

Table 1 Statistics used for model selection for precipitation

| MODEL | R ² | | RMSE | | BIAS | | RR-RMSE | | Score | | | | | | | | Sum |
|----------|----------------|----------|------|----------|------|----------|---------|----------|----------------|----|------|----|------|----|---------|----|-----|
| | Glob | Ethiopia | Glob | Ethiopia | Glob | Ethiopia | Glob | Ethiopia | R ² | | RMSE | | BIAS | | RR-RMSE | | |
| | | | | | | | | | G | E | G | E | G | E | G | E | |
| MODBAR | 0.91 | 0.96 | 0.87 | 0.75 | 0.18 | 0.53 | 0.85 | 0.54 | 1 | 1 | 1 | 1 | | | 1 | 1 | 6 |
| GFDLCM21 | 0.86 | 0.92 | 1.15 | 0.55 | 0.22 | 0.02 | 1.13 | 0.55 | 1 | | 1 | 1 | | 1 | 1 | 1 | 6 |
| GFDLCM20 | 0.87 | 0.96 | 1.10 | 0.88 | 0.09 | 0.25 | 1.10 | 0.85 | 1 | 1 | 1 | | 1 | 1 | 1 | | 6 |
| UKHADCM3 | 0.86 | 0.94 | 1.26 | 0.48 | 0.23 | 0.04 | 1.24 | 0.48 | 1 | 1 | | 1 | | 1 | | 1 | 5 |
| MIROCMED | 0.83 | 0.97 | 1.16 | 1.37 | 0.04 | 1.16 | 1.16 | 0.72 | | 1 | 1 | -1 | 1 | -1 | 1 | | 2 |
| CCCMA-31 | 0.89 | 0.93 | 0.95 | 1.39 | 0.01 | 0.64 | 0.95 | 1.24 | 1 | | 1 | -1 | 1 | | 1 | -1 | 2 |
| MPIECH-5 | 0.81 | 0.94 | 1.35 | 0.58 | 0.25 | 0.30 | 1.33 | 0.49 | | 1 | -1 | 1 | | | -1 | 1 | 1 |
| ECHO---G | 0.91 | 0.54 | 0.86 | 1.96 | 0.13 | 1.79 | 0.85 | 0.78 | 1 | -1 | 1 | -1 | 1 | -1 | 1 | | 1 |
| MRI-232A | 0.89 | 0.84 | 0.97 | 2.47 | 0.08 | 1.26 | 0.96 | 2.12 | 1 | | 1 | -1 | 1 | -1 | 1 | -1 | 1 |
| FGOALS1G | 0.82 | 0.68 | 1.23 | 0.78 | 0.31 | 0.39 | 1.19 | 0.67 | | -1 | | 1 | -1 | | | 1 | 0 |
| CCSM--30 | 0.80 | 0.32 | 1.33 | 0.92 | 0.16 | 0.26 | 1.32 | 0.88 | | -1 | | | | 1 | | | 0 |
| CSIRO-30 | 0.81 | 0.93 | 1.21 | 0.97 | 0.16 | 0.28 | 1.20 | 0.93 | | | | | | 1 | | -1 | 0 |
| IPSL_CM4 | 0.81 | 0.82 | 1.27 | 1.15 | 0.09 | 1.04 | 1.27 | 0.48 | | -1 | | -1 | 1 | -1 | | 1 | -1 |
| MIROC-HI | 0.80 | 0.88 | 1.34 | 3.08 | 0.28 | 2.55 | 1.31 | 1.73 | | | | | | | | -1 | -1 |
| NCARPCM1 | 0.67 | 0.79 | 1.72 | 0.54 | 0.34 | 0.07 | 1.68 | 0.54 | -1 | -1 | -1 | 1 | -1 | 1 | -1 | 1 | -2 |
| INMCM-30 | 0.70 | 0.64 | 1.61 | 0.77 | 0.12 | 0.36 | 1.60 | 0.68 | -1 | -1 | -1 | 1 | 1 | | -1 | | -2 |
| UKHADGEM | 0.80 | 0.92 | 1.61 | 0.93 | 0.39 | 0.02 | 1.57 | 0.93 | -1 | | -1 | | -1 | 1 | -1 | -1 | -4 |
| BCCRBCM2 | 0.79 | 0.95 | 1.31 | 1.57 | 0.31 | 1.15 | 1.28 | 1.06 | -1 | 1 | | -1 | -1 | -1 | | -1 | -4 |
| GISS--EH | 0.73 | 0.76 | 1.51 | 0.97 | 0.34 | 0.51 | 1.47 | 0.83 | -1 | -1 | -1 | | -1 | | -1 | | -5 |
| CNRM-CM3 | 0.77 | 0.98 | 1.44 | 1.97 | 0.54 | 1.77 | 1.33 | 0.86 | -1 | 1 | -1 | -1 | -1 | -1 | -1 | -1 | -5 |
| GISS--ER | 0.77 | 0.85 | 1.43 | 1.14 | 0.30 | 0.65 | 1.40 | 0.94 | -1 | | -1 | | -1 | -1 | -1 | -1 | -6 |

Table 2 Statistics used for model selection for temperature

| MODEL | CORREL | | RMSE | | BIAS | | CORR-RMSE | | Score | | | | | | | | Sum |
|----------|--------|----------|------|----------|-------|----------|-----------|----------|----------------|----|------|----|------|----|---------|----|-----|
| | Glob | Ethiopia | Glob | Ethiopia | Glob | Ethiopia | Glob | Ethiopia | R ² | | RMSE | | BIAS | | RR-RMSE | | |
| | | | | | | | | | G | E | G | E | G | E | G | E | |
| MPIECH-5 | 1.00 | 0.96 | 1.47 | 1.25 | -0.26 | 0.26 | 1.45 | 1.25 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 |
| UKHADCM3 | 0.99 | 0.92 | 2.05 | 2.30 | -0.90 | 0.90 | 1.84 | 2.22 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 7 |
| MIROC-HI | 0.99 | 0.98 | 1.67 | 2.51 | -0.54 | 0.54 | 1.58 | 0.86 | 1 | 1 | 1 | 1 | 1 | -1 | 1 | 1 | 6 |
| CCSM--30 | 1.00 | 0.87 | 1.40 | 2.56 | -0.29 | 0.29 | 1.36 | 2.53 | 1 | | 1 | 1 | 1 | 1 | 1 | | 6 |
| MODBAR | 1.00 | 0.93 | 1.75 | 2.81 | -1.24 | 1.24 | 1.23 | 2.16 | 1 | 1 | 1 | 1 | | | 1 | | 5 |
| GFDLCM21 | 0.99 | 0.93 | 2.30 | 2.88 | -1.47 | 1.47 | 1.77 | 1.61 | 1 | 1 | | 1 | | -1 | 1 | 1 | 4 |
| MRI-232A | 1.00 | 0.79 | 1.89 | 2.90 | -0.81 | 0.81 | 1.71 | 2.80 | 1 | -1 | 1 | | 1 | 1 | 1 | -1 | 3 |
| CNRM-CM3 | 0.99 | 0.91 | 2.68 | 4.97 | -1.76 | 1.76 | 2.03 | 2.11 | | | | | | | | 1 | 1 |
| CSIRO-30 | 0.99 | 0.93 | 2.65 | 3.43 | -1.77 | 1.77 | 1.97 | 1.79 | | 1 | | -1 | | -1 | | 1 | 0 |

| | | | | | | | | | | | | | | | | | |
|----------|------|------|------|------|-------|------|------|------|----|----|----|----|----|----|----|----|----|
| GISS--EH | 0.98 | 0.85 | 2.71 | 2.66 | 0.62 | 0.62 | 2.64 | 2.66 | -1 | | | 1 | 1 | 1 | -1 | -1 | 0 |
| ECHO---G | 0.99 | 0.74 | 2.03 | 3.19 | 0.31 | 0.31 | 2.01 | 3.15 | -1 | -1 | 1 | | 1 | 1 | | -1 | 0 |
| UKHADGEM | 0.99 | 0.89 | 2.90 | 3.21 | -2.11 | 2.11 | 1.99 | 2.15 | 1 | | -1 | | -1 | -1 | | | -2 |
| MIROCMED | 0.99 | 0.82 | 2.20 | 3.35 | -1.06 | 1.06 | 1.93 | 2.89 | | -1 | | | | | | -1 | -2 |
| GFDLCM20 | 0.99 | 0.97 | 3.12 | 3.51 | -2.28 | 2.28 | 2.13 | 1.34 | -1 | 1 | -1 | -1 | -1 | -1 | -1 | 1 | -4 |
| BCCRBCM2 | 0.99 | 0.90 | 3.27 | 4.32 | -2.22 | 2.22 | 2.41 | 2.08 | -1 | | -1 | -1 | -1 | -1 | -1 | 1 | -5 |
| CCCMA-31 | 0.99 | 0.84 | 3.01 | 3.45 | -1.81 | 1.81 | 2.41 | 2.53 | | -1 | -1 | -1 | -1 | | -1 | | -5 |
| IPSL_CM4 | 0.99 | 0.80 | 2.78 | 3.43 | -1.79 | 1.79 | 2.13 | 3.43 | -1 | -1 | -1 | -1 | -1 | 1 | -1 | -1 | -6 |
| NCARPCM1 | 0.99 | 0.78 | 2.98 | 4.70 | -2.14 | 2.14 | 2.07 | 3.19 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -8 |
| INMCM-30 | 0.99 | 0.78 | 3.02 | 4.58 | -1.97 | 1.97 | 2.29 | 3.41 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -8 |

Table 3 Average score value from precipitation and average

| Model | Score | | Average | Rank |
|----------|---------------|-------------|---------|------|
| | Precipitation | Temperature | | |
| UKHADCM3 | 7 | 5 | 6 | 1 |
| MODBAR | 5 | 6 | 5.5 | 2 |
| GFDLCM21 | 4 | 6 | 5 | 3 |
| MPIECH-5 | 8 | 1 | 4.5 | 4 |
| CCSM--30 | 6 | 0 | 3 | 5 |
| MIROC-HI | 6 | -1 | 2.5 | 6 |
| MRI-232A | 3 | 1 | 2 | 7 |
| GFDLCM20 | -4 | 6 | 1 | 8 |
| ECHO---G | 0 | 1 | 0.5 | 9 |
| CSIRO-30 | 0 | 0 | 0 | 10 |
| MIROCMED | -2 | 2 | 0 | 11 |
| CCCMA-31 | -5 | 2 | -1.5 | 12 |
| CNRM-CM3 | 1 | -5 | -2 | 13 |
| GISS--EH | 0 | -5 | -2.5 | 14 |
| UKHADGEM | -2 | -4 | -3 | 15 |
| IPSL_CM4 | -6 | -1 | -3.5 | 16 |
| BCCRBCM2 | -5 | -4 | -4.5 | 17 |
| INMCM-30 | -8 | -2 | -5 | 18 |
| NCARPCM1 | -8 | -2 | -5 | 19 |