Summary of the TractLSM outputs

This document summarizes:  
  
 (i) parameters and site-level input data used for the runs  
 (ii) general analysis about the output generated  
   
The following projects are accounted for:  
 **var\_kmax\_adjust\_average  
 var\_kmax\_adjust\_extreme  
 var\_kmax\_sample**

# General (PFT-based) Model parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Abbreviation | Parameter description | Value | | | Unit |
| DBF | EBF | ENF |
| w\_l\_max | maximum leaf width | 0.080 | 0.050 | 0.001 | m |
| can\_int | canopy intercept | 0.250 | 0.250 | 0.150 | - |
| alpha\_l | leaf albedo | 0.092 | 0.076 | 0.062 | - |
| alpha\_ws | wet soil albedo | 0.100 | | | - |
| alpha\_ds | dry soil albedo | 0.250 | | | - |
| eps\_l | leaf emissivity | 0.970 | | | - |
| eps\_s | soil emissivity |  |  | 0.945 | - |

# Photosynthetis Model parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Abbreviation | Parameter description | Value | Unit |
| CO2 | atmospheric CO2 concentration | 37.00 | Pa |
| O2 | atmospheric O2 concentration | 20.73 | kPa |
| gamma star | CO2 compensation point @ 25 degC | 4.22 | Pa |
| Kc | Michaelis-Menton constant for carboxylation | 39.96 | Pa |
| Ko | Michaelis-Menton constant for oxygenation | 27.48 | kPa |
| J:V | Jmax25 to Vmax25 ratio | 1.67 | - |
| alpha | quantum yield of electron transport | 0.30 | mol(photon).mol(e-)-1 |
| c1 | curvature of the light response | 0.7000 | - |
| c2 | transition Je vs Jc | 0.99 | - |
| Ec | energy of activation of the carboxylation | 79430.00 | J.mol-1 |
| Eo | energy of activation of the oxygenation | 36380.00 | J.mol-1 |
| Ev | energy of activation of Vcmax | 60000.00 | J.mol-1 |
| Ej | energy of activation of Jmax | 30000.00 | J.mol-1 |
| Egamm | energy of activation of the CO2 compensation point | 37830.00 | J.mol-1 |
| deltaSv | Vcmax entropy factor | 650.00 | J.mol-1.K-1 |
| deltaSj | Jmax entropy factor | 650.00 | J.mol-1.K-1 |
| Hdv | Vcmax rate of decrease above the optimum T | 200000.00 | J.mol-1 |
| Hdj | Jmax rate of decrease above the optimum T | 200000.00 | J.mol-1 |

# General Site Info

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Site Name | Country | Latitude | Longitude | PFT | Dominant Species | Data | Reference |
| Hyytiala | Suomi | 61.85 | 24.29 | ENF | Pinus sylvestris | FN |  |
| Soroe | Danmark | 55.49 | 11.64 | DBF | Fagus sylvatica | FN |  |
| Loobos | Nederland | 52.17 | 5.74 | ENF | Pinus sylvestris | FN |  |
| Hesse | France | 48.67 | 7.07 | DBF | Fagus Sylvatica | LT |  |
| Parco | Italia | 45.20 | 9.06 | DBF | Populus x canadensis | FN |  |
| Puechabon | France | 43.74 | 3.60 | EBF | Quercus Ilex | FN |  |
| Rocca1 | Italia | 42.41 | 11.93 | DBF | Quercus Cerris | FN |  |
| Rocca2 | Italia | 42.39 | 11.92 | DBF | Quercus Cerris | FN |  |
| ElSaler1 | España | 39.35 | -0.32 | ENF | Pinus halepensis | LT |  |
| Espirra | Portugal | 38.64 | -8.60 | EBF | Eucalyptus Globulus | LT |  |

# Site Climate and composite LAI

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Site Name | Koeppen Climate Class | MAP (mm/y) | Tair,avg (degC) | Davg (kPa) | Tair,xx (degC) | Dxx (kPa) | Composite LAI (m2/m2) |
| Hyytiala | Dfc | 570.41 | 9.88 | 0.34 | 20.20 | 1.19 | 1.34 |
| Soroe | Cfb | 568.39 | 12.82 | 0.31 | 19.70 | 0.77 | 1.58 |
| Loobos | Cfb | 777.69 | 13.40 | 0.34 | 22.00 | 1.14 | 1.34 |
| Hesse | Cfb | 753.11 | 14.29 | 0.48 | 23.50 | 1.36 | 2.31 |
| Parco | Cfa | 1026.39 | 18.14 | 0.69 | 28.00 | 1.95 | 0.76 |
| Puechabon | Csa | 771.62 | 17.56 | 0.77 | 28.00 | 2.39 | 1.13 |
| Rocca1 | Csa | 675.33 | 19.71 | 0.79 | 29.40 | 2.13 | 1.83 |
| Rocca2 | Csa | 675.33 | 19.71 | 0.79 | 29.40 | 2.13 | 1.64 |
| ElSaler1 | Csa | 383.47 | 21.29 | 0.90 | 30.00 | 2.21 | 0.67 |
| Espirra | Csa | 735.71 | 20.02 | 0.84 | 29.00 | 2.34 | 0.85 |

# Site Soil Parameters

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Site Name | Psie (-MPa) | k\_s,sat (m s-1) | theta\_sat (m3/m3) | theta\_fc (m3/m3) | theta\_wp (m3/m3) | b (-) | r\_soil (-) | Z\_total (m) |
| Hyytiala | 1.78e-03 | -5.17e-06 | 4.28e-01 | 2.74e-01 | 1.53e-01 | 6.57 | 0.20 | 0.28 |
| Soroe | 1.62e-03 | -5.71e-06 | 4.24e-01 | 2.65e-01 | 1.46e-01 | 6.43 | 0.20 | 0.32 |
| Loobos | 1.12e-03 | -9.31e-06 | 4.08e-01 | 2.13e-01 | 1.03e-01 | 5.22 | 0.20 | 0.25 |
| Hesse | 1.50e-03 | -5.62e-06 | 4.21e-01 | 2.69e-01 | 1.54e-01 | 6.86 | 0.20 | 0.41 |
| Parco | 1.48e-03 | -6.23e-06 | 4.20e-01 | 2.57e-01 | 1.41e-01 | 6.33 | 0.20 | 1.47 |
| Puechabon | 1.51e-03 | -5.27e-06 | 4.22e-01 | 2.75e-01 | 1.62e-01 | 7.22 | 0.40 | 1.36 |
| Rocca1 | 1.66e-03 | -5.39e-06 | 4.25e-01 | 2.71e-01 | 1.53e-01 | 6.64 | 0.20 | 1.07 |
| Rocca2 | 1.66e-03 | -5.39e-06 | 4.25e-01 | 2.71e-01 | 1.53e-01 | 6.64 | 0.20 | 1.07 |
| ElSaler1 | 1.05e-03 | -8.83e-06 | 4.06e-01 | 2.25e-01 | 1.17e-01 | 5.84 | 0.40 | 1.25 |
| Espirra | 1.24e-03 | -7.13e-06 | 4.13e-01 | 2.46e-01 | 1.35e-01 | 6.34 | 0.40 | 1.26 |

# Site Plant Traits

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Site Name | Vcmax25 (umol/m2/s) | Rd25 (umol/m2/s) | g1 (kPa1/2) | P50 (-MPa) | P88 (-MPa) |
| Hyytiala | 23.36 | 0.35 | 1.29 | 3.09 | 3.45 |
| Soroe | 80.10 | 1.20 | 3.66 | 3.15 | 3.67 |
| Loobos | 37.07 | 0.56 | 2.35 | 3.09 | 3.45 |
| Hesse | 80.10 | 1.20 | 4.45 | 3.15 | 3.67 |
| Parco | 57.70 | 0.87 | 4.45 | 1.80 | 2.70 |
| Puechabon | 40.00 | 0.60 | 1.56 | 6.90 | 9.43 |
| Rocca1 | 57.70 | 0.87 | 4.45 | 4.56 | 8.38 |
| Rocca2 | 57.70 | 0.87 | 4.45 | 4.56 | 8.38 |
| ElSaler1 | 62.50 | 0.94 | 2.35 | 5.14 | 5.61 |
| Espirra | 61.40 | 0.92 | 4.11 | 4.12 | 4.50 |

# Site kmax values

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Site Name | average scenario | | | extreme scenario | | |
| kmax,high (mmol/m2/s/MPa) | kmax,optimal (mmol/m2/s/MPa) | kmax,low (mmol/m2/s/MPa) | kmax,high (mmol/m2/s/MPa) | kmax,optimal (mmol/m2/s/MPa) | kmax,low (mmol/m2/s/MPa) |
| Hyytiala | 0.09 | 0.09 | 0.08 | 0.41 | 0.43 | 0.36 |
| Soroe | 0.31 | 0.32 | 0.26 | 0.83 | 0.85 | 0.70 |
| Loobos | 0.16 | 0.16 | 0.14 | 0.61 | 0.64 | 0.54 |
| Hesse | 0.60 | 0.62 | 0.51 | 1.82 | 1.86 | 1.55 |
| Parco | 1.06 | 0.88 | 0.73 | 2.53 | 2.10 | 1.74 |
| Puechabon | 0.24 | 0.22 | 0.18 | 0.71 | 0.64 | 0.52 |
| Rocca1 | 1.03 | 0.67 | 0.70 | 2.35 | 1.52 | 1.59 |
| Rocca2 | 0.97 | 0.63 | 0.66 | 2.22 | 1.44 | 1.50 |
| ElSaler1 | 0.28 | 0.29 | 0.26 | 0.53 | 0.56 | 0.49 |
| Espirra | 0.38 | 0.40 | 0.34 | 0.86 | 0.91 | 0.79 |

# Site kmax range analysis

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Site Name | average scenario | | extreme scenario | | overall | |
| min | max | min | max | min | max |
| Hyytiala | 0.08 | 0.09 | 0.36 | 0.43 | 0.08 | 0.43 |
| Soroe | 0.26 | 0.32 | 0.70 | 0.85 | 0.26 | 0.85 |
| Loobos | 0.14 | 0.16 | 0.54 | 0.64 | 0.14 | 0.64 |
| Hesse | 0.51 | 0.62 | 1.55 | 1.86 | 0.51 | 1.86 |
| Parco | 0.73 | 1.06 | 1.74 | 2.53 | 0.73 | 2.53 |
| Puechabon | 0.18 | 0.24 | 0.52 | 0.71 | 0.18 | 0.71 |
| Rocca1 | 0.67 | 1.03 | 1.52 | 2.35 | 0.67 | 2.35 |
| Rocca2 | 0.63 | 0.97 | 1.44 | 2.22 | 0.63 | 2.22 |
| ElSaler1 | 0.26 | 0.29 | 0.49 | 0.56 | 0.26 | 0.56 |
| Espirra | 0.34 | 0.40 | 0.79 | 0.91 | 0.34 | 0.91 |
|  |  |  |  |  |  |  |
| across sites | 0.08 | 1.06 | 0.36 | 2.53 | 0.08 | 2.53 |

# Site kmax ratio analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Site Name | extreme:average | | | |
| high | optimal | low | overall |
| Hyytiala | 4.69 | 4.74 | 4.73 | 4.72 |
| Soroe | 2.67 | 2.68 | 2.66 | 2.67 |
| Loobos | 3.87 | 3.90 | 3.85 | 3.87 |
| Hesse | 3.02 | 3.01 | 3.02 | 3.02 |
| Parco | 2.39 | 2.39 | 2.39 | 2.39 |
| Puechabon | 2.89 | 2.88 | 2.88 | 2.88 |
| Rocca1 | 2.28 | 2.28 | 2.29 | 2.28 |
| Rocca2 | 2.27 | 2.28 | 2.28 | 2.28 |
| ElSaler1 | 1.90 | 1.90 | 1.90 | 1.90 |
| Espirra | 2.29 | 2.29 | 2.29 | 2.29 |
|  |  |  |  |  |
| across sites | 2.83 | 2.83 | 2.83 | 2.83 |

# ProfitMax optimal NMSEs

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Site Name | Flux | 2003 & 2006 | | | | 2002 & 2005 | | | |
|  | average scenario | extreme scenario | control | calib | average scenario | extreme scenario | control | calib |
| Hyytiala | GPP | 0.00 | 0.07 | 0.15 | 0.07 | 0.00 | 0.10 | 0.21 | 0.10 |
|  | ET | 0.00 | 0.06 | 1.03 | 0.05 | 0.00 | 0.09 | 1.39 | 0.08 |
| Soroe | GPP | 0.00 | 0.09 | 0.08 | 0.09 | 0.00 | 0.07 | 0.05 | 0.06 |
|  | ET | 0.00 | 0.13 | 0.18 | 0.10 | 0.00 | 0.21 | 0.10 | 0.10 |
| Loobos | GPP | 0.00 | 0.06 | 0.07 | 0.06 | 0.00 | 0.06 | 0.07 | 0.05 |
|  | ET | 0.00 | 0.08 | 0.25 | 0.08 | 0.00 | 0.06 | 0.33 | 0.05 |
| Hesse | GPP | 0.23 | 0.00 | 0.23 | 0.22 | 0.23 | 0.00 | 0.15 | 0.21 |
|  | ET | 0.26 | 0.00 | 0.43 | 0.30 | 0.18 | 0.00 | 0.22 | 0.17 |
| Parco | GPP | 0.00 | 0.25 | 0.25 | 0.25 | 0.00 | 0.36 | 0.34 | 0.37 |
|  | ET | 0.00 | 0.24 | 0.40 | 0.22 | 0.00 | 0.26 | 0.29 | 0.24 |
| Puechabon | GPP | 0.00 | 0.15 | 0.13 | 0.15 | 0.00 | 0.15 | 0.12 | 0.13 |
|  | ET | 0.00 | 0.46 | 0.21 | 0.20 | 0.00 | 0.30 | 0.46 | 0.19 |
| Rocca1 | GPP | 0.20 | 0.00 | 0.25 | 0.19 | 0.14 | 0.00 | 0.17 | 0.15 |
|  | ET | 0.12 | 0.00 | 0.35 | 0.10 | 0.10 | 0.00 | 0.34 | 0.10 |
| Rocca2 | GPP | 0.30 | 0.00 | 0.38 | 0.28 | 0.17 | 0.00 | 0.19 | 0.18 |
|  | ET | 0.30 | 0.00 | 0.61 | 0.21 | 0.23 | 0.00 | 0.15 | 0.16 |
| ElSaler1 | GPP | 0.10 | 0.00 | 0.08 | 0.11 | 0.04 | 0.00 | 0.05 | 0.05 |
|  | ET | 0.16 | 0.00 | 0.48 | 0.15 | 0.13 | 0.00 | 0.31 | 0.10 |
| Espirra | GPP | 0.04 | 0.00 | 0.07 | 0.07 | 0.08 | 0.00 | 0.06 | 0.07 |
|  | ET | 0.12 | 0.00 | 0.30 | 0.15 | 0.16 | 0.00 | 0.13 | 0.19 |
| across sites | GPP | 0.17 | 0.12 | 0.17 | 0.15 | 0.14 | 0.15 | 0.14 | 0.14 |
|  | ET | 0.19 | 0.19 | 0.42 | 0.16 | 0.16 | 0.18 | 0.37 | 0.14 |
|  |  |  |  |  |  |  |  |  |  |
| overall | GPP | 0.15 | 0.13 | 0.15 | 0.14 |  |  |  |  |
|  | ET | 0.18 | 0.19 | 0.40 | 0.15 |  |  |  |  |

# ProfitMax optimal MAEs

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Site Name | Flux | 2003 & 2006 | | | | 2002 & 2005 | | | |
|  | average scenario | extreme scenario | control | calib | average scenario | extreme scenario | control | calib |
| Hyytiala | GPP | 0.00 | 0.94 | 1.38 | 0.92 | 0.00 | 1.27 | 1.78 | 1.26 |
|  | ET | 0.00 | 0.24 | 0.76 | 0.23 | 0.00 | 0.30 | 0.89 | 0.29 |
| Soroe | GPP | 0.00 | 1.97 | 1.86 | 1.97 | 0.00 | 1.55 | 1.37 | 1.53 |
|  | ET | 0.00 | 0.54 | 0.58 | 0.48 | 0.00 | 0.65 | 0.38 | 0.42 |
| Loobos | GPP | 0.00 | 1.08 | 1.16 | 1.09 | 0.00 | 1.11 | 1.24 | 1.10 |
|  | ET | 0.00 | 0.37 | 0.54 | 0.40 | 0.00 | 0.32 | 0.65 | 0.31 |
| Hesse | GPP | 2.63 | 0.00 | 2.94 | 2.63 | 3.35 | 0.00 | 2.81 | 3.25 |
|  | ET | 0.67 | 0.00 | 0.91 | 0.76 | 0.53 | 0.00 | 0.65 | 0.57 |
| Parco | GPP | 0.00 | 2.22 | 2.20 | 2.21 | 0.00 | 3.03 | 2.97 | 3.06 |
|  | ET | 0.00 | 0.77 | 0.91 | 0.73 | 0.00 | 0.75 | 0.72 | 0.71 |
| Puechabon | GPP | 0.00 | 1.33 | 1.15 | 1.34 | 0.00 | 1.40 | 1.34 | 1.30 |
|  | ET | 0.00 | 0.94 | 0.39 | 0.47 | 0.00 | 0.86 | 0.69 | 0.54 |
| Rocca1 | GPP | 2.09 | 0.00 | 2.35 | 2.02 | 1.86 | 0.00 | 2.23 | 1.87 |
|  | ET | 0.41 | 0.00 | 0.84 | 0.38 | 0.41 | 0.00 | 1.01 | 0.43 |
| Rocca2 | GPP | 2.67 | 0.00 | 3.11 | 2.58 | 2.10 | 0.00 | 2.11 | 2.10 |
|  | ET | 0.69 | 0.00 | 1.15 | 0.72 | 0.67 | 0.00 | 0.69 | 0.71 |
| ElSaler1 | GPP | 1.12 | 0.00 | 0.96 | 1.17 | 0.81 | 0.00 | 0.83 | 0.85 |
|  | ET | 0.46 | 0.00 | 0.78 | 0.53 | 0.50 | 0.00 | 0.69 | 0.42 |
| Espirra | GPP | 0.87 | 0.00 | 1.09 | 1.11 | 1.31 | 0.00 | 1.00 | 1.13 |
|  | ET | 0.48 | 0.00 | 0.70 | 0.53 | 0.47 | 0.00 | 0.36 | 0.50 |
| across sites | GPP | 1.88 | 1.51 | 1.82 | 1.70 | 1.89 | 1.67 | 1.77 | 1.74 |
|  | ET | 0.54 | 0.57 | 0.75 | 0.52 | 0.51 | 0.57 | 0.67 | 0.49 |
|  |  |  |  |  |  |  |  |  |  |
| overall | GPP | 1.88 | 1.59 | 1.79 | 1.72 |  |  |  |  |
|  | ET | 0.53 | 0.57 | 0.71 | 0.51 |  |  |  |  |

# ProfitMax optimal SDs

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Site Name | Flux | 2003 & 2006 | | | | 2002 & 2005 | | | |
|  | average scenario | extreme scenario | control | calib | average scenario | extreme scenario | control | calib |
| Hyytiala | GPP | 0.00 | 0.04 | 0.15 | 0.03 | 0.00 | 0.04 | 0.16 | 0.03 |
|  | ET | 0.00 | 0.10 | 0.50 | 0.04 | 0.00 | 0.15 | 0.57 | 0.09 |
| Soroe | GPP | 0.00 | 0.24 | 0.20 | 0.26 | 0.00 | 0.14 | 0.11 | 0.18 |
|  | ET | 0.00 | 0.02 | 0.14 | 0.18 | 0.00 | 0.31 | 0.16 | 0.05 |
| Loobos | GPP | 0.00 | 0.09 | 0.11 | 0.07 | 0.00 | 0.13 | 0.15 | 0.13 |
|  | ET | 0.00 | 0.07 | 0.18 | 0.02 | 0.00 | 0.14 | 0.19 | 0.11 |
| Hesse | GPP | 0.43 | 0.00 | 0.26 | 0.41 | 0.43 | 0.00 | 0.26 | 0.40 |
|  | ET | 0.39 | 0.00 | 0.04 | 0.32 | 0.39 | 0.00 | 0.05 | 0.32 |
| Parco | GPP | 0.00 | 0.35 | 0.34 | 0.36 | 0.00 | 0.46 | 0.45 | 0.46 |
|  | ET | 0.00 | 0.05 | 0.22 | 0.12 | 0.00 | 0.08 | 0.31 | 0.14 |
| Puechabon | GPP | 0.00 | 0.23 | 0.34 | 0.33 | 0.00 | 0.23 | 0.38 | 0.32 |
|  | ET | 0.00 | 0.39 | 0.22 | 0.10 | 0.00 | 0.08 | 0.46 | 0.37 |
| Rocca1 | GPP | 0.38 | 0.00 | 0.13 | 0.34 | 0.24 | 0.00 | 0.02 | 0.23 |
|  | ET | 0.28 | 0.00 | 0.07 | 0.20 | 0.06 | 0.00 | 0.76 | 0.00 |
| Rocca2 | GPP | 0.47 | 0.00 | 0.27 | 0.35 | 0.32 | 0.00 | 0.15 | 0.28 |
|  | ET | 0.44 | 0.00 | 0.20 | 0.16 | 0.27 | 0.00 | 0.17 | 0.03 |
| ElSaler1 | GPP | 0.07 | 0.00 | 0.05 | 0.13 | 0.19 | 0.00 | 0.22 | 0.17 |
|  | ET | 0.17 | 0.00 | 0.16 | 0.04 | 0.26 | 0.00 | 0.26 | 0.20 |
| Espirra | GPP | 0.07 | 0.00 | 0.24 | 0.32 | 0.29 | 0.00 | 0.04 | 0.05 |
|  | ET | 0.09 | 0.00 | 0.35 | 0.38 | 0.28 | 0.00 | 0.27 | 0.22 |
| across sites | GPP | 0.29 | 0.19 | 0.21 | 0.26 | 0.29 | 0.20 | 0.19 | 0.23 |
|  | ET | 0.27 | 0.13 | 0.21 | 0.16 | 0.25 | 0.15 | 0.32 | 0.15 |
|  |  |  |  |  |  |  |  |  |  |
| overall | GPP | 0.29 | 0.19 | 0.20 | 0.24 |  |  |  |  |
|  | ET | 0.26 | 0.14 | 0.26 | 0.15 |  |  |  |  |

# ProfitMax optimal P5s

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Site Name | Flux | 2003 & 2006 | | | | 2002 & 2005 | | | |
|  | average scenario | extreme scenario | control | calib | average scenario | extreme scenario | control | calib |
| Hyytiala | GPP | 0.00 | 0.35 | 0.65 | 0.35 | 0.00 | 0.70 | 0.87 | 0.70 |
|  | ET | 0.00 | 0.02 | 0.15 | 0.01 | 0.00 | 0.08 | 0.12 | 0.07 |
| Soroe | GPP | 0.00 | 0.29 | 0.31 | 0.29 | 0.00 | 0.13 | 0.05 | 0.04 |
|  | ET | 0.00 | 0.12 | 0.21 | 0.05 | 0.00 | 0.03 | 0.03 | 0.06 |
| Loobos | GPP | 0.00 | 0.98 | 1.05 | 1.04 | 0.00 | 0.52 | 0.57 | 0.52 |
|  | ET | 0.00 | 0.09 | 0.28 | 0.09 | 0.00 | 0.00 | 0.43 | 0.03 |
| Hesse | GPP | 1.76 | 0.00 | 1.67 | 1.77 | 0.93 | 0.00 | 0.91 | 0.93 |
|  | ET | 0.50 | 0.00 | 0.36 | 0.57 | 0.26 | 0.00 | 0.16 | 0.34 |
| Parco | GPP | 0.00 | 0.26 | 0.28 | 0.26 | 0.00 | 0.11 | 0.11 | 0.11 |
|  | ET | 0.00 | 0.03 | 0.04 | 0.03 | 0.00 | 0.31 | 0.15 | 0.28 |
| Puechabon | GPP | 0.00 | 0.85 | 0.58 | 0.84 | 0.00 | 1.06 | 0.92 | 1.03 |
|  | ET | 0.00 | 0.53 | 0.11 | 0.30 | 0.00 | 0.75 | 0.22 | 0.22 |
| Rocca1 | GPP | 1.00 | 0.00 | 0.67 | 0.79 | 1.75 | 0.00 | 1.70 | 1.78 |
|  | ET | 0.23 | 0.00 | 0.60 | 0.28 | 0.11 | 0.00 | 0.30 | 0.13 |
| Rocca2 | GPP | 0.92 | 0.00 | 0.92 | 0.00 | 2.35 | 0.00 | 2.44 | 2.53 |
|  | ET | 0.26 | 0.00 | 0.59 | 0.43 | 0.20 | 0.00 | 0.06 | 0.06 |
| ElSaler1 | GPP | 0.36 | 0.00 | 0.40 | 0.35 | 0.64 | 0.00 | 0.57 | 0.70 |
|  | ET | 0.00 | 0.00 | 0.32 | 0.11 | 0.21 | 0.00 | 0.10 | 0.37 |
| Espirra | GPP | 0.84 | 0.00 | 1.80 | 1.68 | 0.96 | 0.00 | 0.40 | 0.59 |
|  | ET | 0.39 | 0.00 | 0.60 | 0.67 | 0.21 | 0.00 | 0.12 | 0.18 |
| across sites | GPP | 0.97 | 0.55 | 0.83 | 0.74 | 1.33 | 0.51 | 0.85 | 0.89 |
|  | ET | 0.28 | 0.16 | 0.33 | 0.25 | 0.20 | 0.23 | 0.17 | 0.17 |
|  |  |  |  |  |  |  |  |  |  |
| overall | GPP | 1.15 | 0.53 | 0.84 | 0.82 |  |  |  |  |
|  | ET | 0.24 | 0.20 | 0.25 | 0.21 |  |  |  |  |

# ProfitMax optimal P95s

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Site Name | Flux | 2003 & 2006 | | | | 2002 & 2005 | | | |
|  | average scenario | extreme scenario | control | calib | average scenario | extreme scenario | control | calib |
| Hyytiala | GPP | 0.00 | 0.80 | 1.74 | 0.72 | 0.00 | 1.70 | 2.59 | 1.62 |
|  | ET | 0.00 | 0.28 | 1.39 | 0.07 | 0.00 | 0.36 | 1.55 | 0.18 |
| Soroe | GPP | 0.00 | 3.26 | 2.84 | 3.59 | 0.00 | 2.40 | 1.80 | 2.65 |
|  | ET | 0.00 | 0.18 | 0.57 | 0.59 | 0.00 | 1.01 | 0.48 | 0.29 |
| Loobos | GPP | 0.00 | 1.66 | 1.88 | 1.63 | 0.00 | 1.58 | 1.83 | 1.55 |
|  | ET | 0.00 | 0.12 | 0.74 | 0.00 | 0.00 | 0.23 | 0.80 | 0.13 |
| Hesse | GPP | 4.22 | 0.00 | 1.60 | 3.80 | 4.48 | 0.00 | 2.19 | 4.24 |
|  | ET | 0.74 | 0.00 | 0.46 | 0.45 | 1.04 | 0.00 | 0.57 | 0.72 |
| Parco | GPP | 0.00 | 3.34 | 3.12 | 3.39 | 0.00 | 6.16 | 5.98 | 6.21 |
|  | ET | 0.00 | 0.54 | 1.10 | 0.75 | 0.00 | 0.03 | 1.07 | 0.35 |
| Puechabon | GPP | 0.00 | 0.37 | 1.62 | 1.00 | 0.00 | 0.88 | 2.01 | 1.42 |
|  | ET | 0.00 | 1.18 | 0.51 | 0.05 | 0.00 | 0.27 | 1.58 | 1.03 |
| Rocca1 | GPP | 3.20 | 0.00 | 2.27 | 3.02 | 0.41 | 0.00 | 1.40 | 0.36 |
|  | ET | 1.26 | 0.00 | 0.49 | 1.04 | 0.16 | 0.00 | 2.02 | 0.02 |
| Rocca2 | GPP | 4.94 | 0.00 | 4.03 | 4.27 | 0.62 | 0.00 | 0.94 | 0.08 |
|  | ET | 2.06 | 0.00 | 1.36 | 1.23 | 1.02 | 0.00 | 0.58 | 0.13 |
| ElSaler1 | GPP | 0.04 | 0.00 | 0.25 | 0.12 | 0.80 | 0.00 | 1.02 | 0.65 |
|  | ET | 0.60 | 0.00 | 0.73 | 0.29 | 0.38 | 0.00 | 0.60 | 0.09 |
| Espirra | GPP | 0.19 | 0.00 | 0.24 | 0.13 | 0.75 | 0.00 | 0.49 | 0.52 |
|  | ET | 0.80 | 0.00 | 0.05 | 0.25 | 0.33 | 0.00 | 0.33 | 0.13 |
| across sites | GPP | 2.52 | 1.88 | 1.96 | 2.17 | 1.41 | 2.54 | 2.03 | 1.93 |
|  | ET | 1.09 | 0.46 | 0.74 | 0.47 | 0.59 | 0.38 | 0.96 | 0.31 |
|  |  |  |  |  |  |  |  |  |  |
| overall | GPP | 1.97 | 2.21 | 1.99 | 2.05 |  |  |  |  |
|  | ET | 0.84 | 0.42 | 0.85 | 0.39 |  |  |  |  |

# % overall improvement on Control metrics

|  |  |  |  |
| --- | --- | --- | --- |
| metric | flux | climate | calib |
| NMSE | GPP | 5.90 | 6.82 |
| ET | 54.21 | 62.90 |
| MAE | GPP | 3.23 | 3.85 |
| ET | 22.76 | 28.96 |
| SD | GPP | -19.61 | -20.54 |
| ET | 23.83 | 41.23 |
| P5 | GPP | 0.58 | 3.25 |
| ET | 12.76 | 13.90 |
| P95 | GPP | -4.82 | -2.75 |
| ET | 25.74 | 54.01 |

# ProfitMax optimal Quantile Ranks

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Site Name | Flux | 2003 & 2006 | | | | 2002 & 2005 | |
|  | climate | control | calib | climate | control | calib |
| Hyytiala | GPP | 0.44 | 1.00 | 0.32 | 0.48 | 1.00 | 0.24 |
|  | ET | 0.40 | 1.00 | 0.20 | 0.44 | 1.00 | 0.20 |
| Soroe | GPP | 0.44 | 0.36 | 0.96 | 0.76 | 0.28 | 0.72 |
|  | ET | 0.64 | 0.88 | 0.60 | 0.88 | 0.36 | 0.40 |
| Loobos | GPP | 0.28 | 0.96 | 0.48 | 0.40 | 1.00 | 0.20 |
|  | ET | 0.40 | 0.96 | 0.44 | 0.36 | 0.96 | 0.28 |
| Hesse | GPP | 0.56 | 0.48 | 0.44 | 0.64 | 0.20 | 0.52 |
|  | ET | 0.60 | 0.56 | 0.64 | 0.56 | 0.48 | 0.56 |
| Parco | GPP | 0.60 | 0.44 | 0.56 | 0.56 | 0.36 | 0.76 |
|  | ET | 0.48 | 0.92 | 0.40 | 0.52 | 0.72 | 0.48 |
| Puechabon | GPP | 0.60 | 0.52 | 0.76 | 0.64 | 0.56 | 0.52 |
|  | ET | 0.80 | 0.36 | 0.28 | 0.60 | 0.80 | 0.44 |
| Rocca1 | GPP | 0.92 | 0.56 | 0.52 | 0.52 | 0.68 | 0.60 |
|  | ET | 0.68 | 0.72 | 0.40 | 0.36 | 0.96 | 0.44 |
| Rocca2 | GPP | 0.92 | 0.64 | 0.36 | 0.64 | 0.76 | 0.52 |
|  | ET | 0.68 | 0.84 | 0.44 | 0.88 | 0.52 | 0.40 |
| ElSaler1 | GPP | 0.60 | 0.56 | 0.76 | 0.56 | 0.80 | 0.68 |
|  | ET | 0.36 | 0.88 | 0.44 | 0.52 | 0.72 | 0.36 |
| Espirra | GPP | 0.56 | 0.84 | 0.80 | 0.60 | 0.20 | 0.40 |
|  | ET | 0.36 | 0.76 | 0.76 | 0.48 | 0.32 | 0.56 |
| across sites mean | GPP | 0.59 | 0.64 | 0.60 | 0.58 | 0.58 | 0.52 |
|  | ET | 0.54 | 0.79 | 0.46 | 0.56 | 0.68 | 0.41 |
| across sites median | GPP | 0.58 | 0.56 | 0.54 | 0.58 | 0.62 | 0.52 |
|  | ET | 0.54 | 0.86 | 0.44 | 0.52 | 0.72 | 0.42 |
|  |  |  |  |  |  |  |  |
| overall mean | GPP | 0.59 | 0.61 | 0.56 |  |  |  |
|  | ET | 0.55 | 0.74 | 0.44 |  |  |  |
| overall median | GPP | 0.58 | 0.56 | 0.52 |  |  |  |
|  | ET | 0.52 | 0.78 | 0.44 |  |  |  |

# ProfitMax high Quantile Ranks

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Site Name | Flux | 2003 & 2006 | | | | 2002 & 2005 | |
|  | climate | control | calib | climate | control | calib |
| Hyytiala | GPP | 0.56 |  |  | 0.60 |  |  |
|  | ET | 0.60 |  |  | 0.56 |  |  |
| Soroe | GPP | 0.56 |  |  | 0.72 |  |  |
|  | ET | 0.44 |  |  | 0.76 |  |  |
| Loobos | GPP | 0.48 |  |  | 0.60 |  |  |
|  | ET | 0.48 |  |  | 0.56 |  |  |
| Hesse | GPP | 0.68 |  |  | 0.76 |  |  |
|  | ET | 0.56 |  |  | 0.60 |  |  |
| Parco | GPP | 0.56 |  |  | 0.32 |  |  |
|  | ET | 0.68 |  |  | 0.84 |  |  |
| Puechabon | GPP | 0.32 |  |  | 0.68 |  |  |
|  | ET | 0.92 |  |  | 0.72 |  |  |
| Rocca1 | GPP | 0.28 |  |  | 0.64 |  |  |
|  | ET | 0.64 |  |  | 0.84 |  |  |
| Rocca2 | GPP | 0.44 |  |  | 0.60 |  |  |
|  | ET | 0.48 |  |  | 0.52 |  |  |
| ElSaler1 | GPP | 0.56 |  |  | 0.52 |  |  |
|  | ET | 0.56 |  |  | 0.64 |  |  |
| Espirra | GPP | 0.40 |  |  | 0.80 |  |  |
|  | ET | 0.48 |  |  | 0.72 |  |  |

# ProfitMax low Quantile Ranks

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Site Name | Flux | 2003 & 2006 | | | | 2002 & 2005 | |
|  | climate | control | calib | climate | control | calib |
| Hyytiala | GPP | 0.68 |  |  | 0.68 |  |  |
|  | ET | 0.80 |  |  | 0.80 |  |  |
| Soroe | GPP | 0.68 |  |  | 0.52 |  |  |
|  | ET | 0.44 |  |  | 0.60 |  |  |
| Loobos | GPP | 0.80 |  |  | 0.80 |  |  |
|  | ET | 0.72 |  |  | 0.84 |  |  |
| Hesse | GPP | 0.84 |  |  | 0.88 |  |  |
|  | ET | 0.64 |  |  | 0.80 |  |  |
| Parco | GPP | 0.84 |  |  | 1.00 |  |  |
|  | ET | 0.52 |  |  | 0.44 |  |  |
| Puechabon | GPP | 0.80 |  |  | 0.60 |  |  |
|  | ET | 0.64 |  |  | 0.44 |  |  |
| Rocca1 | GPP | 0.72 |  |  | 0.56 |  |  |
|  | ET | 0.56 |  |  | 0.40 |  |  |
| Rocca2 | GPP | 0.64 |  |  | 0.48 |  |  |
|  | ET | 0.56 |  |  | 0.68 |  |  |
| ElSaler1 | GPP | 0.52 |  |  | 0.44 |  |  |
|  | ET | 0.76 |  |  | 0.76 |  |  |
| Espirra | GPP | 0.40 |  |  | 1.00 |  |  |
|  | ET | 0.64 |  |  | 0.92 |  |  |

# Total GPP April-November (g C/m2)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Site Name | years | average scenario | extreme scenario | control | calib | obs |
| Hyytiala | 2003 & 2006 | 1198.06 | 1589.12 | 1405.45 | 1592.81 | 1983.06 |
|  | 2002 & 2005 | 1237.83 | 1639.81 | 1440.04 | 1646.58 | 2126.01 |
|  | across years | 1217.94 | 1614.47 | 1422.75 | 1619.69 | 2054.53 |
| Soroe | 2003 & 2006 | 2900.55 | 3321.48 | 3442.51 | 3283.56 | 3710.80 |
|  | 2002 & 2005 | 2911.35 | 3245.78 | 3378.10 | 3240.92 | 3636.09 |
|  | across years | 2905.95 | 3283.63 | 3410.31 | 3262.24 | 3673.45 |
| Loobos | 2003 & 2006 | 1779.31 | 2245.04 | 2183.38 | 2246.08 | 2600.41 |
|  | 2002 & 2005 | 1876.64 | 2298.90 | 2228.18 | 2307.70 | 2851.55 |
|  | across years | 1827.98 | 2271.97 | 2205.78 | 2276.89 | 2725.98 |
| Hesse | 2003 & 2006 | 1421.41 | 1431.46 | 1671.68 | 1462.26 | 1413.34 |
|  | 2002 & 2005 | 1570.31 | 1728.47 | 1815.72 | 1608.64 | 1916.82 |
|  | across years | 1495.86 | 1579.97 | 1743.70 | 1535.45 | 1665.08 |
| Parco | 2003 & 2006 | 873.63 | 989.93 | 999.34 | 989.59 | 1382.08 |
|  | 2002 & 2005 | 994.65 | 1091.58 | 1107.18 | 1085.15 | 1721.45 |
|  | across years | 934.14 | 1040.76 | 1053.26 | 1037.37 | 1551.76 |
| Puechabon | 2003 & 2006 | 1908.06 | 2138.77 | 1791.68 | 2088.84 | 1535.74 |
|  | 2002 & 2005 | 2008.21 | 2354.37 | 1980.27 | 2194.27 | 1815.51 |
|  | across years | 1958.13 | 2246.57 | 1885.98 | 2141.55 | 1675.63 |
| Rocca1 | 2003 & 2006 | 2700.21 | 2663.53 | 2788.93 | 2721.39 | 2608.52 |
|  | 2002 & 2005 | 3077.07 | 3303.10 | 3414.05 | 3120.46 | 2731.29 |
|  | across years | 2888.64 | 2983.31 | 3101.49 | 2920.92 | 2669.91 |
| Rocca2 | 2003 & 2006 | 2719.19 | 2693.19 | 2816.95 | 2806.10 | 3032.71 |
|  | 2002 & 2005 | 3005.15 | 3180.30 | 3312.62 | 3159.03 | 2860.58 |
|  | across years | 2862.17 | 2936.74 | 3064.79 | 2982.56 | 2946.65 |
| ElSaler1 | 2003 & 2006 | 1060.84 | 967.32 | 990.13 | 1065.69 | 929.19 |
|  | 2002 & 2005 | 1150.18 | 1214.34 | 1123.70 | 1178.55 | 1098.43 |
|  | across years | 1105.51 | 1090.83 | 1056.91 | 1122.12 | 1013.81 |
| Espirra | 2003 & 2006 | 1124.75 | 934.83 | 1082.86 | 1081.26 | 1256.36 |
|  | 2002 & 2005 | 1172.61 | 940.83 | 1103.05 | 1125.41 | 1200.88 |
|  | across years | 1148.68 | 937.83 | 1092.95 | 1103.33 | 1228.62 |

# % total April-Nov improvement on GPP Control

|  |  |  |  |
| --- | --- | --- | --- |
| Site Name | average scenario | extreme scenario | calib |
| Hyytiala | -32.42 | 30.35 | 31.17 |
| Soroe | -191.67 | -48.14 | -56.27 |
| Loobos | -72.63 | 12.72 | 13.67 |
| Hesse | -115.25 | -8.27 | -64.89 |
| Parco | -23.90 | -2.51 | -3.19 |
| Puechabon | -34.30 | -171.43 | -121.50 |
| Rocca1 | 49.32 | 27.38 | 41.84 |
| Rocca2 | 28.49 | 91.61 | 69.60 |
| ElSaler1 | -112.74 | -78.69 | -151.28 |
| Espirra | 41.07 | -114.34 | 7.65 |

# Total ET April-November (mm)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Site Name | years | average scenario | extreme scenario | control | calib | obs |
| Hyytiala | 2003 & 2006 | 206.78 | 520.66 | 250.25 | 551.66 | 526.92 |
|  | 2002 & 2005 | 213.07 | 539.47 | 255.46 | 572.86 | 546.80 |
|  | across years | 209.92 | 530.07 | 252.86 | 562.26 | 536.86 |
| Soroe | 2003 & 2006 | 440.94 | 892.17 | 680.17 | 771.87 | 850.35 |
|  | 2002 & 2005 | 414.50 | 835.93 | 642.71 | 722.95 | 681.23 |
|  | across years | 427.72 | 864.05 | 661.44 | 747.41 | 765.79 |
| Loobos | 2003 & 2006 | 307.53 | 718.36 | 471.99 | 742.99 | 747.92 |
|  | 2002 & 2005 | 327.34 | 737.57 | 470.08 | 767.27 | 784.45 |
|  | across years | 317.44 | 727.97 | 471.03 | 755.13 | 766.18 |
| Hesse | 2003 & 2006 | 362.90 | 648.97 | 419.74 | 401.51 | 278.90 |
|  | 2002 & 2005 | 344.68 | 836.66 | 441.26 | 386.58 | 335.64 |
|  | across years | 353.79 | 742.81 | 430.50 | 394.05 | 307.27 |
| Parco | 2003 & 2006 | 243.44 | 414.43 | 331.89 | 400.52 | 473.50 |
|  | 2002 & 2005 | 243.67 | 471.63 | 317.17 | 434.58 | 389.87 |
|  | across years | 243.56 | 443.03 | 324.53 | 417.55 | 431.69 |
| Puechabon | 2003 & 2006 | 473.74 | 871.21 | 399.13 | 652.70 | 468.73 |
|  | 2002 & 2005 | 461.99 | 992.25 | 440.09 | 646.17 | 580.61 |
|  | across years | 467.86 | 931.73 | 419.61 | 649.44 | 524.67 |
| Rocca1 | 2003 & 2006 | 728.75 | 945.63 | 773.66 | 752.69 | 828.13 |
|  | 2002 & 2005 | 742.58 | 1182.15 | 980.39 | 777.47 | 636.25 |
|  | across years | 735.67 | 1063.89 | 877.03 | 765.08 | 732.19 |
| Rocca2 | 2003 & 2006 | 704.18 | 935.93 | 777.64 | 822.45 | 921.37 |
|  | 2002 & 2005 | 717.91 | 1138.76 | 930.12 | 891.60 | 849.87 |
|  | across years | 711.04 | 1037.35 | 853.88 | 857.03 | 885.62 |
| ElSaler1 | 2003 & 2006 | 315.13 | 419.08 | 216.27 | 351.58 | 366.23 |
|  | 2002 & 2005 | 336.95 | 550.50 | 246.96 | 399.29 | 371.87 |
|  | across years | 326.04 | 484.79 | 231.61 | 375.43 | 369.05 |
| Espirra | 2003 & 2006 | 314.78 | 404.95 | 276.03 | 340.69 | 394.88 |
|  | 2002 & 2005 | 322.44 | 419.02 | 282.20 | 349.43 | 272.09 |
|  | across years | 318.61 | 411.98 | 279.12 | 345.06 | 333.48 |

# % total April-Nov improvement on ET Control

|  |  |  |  |
| --- | --- | --- | --- |
| Site Name | average scenario | extreme scenario | calib |
| Hyytiala | -15.12 | 97.61 | 91.06 |
| Soroe | -224.00 | 5.83 | 82.39 |
| Loobos | -52.04 | 87.05 | 96.25 |
| Hesse | 62.25 | -253.44 | 29.58 |
| Parco | -75.56 | 89.42 | 86.81 |
| Puechabon | 45.93 | -287.45 | -18.75 |
| Rocca1 | 97.60 | -129.02 | 77.29 |
| Rocca2 | -449.99 | -378.00 | 9.92 |
| ElSaler1 | 68.70 | 15.79 | 95.36 |
| Espirra | 72.64 | -44.40 | 78.70 |

# Es:ET & E:ET average instantaneous ratios April-November

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Site Name | years | control Es:ET | calib Es:ET | control E:ET | calib E:ET |
| Hyytiala | 2003 & 2006 | 0.59 | 0.20 | 1.41 | 1.80 |
|  | 2002 & 2005 | 0.59 | 0.15 | 1.41 | 1.85 |
|  | across years | 0.59 | 0.17 | 1.41 | 1.83 |
| Soroe | 2003 & 2006 | 0.23 | 0.16 | 1.77 | 1.84 |
|  | 2002 & 2005 | 0.18 | 0.13 | 1.82 | 1.87 |
|  | across years | 0.20 | 0.15 | 1.80 | 1.85 |
| Loobos | 2003 & 2006 | 0.40 | 0.16 | 1.60 | 1.84 |
|  | 2002 & 2005 | 0.46 | 0.19 | 1.54 | 1.81 |
|  | across years | 0.43 | 0.17 | 1.57 | 1.83 |
| Hesse | 2003 & 2006 | 0.05 | 0.04 | 0.95 | 0.96 |
|  | 2002 & 2005 | 0.07 | 0.06 | 0.93 | 0.94 |
|  | across years | 0.06 | 0.05 | 0.94 | 0.95 |
| Parco | 2003 & 2006 | 0.04 | 0.03 | 0.96 | 0.97 |
|  | 2002 & 2005 | 0.16 | 0.12 | 0.84 | 0.88 |
|  | across years | 0.10 | 0.08 | 0.90 | 0.92 |
| Puechabon | 2003 & 2006 | 0.17 | 0.08 | 1.83 | 1.92 |
|  | 2002 & 2005 | 0.17 | 0.09 | 1.83 | 1.91 |
|  | across years | 0.17 | 0.08 | 1.83 | 1.92 |
| Rocca1 | 2003 & 2006 | 0.09 | 0.11 | 1.91 | 1.89 |
|  | 2002 & 2005 | 0.09 | 0.14 | 1.91 | 1.86 |
|  | across years | 0.09 | 0.12 | 1.91 | 1.88 |
| Rocca2 | 2003 & 2006 | 0.10 | 0.11 | 1.90 | 1.89 |
|  | 2002 & 2005 | 0.12 | 0.14 | 1.88 | 1.86 |
|  | across years | 0.11 | 0.12 | 1.89 | 1.88 |
| ElSaler1 | 2003 & 2006 | 0.10 | 0.06 | 0.90 | 0.94 |
|  | 2002 & 2005 | 0.09 | 0.05 | 0.91 | 0.95 |
|  | across years | 0.10 | 0.06 | 0.90 | 0.94 |
| Espirra | 2003 & 2006 | 0.06 | 0.03 | 0.94 | 0.97 |
|  | 2002 & 2005 | 0.08 | 0.04 | 0.92 | 0.96 |
|  | across years | 0.07 | 0.04 | 0.93 | 0.96 |