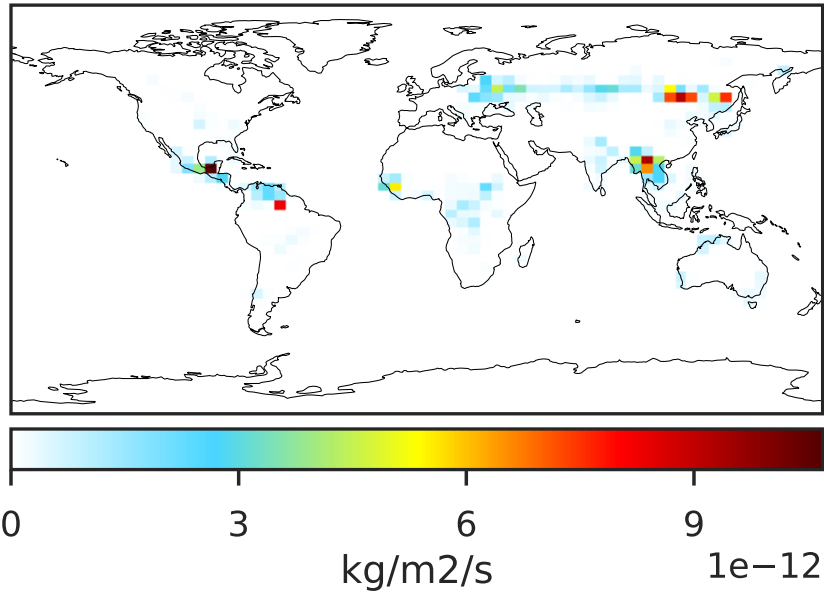
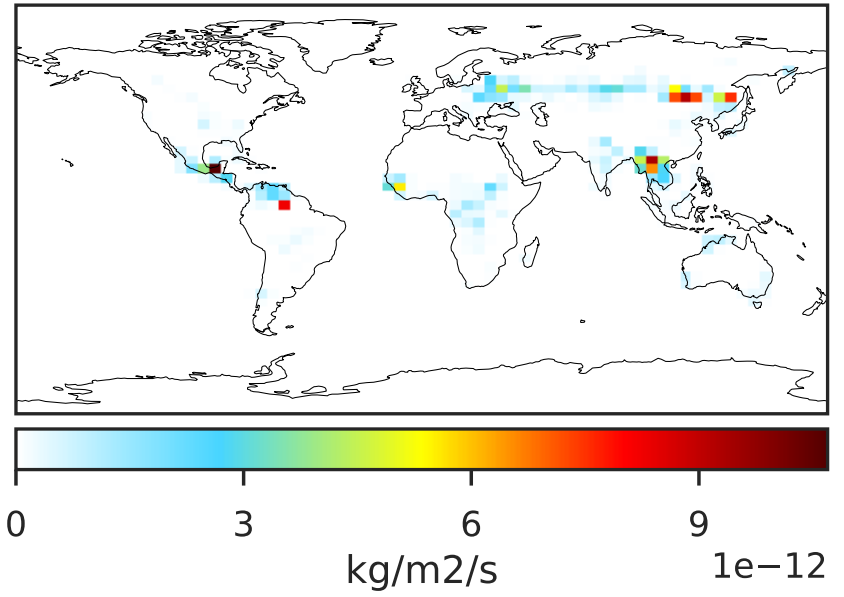


EmisACET_BioBurn (Apr2019)

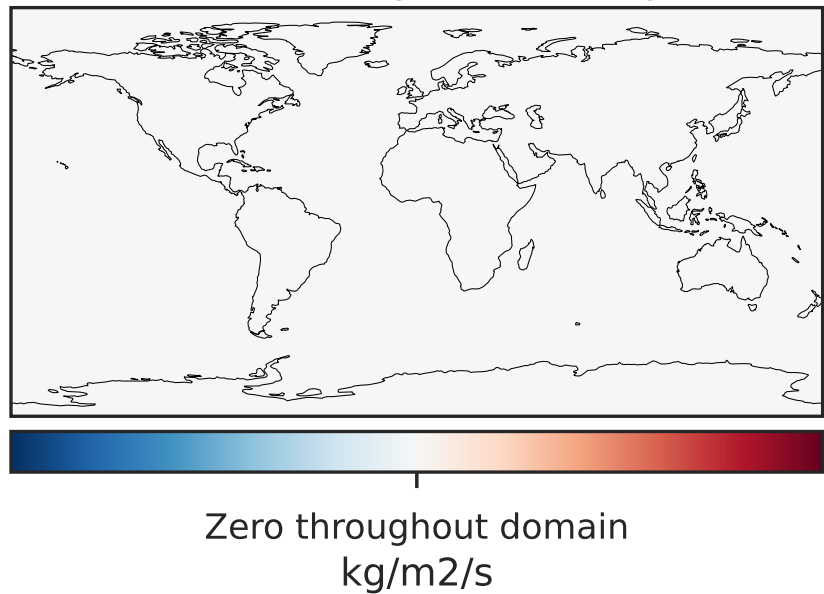
14.2.0-rc.2 (Ref)
4.0x5.0



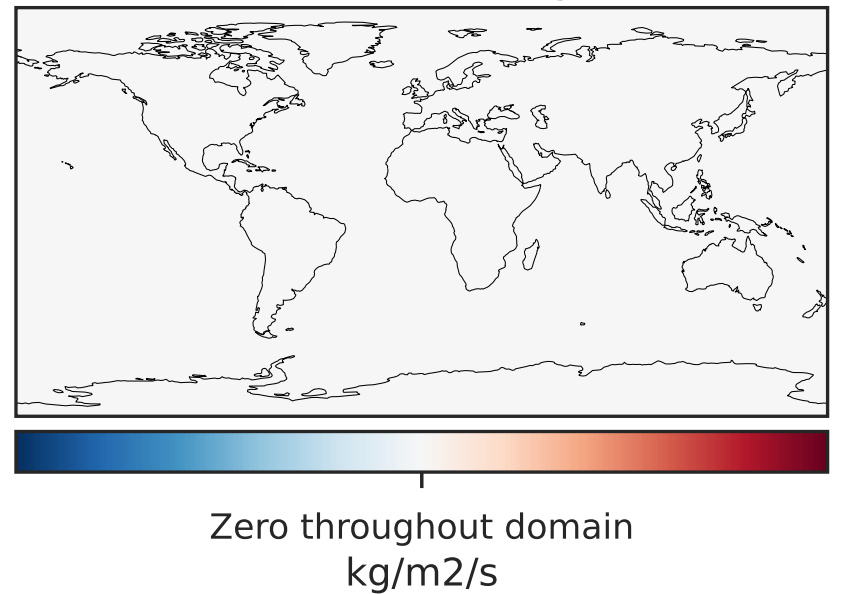
14.3.0-rc.0 (Dev)
4.0x5.0



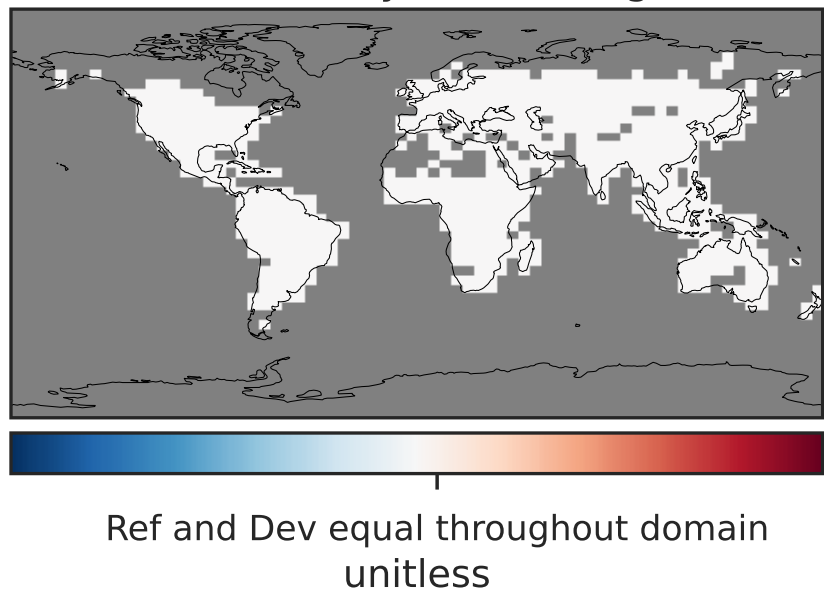
Difference
Dev - Ref, Dynamic Range



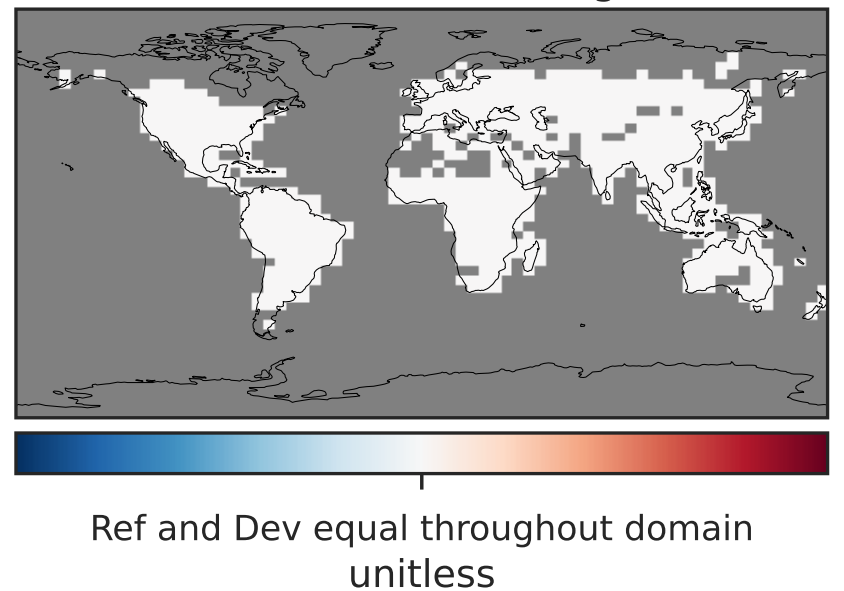
Difference
Dev - Ref, Restricted Range [5%,95%]



Ratio
Dev/Ref, Dynamic Range

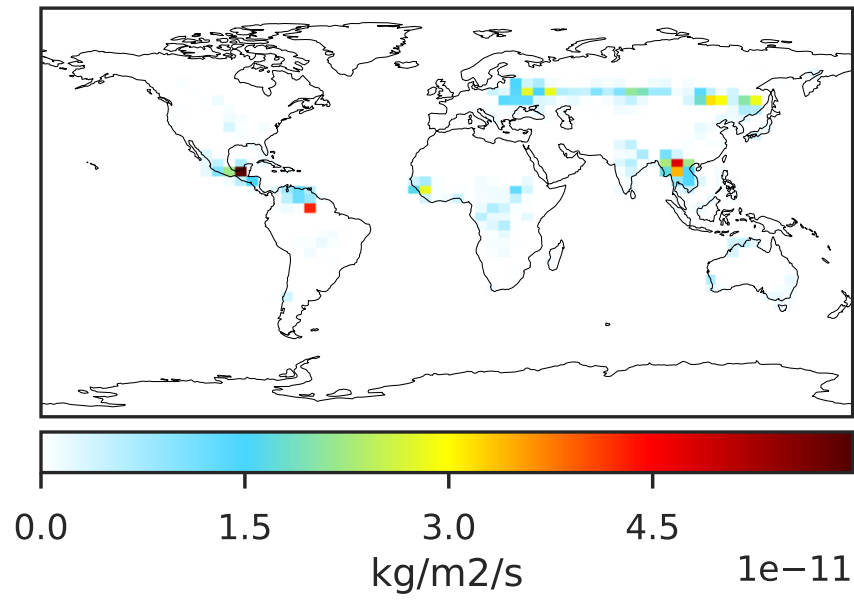


Ratio
Dev/Ref, Fixed Range

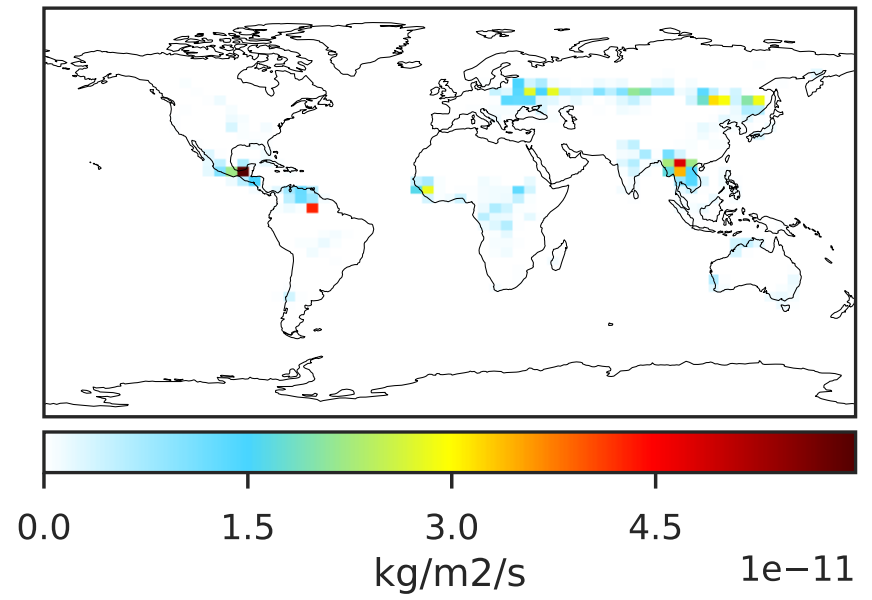


EmisACTA_BioBurn (Apr2019)

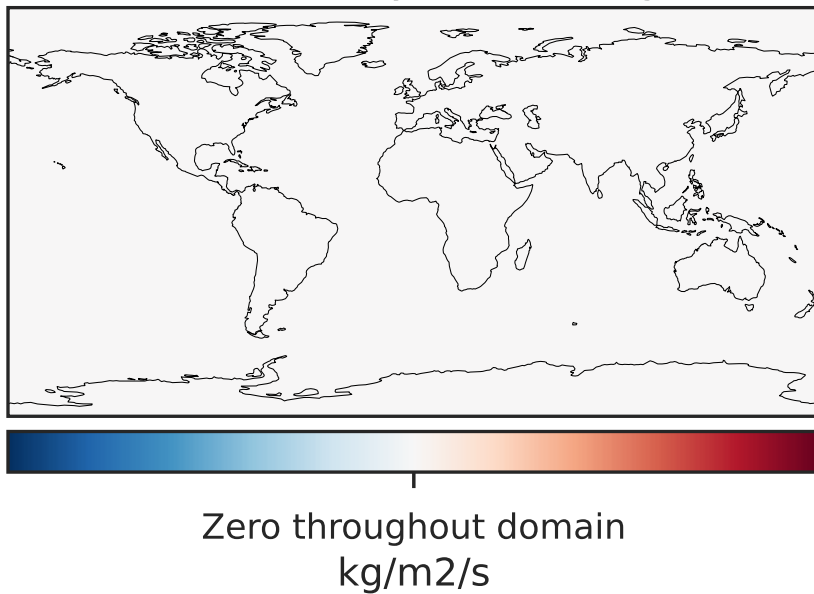
14.2.0-rc.2 (Ref)
4.0x5.0



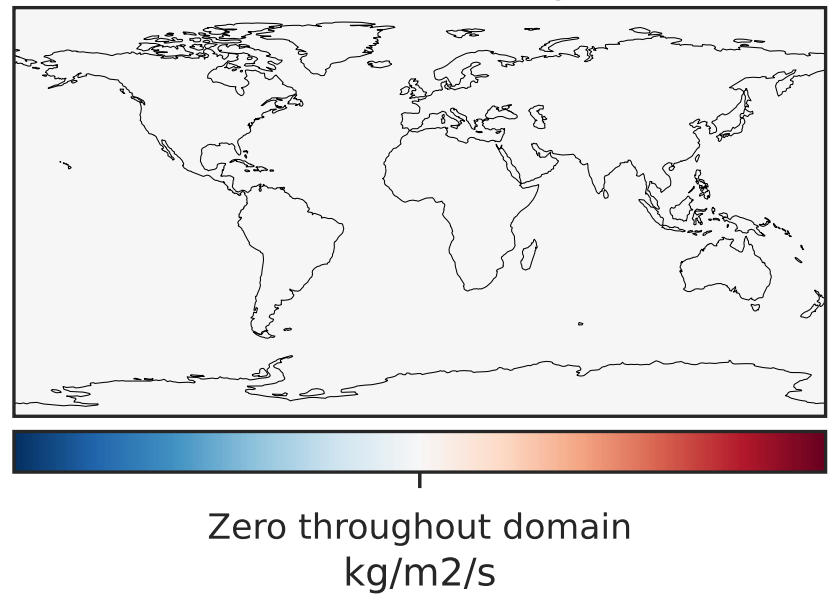
14.3.0-rc.0 (Dev)
4.0x5.0



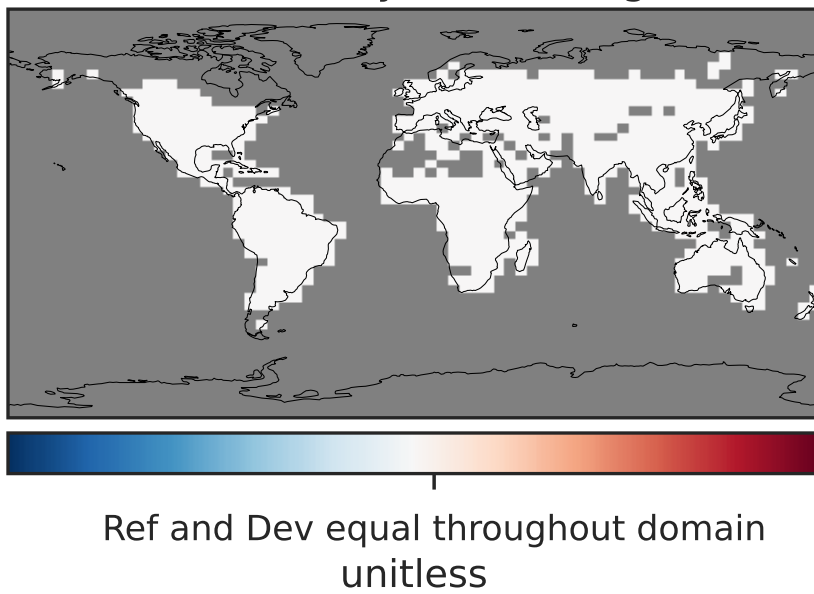
Difference
Dev - Ref, Dynamic Range



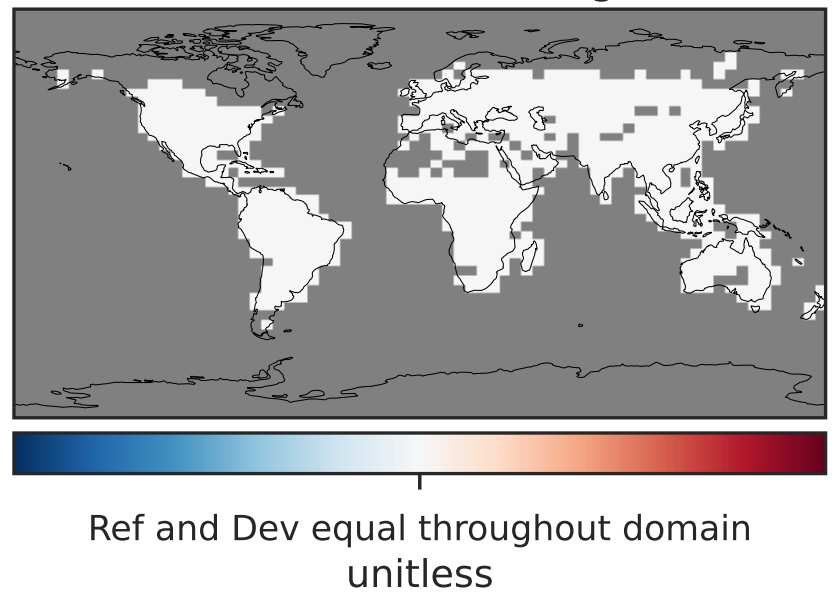
Difference
Dev - Ref, Restricted Range [5%,95%]



Ratio
Dev/Ref, Dynamic Range

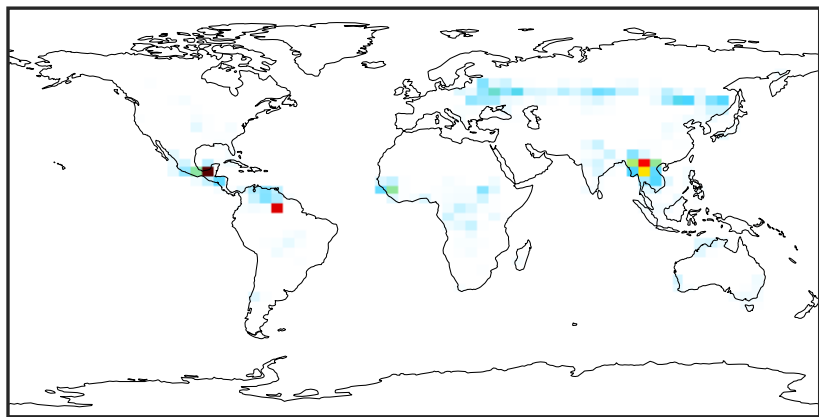


Ratio
Dev/Ref, Fixed Range



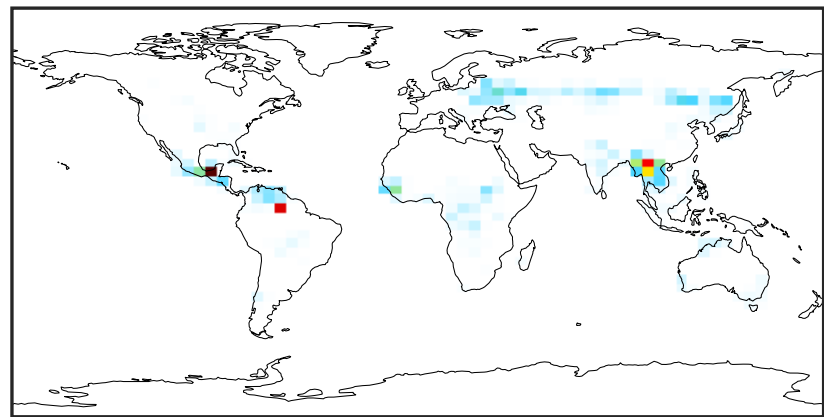
EmisALD2_BioBurn (Apr2019)

14.2.0-rc.2 (Ref)
4.0x5.0



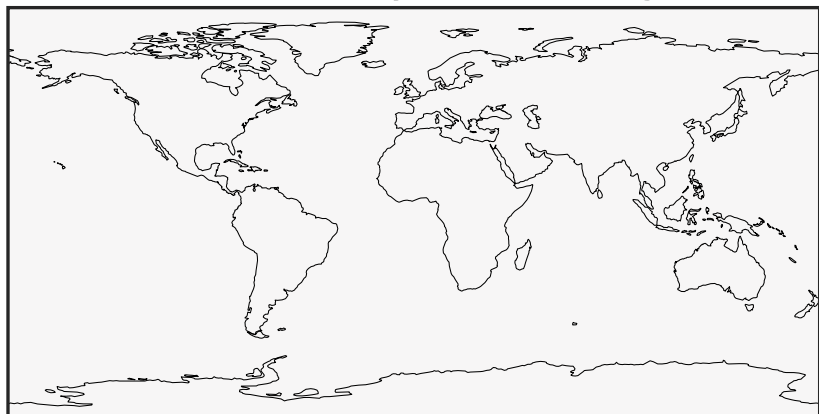
0.0 0.8 1.6 2.4 $1e-11$
kg/m²/s

14.3.0-rc.0 (Dev)
4.0x5.0



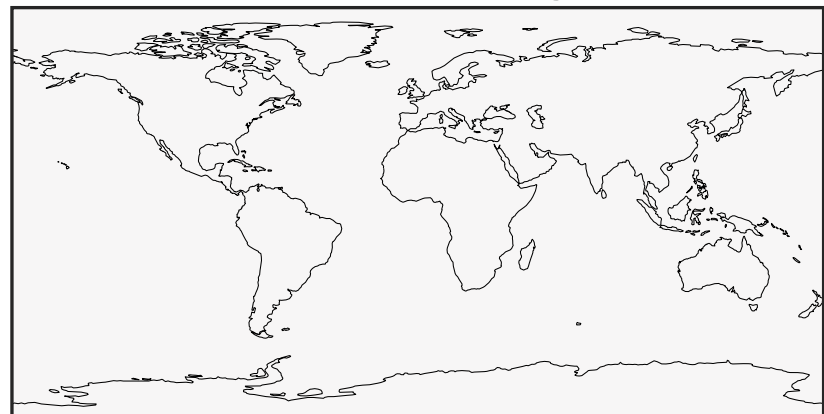
0.0 0.8 1.6 2.4 $1e-11$
kg/m²/s

Difference
Dev - Ref, Dynamic Range



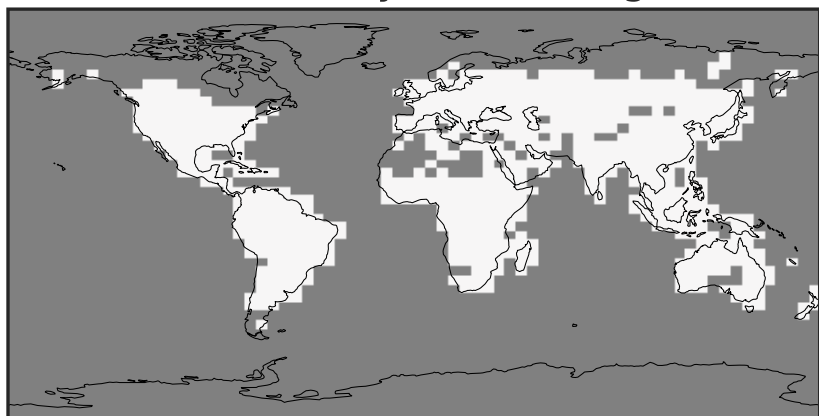
Zero throughout domain
kg/m²/s

Difference
Dev - Ref, Restricted Range [5%,95%]



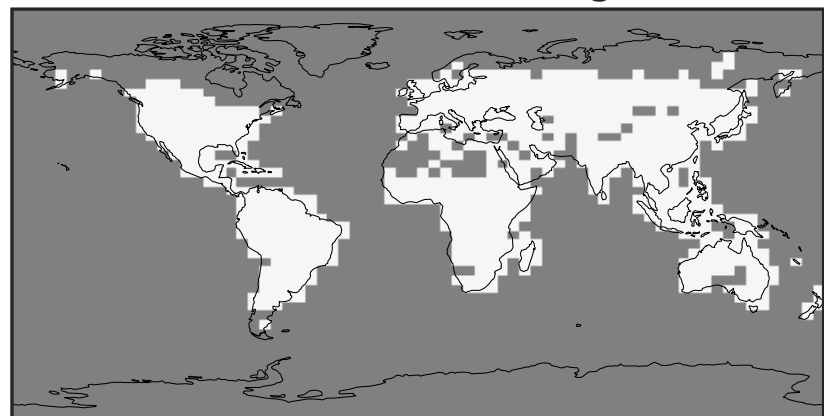
Zero throughout domain
kg/m²/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

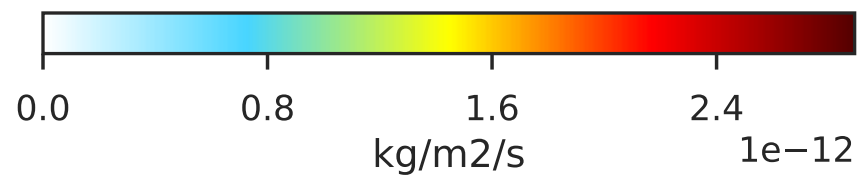
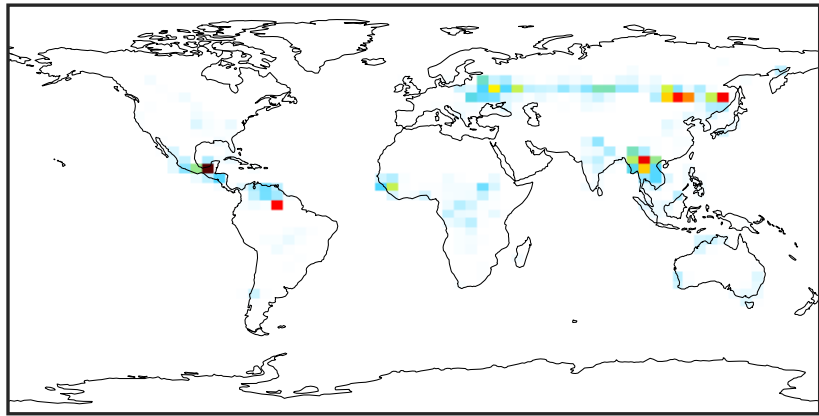
Ratio
Dev/Ref, Fixed Range



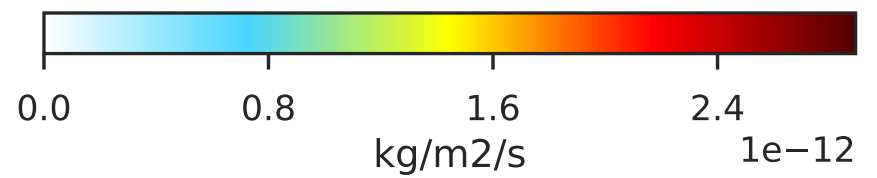
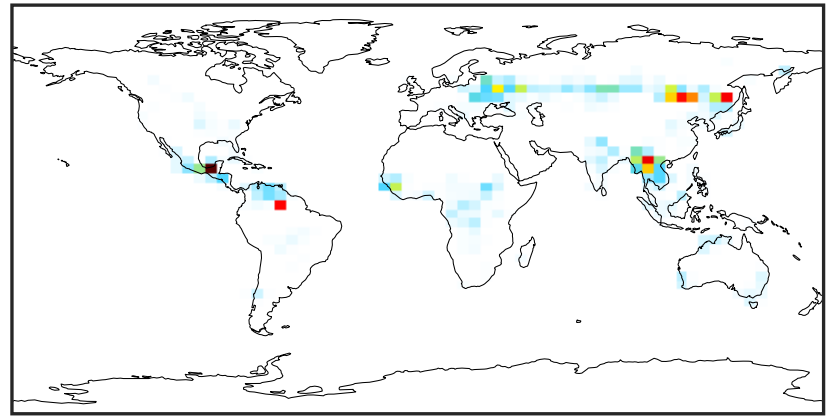
Ref and Dev equal throughout domain
unitless

EmisALK4_BioBurn (Apr2019)

14.2.0-rc.2 (Ref)
4.0x5.0



14.3.0-rc.0 (Dev)
4.0x5.0

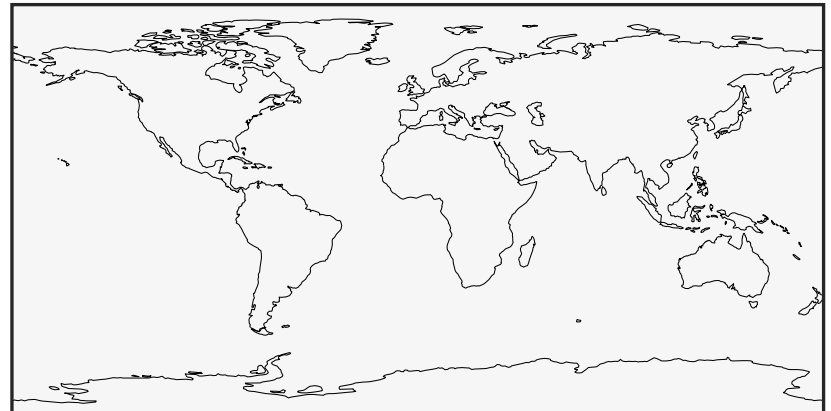


Difference
Dev - Ref, Dynamic Range



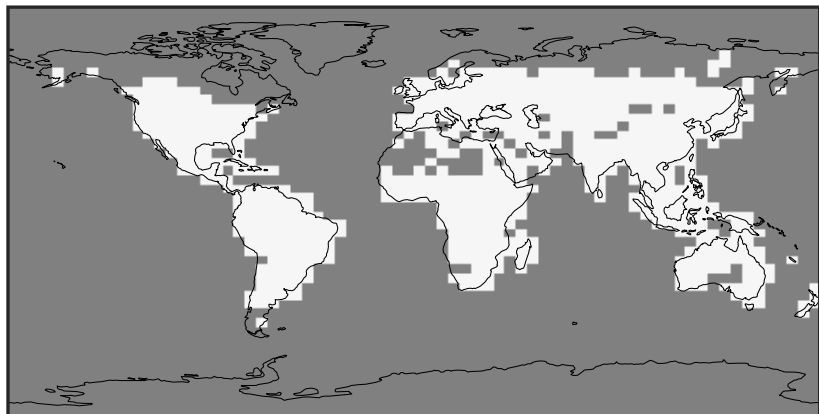
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



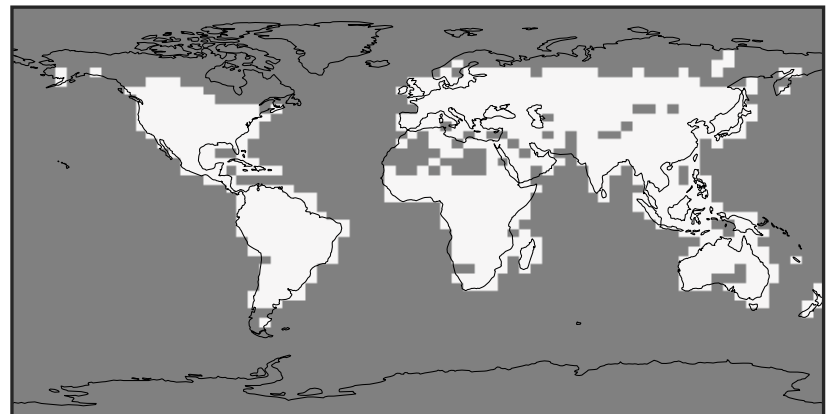
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

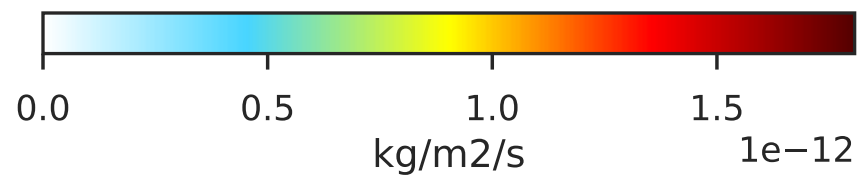
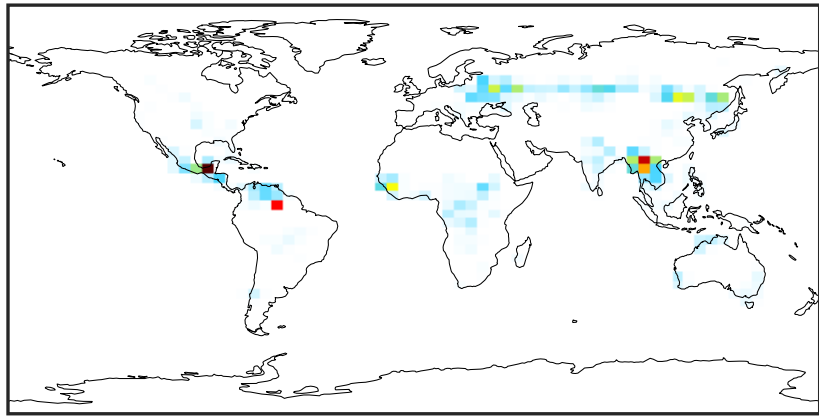
Ratio
Dev/Ref, Fixed Range



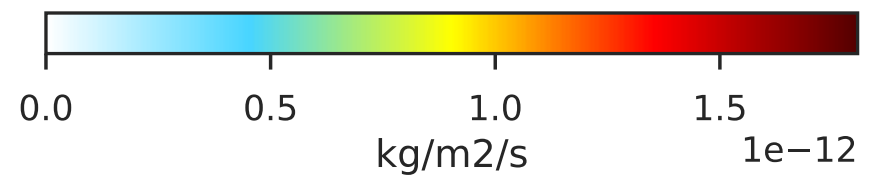
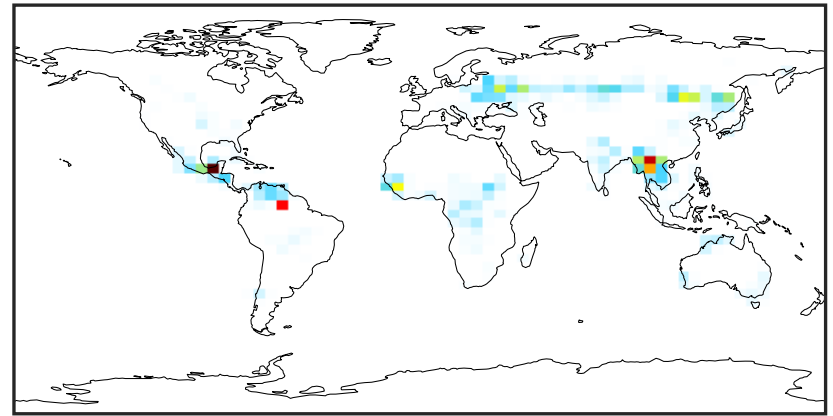
Ref and Dev equal throughout domain
unitless

EmisBCPI_BioBurn (Apr2019)

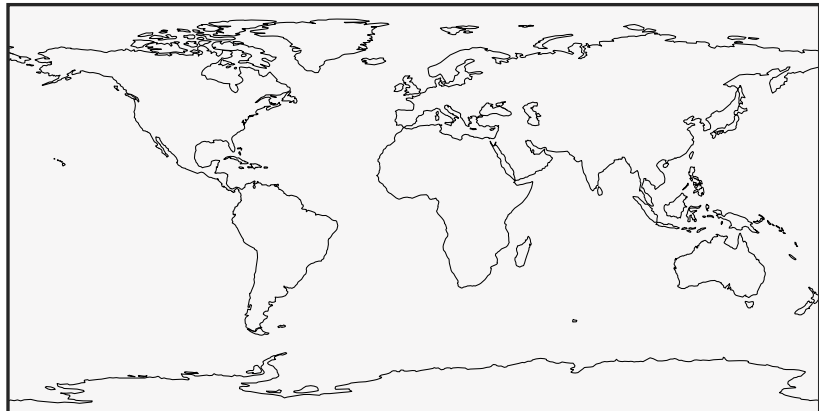
14.2.0-rc.2 (Ref)
4.0x5.0



14.3.0-rc.0 (Dev)
4.0x5.0



Difference
Dev - Ref, Dynamic Range



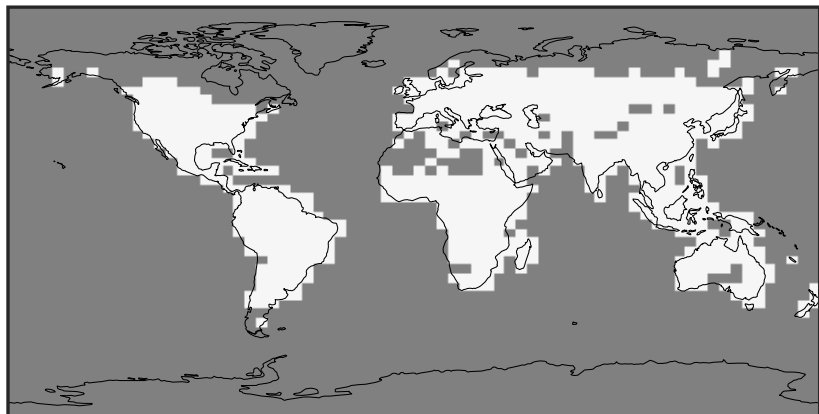
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



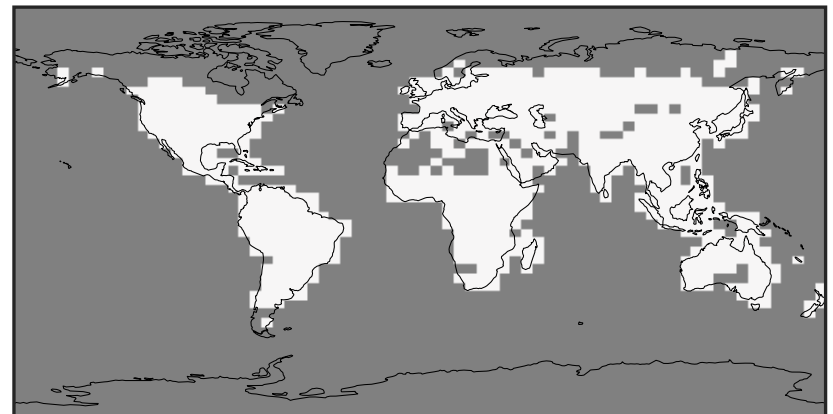
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

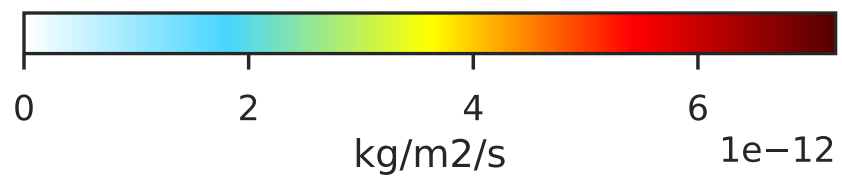
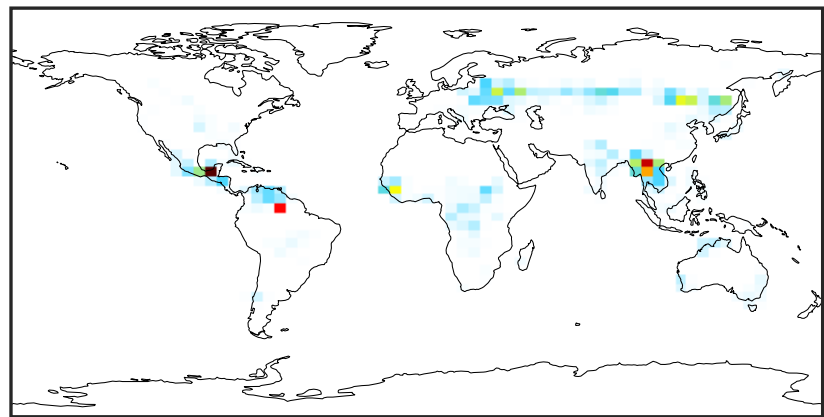
Ratio
Dev/Ref, Fixed Range



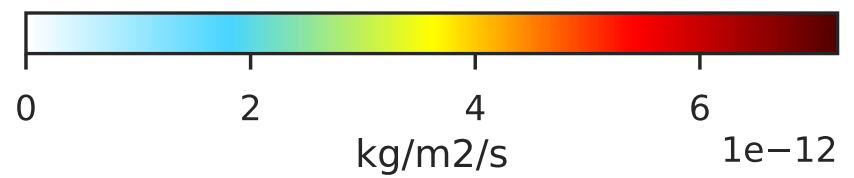
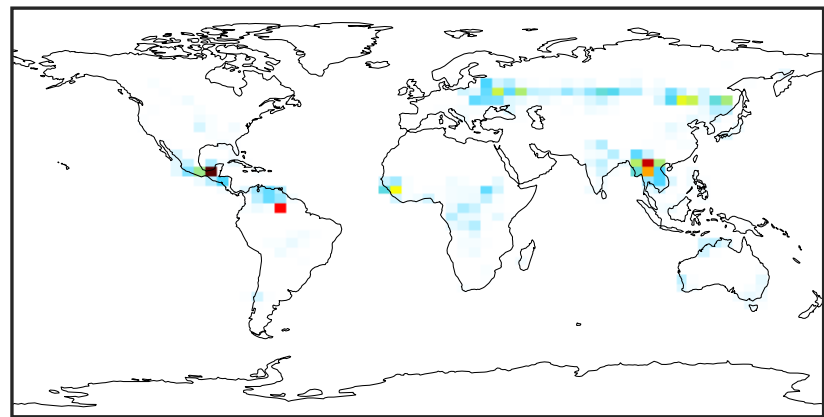
Ref and Dev equal throughout domain
unitless

EmisBCPO_BioBurn (Apr2019)

14.2.0-rc.2 (Ref)
4.0x5.0



14.3.0-rc.0 (Dev)
4.0x5.0



Difference
Dev - Ref, Dynamic Range



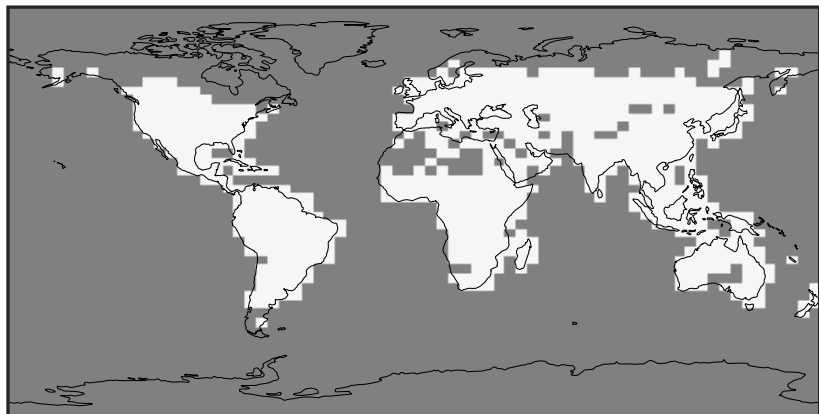
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



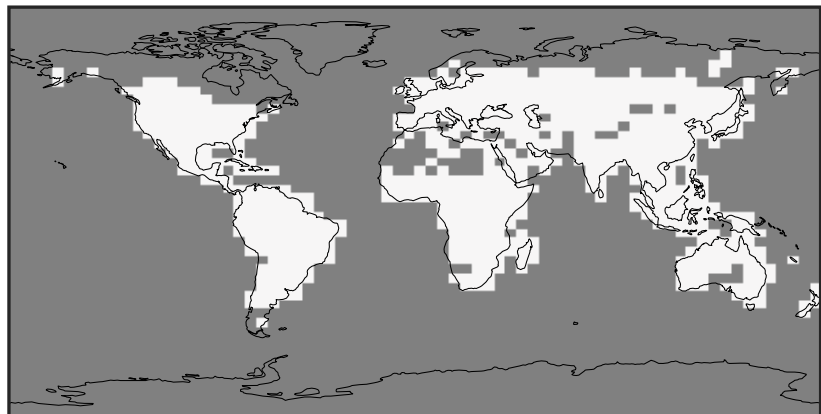
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

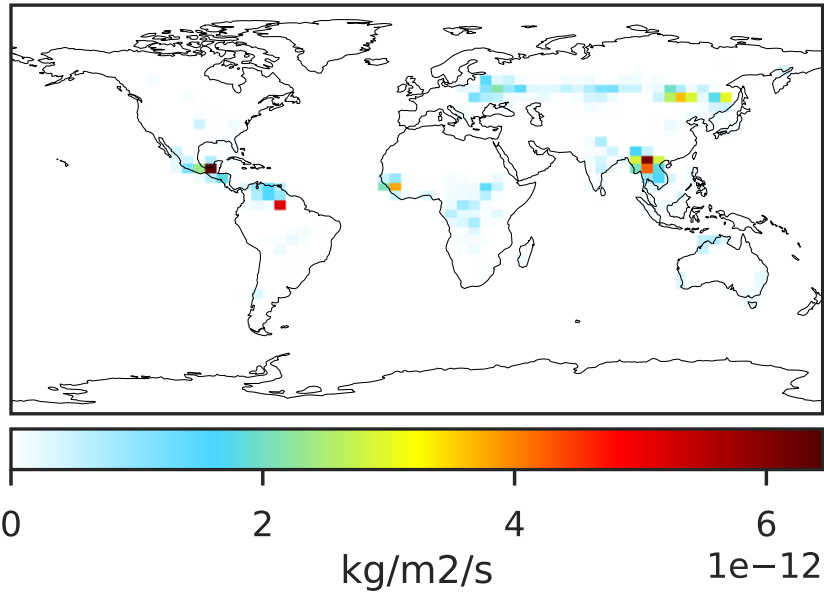
Ratio
Dev/Ref, Fixed Range



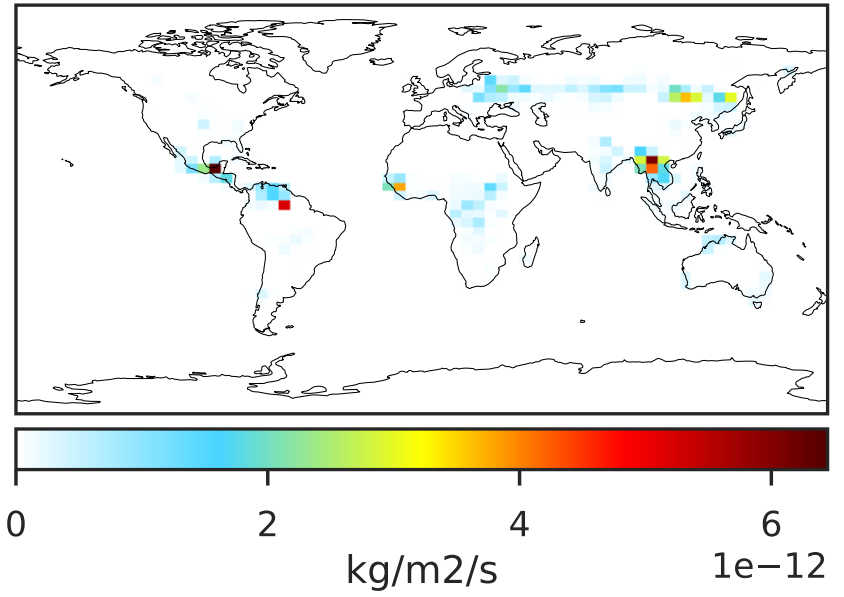
Ref and Dev equal throughout domain
unitless

EmisBENZ_BioBurn (Apr2019)

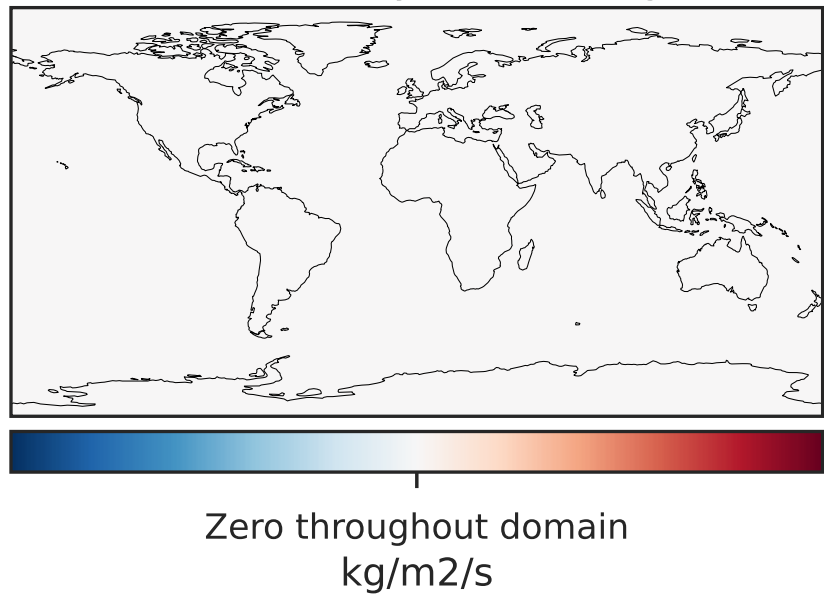
14.2.0-rc.2 (Ref)
4.0x5.0



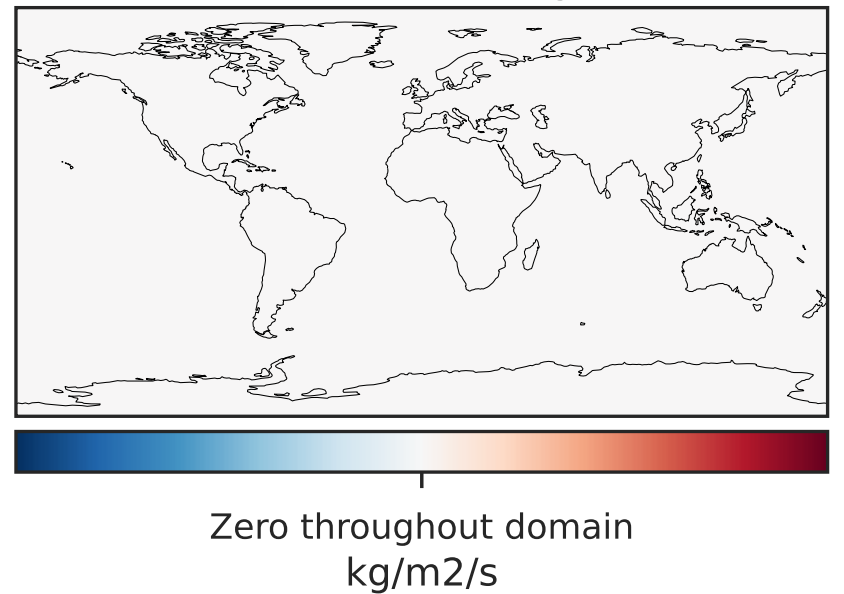
14.3.0-rc.0 (Dev)
4.0x5.0



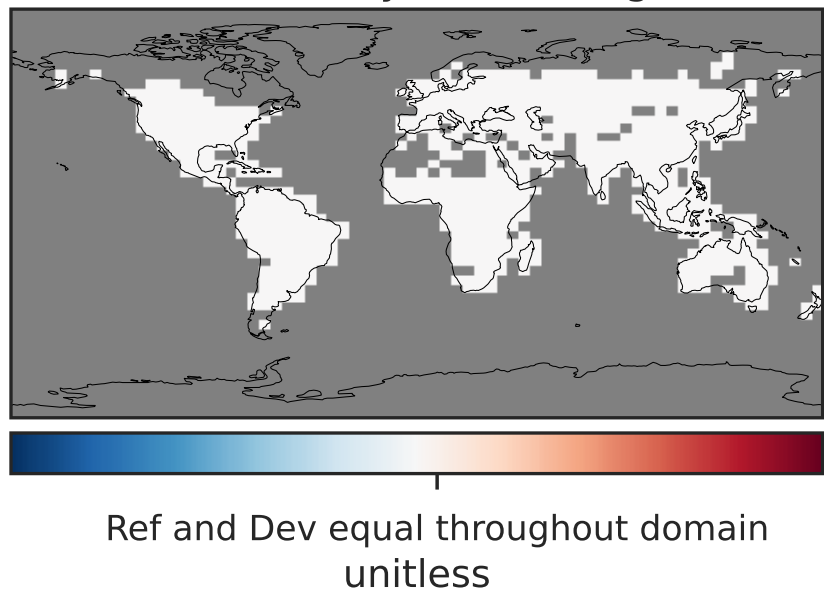
Difference
Dev - Ref, Dynamic Range



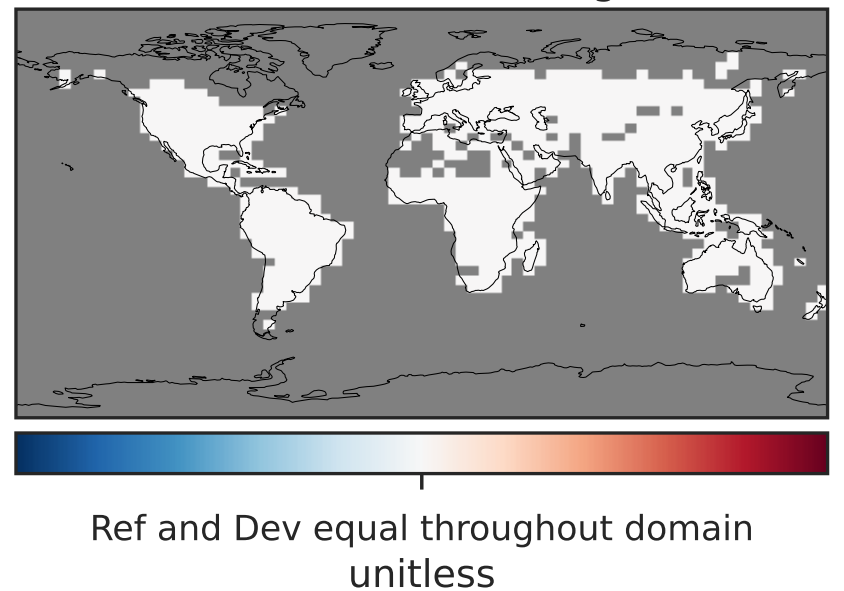
Difference
Dev - Ref, Restricted Range [5%,95%]



Ratio
Dev/Ref, Dynamic Range

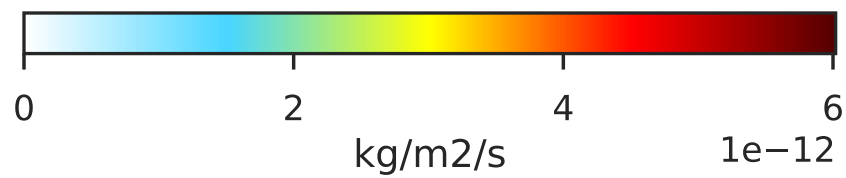
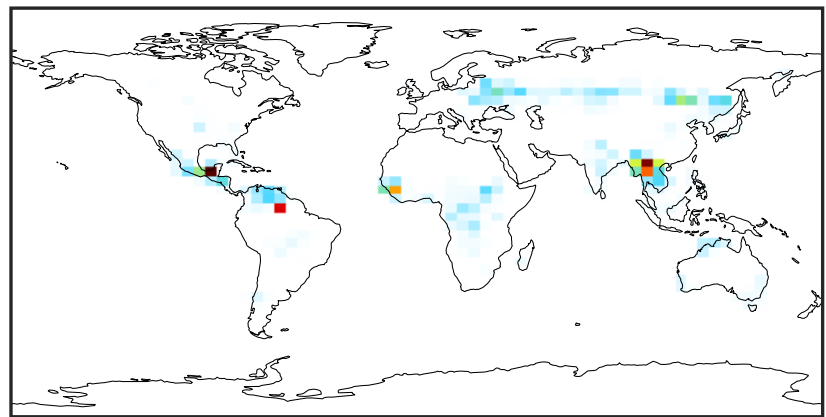


Ratio
Dev/Ref, Fixed Range

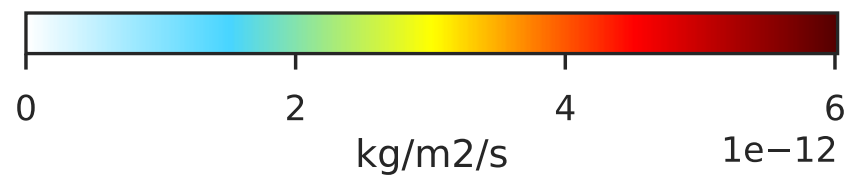
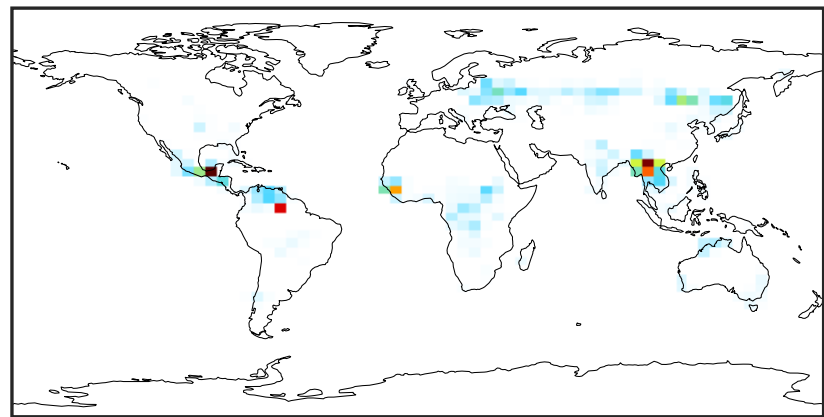


EmisC2H2_BioBurn (Apr2019)

14.2.0-rc.2 (Ref)
4.0x5.0



14.3.0-rc.0 (Dev)
4.0x5.0



Difference
Dev - Ref, Dynamic Range



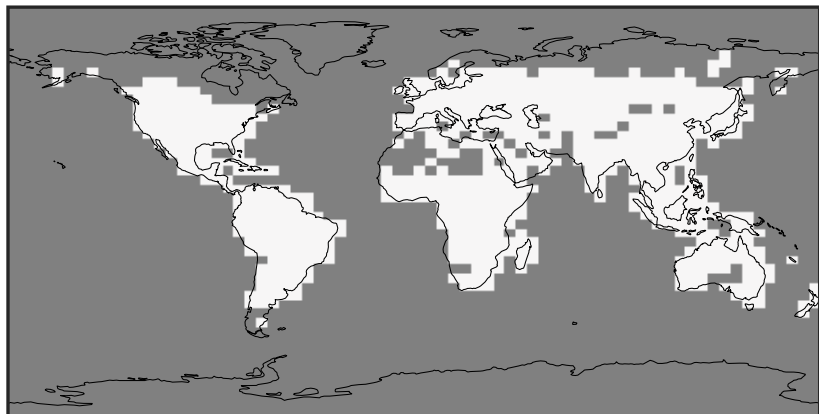
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



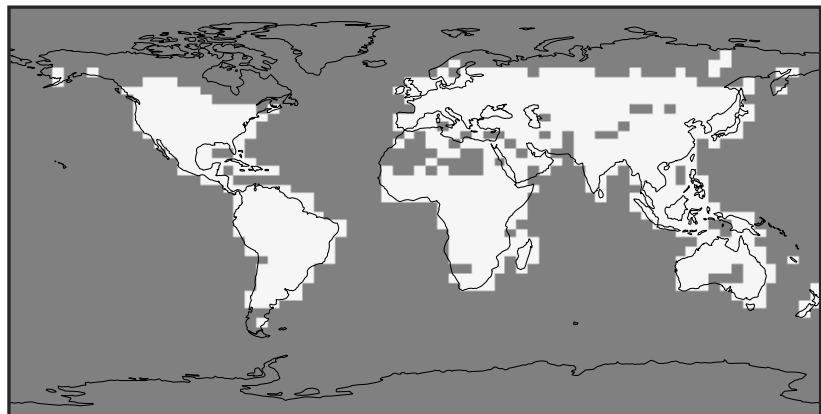
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

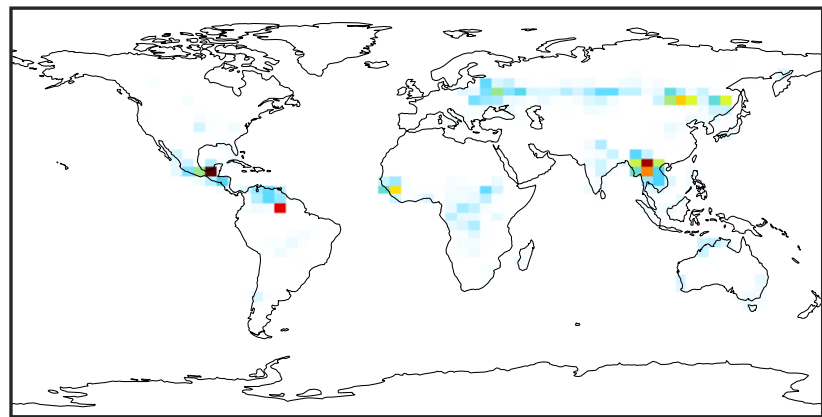
Ratio
Dev/Ref, Fixed Range



Ref and Dev equal throughout domain
unitless

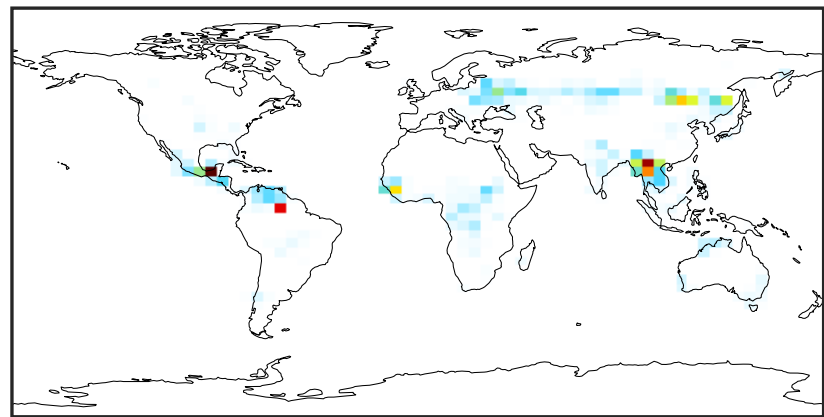
EmisC2H4_BioBurn (Apr2019)

14.2.0-rc.2 (Ref)
4.0x5.0



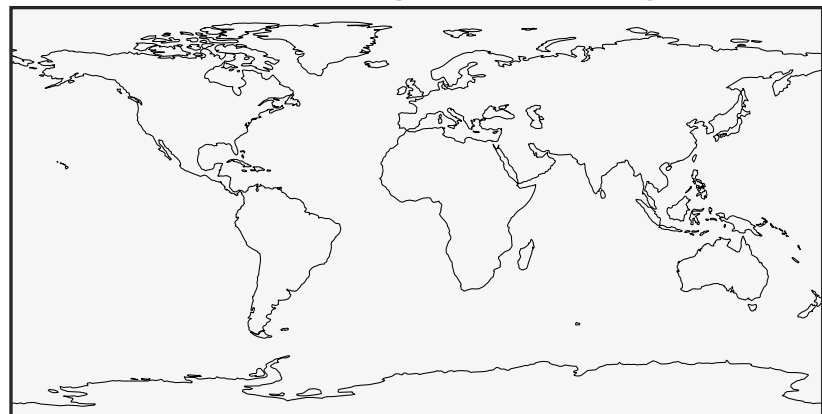
0.0 0.5 1.0 1.5
kg/m²/s 1e-11

14.3.0-rc.0 (Dev)
4.0x5.0



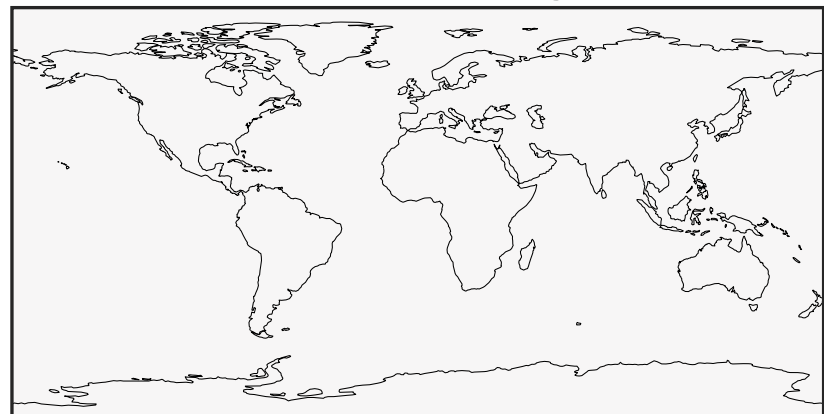
0.0 0.5 1.0 1.5
kg/m²/s 1e-11

Difference
Dev - Ref, Dynamic Range



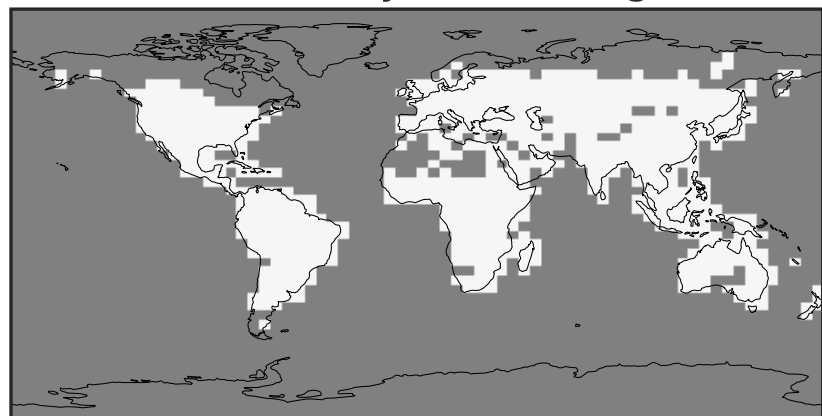
Zero throughout domain
kg/m²/s

Difference
Dev - Ref, Restricted Range [5%,95%]



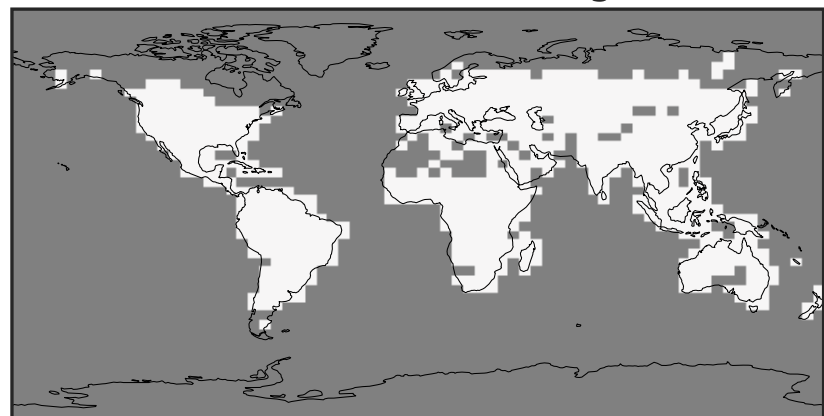
Zero throughout domain
kg/m²/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

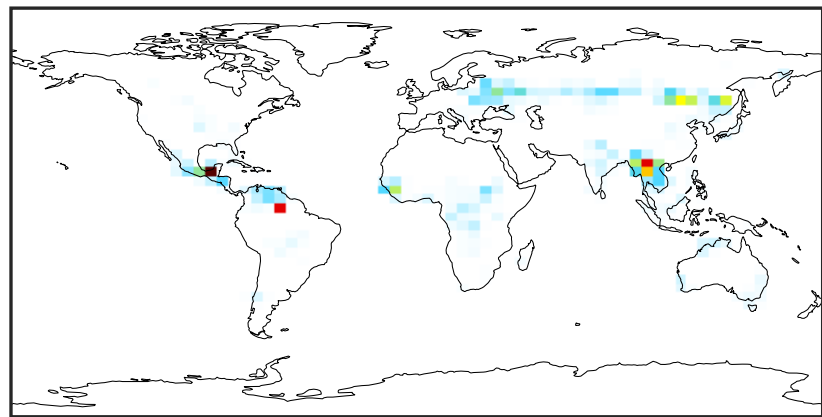
Ratio
Dev/Ref, Fixed Range



Ref and Dev equal throughout domain
unitless

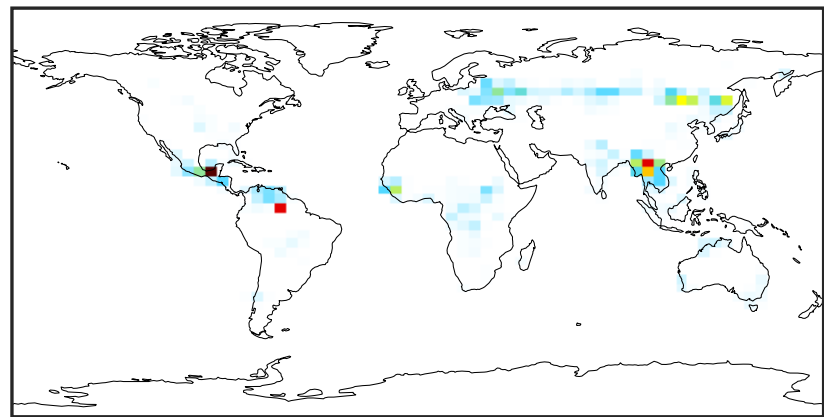
EmisC2H6_BioBurn (Apr2019)

14.2.0-rc.2 (Ref)
4.0x5.0



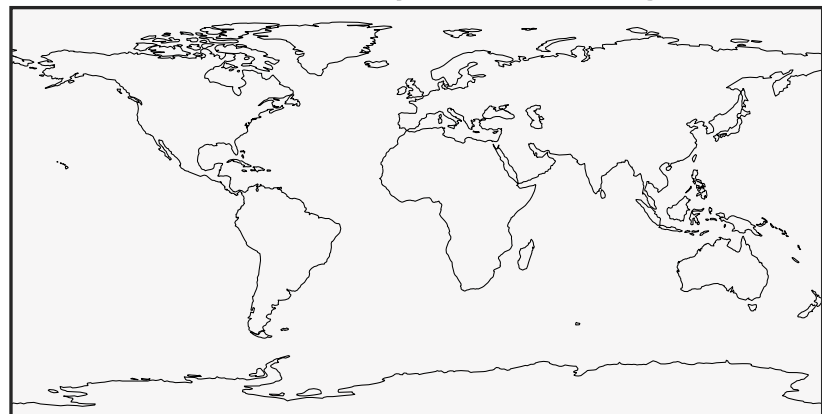
0.0 0.4 0.8 1.2
kg/m2/s 1e-11

14.3.0-rc.0 (Dev)
4.0x5.0



0.0 0.4 0.8 1.2
kg/m2/s 1e-11

Difference
Dev - Ref, Dynamic Range



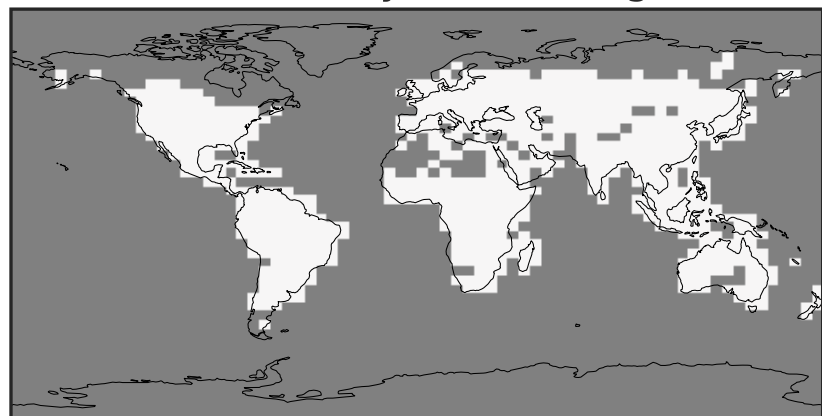
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



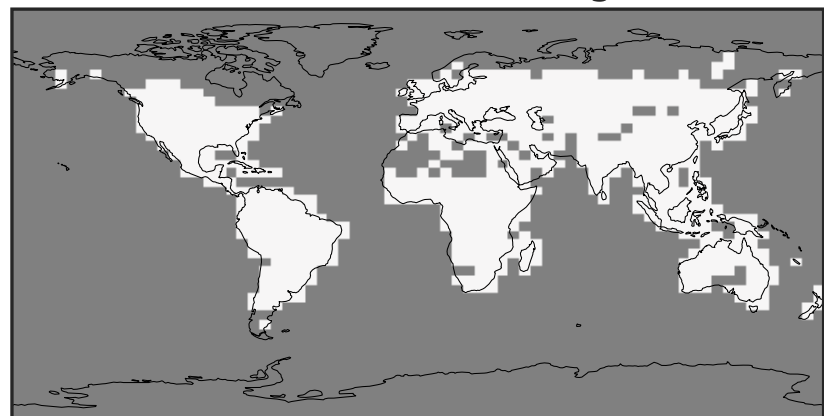
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

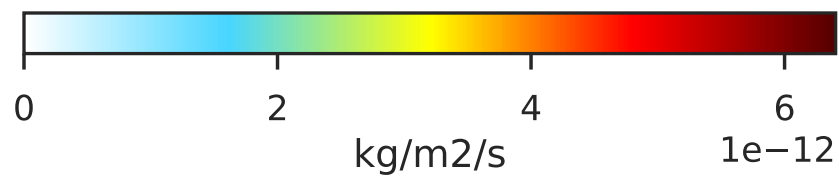
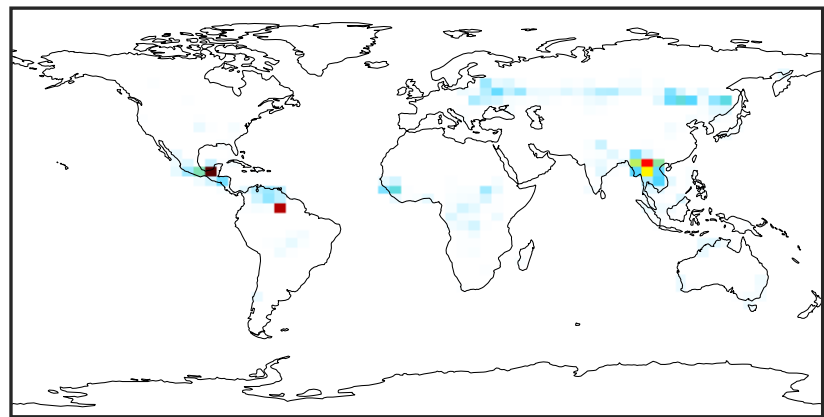
Ratio
Dev/Ref, Fixed Range



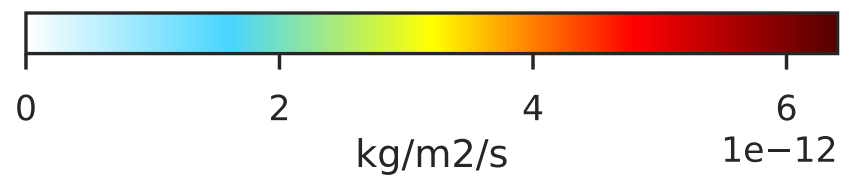
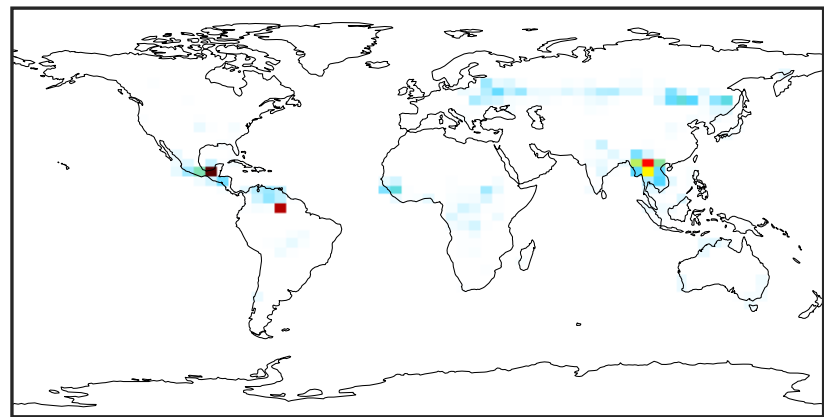
Ref and Dev equal throughout domain
unitless

EmisC3H8_BioBurn (Apr2019)

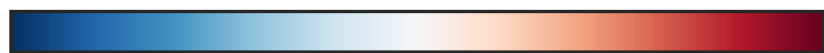
14.2.0-rc.2 (Ref)
4.0x5.0



14.3.0-rc.0 (Dev)
4.0x5.0



Difference
Dev - Ref, Dynamic Range



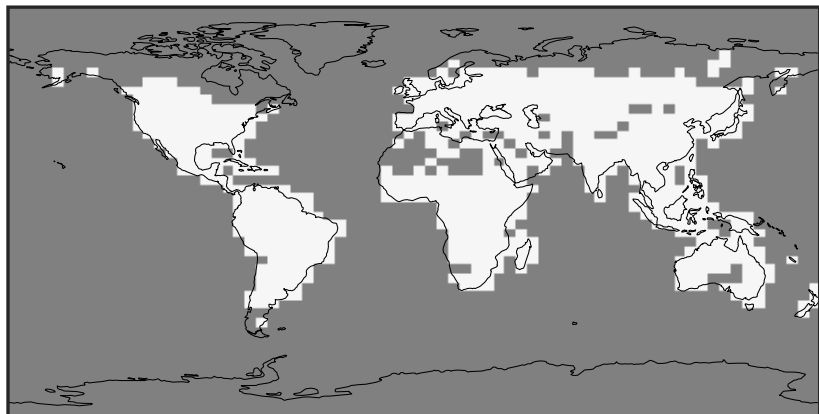
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



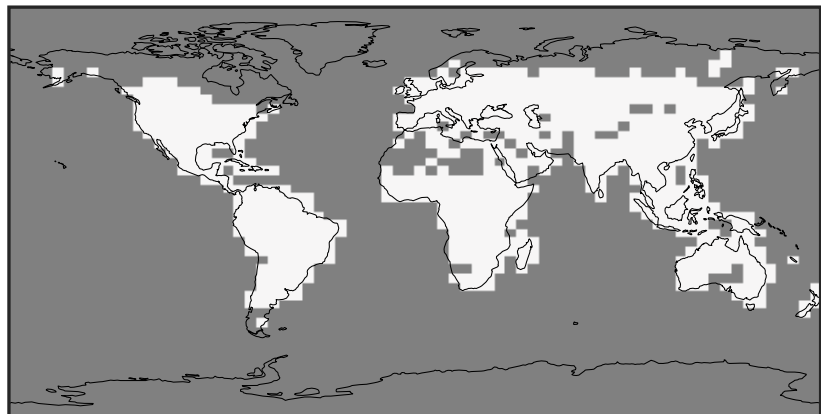
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

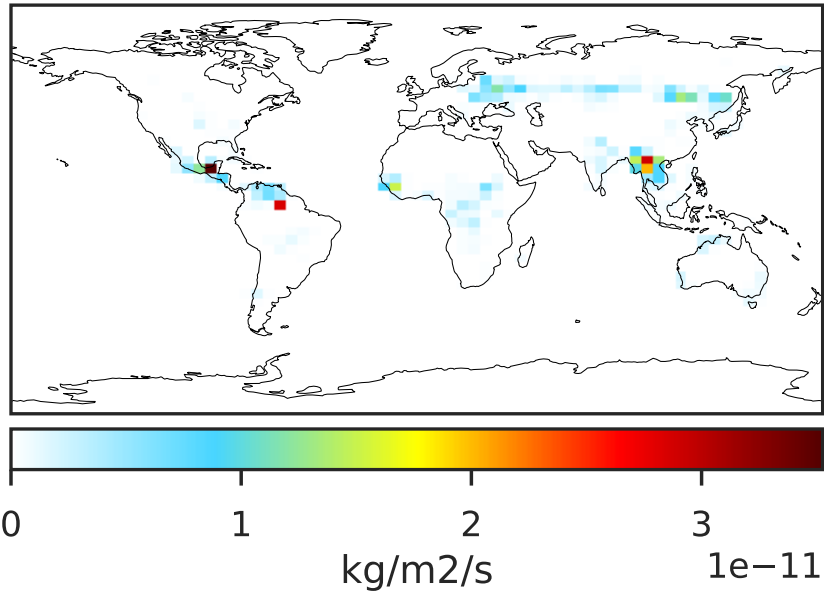
Ratio
Dev/Ref, Fixed Range



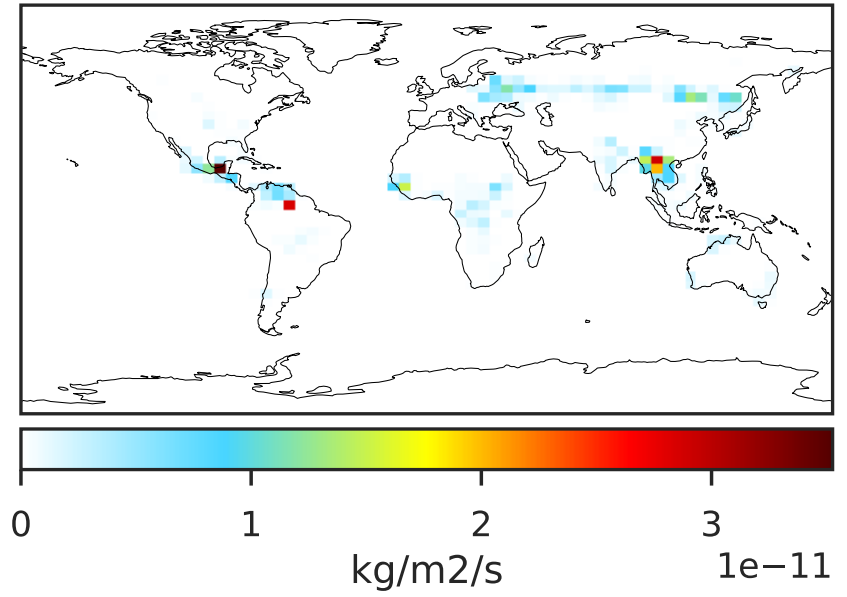
Ref and Dev equal throughout domain
unitless

EmisCH2O_BioBurn (Apr2019)

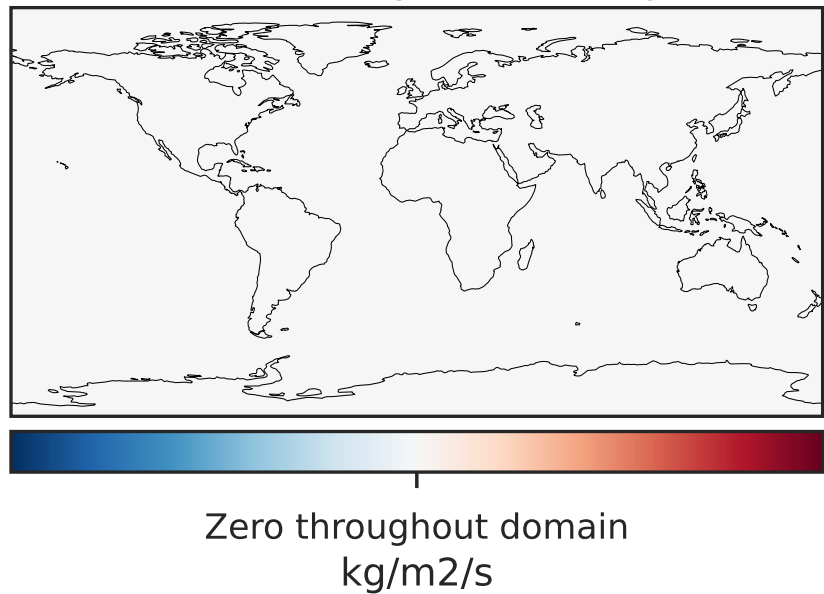
14.2.0-rc.2 (Ref)
4.0x5.0



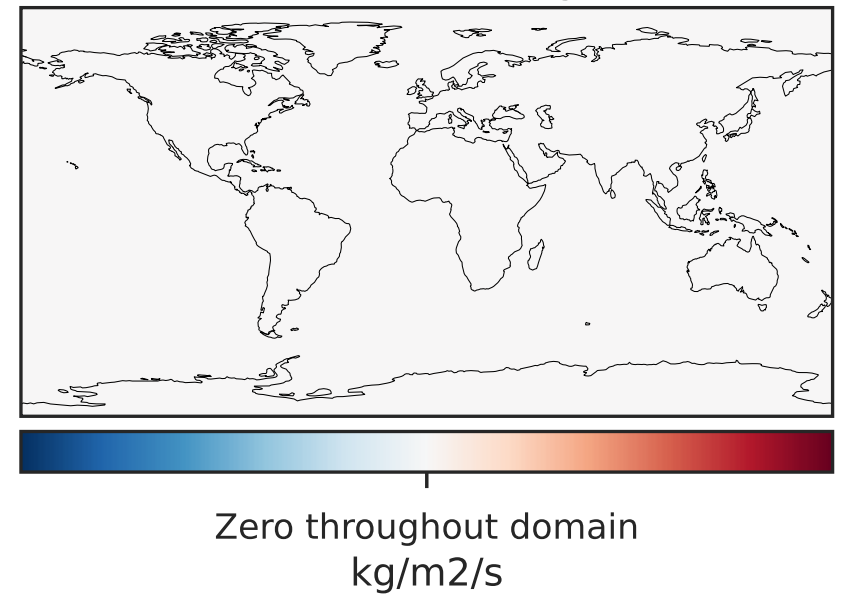
14.3.0-rc.0 (Dev)
4.0x5.0



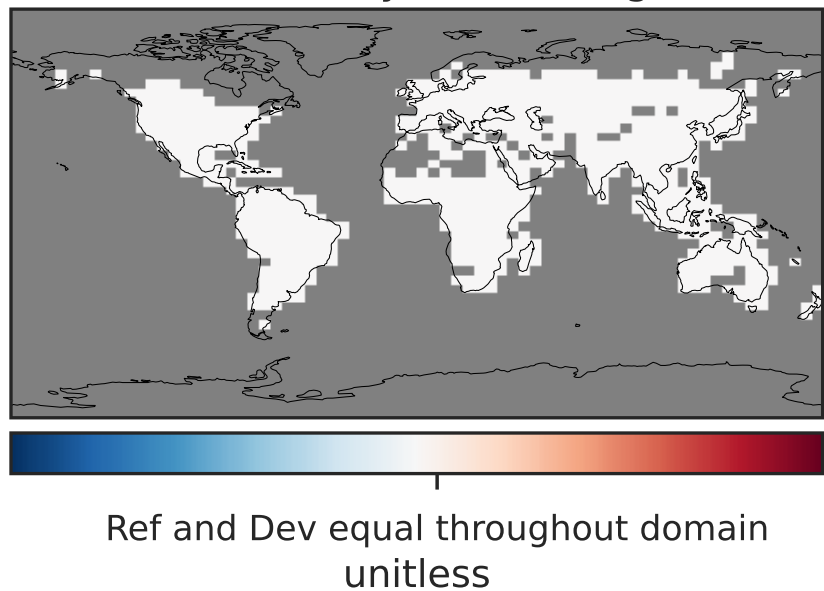
Difference
Dev - Ref, Dynamic Range



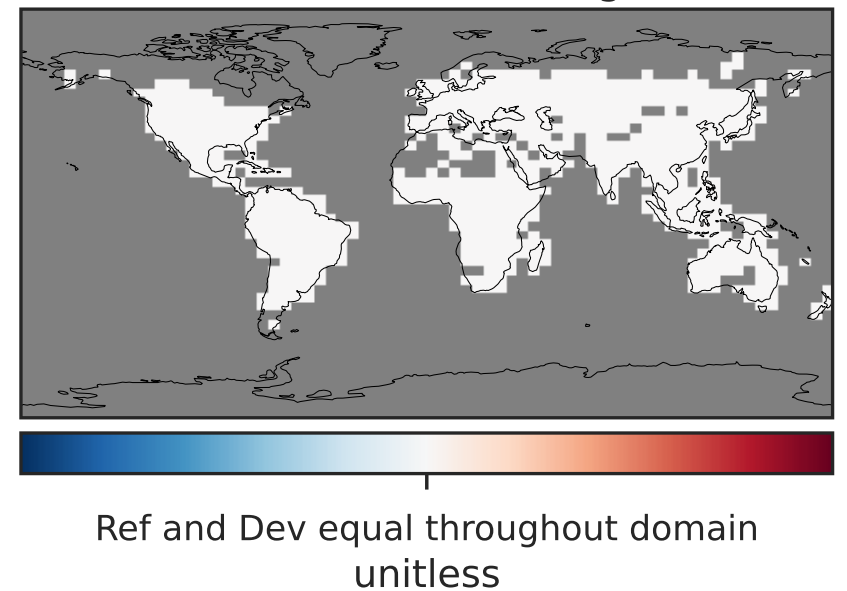
Difference
Dev - Ref, Restricted Range [5%,95%]



Ratio
Dev/Ref, Dynamic Range

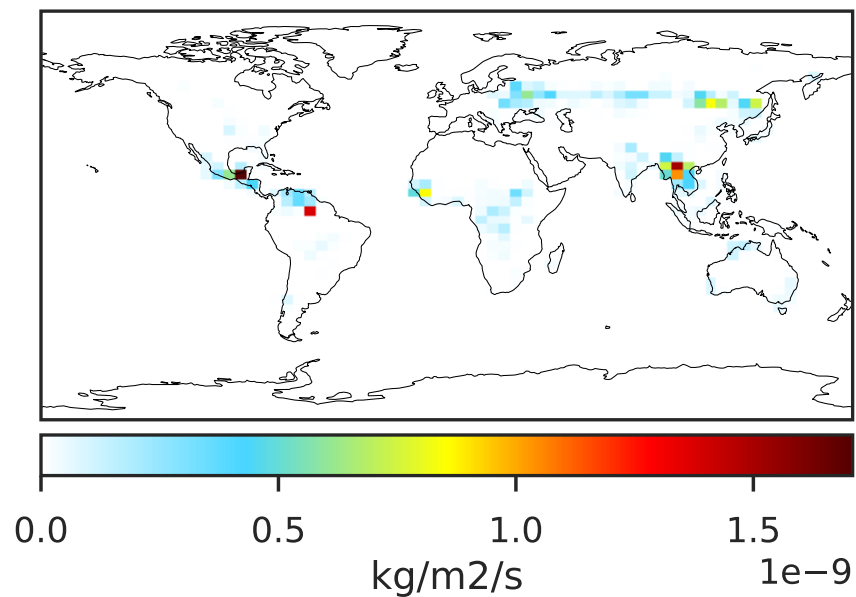


Ratio
Dev/Ref, Fixed Range

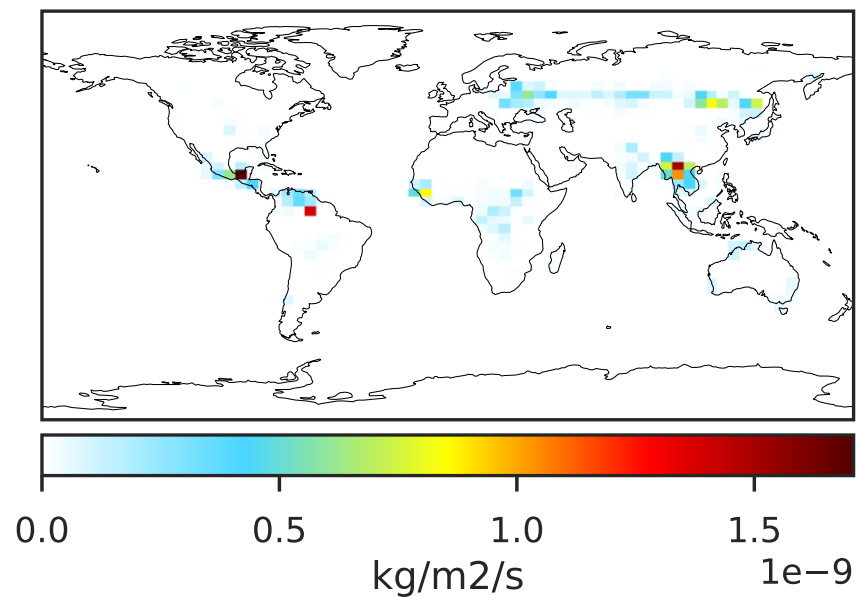


EmisCO_BioBurn (Apr2019)

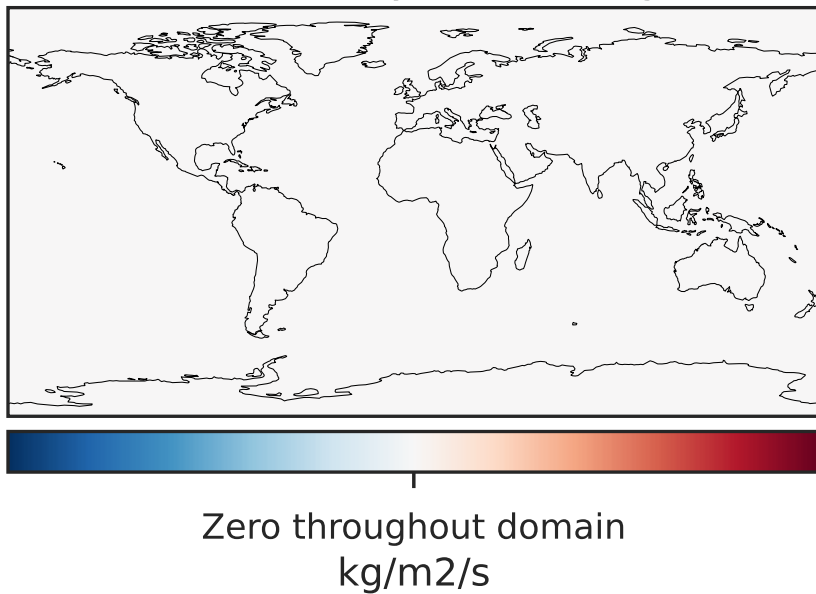
14.2.0-rc.2 (Ref)
4.0x5.0



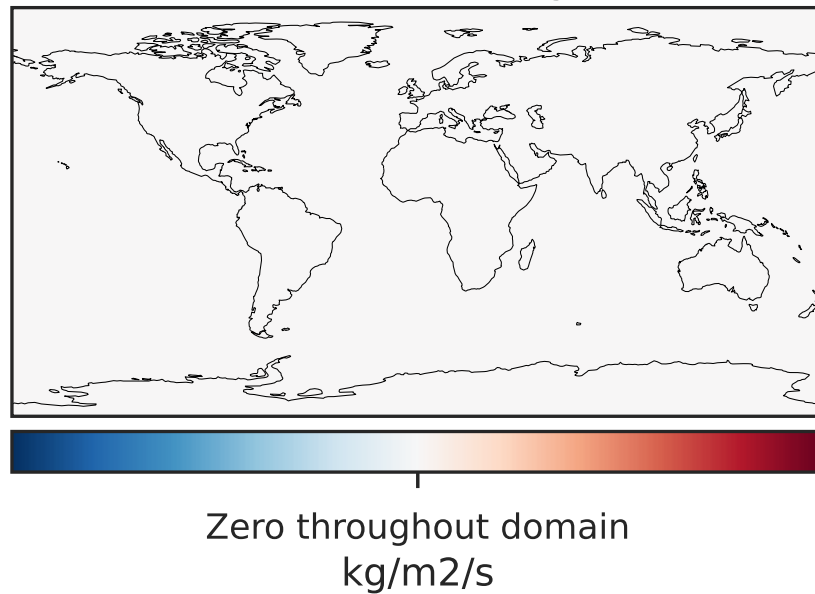
14.3.0-rc.0 (Dev)
4.0x5.0



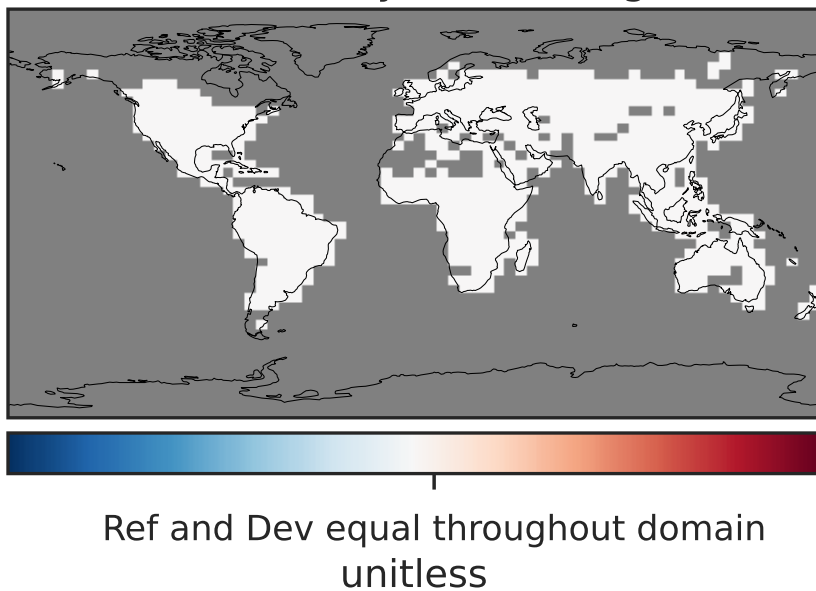
Difference
Dev - Ref, Dynamic Range



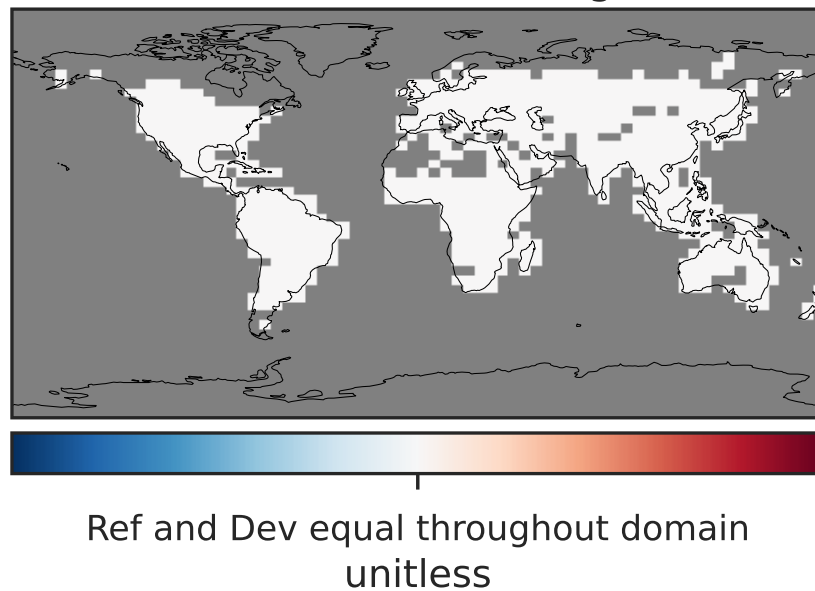
Difference
Dev - Ref, Restricted Range [5%,95%]



Ratio
Dev/Ref, Dynamic Range

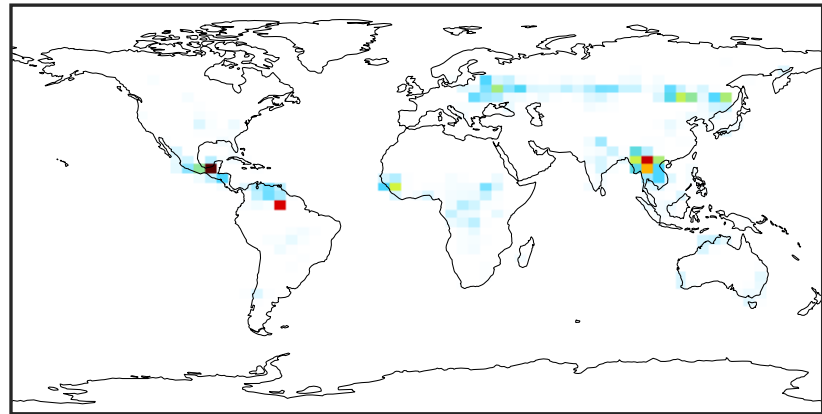


Ratio
Dev/Ref, Fixed Range



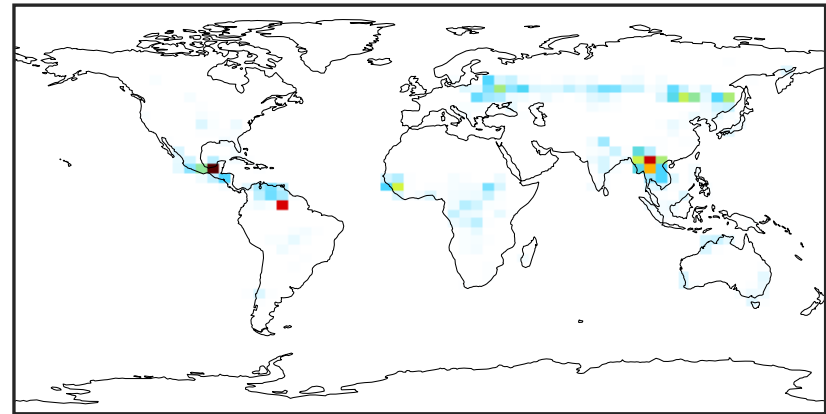
EmisEOH_BioBurn (Apr2019)

14.2.0-rc.2 (Ref)
4.0x5.0



0.0 2.5 5.0 7.5 1e-13
kg/m2/s

14.3.0-rc.0 (Dev)
4.0x5.0



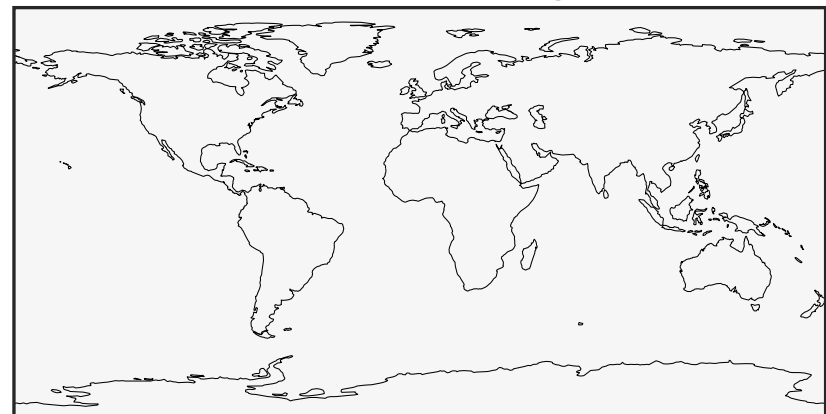
0.0 2.5 5.0 7.5 1e-13
kg/m2/s

Difference
Dev - Ref, Dynamic Range



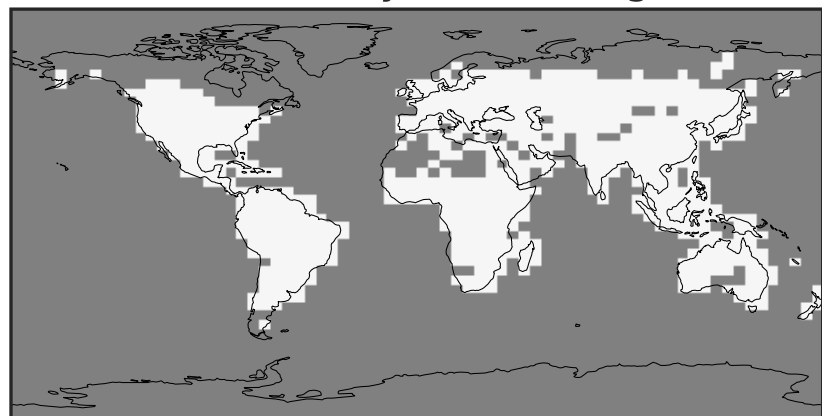
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



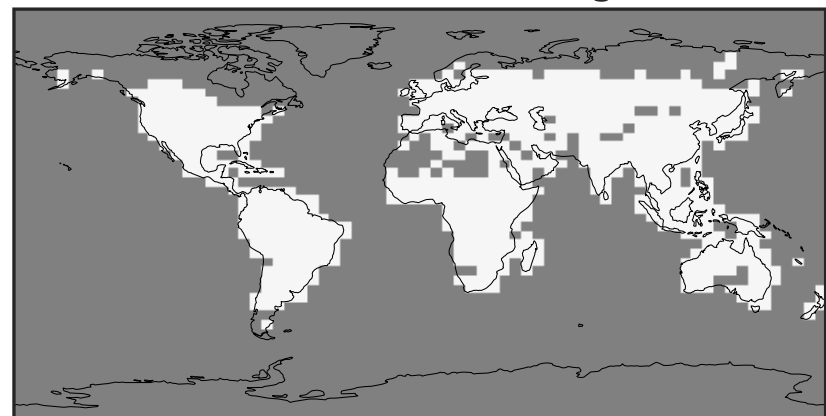
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

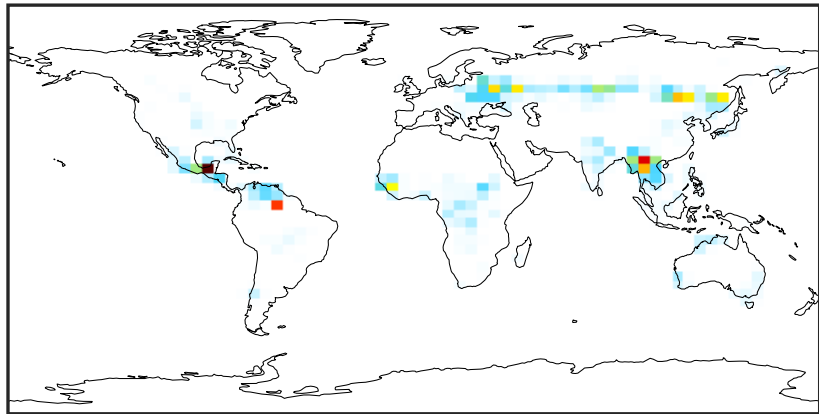
Ratio
Dev/Ref, Fixed Range



Ref and Dev equal throughout domain
unitless

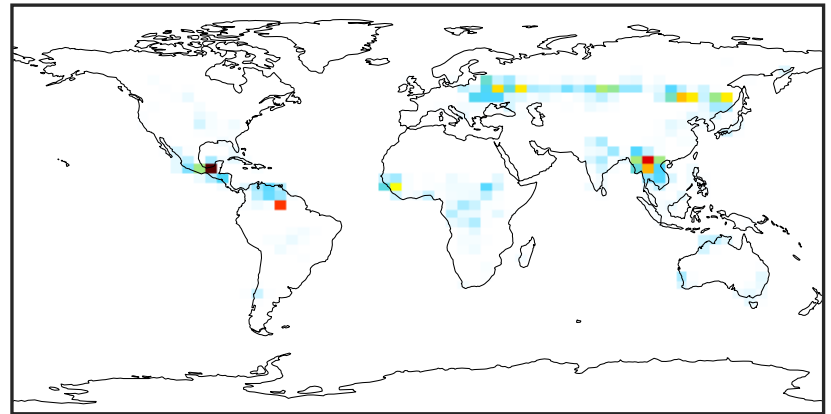
EmisFURA_BioBurn (Apr2019)

14.2.0-rc.2 (Ref)
4.0x5.0



0.0 0.4 0.8 1.2
kg/m²/s 1e-11

14.3.0-rc.0 (Dev)
4.0x5.0



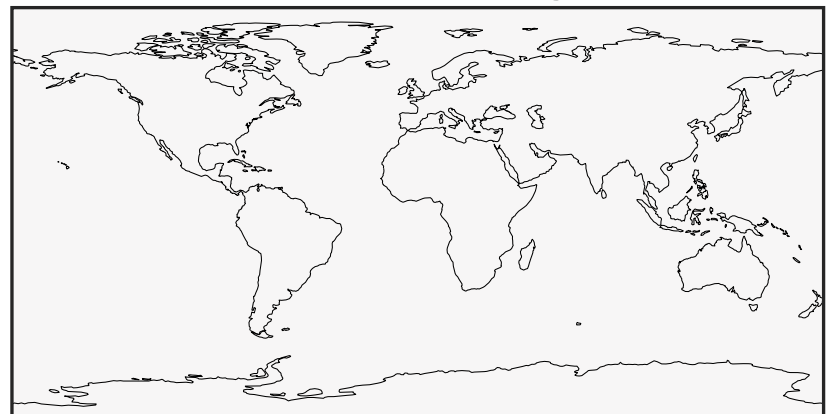
0.0 0.4 0.8 1.2
kg/m²/s 1e-11

Difference
Dev - Ref, Dynamic Range



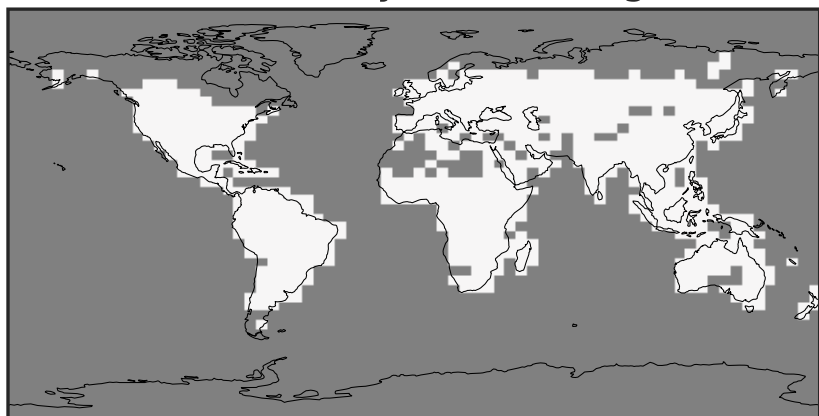
Zero throughout domain
kg/m²/s

Difference
Dev - Ref, Restricted Range [5%,95%]



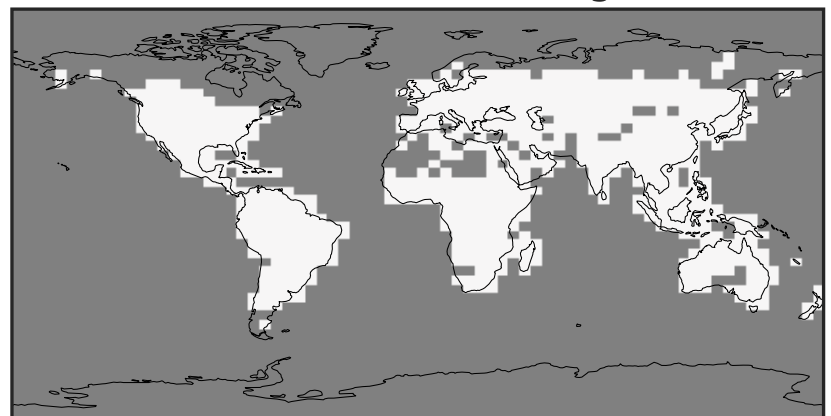
Zero throughout domain
kg/m²/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

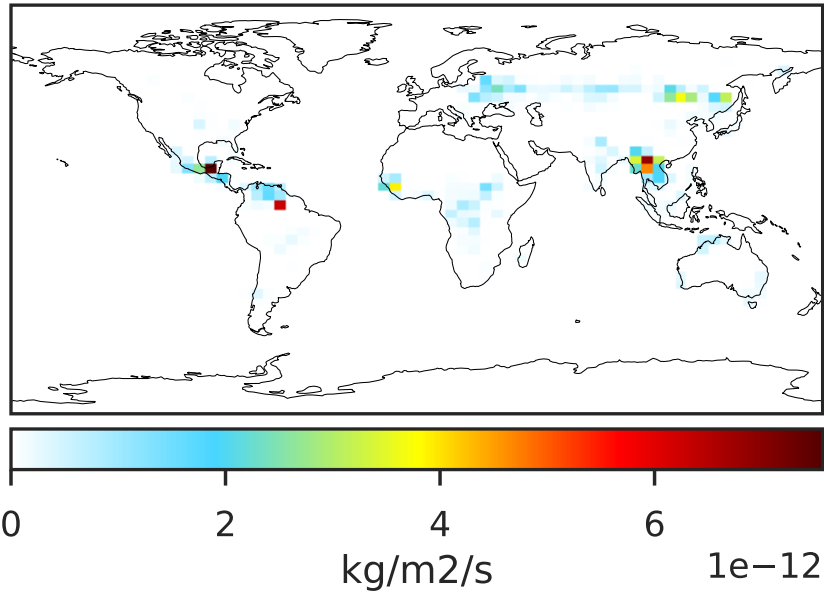
Ratio
Dev/Ref, Fixed Range



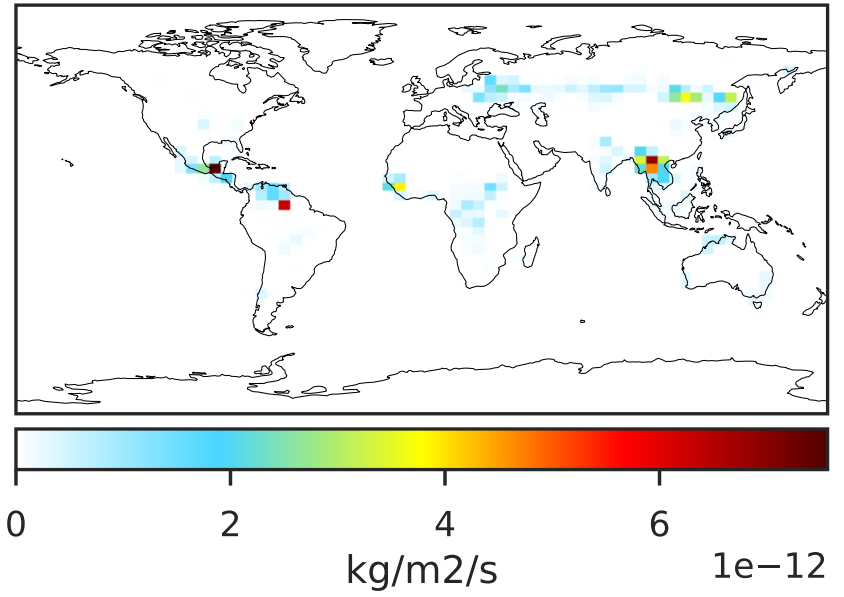
Ref and Dev equal throughout domain
unitless

EmisGLYX_BioBurn (Apr2019)

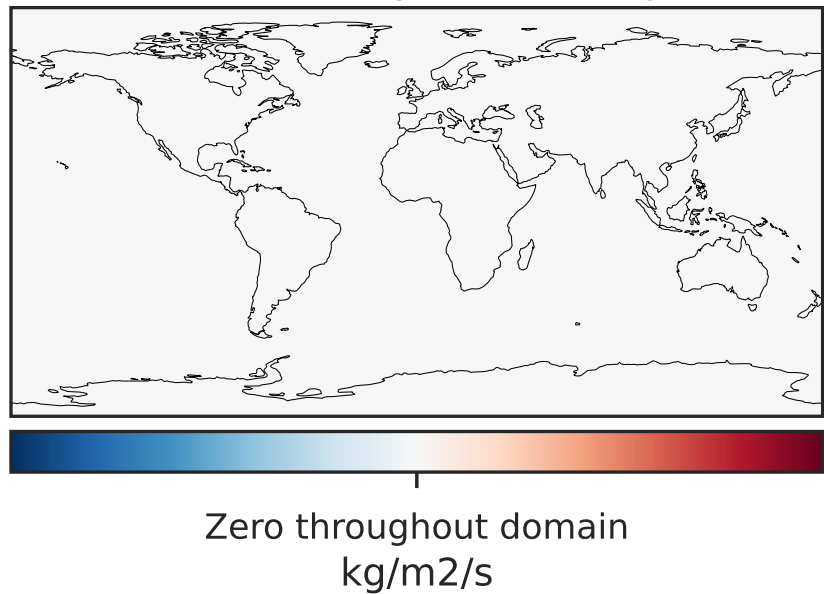
14.2.0-rc.2 (Ref)
4.0x5.0



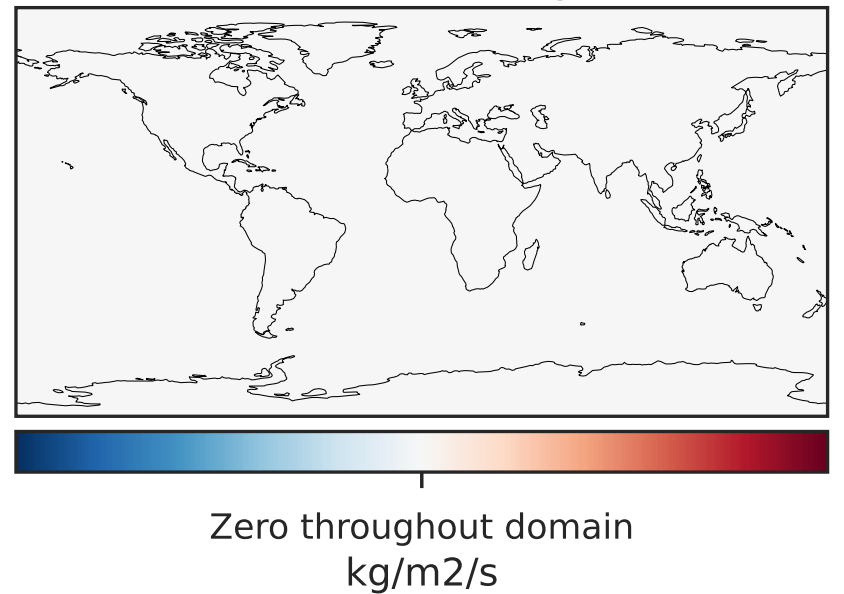
14.3.0-rc.0 (Dev)
4.0x5.0



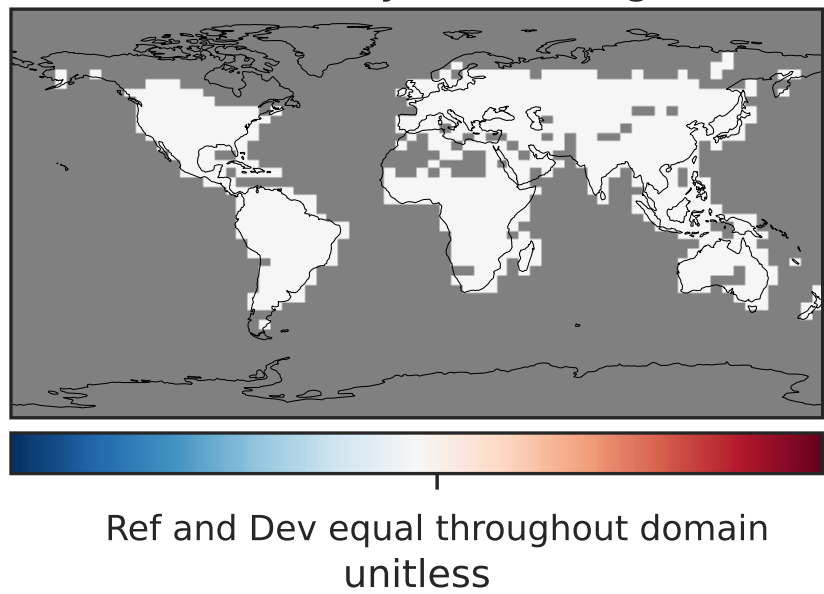
Difference
Dev - Ref, Dynamic Range



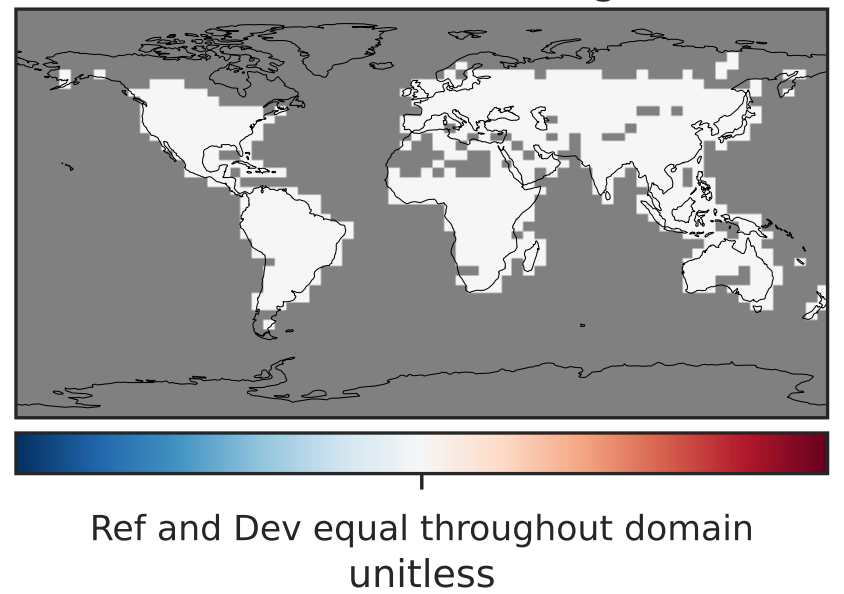
Difference
Dev - Ref, Restricted Range [5%,95%]



Ratio
Dev/Ref, Dynamic Range

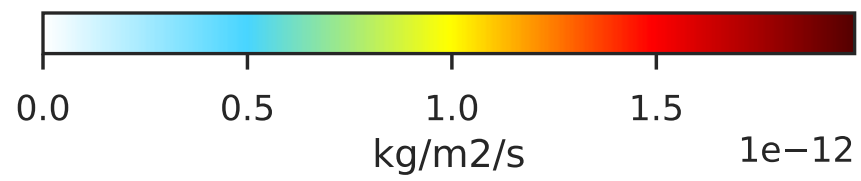
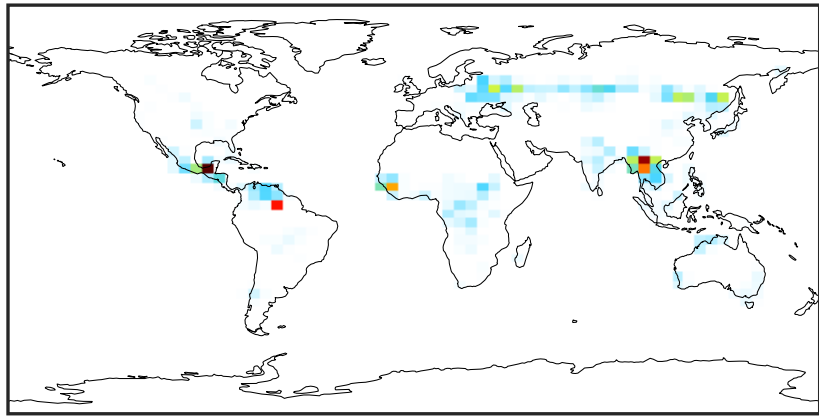


Ratio
Dev/Ref, Fixed Range

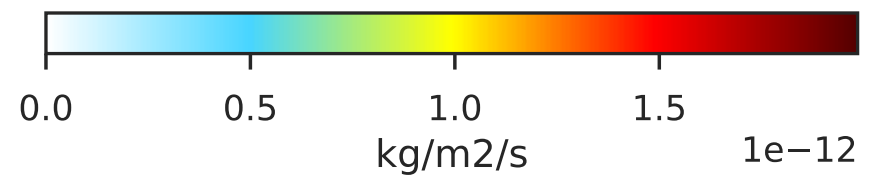
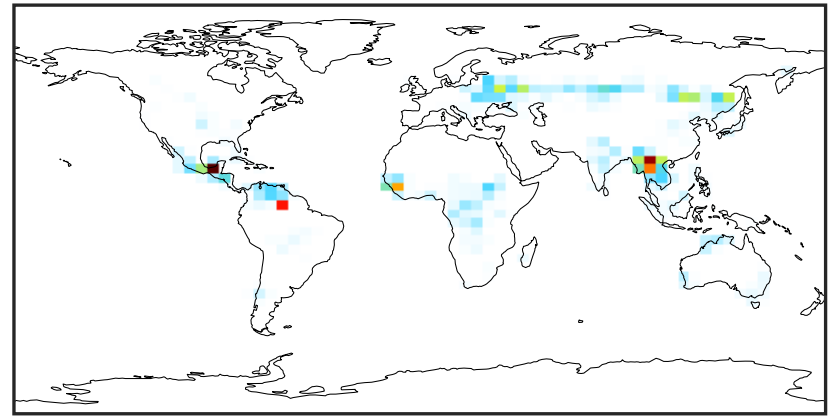


EmisISOP_BioBurn (Apr2019)

14.2.0-rc.2 (Ref)
4.0x5.0



14.3.0-rc.0 (Dev)
4.0x5.0



Difference
Dev - Ref, Dynamic Range



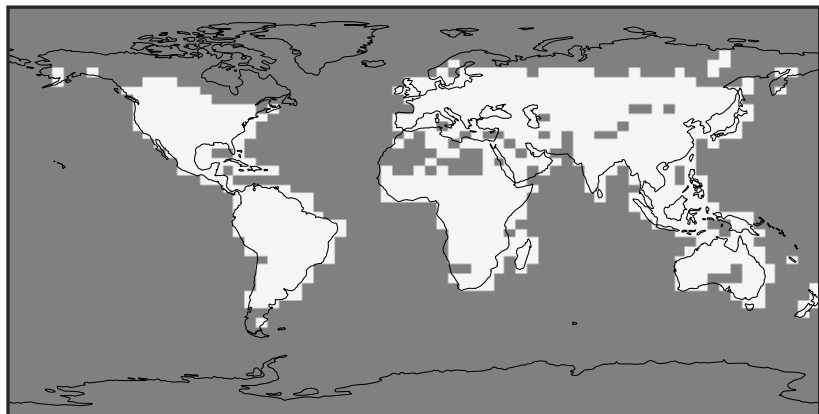
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



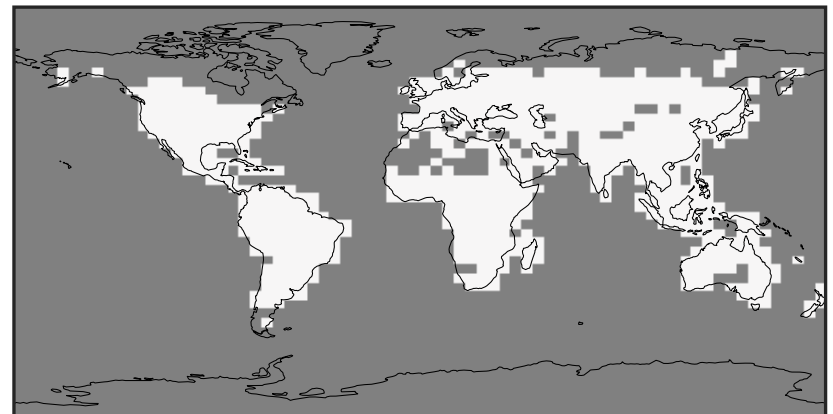
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

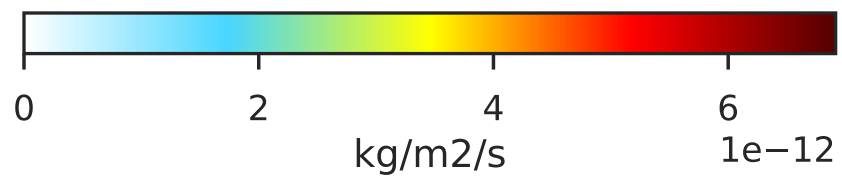
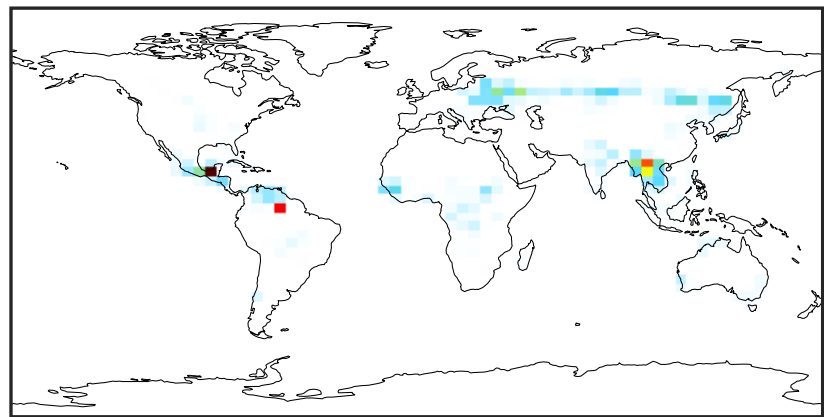
Ratio
Dev/Ref, Fixed Range



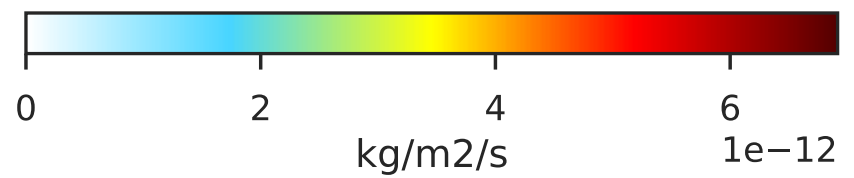
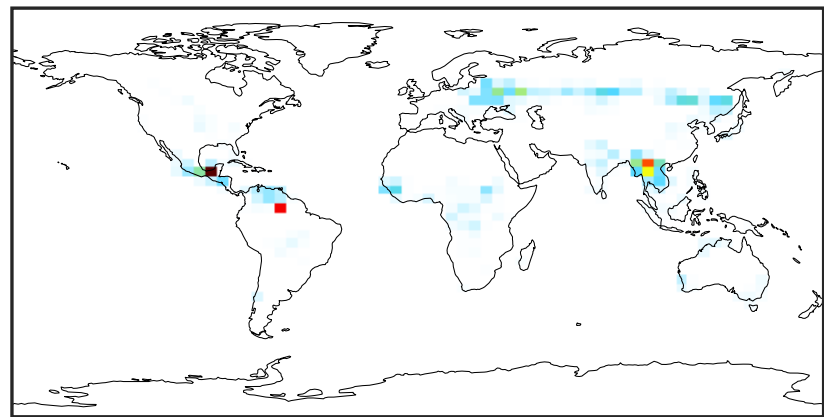
Ref and Dev equal throughout domain
unitless

EmisMEK_BioBurn (Apr2019)

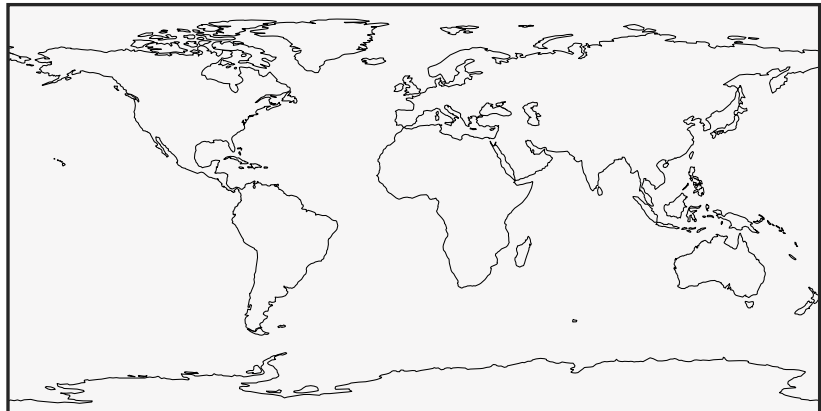
14.2.0-rc.2 (Ref)
4.0x5.0



14.3.0-rc.0 (Dev)
4.0x5.0

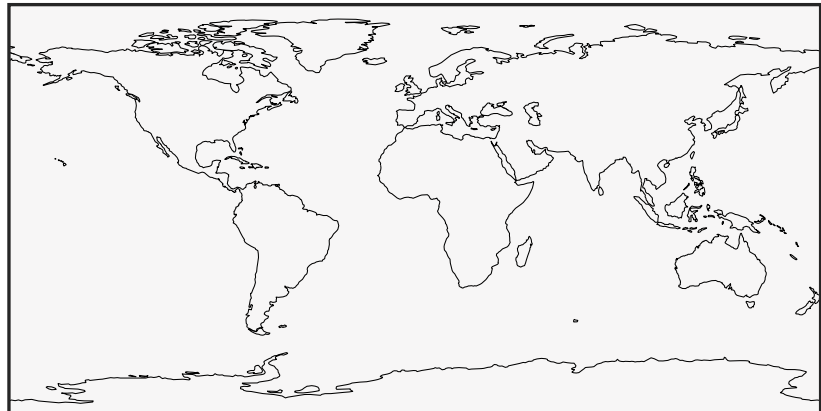


Difference
Dev - Ref, Dynamic Range



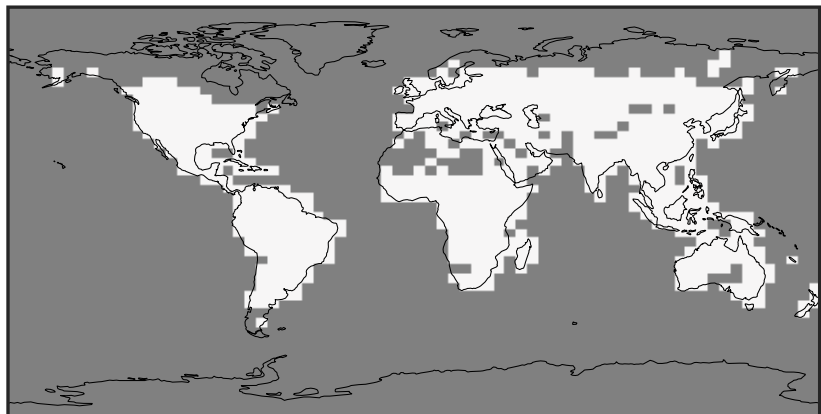
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



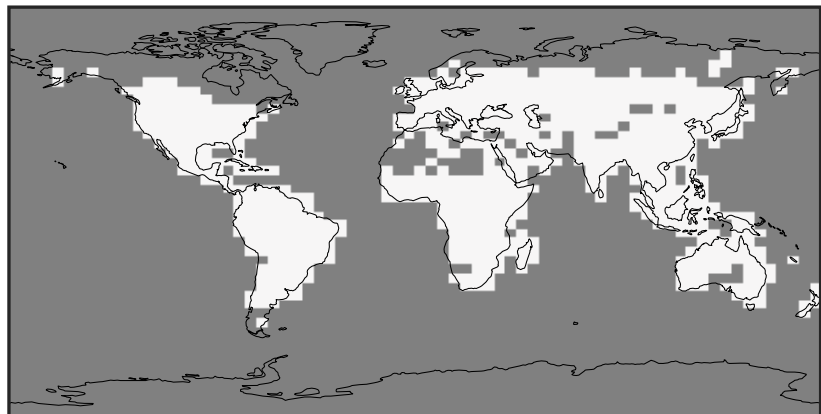
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

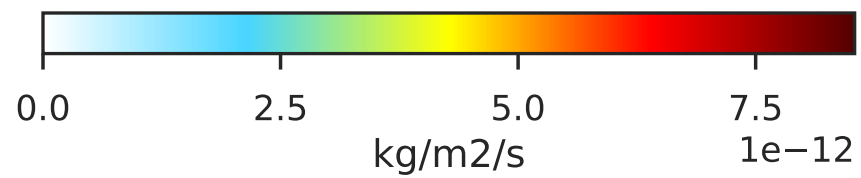
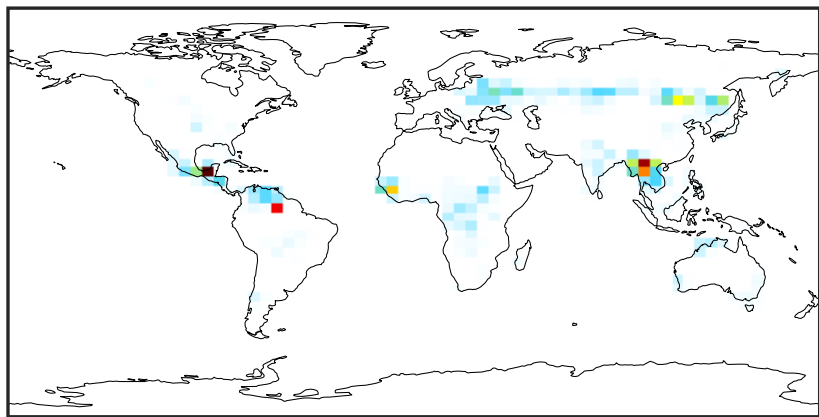
Ratio
Dev/Ref, Fixed Range



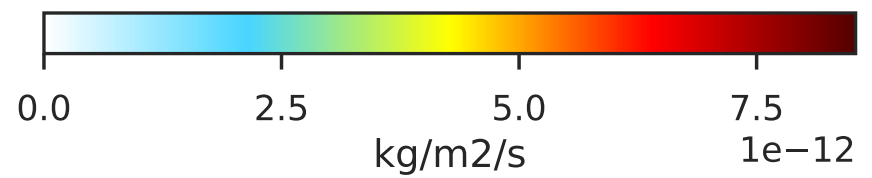
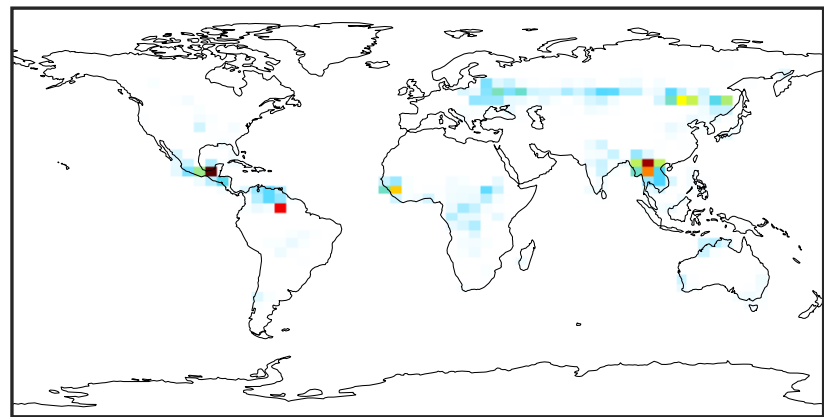
Ref and Dev equal throughout domain
unitless

EmisMGLY_BioBurn (Apr2019)

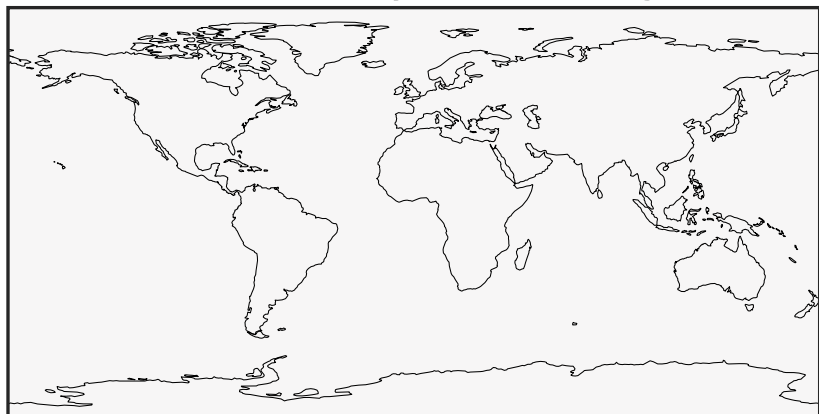
14.2.0-rc.2 (Ref)
4.0x5.0



14.3.0-rc.0 (Dev)
4.0x5.0

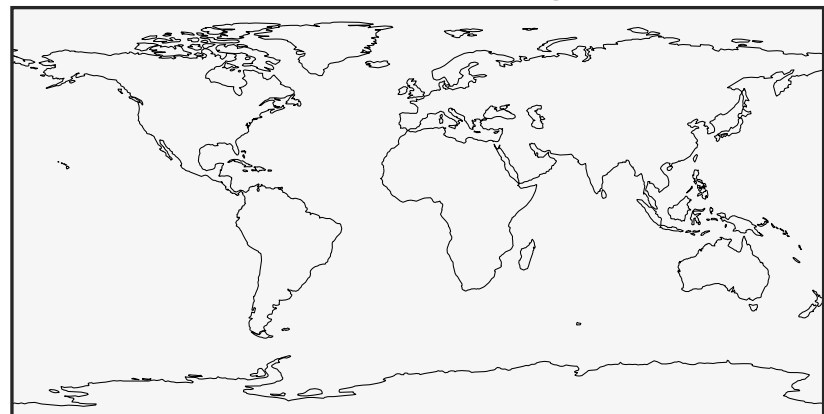


Difference
Dev - Ref, Dynamic Range



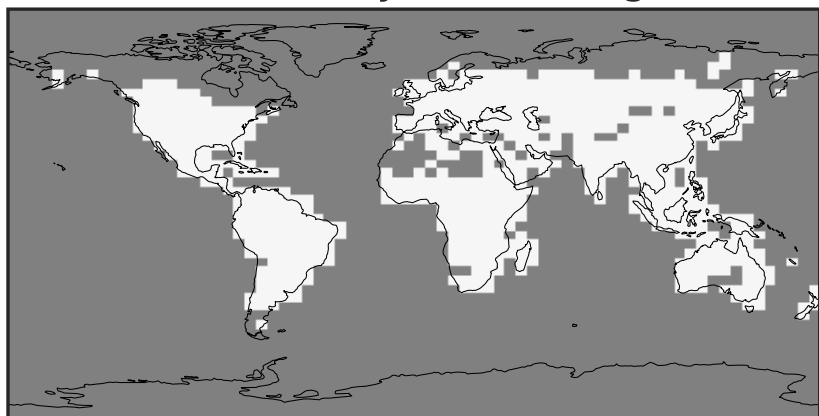
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



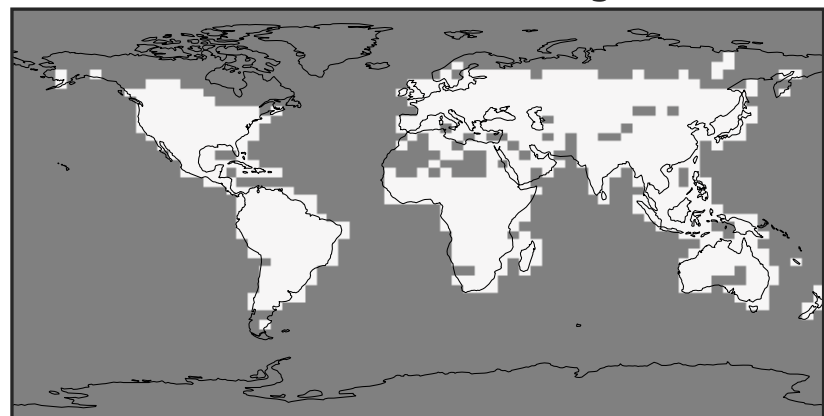
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

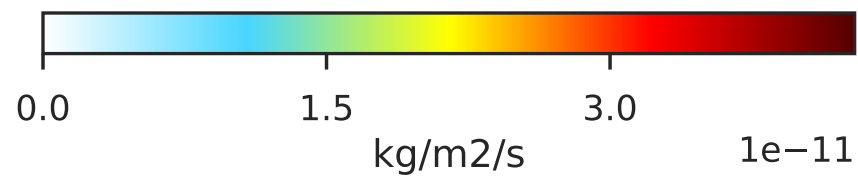
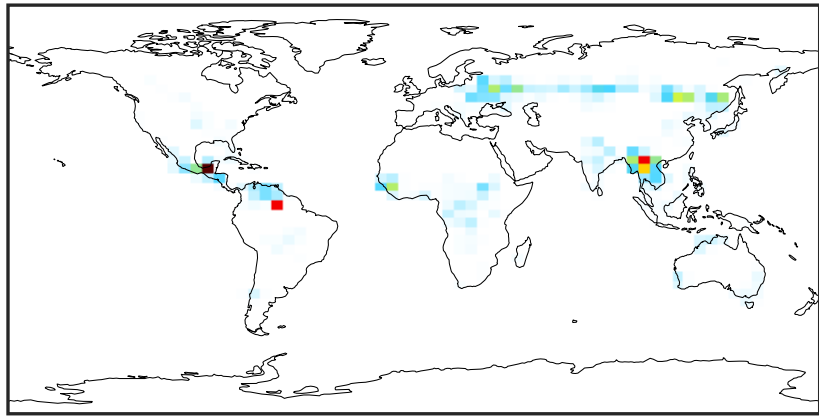
Ratio
Dev/Ref, Fixed Range



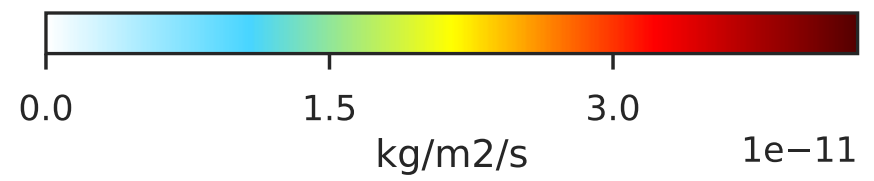
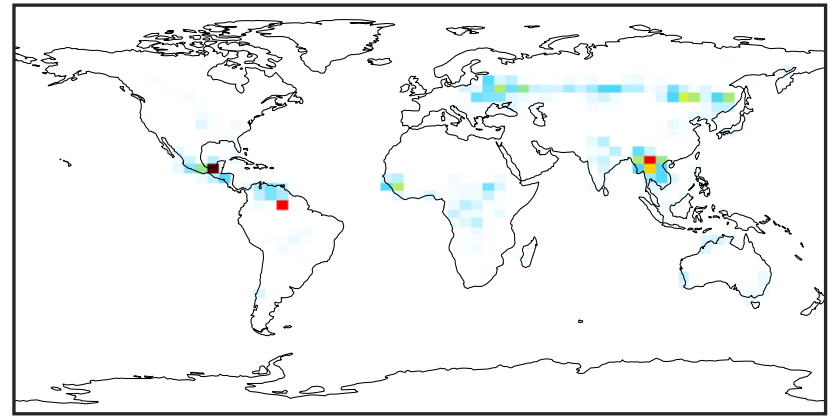
Ref and Dev equal throughout domain
unitless

EmisMOH_BioBurn (Apr2019)

14.2.0-rc.2 (Ref)
4.0x5.0



14.3.0-rc.0 (Dev)
4.0x5.0

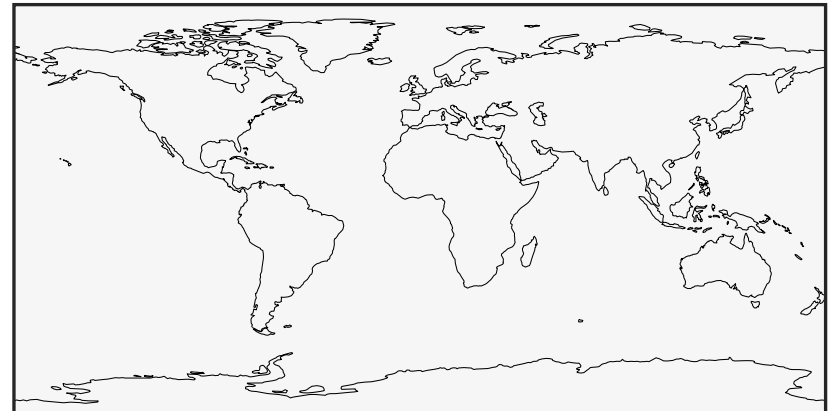


Difference
Dev - Ref, Dynamic Range



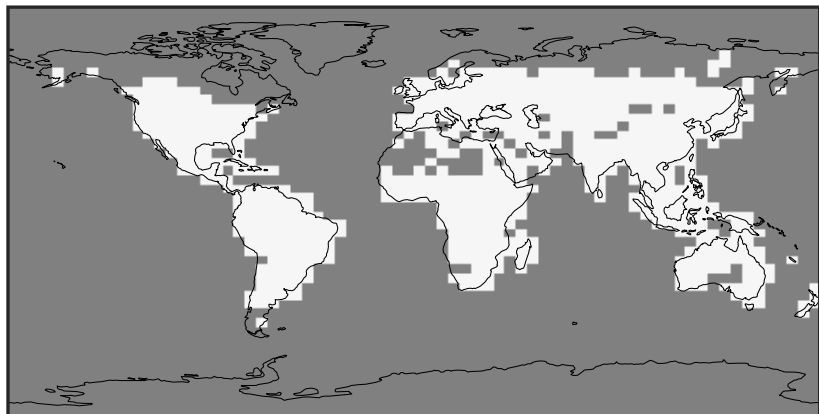
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



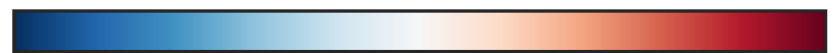
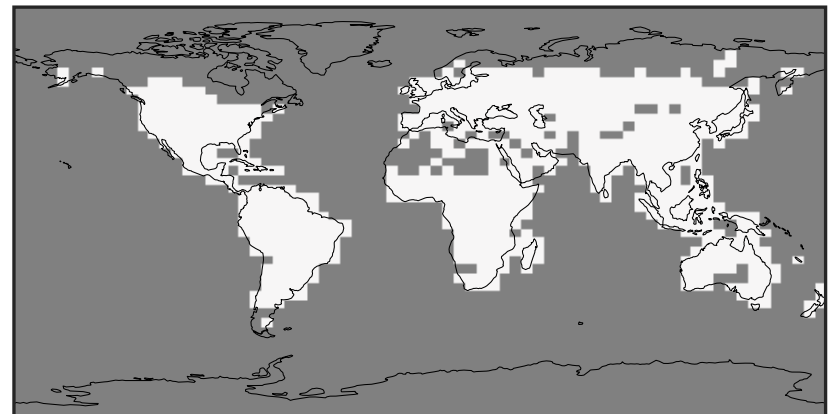
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

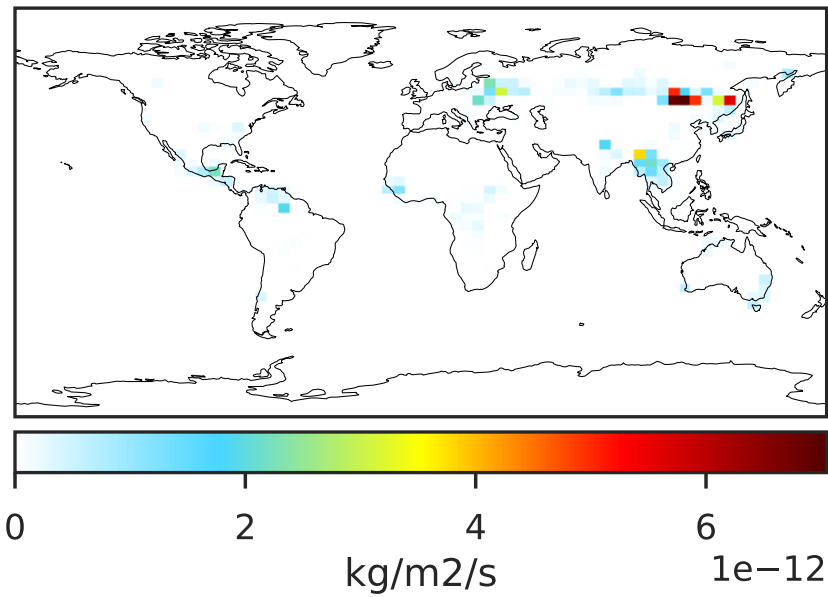
Ratio
Dev/Ref, Fixed Range



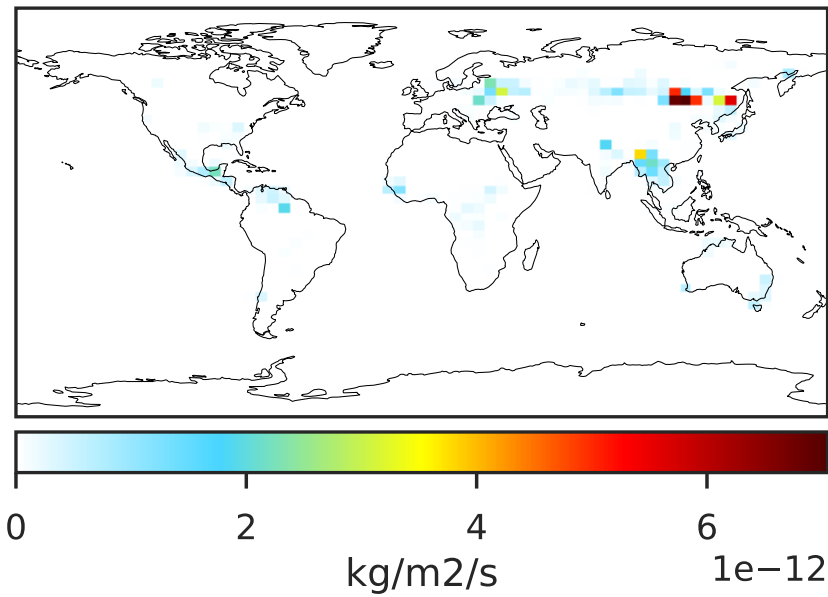
Ref and Dev equal throughout domain
unitless

EmisMTPA_BioBurn (Apr2019)

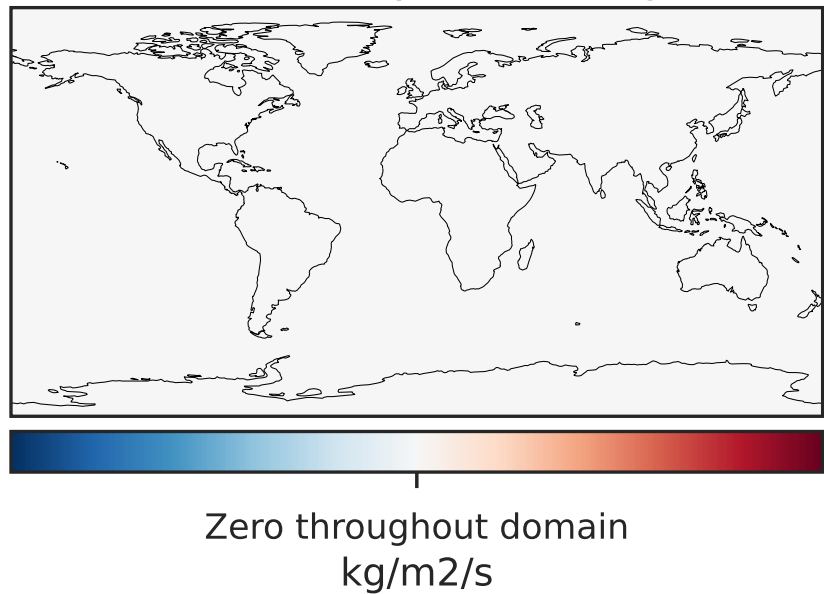
14.2.0-rc.2 (Ref)
4.0x5.0



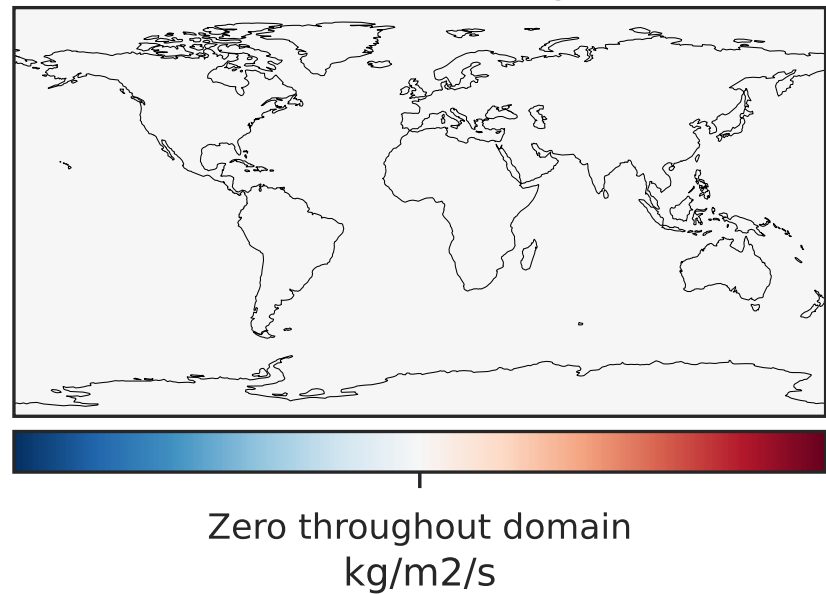
14.3.0-rc.0 (Dev)
4.0x5.0



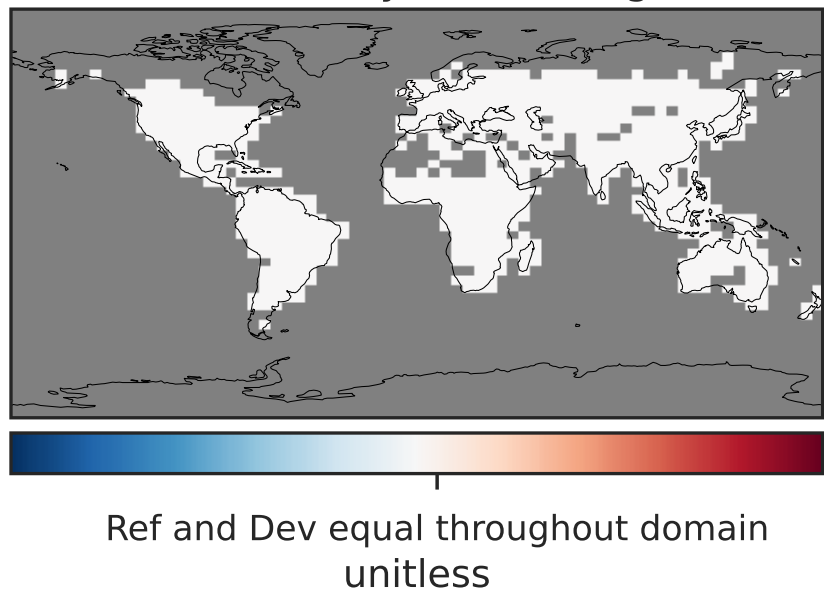
Difference
Dev - Ref, Dynamic Range



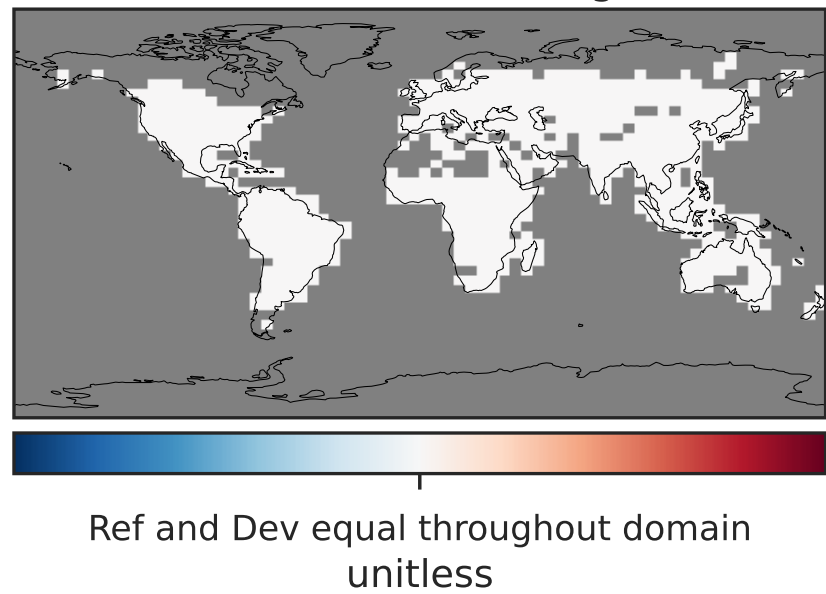
Difference
Dev - Ref, Restricted Range [5%,95%]



Ratio
Dev/Ref, Dynamic Range

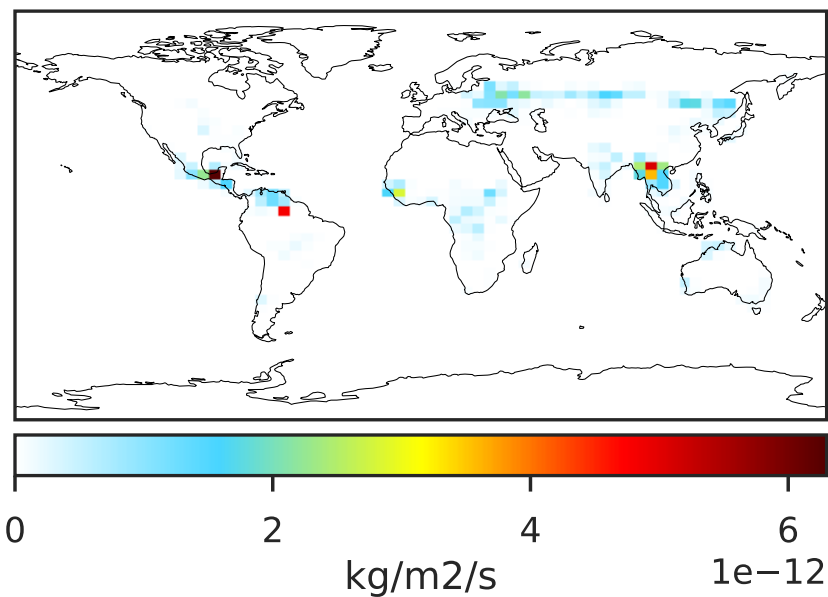


Ratio
Dev/Ref, Fixed Range

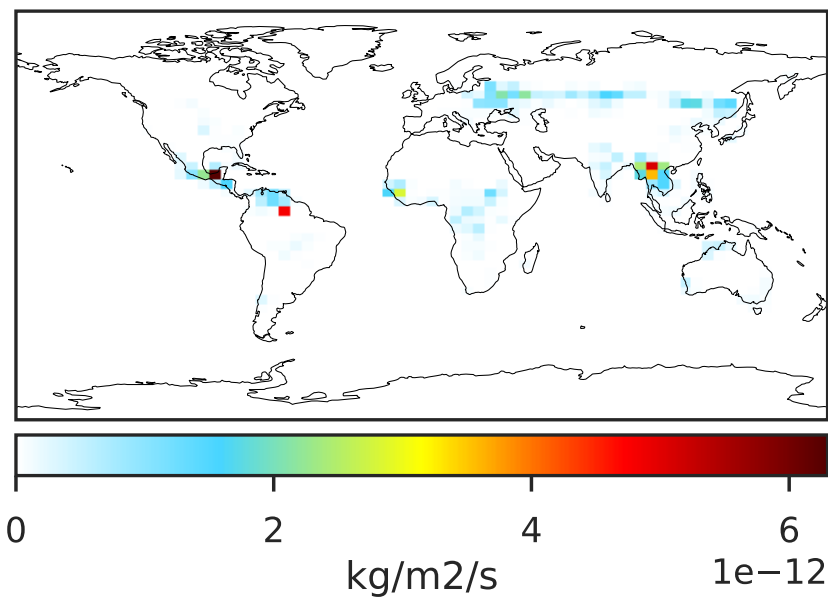


EmisMVK_BioBurn (Apr2019)

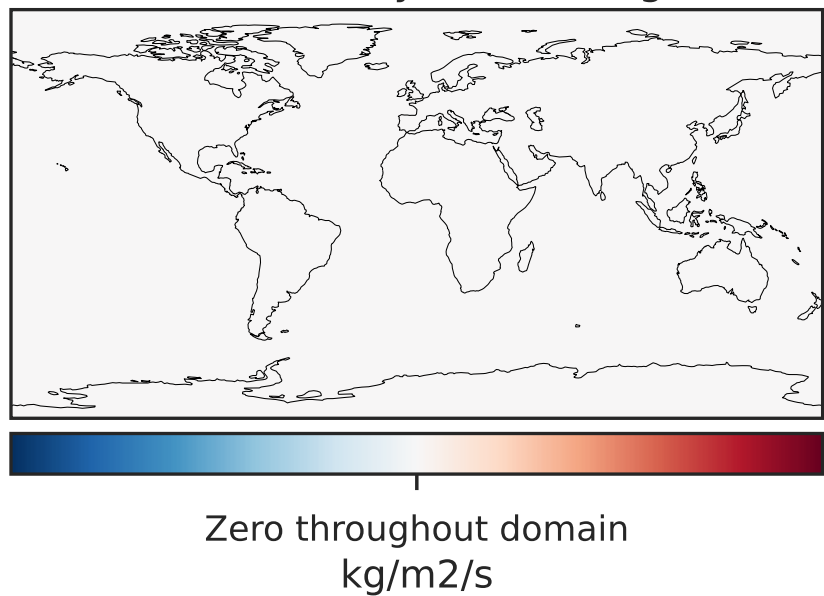
14.2.0-rc.2 (Ref)
4.0x5.0



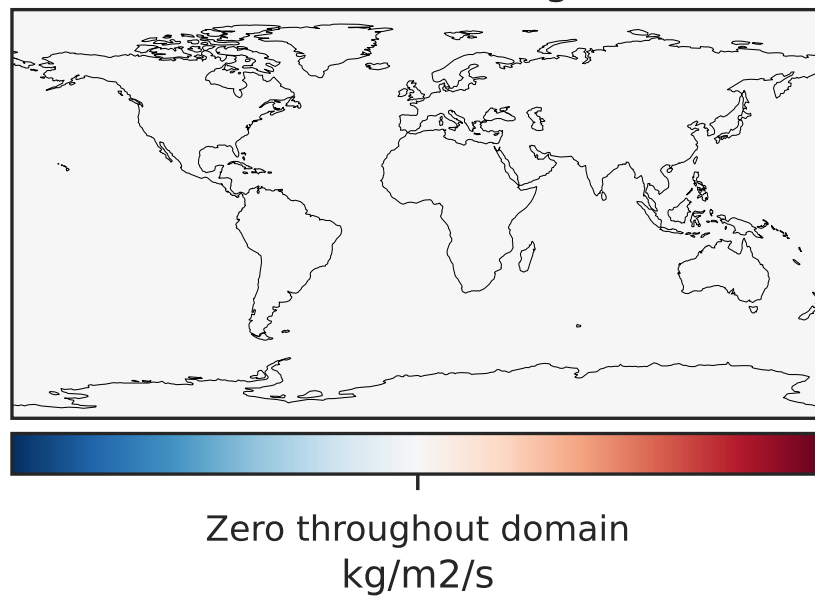
14.3.0-rc.0 (Dev)
4.0x5.0



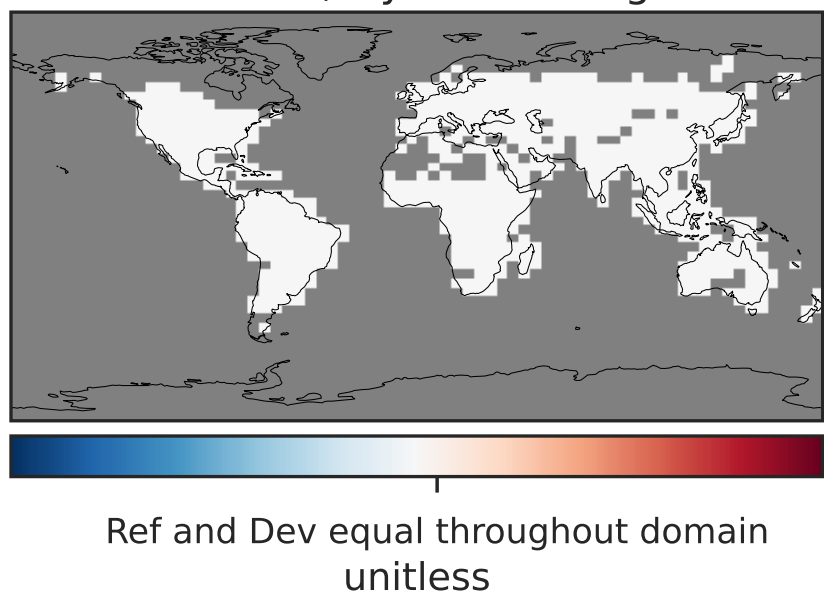
Difference
Dev - Ref, Dynamic Range



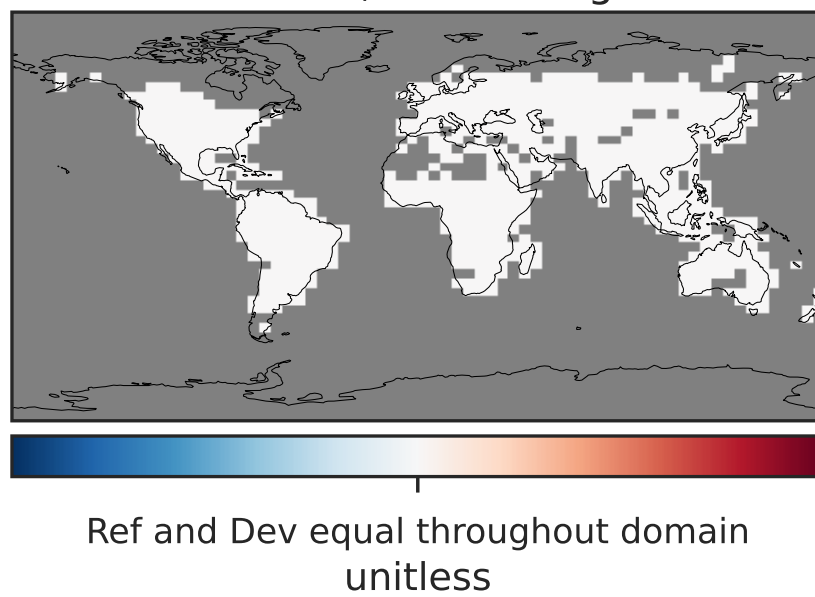
Difference
Dev - Ref, Restricted Range [5%,95%]



Ratio
Dev/Ref, Dynamic Range

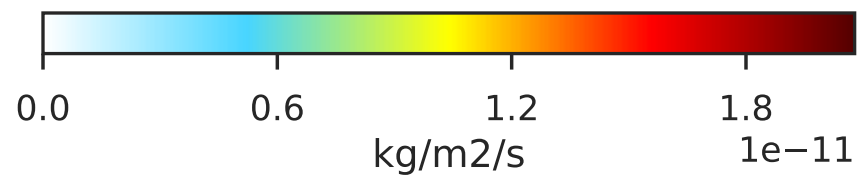
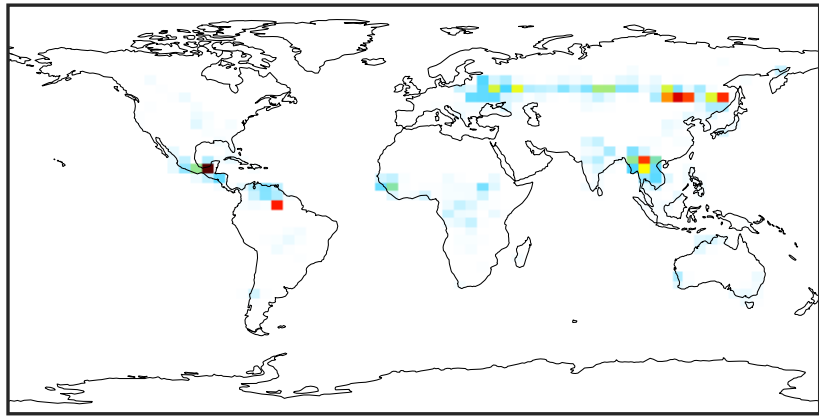


Ratio
Dev/Ref, Fixed Range

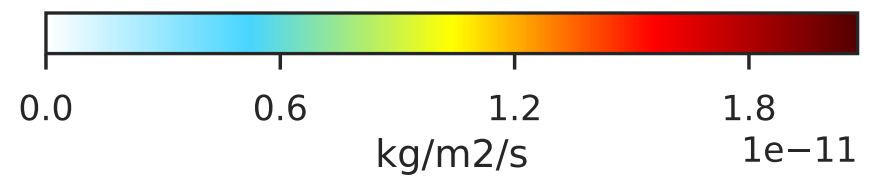
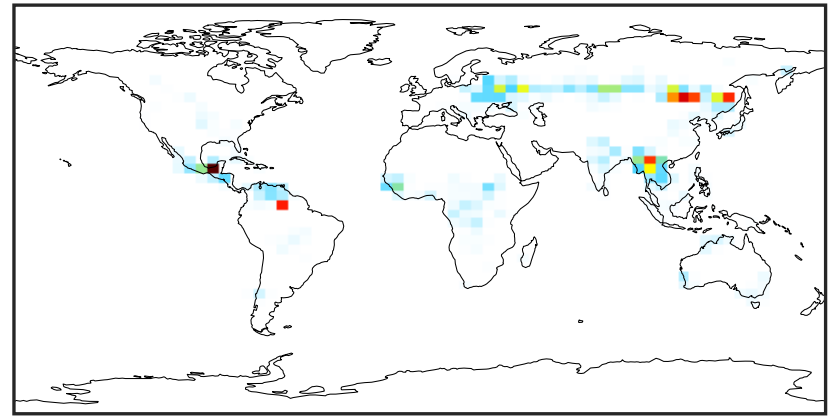


EmisNH3_BioBurn (Apr2019)

14.2.0-rc.2 (Ref)
4.0x5.0



14.3.0-rc.0 (Dev)
4.0x5.0



Difference
Dev - Ref, Dynamic Range



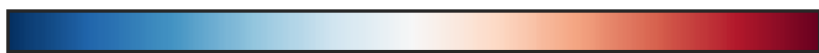
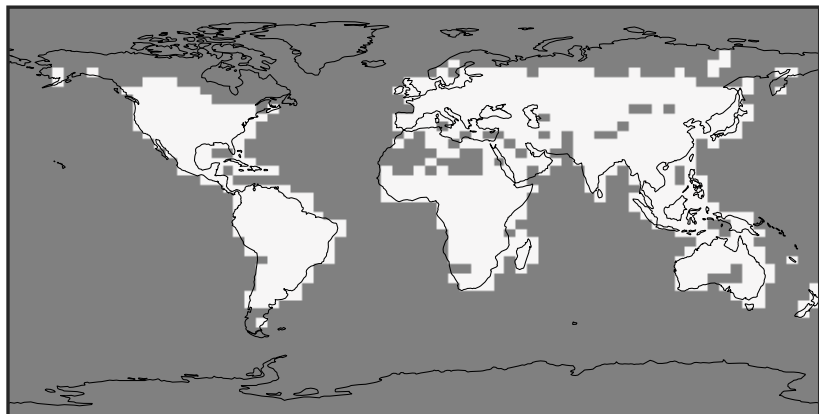
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



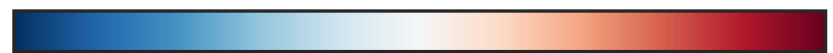
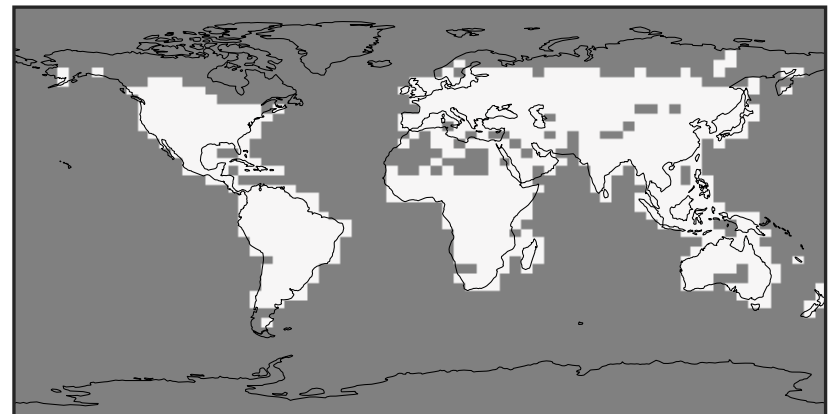
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

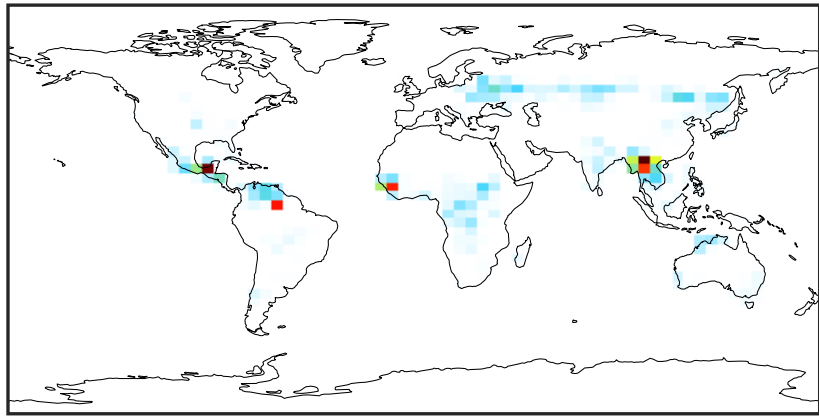
Ratio
Dev/Ref, Fixed Range



Ref and Dev equal throughout domain
unitless

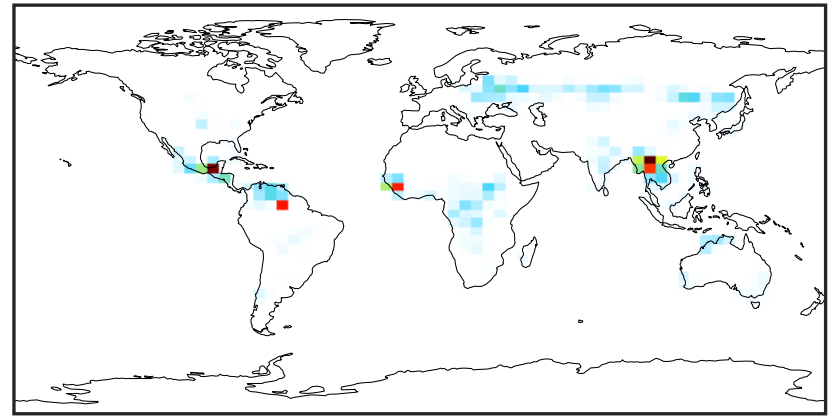
EmisNO_BioBurn (Apr2019)

14.2.0-rc.2 (Ref)
4.0x5.0



0.0 1.5 3.0 4.5 $1e-11$
kg/m2/s

14.3.0-rc.0 (Dev)
4.0x5.0



0.0 1.5 3.0 4.5 $1e-11$
kg/m2/s

Difference
Dev - Ref, Dynamic Range



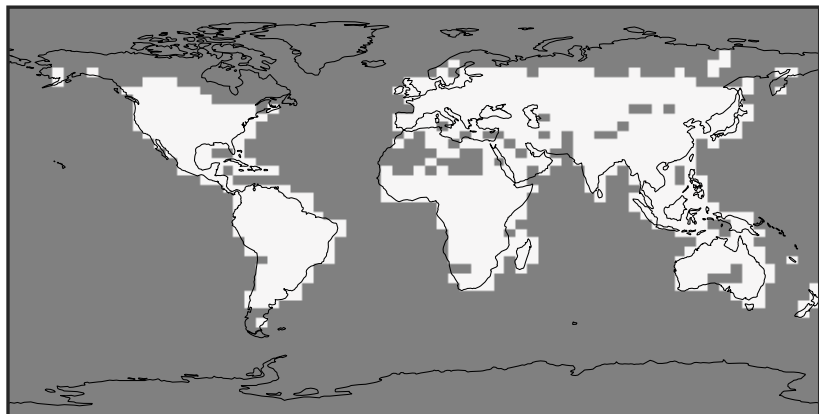
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



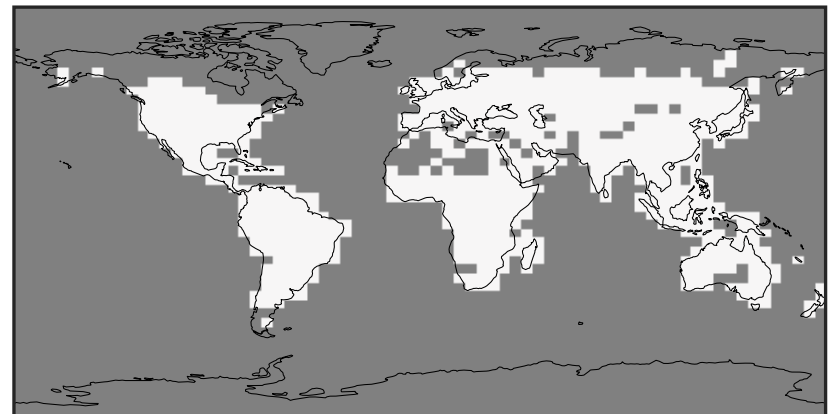
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

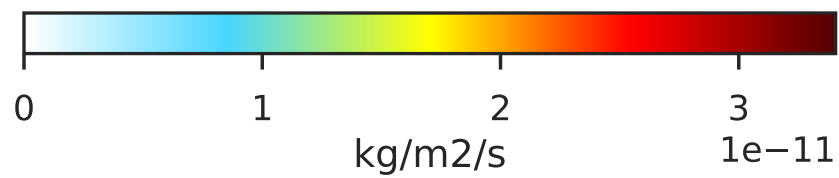
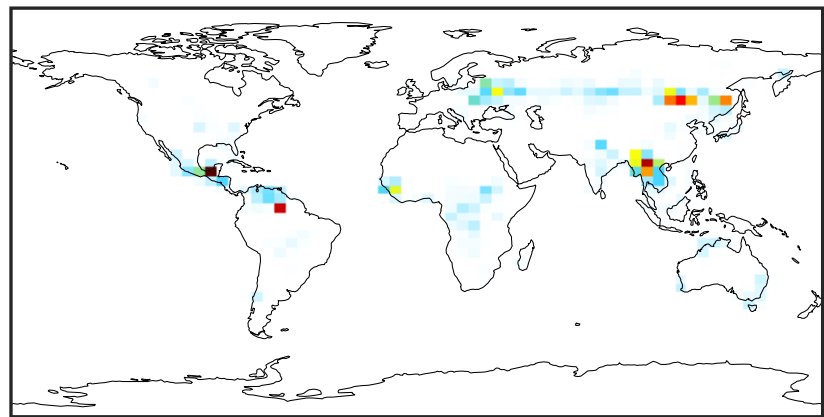
Ratio
Dev/Ref, Fixed Range



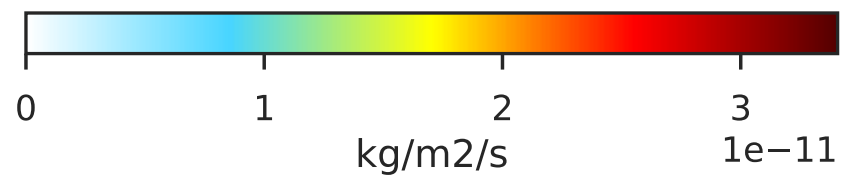
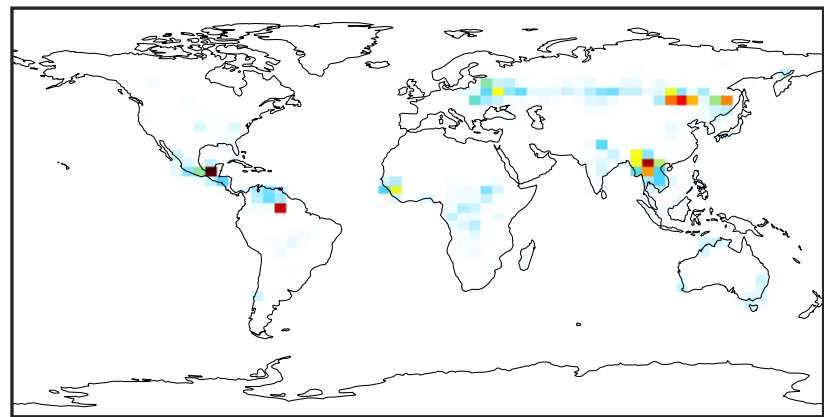
Ref and Dev equal throughout domain
unitless

EmisOCPI_BioBurn (Apr2019)

14.2.0-rc.2 (Ref)
4.0x5.0



14.3.0-rc.0 (Dev)
4.0x5.0



Difference
Dev - Ref, Dynamic Range



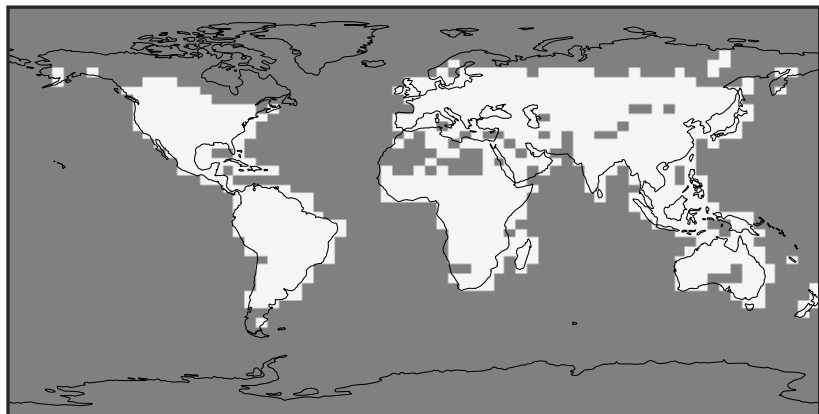
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



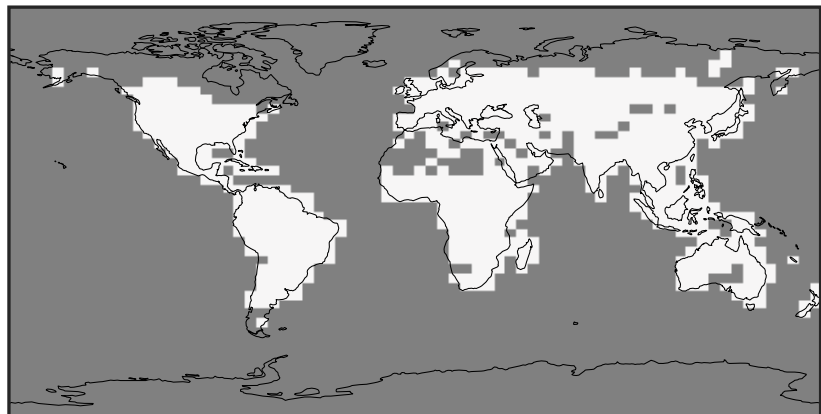
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

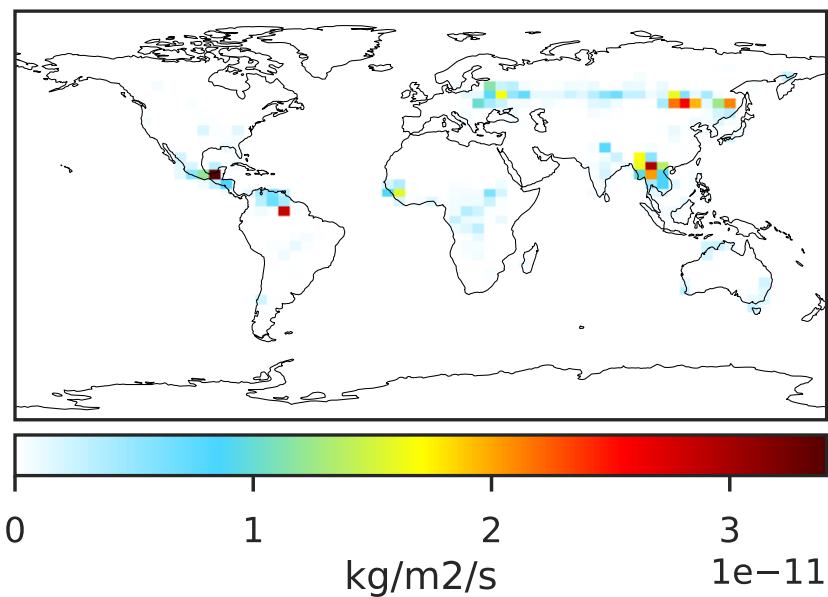
Ratio
Dev/Ref, Fixed Range



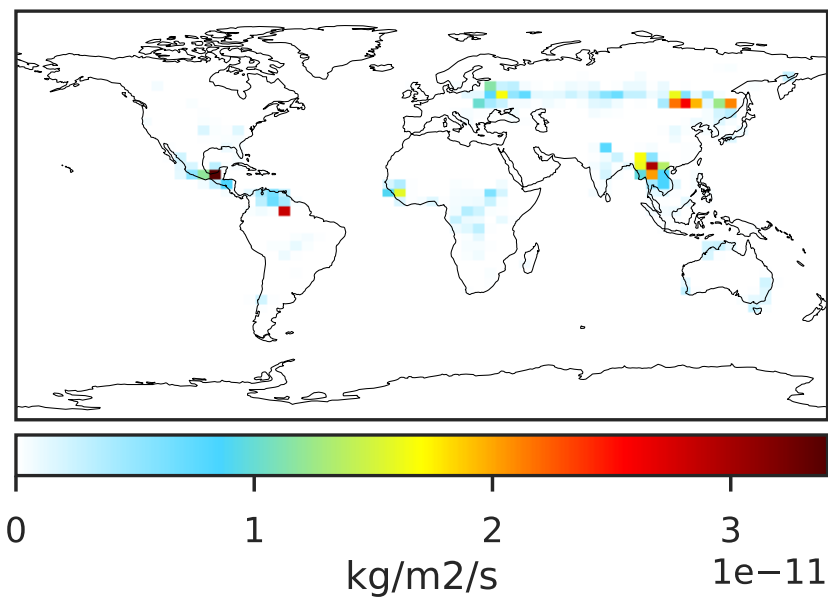
Ref and Dev equal throughout domain
unitless

EmisOCPO_BioBurn (Apr2019)

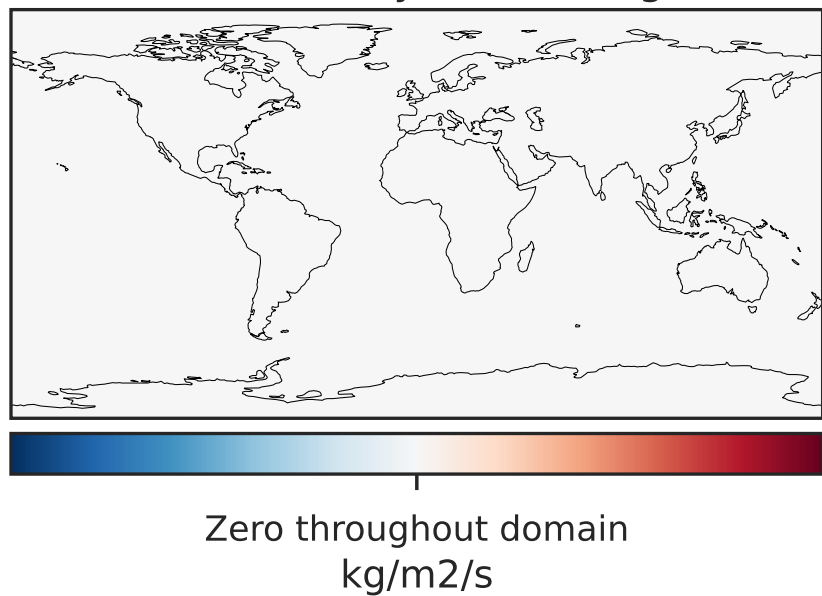
14.2.0-rc.2 (Ref)
4.0x5.0



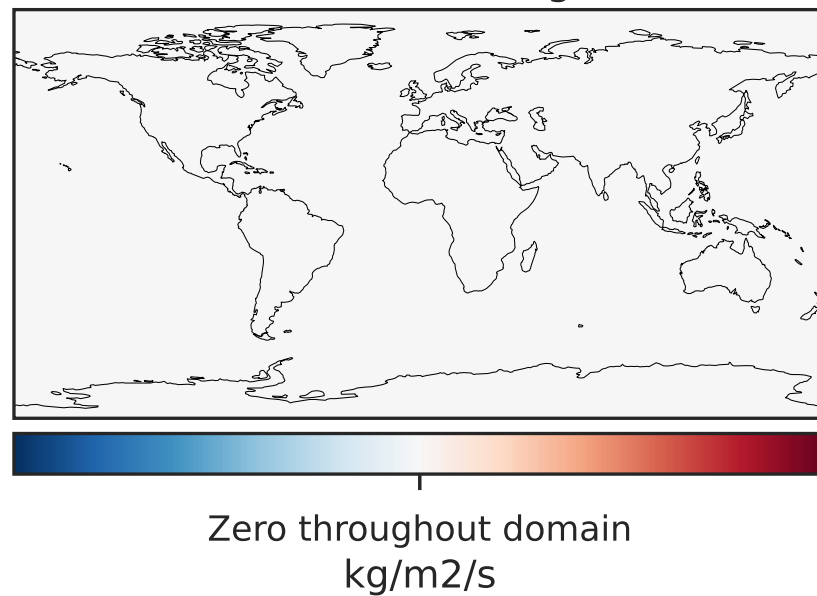
14.3.0-rc.0 (Dev)
4.0x5.0



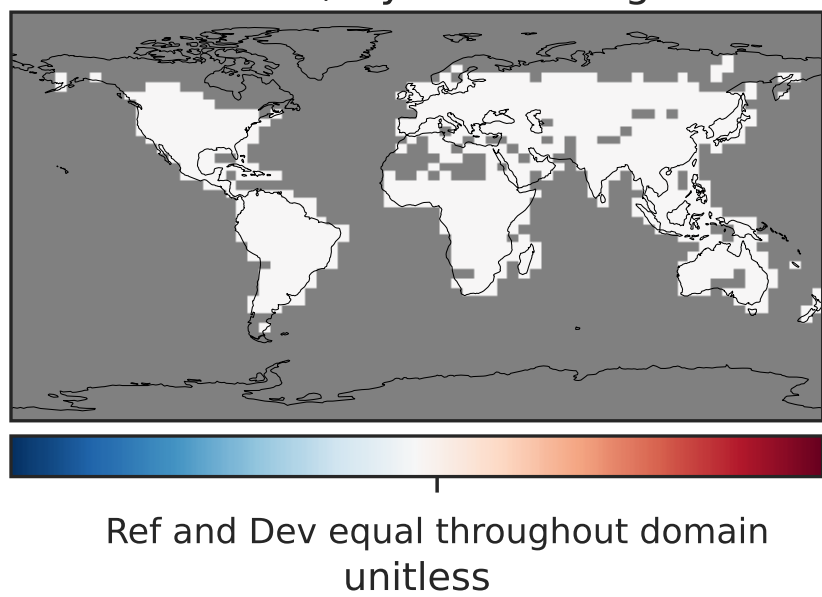
Difference
Dev - Ref, Dynamic Range



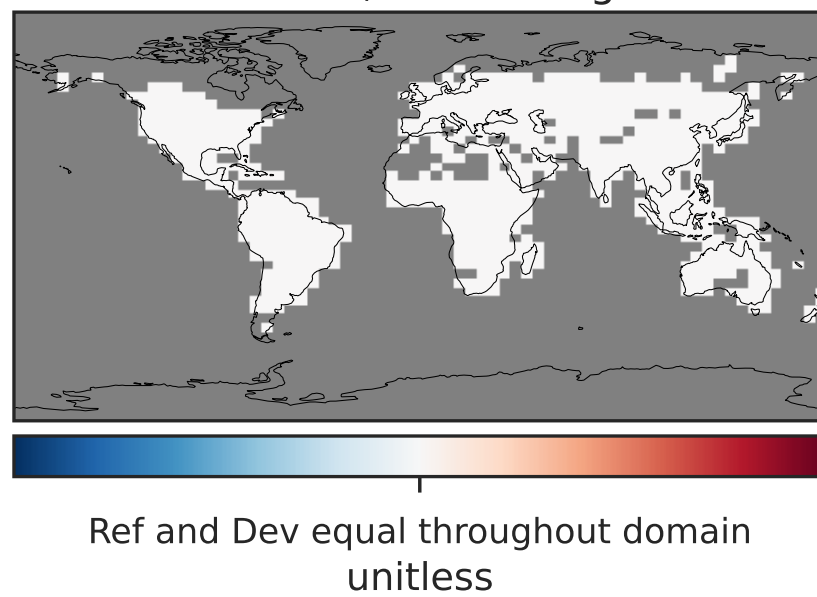
Difference
Dev - Ref, Restricted Range [5%,95%]



Ratio
Dev/Ref, Dynamic Range

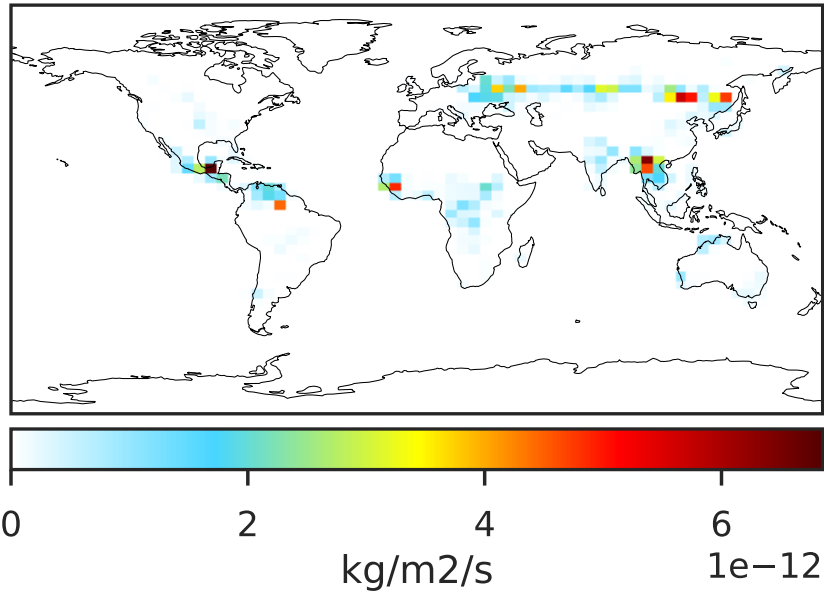


Ratio
Dev/Ref, Fixed Range

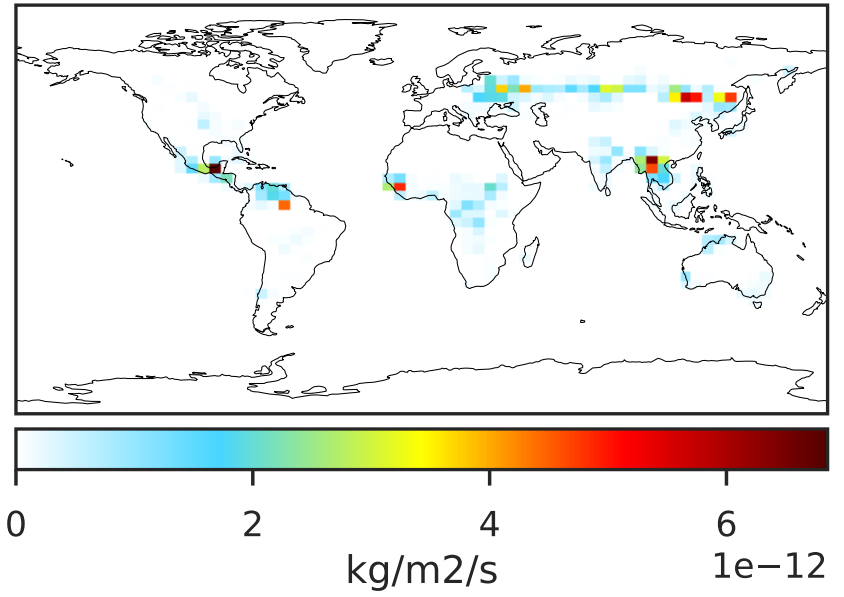


EmisPHEN_BioBurn (Apr2019)

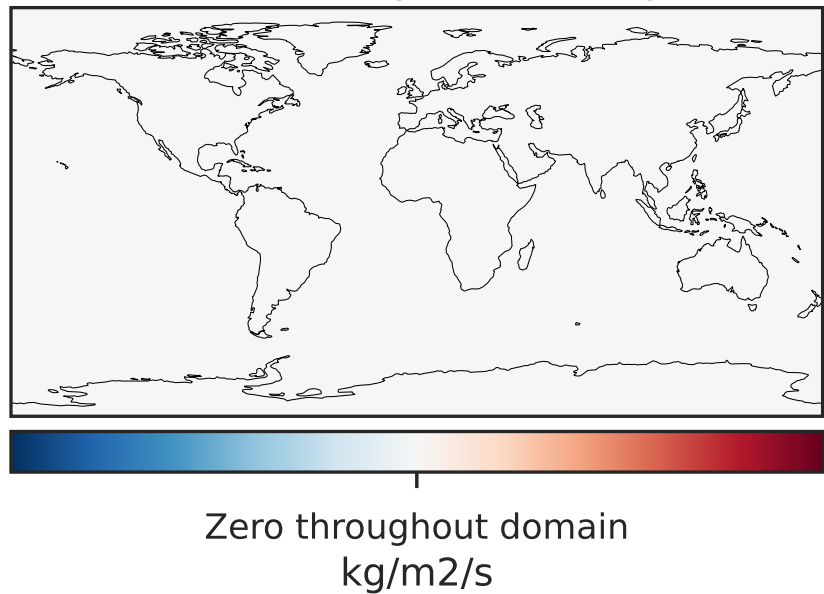
14.2.0-rc.2 (Ref)
4.0x5.0



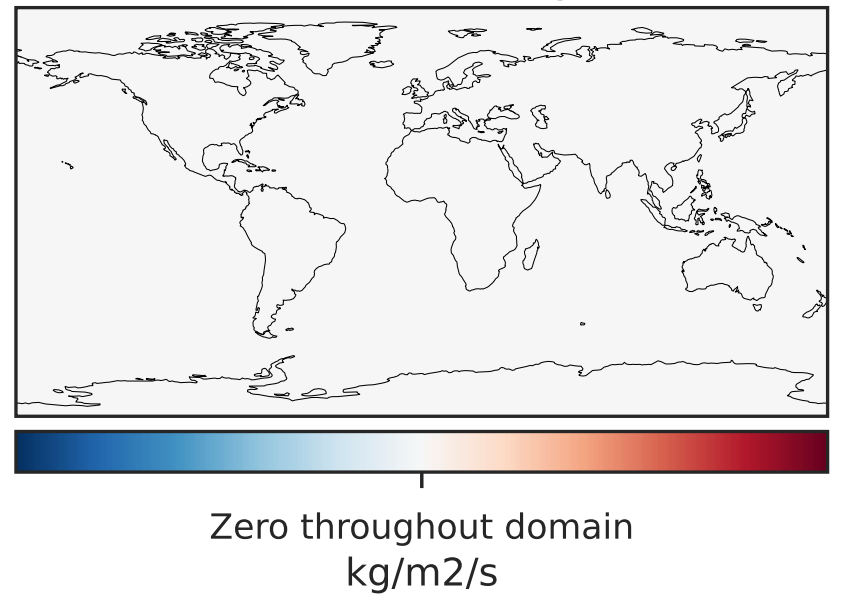
14.3.0-rc.0 (Dev)
4.0x5.0



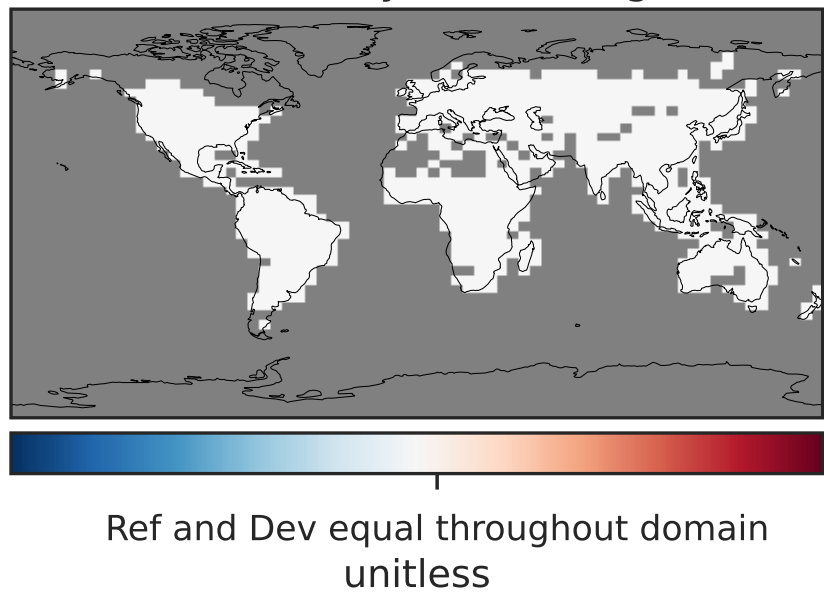
Difference
Dev - Ref, Dynamic Range



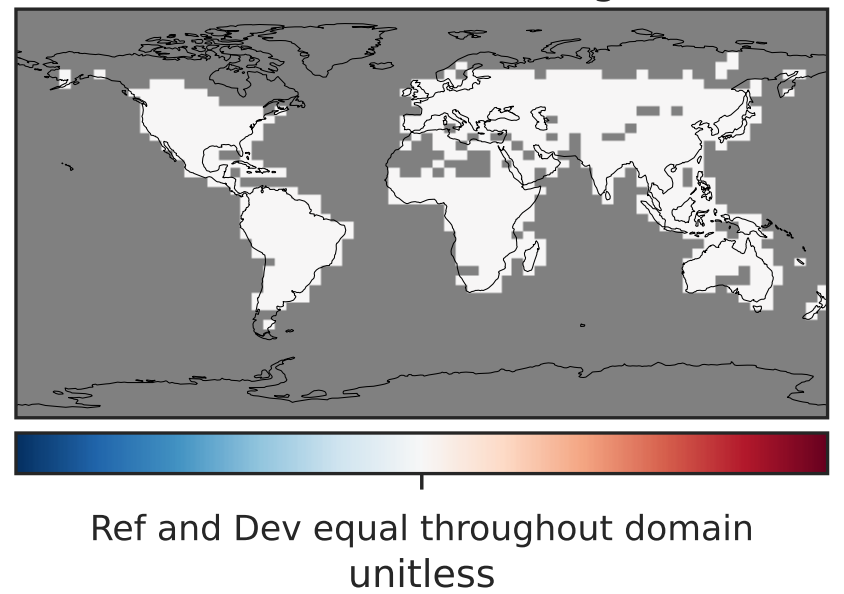
Difference
Dev - Ref, Restricted Range [5%,95%]



Ratio
Dev/Ref, Dynamic Range

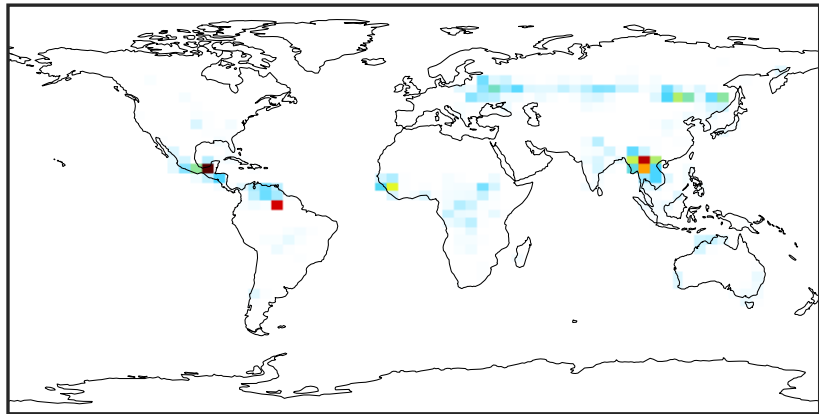


Ratio
Dev/Ref, Fixed Range



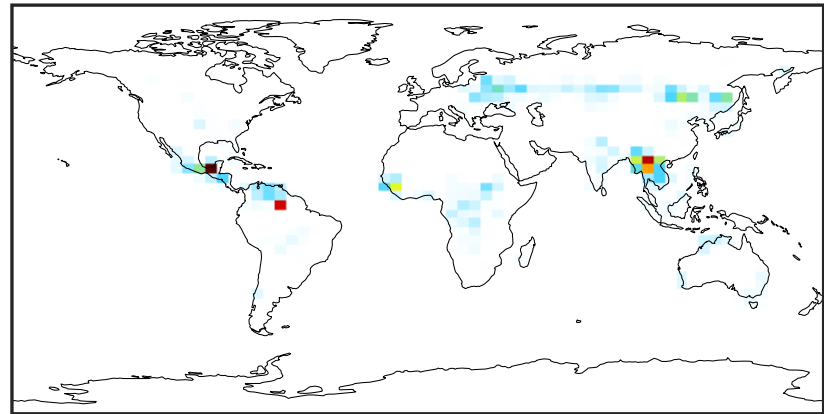
EmisPRPE_BioBurn (Apr2019)

14.2.0-rc.2 (Ref)
4.0x5.0



0.0 0.5 1.0 1.5 $1e-11$
kg/m²/s

14.3.0-rc.0 (Dev)
4.0x5.0



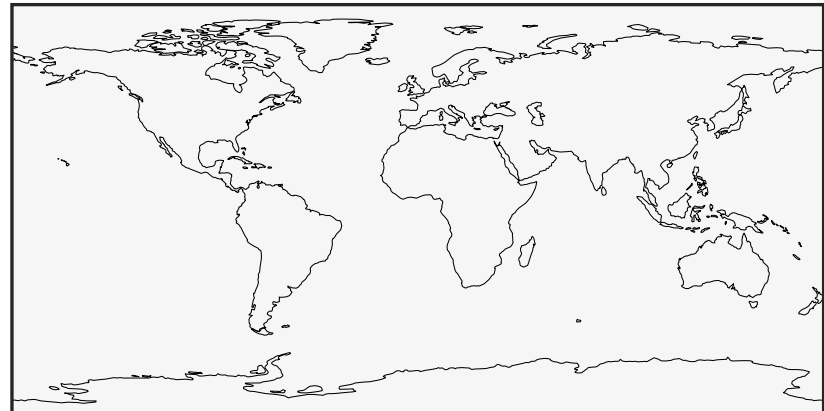
0.0 0.5 1.0 1.5 $1e-11$
kg/m²/s

Difference
Dev - Ref, Dynamic Range



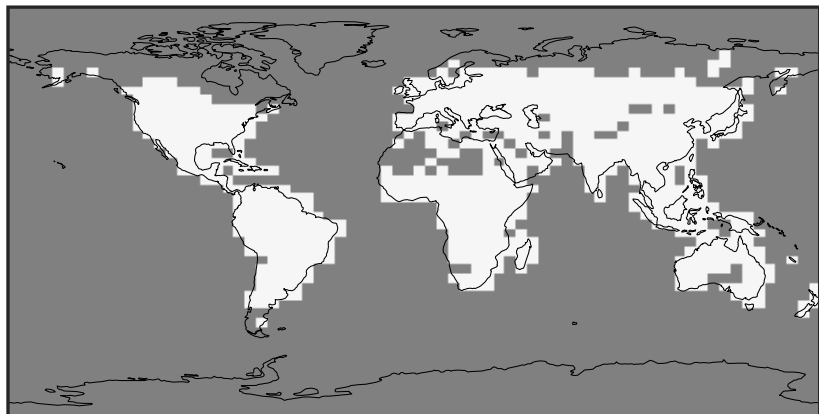
Zero throughout domain
kg/m²/s

Difference
Dev - Ref, Restricted Range [5%,95%]



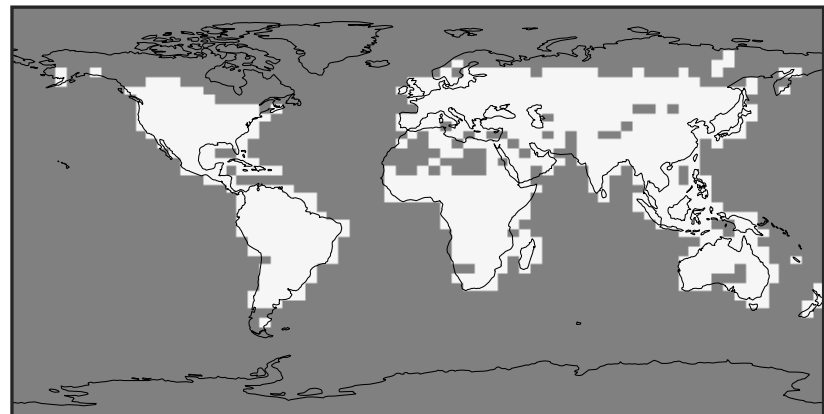
Zero throughout domain
kg/m²/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

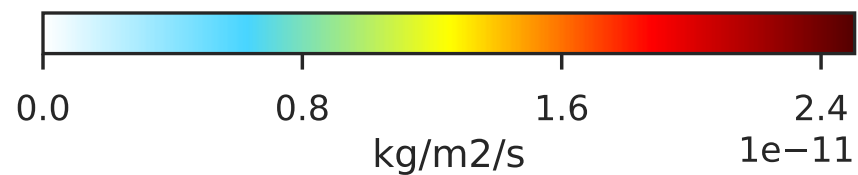
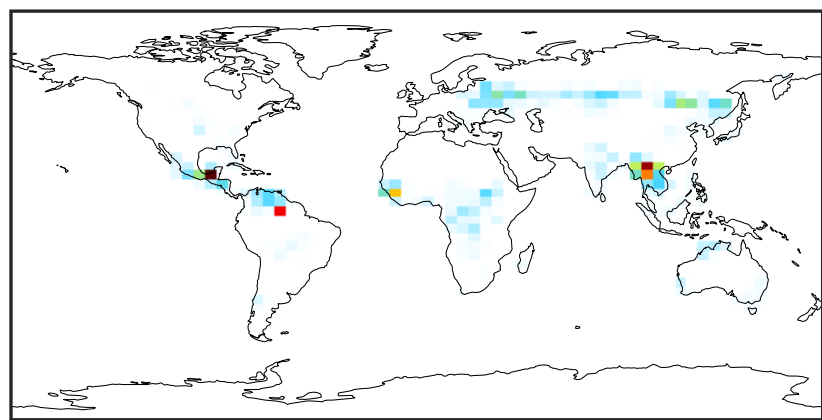
Ratio
Dev/Ref, Fixed Range



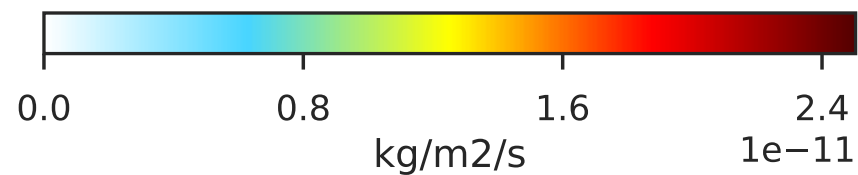
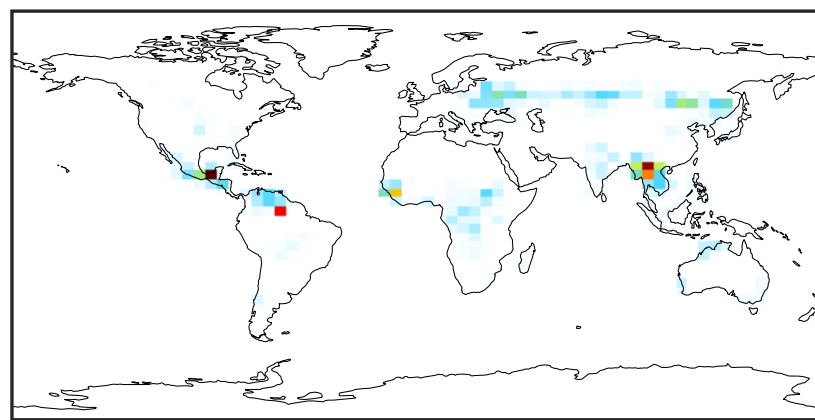
Ref and Dev equal throughout domain
unitless

EmisRCHO_BioBurn (Apr2019)

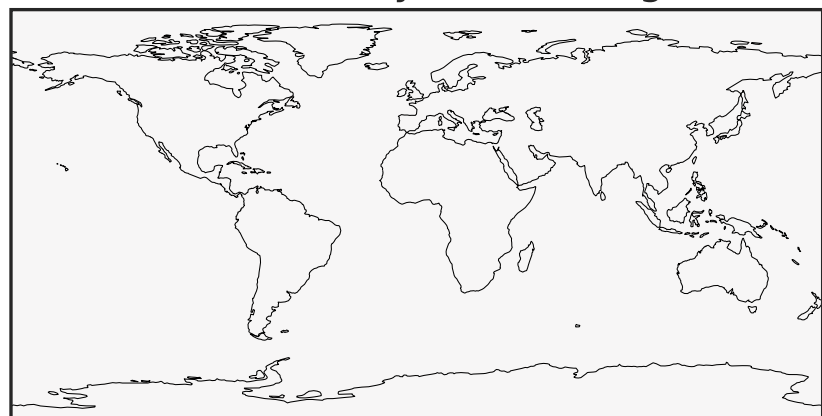
14.2.0-rc.2 (Ref)
4.0x5.0



14.3.0-rc.0 (Dev)
4.0x5.0

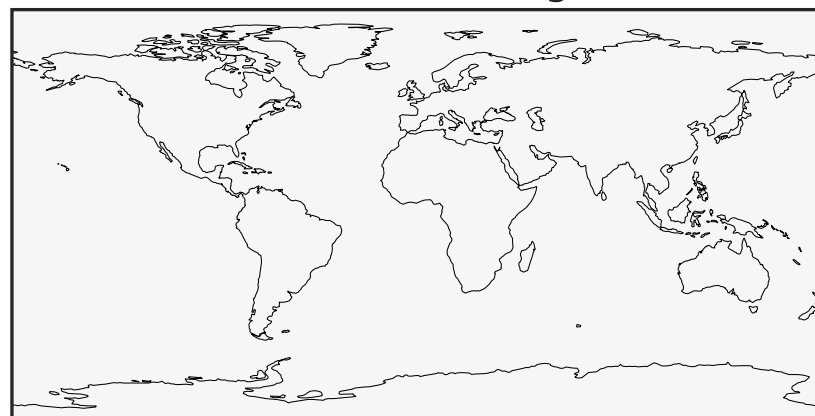


Difference
Dev - Ref, Dynamic Range



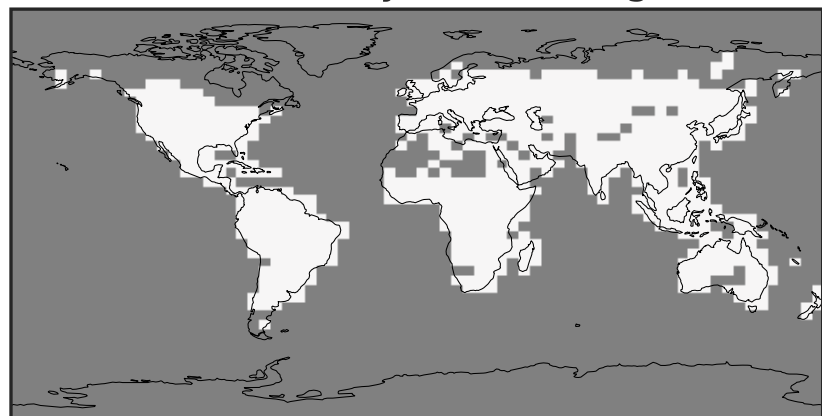
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



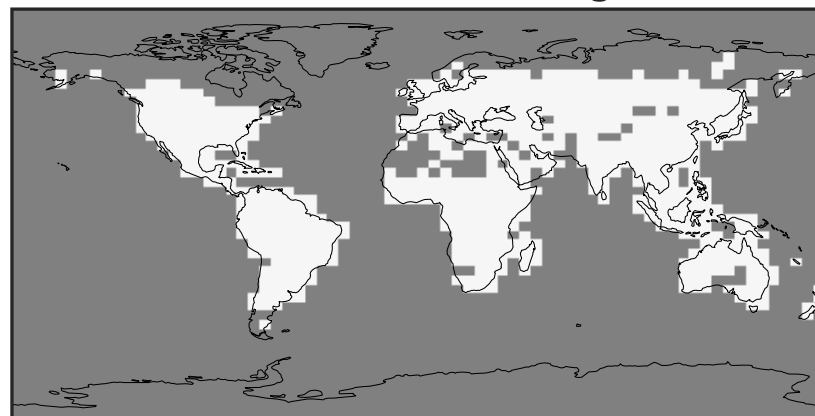
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

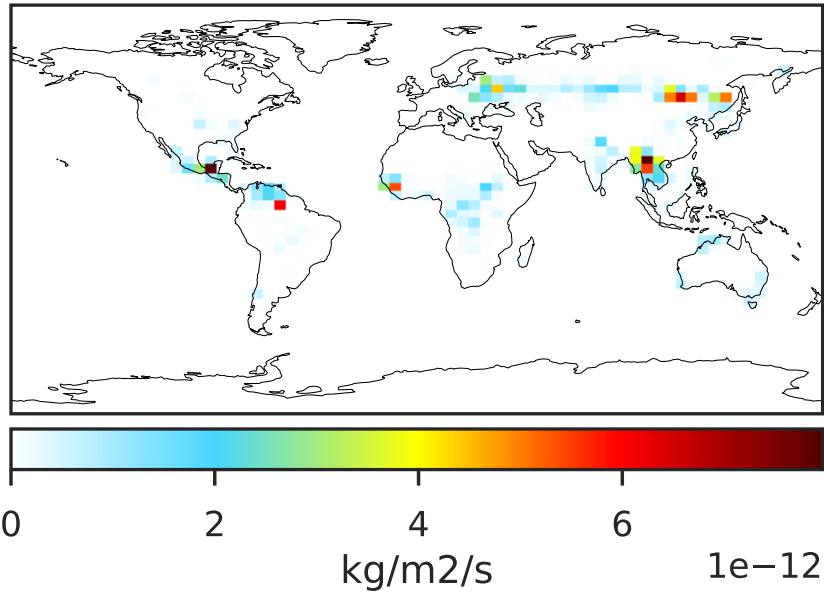
Ratio
Dev/Ref, Fixed Range



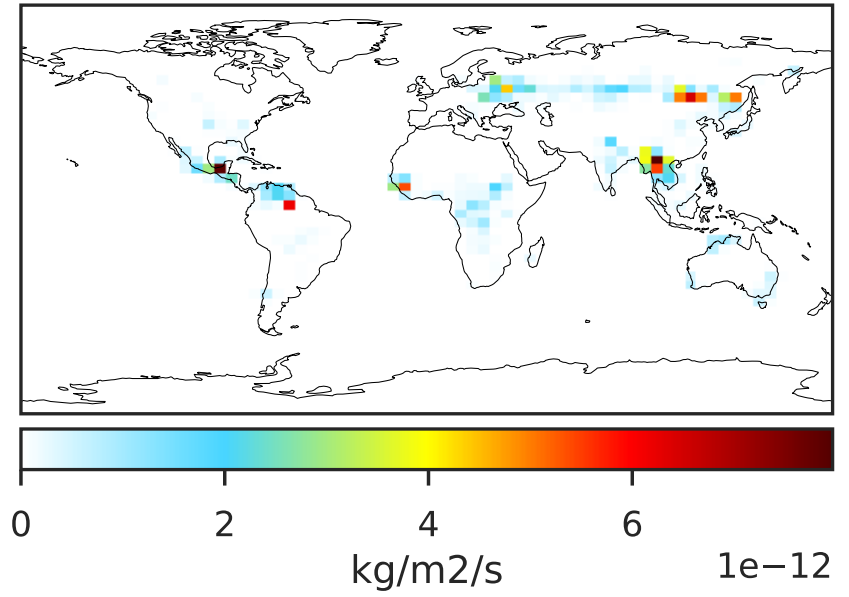
Ref and Dev equal throughout domain
unitless

EmisSO2_BioBurn (Apr2019)

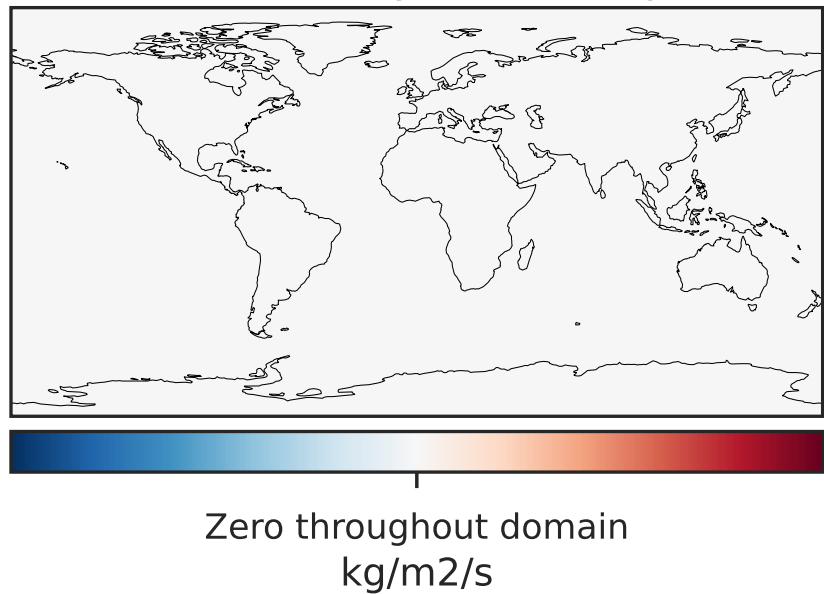
14.2.0-rc.2 (Ref)
4.0x5.0



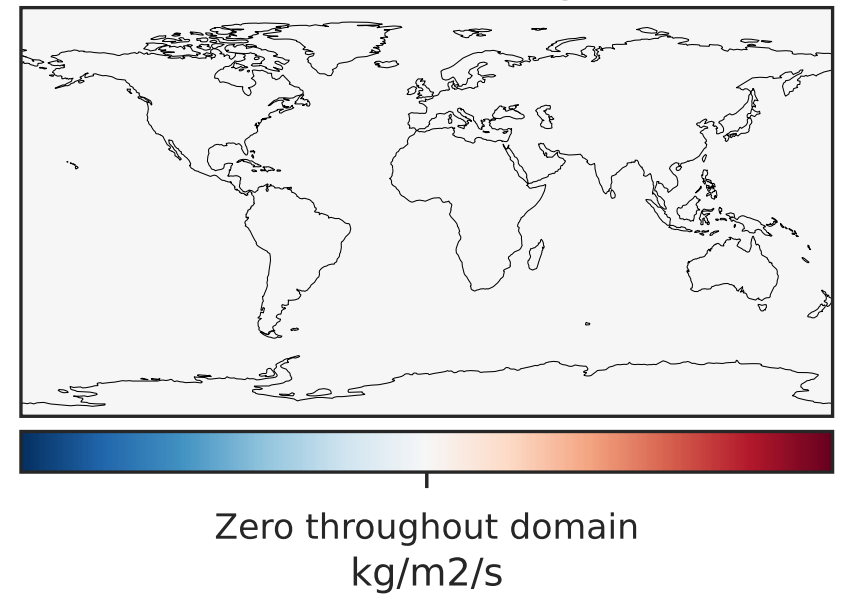
14.3.0-rc.0 (Dev)
4.0x5.0



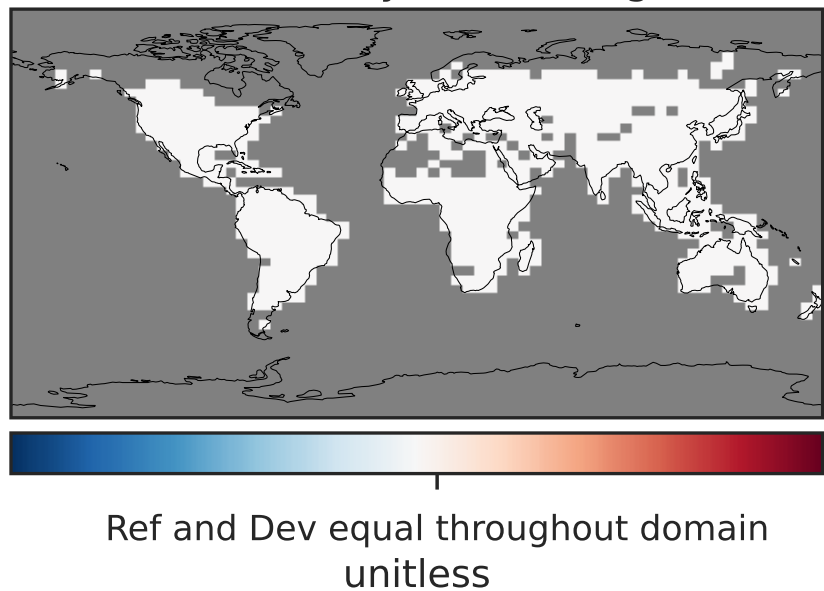
Difference
Dev - Ref, Dynamic Range



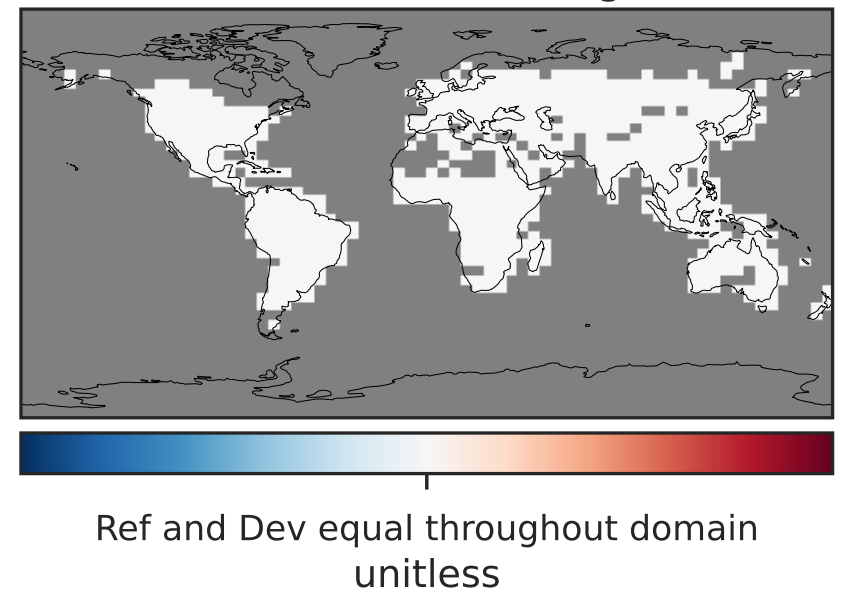
Difference
Dev - Ref, Restricted Range [5%,95%]



Ratio
Dev/Ref, Dynamic Range

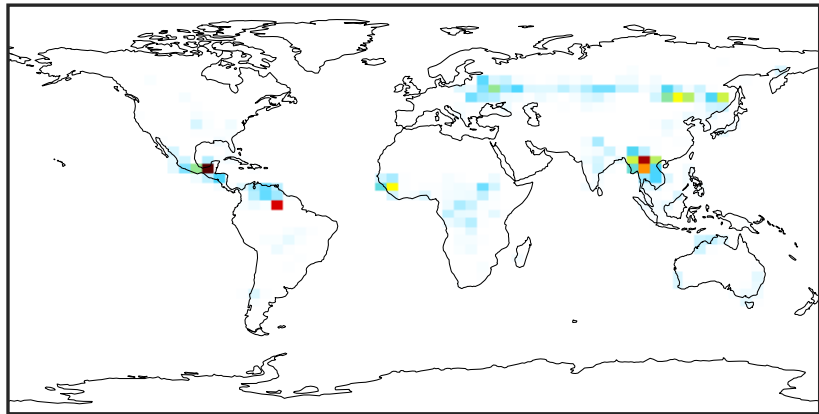


Ratio
Dev/Ref, Fixed Range



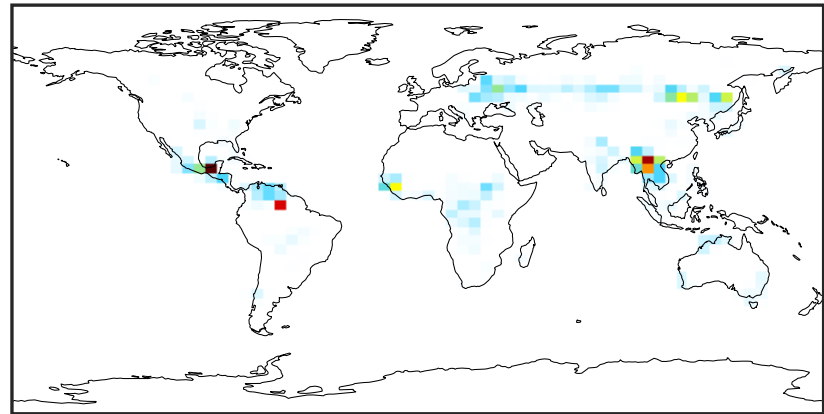
EmisSOAP_BioBurn (Apr2019)

14.2.0-rc.2 (Ref)
4.0x5.0



0.0 0.6 1.2 1.8 10^{-11}
kg/m²/s

14.3.0-rc.0 (Dev)
4.0x5.0



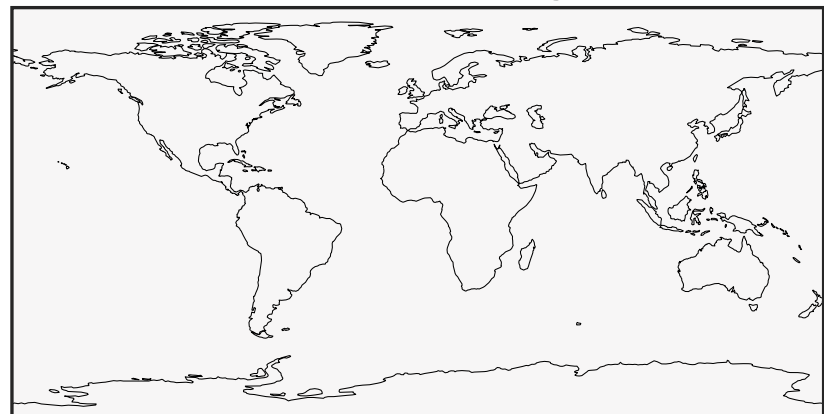
0.0 0.6 1.2 1.8 10^{-11}
kg/m²/s

Difference
Dev - Ref, Dynamic Range



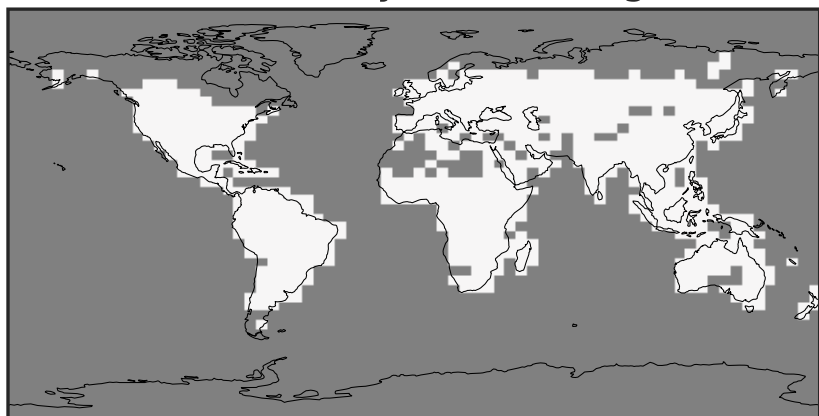
Zero throughout domain
kg/m²/s

Difference
Dev - Ref, Restricted Range [5%,95%]



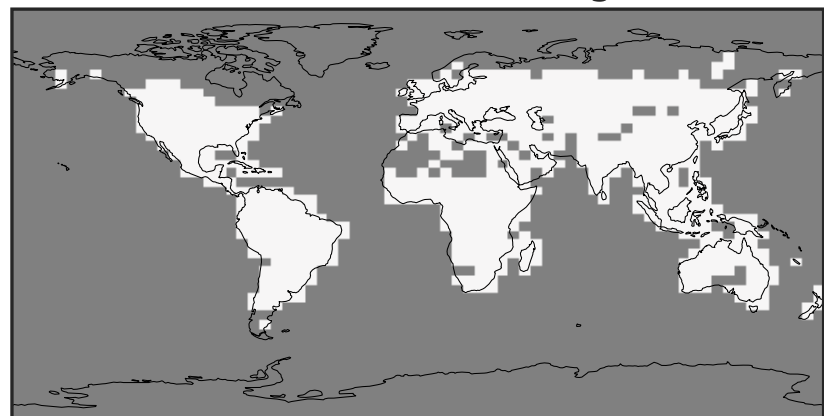
Zero throughout domain
kg/m²/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

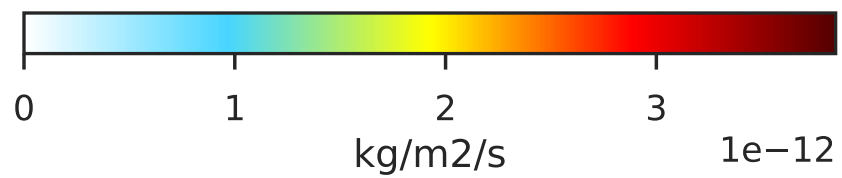
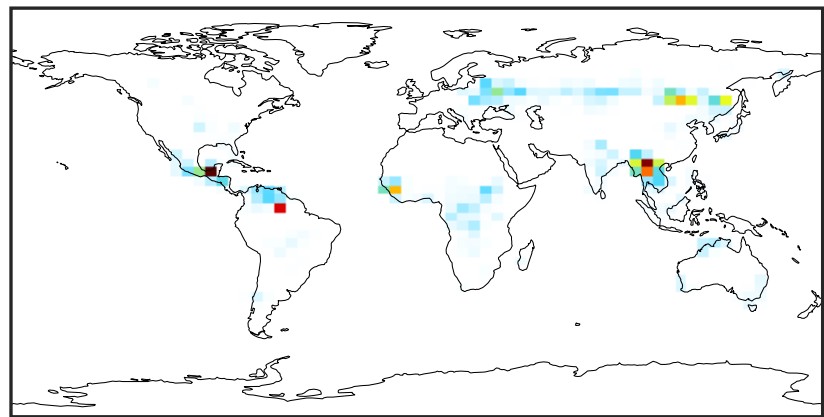
Ratio
Dev/Ref, Fixed Range



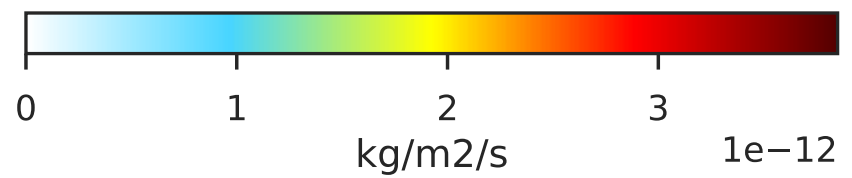
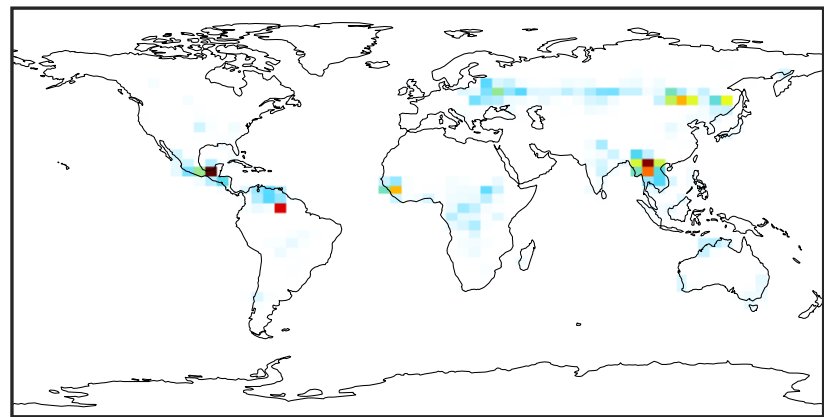
Ref and Dev equal throughout domain
unitless

EmisTOLU_BioBurn (Apr2019)

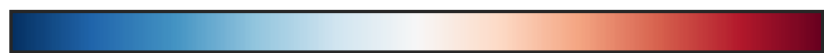
14.2.0-rc.2 (Ref)
4.0x5.0



14.3.0-rc.0 (Dev)
4.0x5.0



Difference
Dev - Ref, Dynamic Range



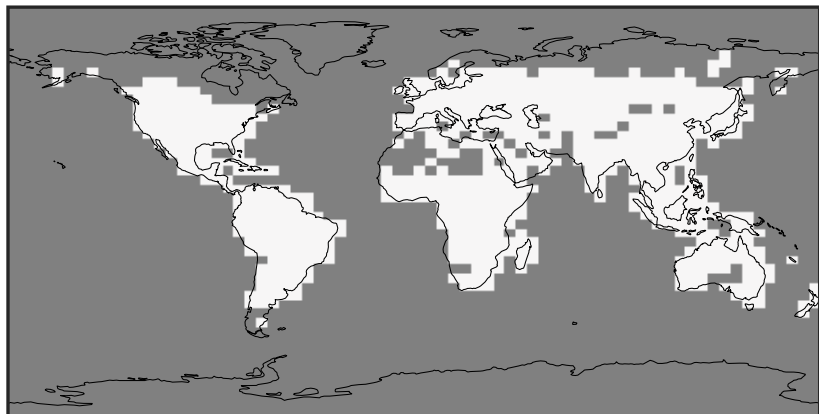
Zero throughout domain
kg/m2/s

Difference
Dev - Ref, Restricted Range [5%,95%]



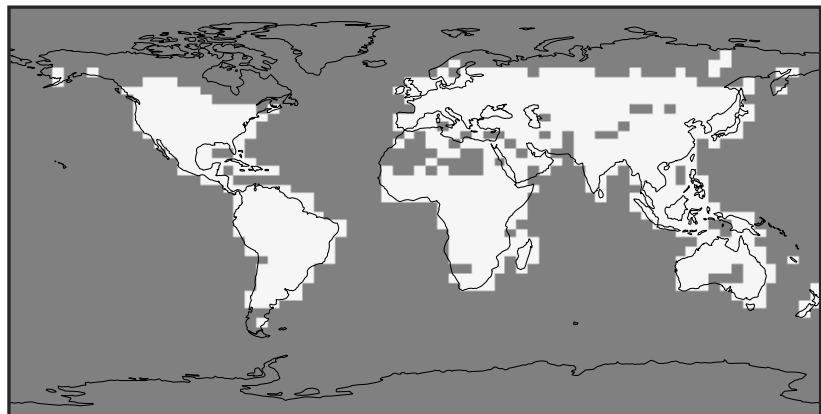
Zero throughout domain
kg/m2/s

Ratio
Dev/Ref, Dynamic Range



Ref and Dev equal throughout domain
unitless

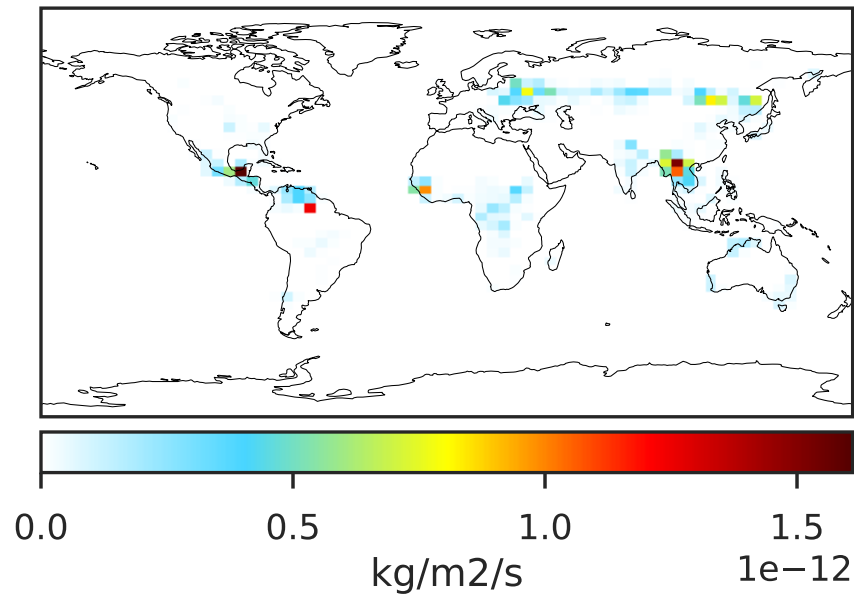
Ratio
Dev/Ref, Fixed Range



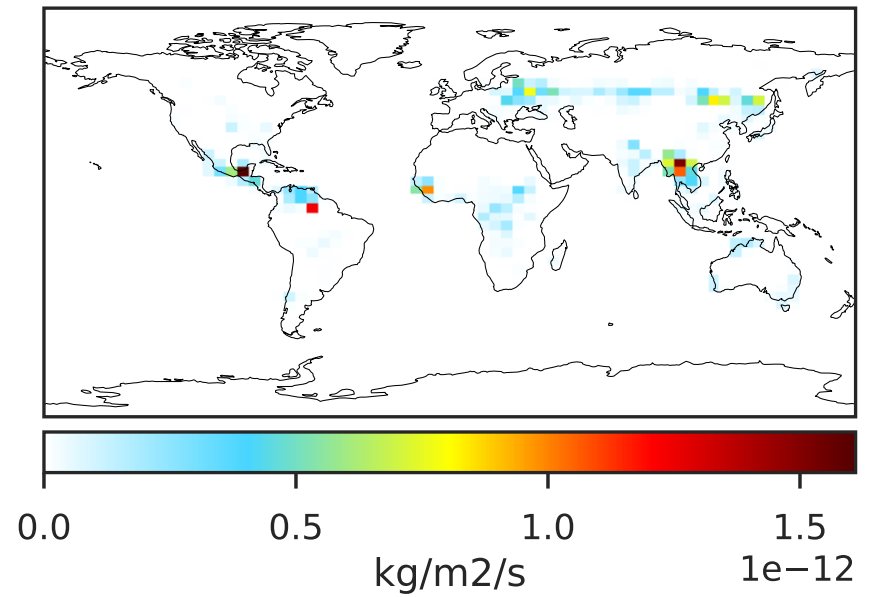
Ref and Dev equal throughout domain
unitless

EmisXYLE_BioBurn (Apr2019)

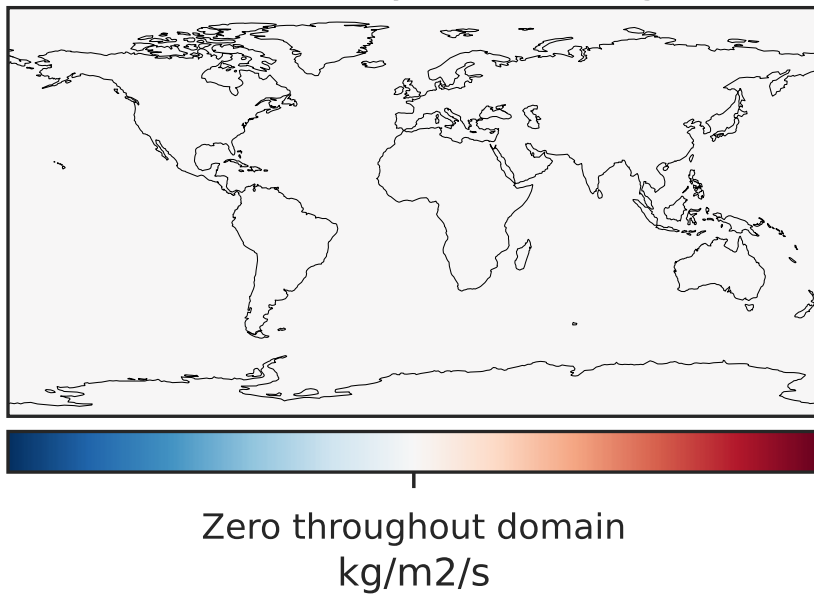
14.2.0-rc.2 (Ref)
4.0x5.0



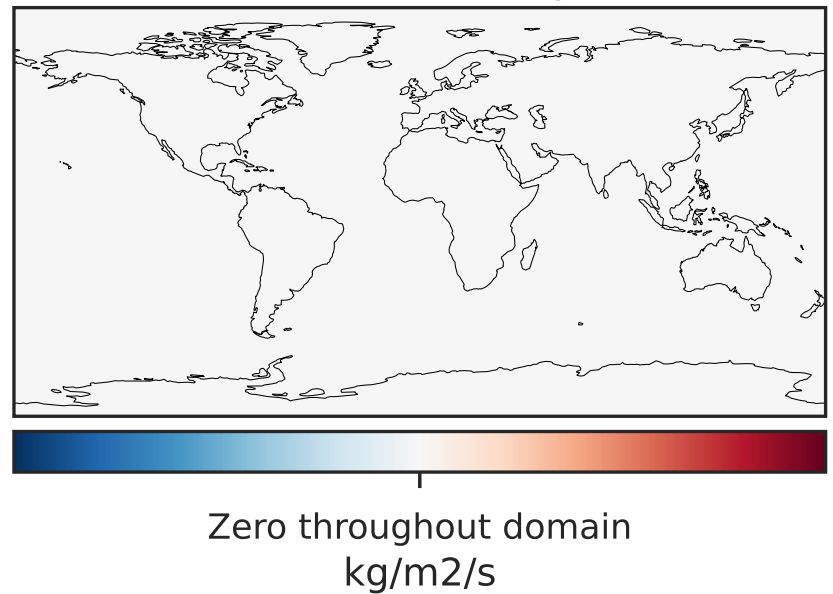
14.3.0-rc.0 (Dev)
4.0x5.0



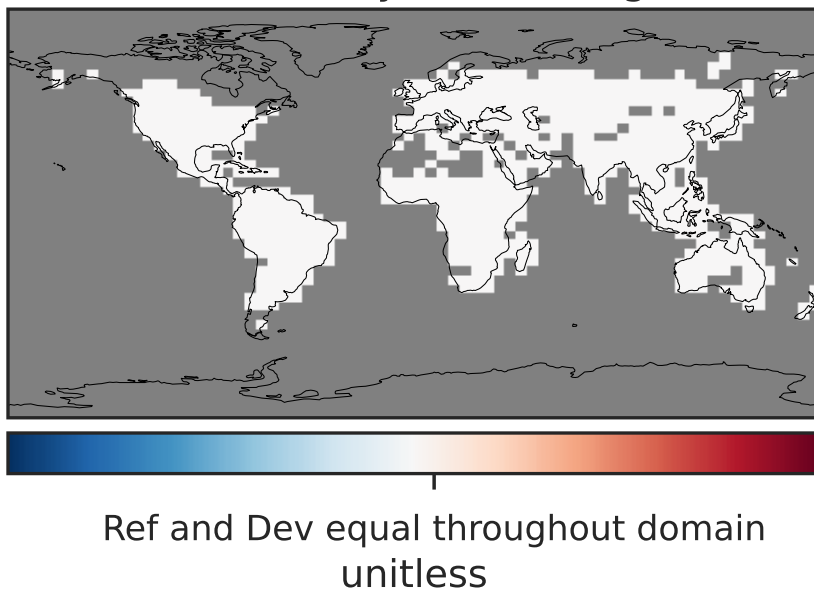
Difference
Dev - Ref, Dynamic Range



Difference
Dev - Ref, Restricted Range [5%,95%]



Ratio
Dev/Ref, Dynamic Range



Ratio
Dev/Ref, Fixed Range

