## Spatial correlation of bias over HMA from 1979-2014 climatology Annual -0.26 0.14 -0.31 0.06 0.22 0.07 0.22 -0.74 -0.64 -0.43-0.45-0.1-0.18 -0.09 -0.21 -0.87 0.19 0.07 -0.11 -0.02 -0.30.25 -0.34 | -0.18 | tas normalized bias -0.51 -0.45-0.21 -0.02-0.290.01 -0.29 -0.5 -0.39 -0.47 -0.53 -0.4 -0.36 -0.35 -0.280.16 -0.62 -0.71 -0.58 0.09 -0.23 -0.16 -0.25 -0.18 -0.1-0.17 tas bias / snc bias --0.21 -0.22 -0.04 -0.070.02 -0.37-0.35 -0.24 -0.02tas bias / pr bias --0.09 -0.22 -0.08 -0.18-0.190.02 -0.05-0.02 0.16 -0.16 -0.11-0.04 0.02 -0.07 -0.26 -0.12 -0.15 0.48 0.41 -0.22-0.05 **-0.18** -0.04 -0.23 -0.38-0.23 -0.060.04 -0.020.03 0.05 -0.04 0.06 0.01 -0.31-0.120.1 -0.22 0.13 0.02 -0.03snc bias / pr bias --0.41-0.04-0.36-0.28-0.09 -0.26-0.1 -0.56 -0.66 -0.55 -0.32-0.37 -0.34-0.43 -0.16-0.09 -0.63 -0.28 -0.52 -0.3-0.21 -0.42 -0.05 -0.45-0.33 -0.12tas bias / elevation -0.46 0.54 0.67 0.53 0.5 0.56 0.56 0.22 0.24 0.44 0.29 0.48 0.37 0.49 snc bias / elevation -0.5 0.5 0.53 0.51 0.44 0.45 0.46 0.5 0.47 0.32 0.41 -0.28 0.01 0.18 0.43 0.12 -0.130.07 -0.12 0.07 -0.15 -0.31 -0.13 -0.05 -0.08 -0.19 -0.18 0.01 -0.06 0.03 -0.05 -0.01 0.15 -0.01 -0.03 -0.12 0.01 pr bias / elevation -**DJFMA** -0.09 -0.33 0.01 -0.33 -0.060.1 -0.04 0.1 -0.79 -0.09 -0.21 0.06 -0.07-0.15 -0.07-0.340.12 -0.45 -0.28 -0.72-0.44-0.44-0.1-0.78 tas normalized bias -0.48-0.3-0.31-0.49 -0.28 -0.49 -0.5 -0.24 -0.52 -0.37-0.45 -0.34 -0.33 -0.14 0.17 -0.51 -0.69 -0.55 -0.12 -0.36 -0.18 -0.36 -0.41 -0.28 -0.03tas bias / snc bias --0.52 -0.17-0.07-0.31-0.27-0.33-0.29-0.02 -0.02-0.02 -0.03 -0.44 -0.17 -0.09 -0.01-0.14 -0.12 0.11 -0.1-0.38 -0.35 -0.24-0.27 -0.13 -0.2 -0.11-0.21 -0.07 -0.01 -0.22 0.02 0.74 0.08 -0.35-0.19-0.32-0.18 **-0.41** -0.5 -0.44 0.24 0.11 -0.04-0.07 0.12 0.09 -0.13 0.1 -0.41 0.04 -0.03 0.1 snc bias / pr bias --0.45 -0.11 -0.35-0.46-0.32 **-0.44** -0.33 -0.58 -0.74-0.61 -0.18 -0.45 -0.37-0.46 -0.11 -0.02 -0.63 -0.36 -0.49 -0.31-0.25 -0.48-0.22 -0.57-0.35 -0.04tas bias / elevation -0.59 0.43 0.71 0.62 0.61 0.37 0.46 0.41 0.42 0.34 0.36 0.41 0.13 -0.03 0.45 0.46 0.52 0.3 0.35 0.3 0.44 0.56 0.42 0.12 snc bias / elevation -0.31 -0.23-0.2-0.39 -0.13-0.04-0.130.12 -0.12 0.13 -0.08 -0.2-0.08 -0.08-0.23 -0.10.16 -0.11-0.190.03 -0.17-0.01-0.09 -0.12 pr bias / elevation -**JJAS** tas normalized bias --0.16 0.35 -0.220.23 0.4 0.23 0.41 -0.62 -0.94-0.48 -0.37-0.5-0.31-0.39 -0.07-0.22 -1 0.42 0.34 -0.040.09 -0.22 -0.170 -0.13 -0.08 0.22 -0.1 -0.43 -0.62 -0.48 -0.39 -0.74 -0.53 -0.43 -0.32 -0.4-0.140.22 -0.49 -0.54-0.14-0.33 -0.05 -0.01 0.04 -0.16 tas bias / snc bias -0 -0.28-0.09 -0.08-0.18 -0.11-0.18 -0.02 -0.08-0.03 0.23 0.08 -0.08-0.02 -0.02 0 -0.28 -0.13 -0.4 -0.39 -0.08 -0.28 -0.12-0.19tas bias / pr bias --0.03 0.13 -0.21 -0.1-0.13 -0.01 -0.07-0.020.21 -0.07 0.05 0.24 0.05 -0.07 snc bias / pr bias -0.27 0.45 0.06 0.12 0.04 0.13 -0.12 -0.13-0.010.02 -0.04 -0.10.24 -0.18 -0.36 -0.02 -0.04 -0.28 -0.39 -0.35 -0.24 -0.28 -0.02 0.11 0.14 -0.39 -0.37-0.34 -0.41-0.31-0.17-0.1-0.57 -0.18 -0.51 -0.30.05 -0.3 -0.37 tas bias / elevation -0.45 0.03 0.02 0.03 0.01 0.55 0.18 0.41 0.08 0.06 0.42 0.02 0.09 0.11 0.7 0.47 0.14 0.6 0.64 0.54 0.52 0.54 0.56 0.54 0.68 0.61 snc bias / elevation -0.11 0.24 0.24 -0.110.06 -0.10.05 -0.1 -0.29 -0.07 -0.16 -0.05 -0.12 -0.11 0.15 -0.11 0 0.04 0.02 0.13 0.21 0.2 -0.01 0.03 -0.1 0.11 pr bias / elevation -CESM2 BCC-CSM2-MR CAS-ESM2-0 CESM2-FV2 CESM2-WACCM CESM2-WACCM-FV2 CNRM-CM6-1-HR **CanESM5** GISS-E2-1-G GISS-E2-1-H PSL-CM6A-LR **MIROC6** MPI-ESM1-2-HR MPI-ESM1-2-LR MRI-ESM2-0 NorESM2-LM SAM0-UNICON UKESM1-0-LL **BCC-ESM1** CNRM-CM6-1 CNRM-ESM2-1 GFDL-CM4 HadGEM3-GC31-LL HadGEM3-GC31-MM MIROC-ES2L TaiESM1