching indicates areas where the correlation is within the 95% confidence level.*
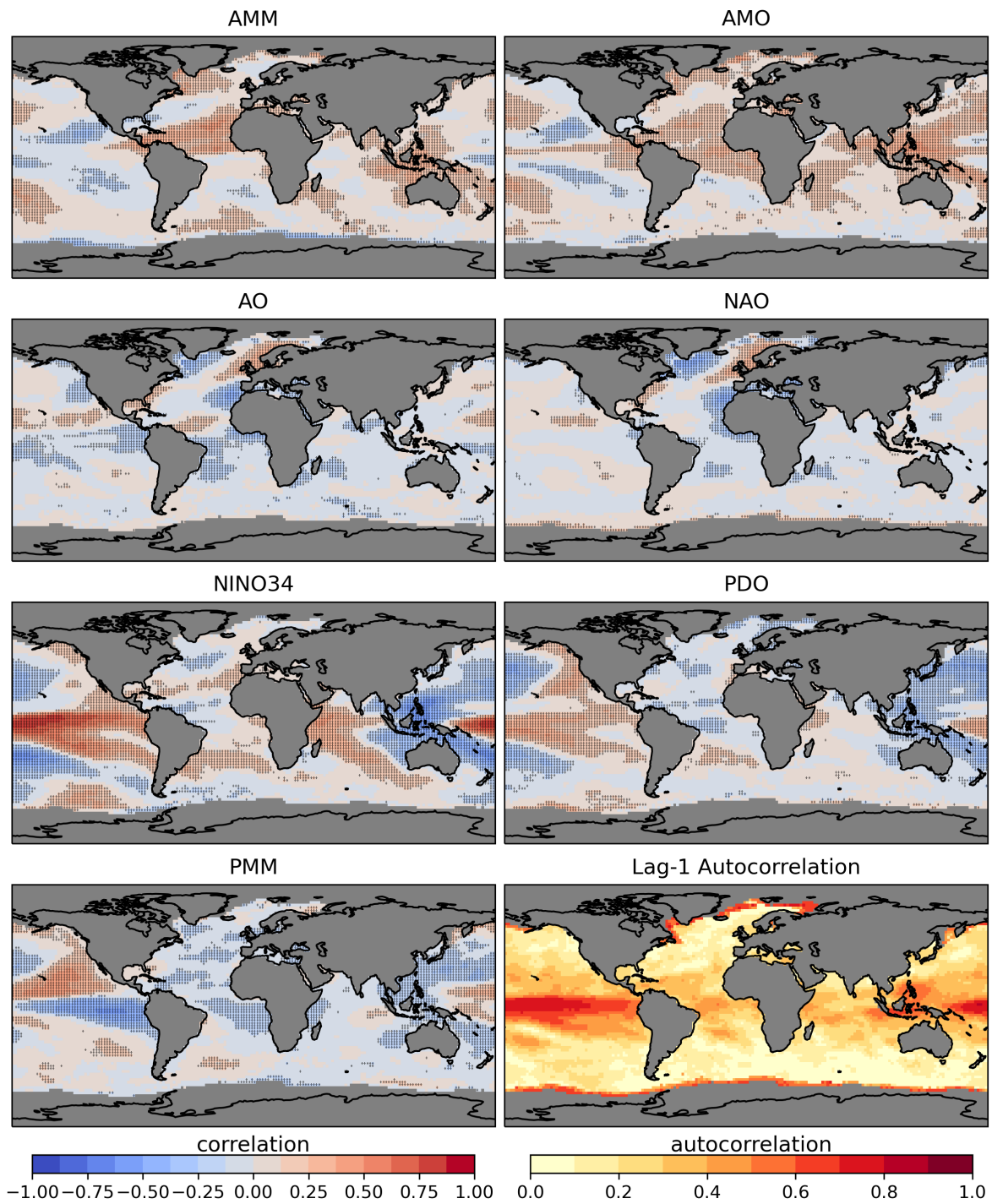
*Figure S13: Global maps of the correlation between NNHIRS total column water vapour (TCWV) and Atlantic Meridional Mode (AMM), Atlantic Multidecadal Oscillation (AMO), Arctic Oscillation (AO), North Atlantic Oscillation (NAO), El Niño Southern Oscillation Index 3.4 (NINO3.4), Pacific Decadal Oscillation (PDO) and Pacific Meridional Mode (PMM) climate indices. The bottom right-hand figure shows the lag-1 autocorrelation for **HOAPS SSM/I V4**. The hatching indicates areas where the correlation is within the 95% confidence level.*