

Monoterpene and Sesquiterpene Emission Estimates for the United States

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Figure S5. Monthly average SQT emissions fluxes with temperature-dependence parameter values, β , of 0.07 K^{-1} (top panel), 0.16 K^{-1} (middle panel), and 0.25 K^{-1} (bottom panel) estimated from EF-S06.

Table S1. Lists of plant samples by PFTs, including locations and time of measurements.

	Common name	Genus/Species	Location	Sample Dates
Needle Leaf Trees (Total number of samples = 40)				
(1)	Gray "Digger" Pine	<i>Pinus sabiniana</i>	NCAR greenhouse, Boulder, CO	Mar 22 - 24, 2005
(1)	Scots pine	<i>Pinus sylvestris</i> L.	NCAR greenhouse, Boulder, CO	May 26 - 31, 2005
(1)	Douglas Fir	<i>Pseudotsuga menziesii</i>	NCAR greenhouse, Boulder, CO	June 1 - 4, 2005
(1)	Ponderosa Pine	<i>Pinus ponderosa</i>	Boulder, CO	July 19 - 20, 2005
(1)	Ponderosa Pine	<i>Pinus ponderosa</i>	Boulder, CO	Aug 23, 2005
(1)	Western Red Cedar	<i>Thuja plicata</i>	California	Sep 5 - 6, 2005
(1)	Redwood	<i>Sequoia sempervirens</i>	California	Sep 7 - 8, 2005
(1)	Douglas Fir	<i>Pseudotsuga menziesii</i>	California	Sep 8 - 9, 2005
(1)	Shortleaf Pine	<i>Pinus Echinata</i>	California	Sep 13 - 14, 2005
(1)	Beach Pine	<i>Pinus Sylvestris</i>	California	Sep 14, 2005
(1)	Redwood	<i>Sequoia sempervirens</i>	California	Sep 14 - 15, 2005
(1)	Grand Fir	<i>Abies grandis</i>	California	Sep 15 - 18, 2005
(1)	Baby Blue Spruce	<i>Picea Pungens</i>	Creekside Nursery, Boulder, CO	Oct 7 - Oct 9, 2005
(1)	White Pine	<i>Pinus strobus</i>	University of Michigan, MI	June 17 - 19, 2005
(1)	White Pine	<i>Pinus strobus</i>	University of Michigan, MI	June 27 - 28, 2005
(1)	White Pine	<i>Pinus strobus</i>	University of Michigan, MI	June 27 - 28, 2005
(1)	Red Pine	<i>Pinus resinosa</i>	University of Michigan, MI	July 5 - 6, 2005
(1)	Red Pine	<i>Pinus resinosa</i>	University of Michigan, MI	July 5 - 6, 2005
(1)	Balsam Fir	<i>Abies balsamea</i>	University of Michigan, MI	July 8, 2005
(1)	Red Pine	<i>Pinus resinosa</i>	University of Michigan, MI	July 23 - 24, 2005
(1)	white pine	<i>Pinus strobus</i>	University of Michigan, MI	July 27 - 28, 2005
(1)	Loblolly pine #1	<i>Pinus teada</i>	Duke forest, NC	Aug 8 - 9, 2005
(1)	Loblolly pine #2A	<i>Pinus teada</i>	Duke forest, NC	Aug 9 - 12, 2005
(1)	Loblolly pine #2B	<i>Pinus teada</i>	Duke forest, NC	Aug 9 - 12, 2005
(1)	Loblolly pine	<i>Pinus teada</i>	Duke forest, NC	Sep 22 - 25, 2004
(1)	Loblolly pine	<i>Pinus teada</i>	Duke forest, NC	Sep 22 - 26, 2004
(1)	Loblolly pine	<i>Pinus teada</i>	Duke forest, NC	Sep 20 - 23, 2004
(1)	Loblolly pine	<i>Pinus teada</i>	Duke forest, NC	Sep 24 - 25, 2005
(2)	Mondel Pine	<i>Pinus eldarica</i>	Las Vegas, NV	
(2)	Mondel Pine	<i>Pinus eldarica</i>	Las Vegas, NV	
(2)	Juniper	<i>Juniperous</i>	Las Vegas, NV	
(2)	Juniper	<i>Juniperous</i>	Las Vegas, NV	
(2)	Pinyon Pine	<i>Pinus monophylla</i>	Las Vegas, NV	
(3)	Pine	<i>Pinus spp.</i>	Nevada desert, Las Vegas, NV	
(3)	Juniper	<i>Juniperus spp.</i>	Nevada desert, Las Vegas, NV	
(1)	Blue Spruce		Creekside Nursery, Boulder, CO	Aug 6 - 7, 2006
(1)	Blue Spruce		Creekside Nursery, Boulder, CO	Aug 7 - 8, 2006
(1)	Eastern White Pine	<i>Pinus Strobus</i>	Creekside Nursery, Boulder, CO	Aug 8 - 9, 2006
(1)	Eastern White Pine	<i>Pinus Strobus</i>	Creekside Nursery, Boulder, CO	Aug 9 - 10, 2006
(1)	Eastern White Pine	<i>Pinus Strobus</i>	Creekside Nursery, Boulder, CO	Aug 10 - 11, 2006

Note: the numbers in parentheses refer to: (1): references 7 and 11; (2): reference 9; (3): reference 10.

	Common name	Genus/Species	Location	Sample Dates
Broadleaf Trees (Total number of samples = 47)				
(1)	Sugar Maple	<i>Acer saccharum</i>	Boulder, CO	July 6 - 7, 2005
(1)	Aspen	<i>Populus tremuloides</i>	Boulder, CO	July 21 - 22, 2005
(1)	Crab Apple	<i>Malus Ionesis</i>	Boulder, CO	July 22 - 23, 2005
(1)	Cherry	<i>Prunus virginiana</i>	Boulder, CO	July 26 - 27, 2005
(1)	Northern Catalpa	<i>Catalpa Speciosa</i>	Boulder, CO	July 30 - 31, 2005
(1)	Norway Maple	<i>Acer platanoides</i>	Boulder, CO	Aug 11, 2005
(1)	Green Ash	<i>Fraxinus pennsylvanica</i>	Boulder, CO	Aug 16, 2005
(1)	Crab Apple	<i>Malus ioensis</i>	Boulder, CO	Aug 18, 2005
(1)	American Chestnut	<i>Castanea dentata</i>	California	Sep 11 - 12, 2005
(1)	Eucalyptus	<i>Eucalyptus spp.</i>	California	Sep 12 - 13, 2005
(1)	Cascara Buckthorn	<i>Rhamnus purshiana</i>	California	Sep 16 - 18, 2005
(1)	Burr Oak	<i>Quercus Macrocarpa</i>	Creekside Nursery, Boulder, CO	Sep 15 - 18, 2005
(1)	Narrowleaf Cottonwood	<i>Populus Angustifolia</i>	Creekside Nursery, Boulder, CO	Sep 19 - 20, 2005
(1)	Cottonless Cottonwood	<i>Populus Deltoides (Siouxland)</i>	Creekside Nursery, Boulder, CO	Sep 20 - 22, 2005
(1)	Swamp White Oak	<i>Quercus Bicolor</i>	Creekside Nursery, Boulder, CO	Sep 23 - 25, 2005
(1)	Schumard Oak	<i>Quercus Shumardii</i>	Creekside Nursery, Boulder, CO	Sep 27 - 28, 2005
(1)	Big-tooth Aspen	<i>Populus grandidentata</i>	University of Michigan, MI	June 20, 2005
(1)	Red Maple	<i>Acer rubrum</i>	University of Michigan, MI	June 21, 2005
(1)	Red Oak	<i>Quercus rubra</i>	University of Michigan, MI	June 24 - 25, 2005
(1)	Big-tooth Aspen	<i>Populus grandidentata</i>	University of Michigan, MI	June 29 - July 1, 2005
(1)	Big-tooth Aspen	<i>Populus grandidentata</i>	University of Michigan, MI	June 29 - July 1, 2005
(1)	Trembling Aspen	<i>Populus tremuloides</i>	University of Michigan, MI	July 2 - 3, 2005
(1)	Trembling Aspen	<i>Populus tremuloides</i>	University of Michigan, MI	July 3 - 4, 2005
(1)	Fire Cherry	<i>Prunus pennsylvanica</i>	University of Michigan, MI	July 12, 2005
(1)	Red Maple	<i>Acer rubrum</i>	University of Michigan, MI	July 21 - 22, 2005
(1)	Red Oak	<i>Quercus rubra</i>	University of Michigan, MI	July 25 - 26, 2005
(1)	Paper birch	<i>Betula papyrifera</i>	University of Michigan, MI	Aug 1 - 2, 2005
(1)	Red Oak	<i>Quercus rubra</i>	University of Michigan, MI	Aug 2 - 3, 2005
(1)	Tulip Poplar	<i>Liriodendron tulipifera</i>	Duke forest, NC	Aug 6 - 7, 2005
(1)	Tulip Poplar	<i>Liriodendron tulipifera</i>	Duke forest, NC	Aug 6 - 7, 2005
(2)	Populus	<i>Populus deltoides</i>	Las Vegas, NV	
(2)	Populus	<i>Populus deltoides</i>	Las Vegas, NV	
(2)	Desert Willow	<i>Chilopsis linearis</i>	Las Vegas, NV	
(2)	Desert Willow	<i>Chilopsis linearis</i>	Las Vegas, NV	
(3)	Palm	<i>Washingtonia spp.</i>	Nevada desert, Las Vegas, NV	
(3)	Mulberry	<i>Morus alba</i>	Nevada desert, Las Vegas, NV	
(3)	Acacia	<i>Acacia spp.</i>	Nevada desert, Las Vegas, NV	
(3)	Ash	<i>Fraxinus spp.</i>	Nevada desert, Las Vegas, NV	
(3)	Cottonwood	<i>Populus spp.</i>	Nevada desert, Las Vegas, NV	
(1)	Pin Oak	<i>Quercus Palustris</i>	Creekside Nursery, Boulder, CO	Jul 25 - 26, 2006
(1)	Pin Oak	<i>Quercus Palustris</i>	Creekside Nursery, Boulder, CO	Jul 27 - 28, 2006
(1)	Cottonless Cottonwood	<i>Populus Deltoide</i>	Creekside Nursery, Boulder, CO	Aug 1 - 2, 2006
(1)	Narrow Leaf Cottonwood		Creekside Nursery, Boulder, CO	Aug 4 - 5, 2006
(1)	Narrow Leaf Cottonwood		Creekside Nursery, Boulder, CO	Aug 5 - 6, 2006
(1)	October Glory Red Maple	<i>Acer rubrum</i>	Creekside Nursery, Boulder, CO	
(1)	October Glory Red Maple	<i>Acer rubrum</i>	Creekside Nursery, Boulder, CO	
(1)	Silver maple	<i>Acer saccharinum</i>	Creekside Nursery, Boulder, CO	

	Common name	Genus/Species	Location	Sample Dates
Shrubs and Bushes (Total number of samples = 18)				
(1)	Sumac	<i>Rhus sp.</i>	University of Michigan, MI	June 22, 2005
(1)	Juniper Bush	<i>Juniperus sp.</i>	Boulder, CO	July 18 - 19, 2005
(1)	Rose of Sharon	<i>Hibiscus Syriacus</i>	Boulder, CO	July 14, 2005
(1)	Shrub	? (could be <i>laurel</i>)	Boulder, CO	Aug 7 - 8, 2005
(1)	Rose	<i>Rosa</i>	Boulder, CO	Aug 2 - 3, 2005
(2)	DRI	-	Las Vegas, NV	
(2)	DRI	-	Las Vegas, NV	
(2)	Black Blush	<i>Coleogyne ramosissima</i>	Las Vegas, NV	
(2)	Yucca	<i>Yucca baccata</i>	Las Vegas, NV	
(2)	Mesquite	<i>Prosopis glandulosa</i>	Las Vegas, NV	
(2)	Mesquite	<i>Prosopis glandulosa</i>	Las Vegas, NV	
(3)	Mesquite	<i>Prosopis spp.</i>	Nevada desert, Las Vegas, NV	
(3)	Creosote	<i>Larrea tridentata</i>	Nevada desert, Las Vegas, NV	
(3)	Saltbush	<i>Atriplex spp.</i>	Nevada desert, Las Vegas, NV	
(3)	Oleander	<i>Nerium oleander</i>	Nevada desert, Las Vegas, NV	
(3)	Rosemary	<i>Rosmarinus officinalis</i>	Nevada desert, Las Vegas, NV	
(3)	Barometerbush	<i>Leucophyllum spp.</i>	Nevada desert, Las Vegas, NV	
(3)	Bursage	<i>Ambrosia dumosa</i>	Nevada desert, Las Vegas, NV	
Grasses and Crops (Total number of samples = 18)				
(1)	Fennel	<i>Ferula communis</i>	Boulder, CO	July 11 - 12, 2005
(1)	Tomato	<i>Lycopersicon esculatum</i>	Boulder, CO	July 16 - 17, 2005
(1)	Sunflower	<i>Helianthus annuus</i>	Boulder, CO	July 8 - 9, 2005
(1)	Sunflower	<i>Helianthus annuus</i>	NCAR greenhouse, Boulder, CO	Aug 15 - 16, 2006
(1)	Sunflower	<i>Helianthus annuus</i>	NCAR greenhouse, Boulder, CO	Aug 16 - 17, 2006
(1)	Sunflower	<i>Helianthus annuus</i>	NCAR greenhouse, Boulder, CO	Aug 18 - 19, 2006
(1)	Corn	Sweet Corn (<i>Hybrid Miracle</i> (EH))	NCAR greenhouse, Boulder, CO	Aug 19 - 20, 2006
(1)	Corn	Sweet Corn (<i>Hybrid Miracle</i> (EH))	NCAR greenhouse, Boulder, CO	Aug 21 - 22, 2006
(1)	Corn	Sweet Corn (<i>Hybrid Miracle</i> (EH))	NCAR greenhouse, Boulder, CO	Aug 22 - 23, 2006
(1)	Corn	Sweet Corn (<i>Hybrid Miracle</i> (EH))	NCAR greenhouse, Boulder, CO	Aug 23 - 24, 2006
(1)	Bean Plant	<i>Roma 2 Bush Bean</i>	NCAR greenhouse, Boulder, CO	Aug 24 - 25, 2006
(1)	Bean Plant	<i>Roma 2 Bush Bean</i>	NCAR greenhouse, Boulder, CO	Aug 26 - 27, 2006
(1)	Wheat		NCAR greenhouse, Boulder, CO	Aug 25 - 26, 2006
(1)	Wheat		NCAR greenhouse, Boulder, CO	Aug 27 - 28, 2006
(1)	Tobacco		NCAR greenhouse, Boulder, CO	Aug 28 - 29, 2006
(1)	Tobacco		NCAR greenhouse, Boulder, CO	Aug 29 - 30, 2006
(1)	Tobacco		NCAR greenhouse, Boulder, CO	Aug 30 - 31, 2006
(1)	Tobacco		NCAR greenhouse, Boulder, CO	Aug 31 - Sept 1, 2006

Figure S1. Vegetative cover as a percentage of areal cover for the four PFTs used in EF-S06 and EF-D06.

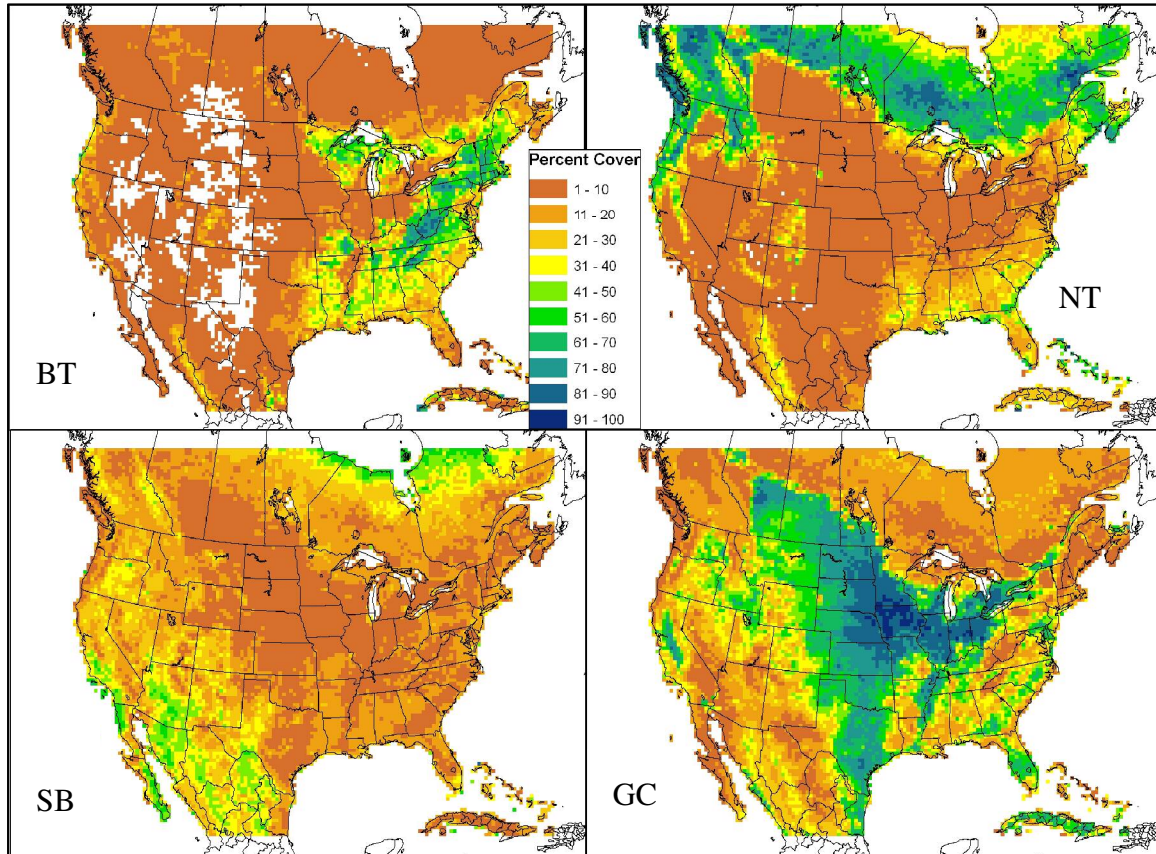
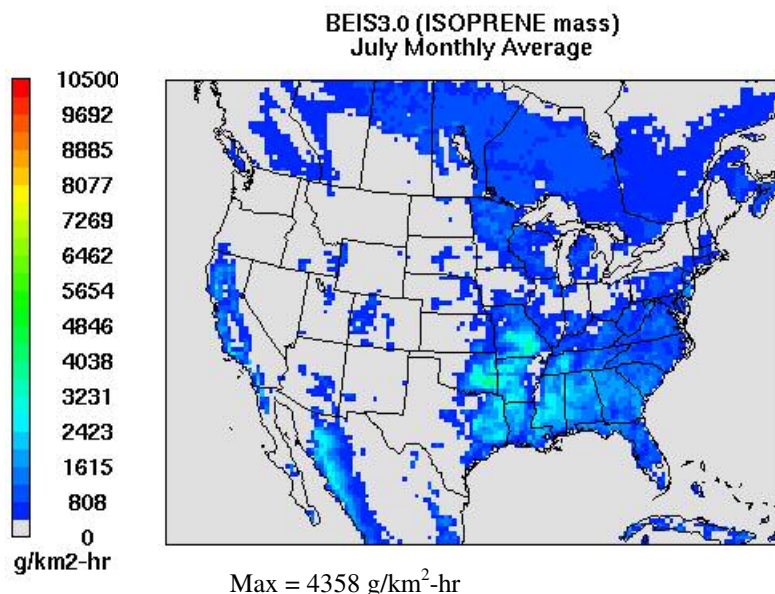


Figure S2. Monthly average of isoprene emissions fluxes for July estimated from BEIS 3.0 (upper panel) and MEGANv2.02 with EF-S06 (lower panel) for July.

Isoprene Emission



Isoprene Emission

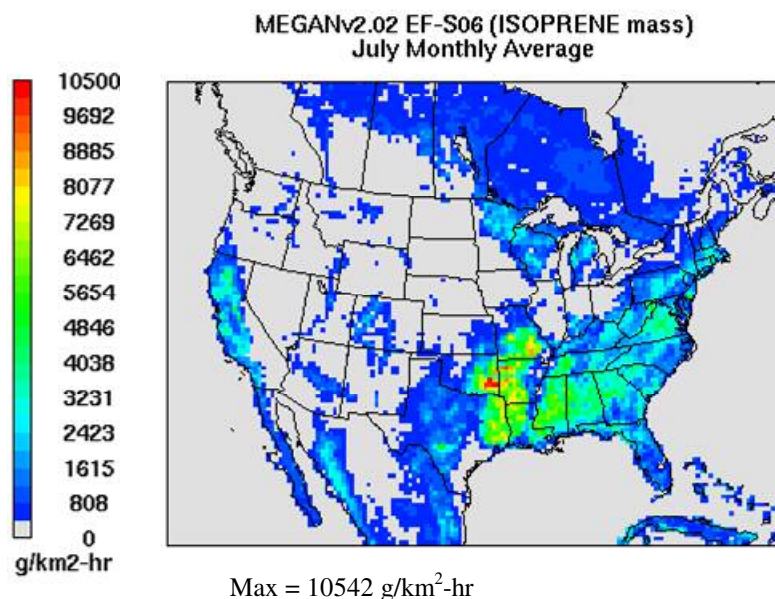
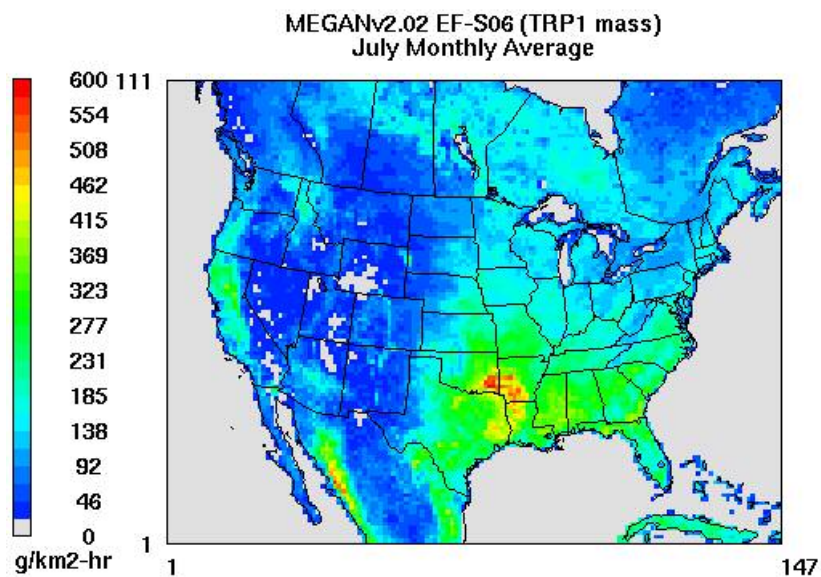
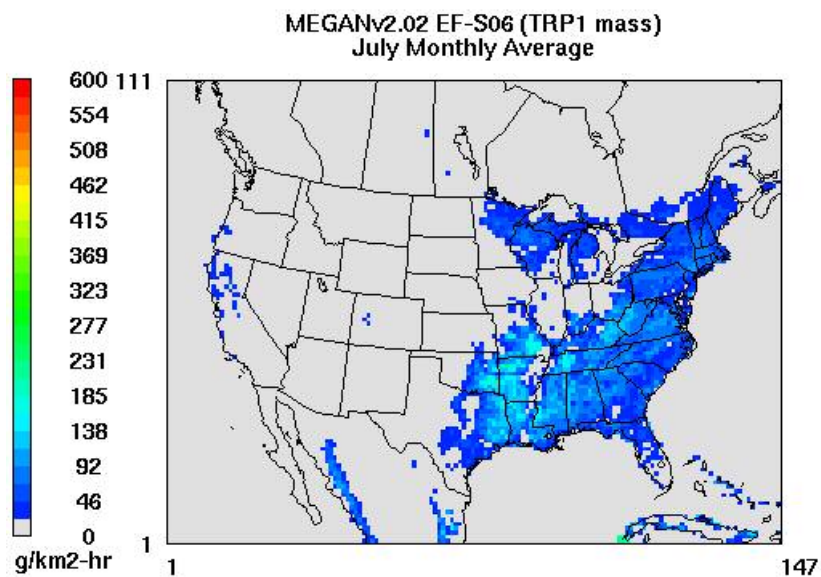


Figure S3. MTP distributions from (a) all PFTs, (b) broadleaf, (c) needle leaf, (d) shrub, and (e) grass-crop for July monthly average emissions. Note: Total average emission is the total of monthly average emissions for the domain.

(a) **MT Emission from all PFTs**



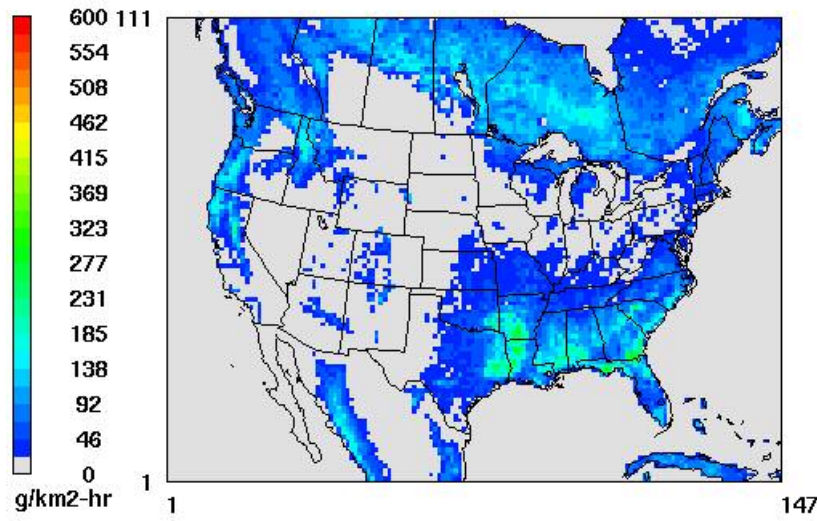
(b) **MT Emission from BT**



(c)

MT Emission from NT

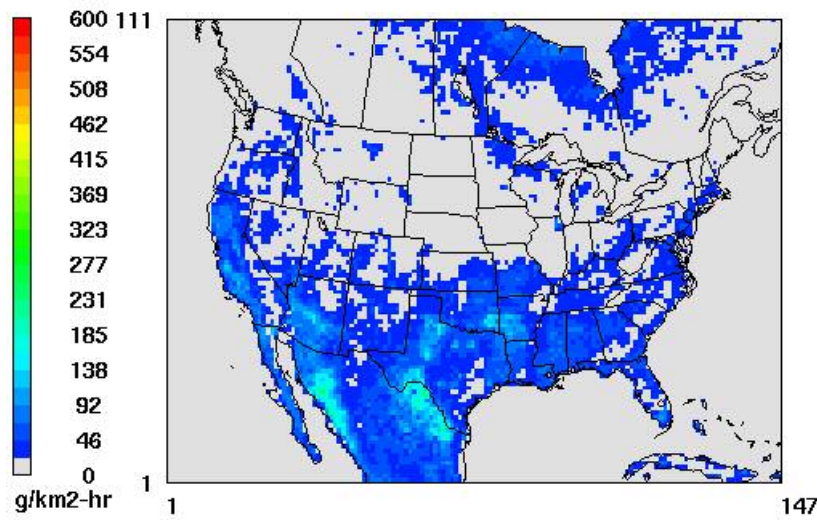
MEGANv2.02 EF-S06 (TRP1 mass)
July Monthly Average



(d)

MT Emission from SB

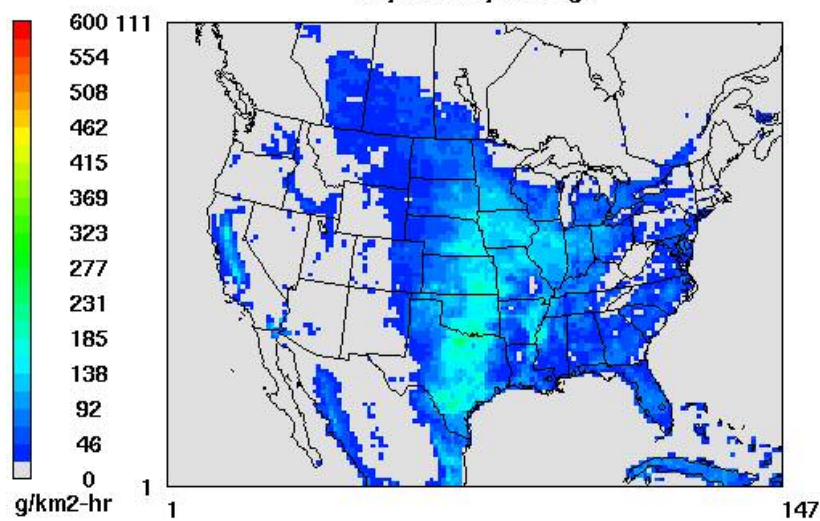
MEGANv2.02 EF-S06 (TRP1 mass)
July Monthly Average



(e)

MT Emission from GC

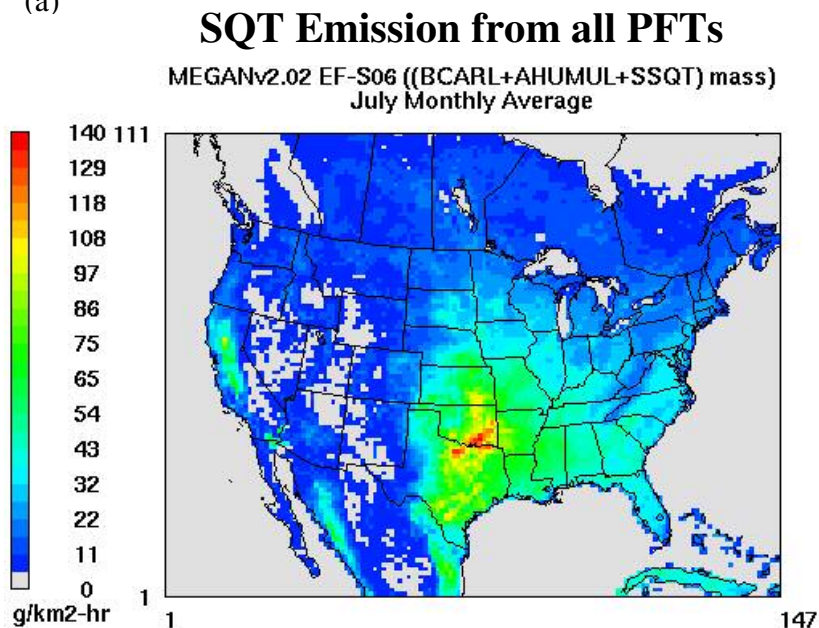
MEGANv2.02 EF-S06 (TRP1 mass)
July Monthly Average



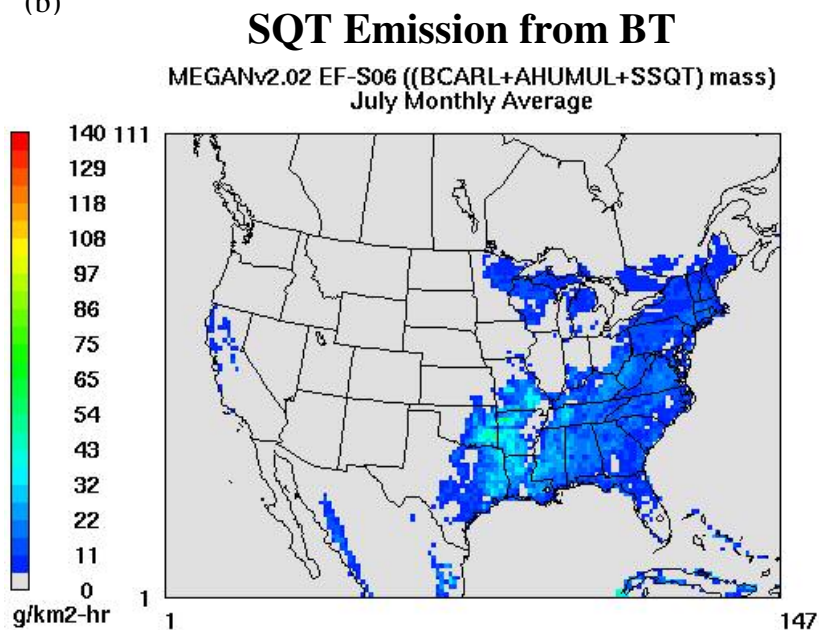
Total average emissions; BT = 244, NT = 651, SB = 421, and GC = 536 ton hr⁻¹.

Figure S4. SQT distributions from (a) all PFTs, (b) broadleaf, (c) needle leaf, (d) shrub, and (e) grass-crop for July monthly average emissions. Note: Total average emission is the total of monthly average emissions for the domain.

(a)



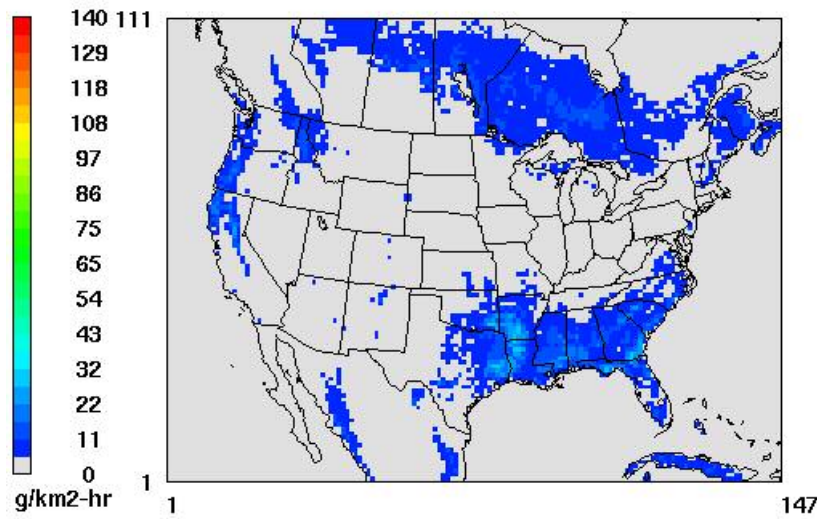
(b)



(c)

SQT Emission from NT

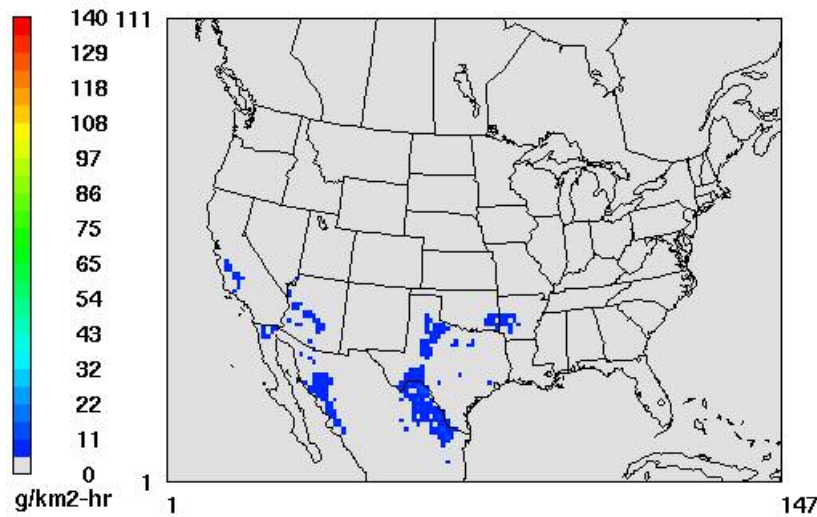
MEGANv2.02 EF-S06 ((BCARL+AHUMUL+SSQT) mass)
July Monthly Average



(d)

SQT Emission from SB

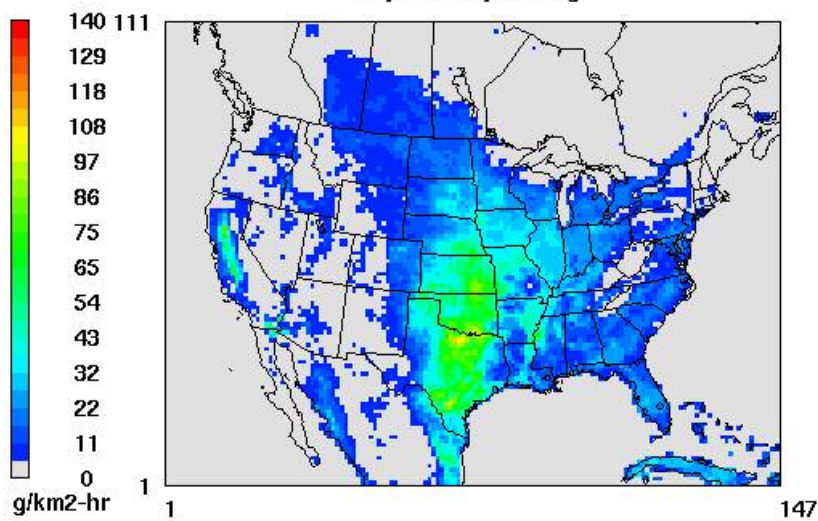
MEGANv2.02 EF-S06 ((BCARL+AHUMUL+SSQT) mass)
July Monthly Average



(e)

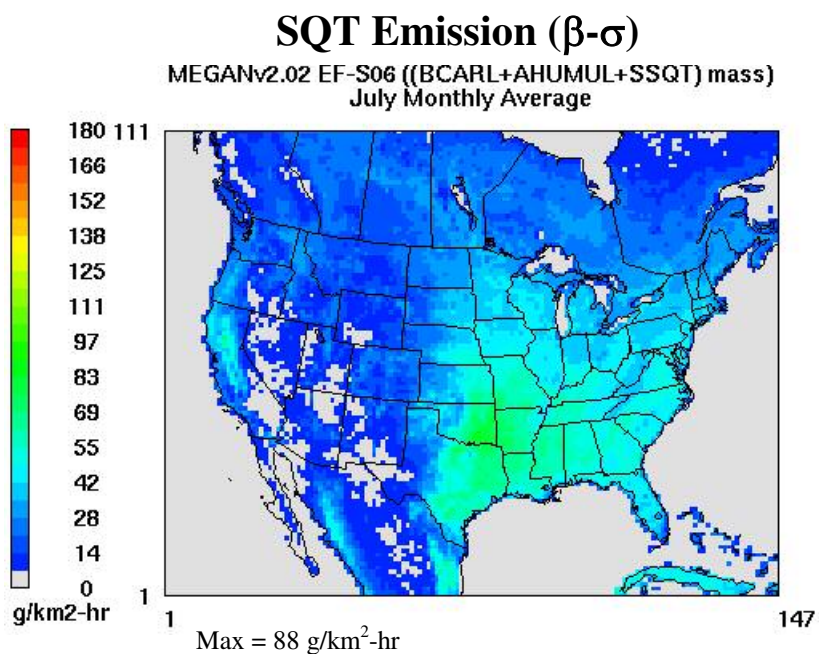
SQT Emission from GC

MEGANv2.02 EF-S06 ((BCARL+AHUMUL+SSQT) mass)
July Monthly Average

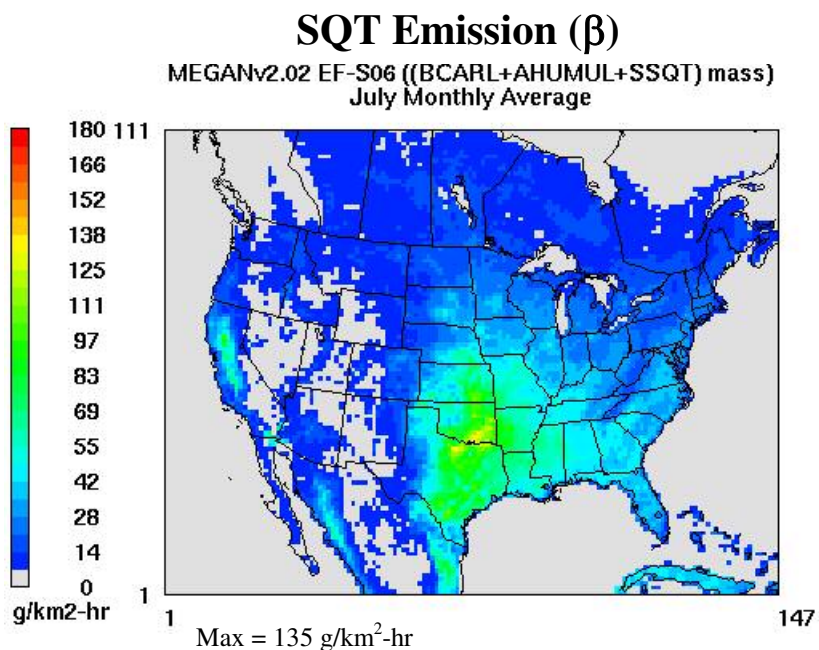


Total average emissions; BT = 50, NT = 54, SB = 20, and GC = 174 ton hr⁻¹.

Figure S5. Monthly average SQT emissions fluxes with temperature-dependence parameter values, β , of 0.07 K^{-1} (top panel), 0.16 K^{-1} (middle panel), and 0.25 K^{-1} (bottom panel) estimated from EF-S06.



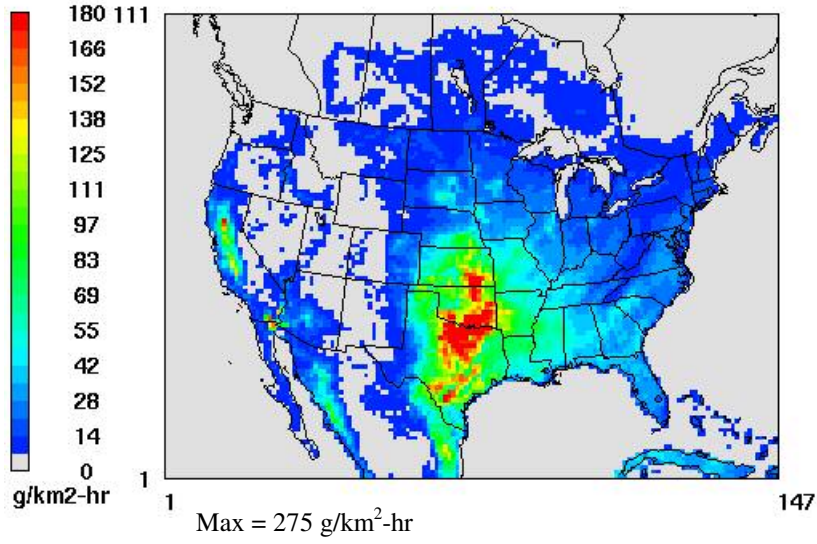
Total average Emission = 386 tons hr⁻¹



Total average Emission = 298 tons hr⁻¹

SQT Emission ($\beta+\sigma$)

MEGANv2.02 EF-S06 ((BCARL+AHUMUL+SSQT) mass)
July Monthly Average



Max = 275 g/km²-hr
Total average Emission = 307 ton hr⁻¹