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Supplement of

Reviews and syntheses: Greenhouse gas emissions in natural and agricultural lands in sub-Saharan Africa: synthesis of available data and suggestions for further studies

D.-G. Kim et al.

Correspondence to: D.-G. Kim (donggillkim@gmail.com)

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Supplement

Table S1 Summary of greenhouse gas carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) emissions and N₂O emission factor (%) in natural ecosystems.

Ecosystem type	Country	Temp (°C)	Rainfall (mm)	CO ₂ (Mg CO ₂ ha ⁻¹ yr ⁻¹)	CH ₄ (kg CH ₄ ha ⁻¹ yr ⁻¹)	N ₂ O (kg N ₂ O ha ⁻¹ yr ⁻¹)	N ₂ O emission factor (%)	Reference
Forest/ plantation/ woodland	Benin	27	1200	57	*	*	*	Lamade et al., 1996
Forest/ plantation/ woodland	Botswana	*	*	13.8	*	*	*	Thomas et al., 2014
Forest/ plantation/ woodland	Cameroon	23.8	1513	*	-4.8 to 0.2	*	*	Macdonald et al., 1998
Forest/ plantation/ woodland	Ethiopia	15	1200	15.7 to 19.4	*	*	*	Yohannes et al., 2011
Forest/ plantation/ woodland	Ghana	25	1750	*	*	3.6	*	Castaldi et al., 2013
Forest/ plantation/ woodland	Kenya	23.3	1662	20.2	-2.9	4.1	*	Werner et al., 2007
Forest/ plantation/ woodland	Republic of Congo	24.4	1875	11.4 to 15.2	*	*	*	Maldague and Hilger, 1963
Forest/ plantation/ woodland	Republic of Congo	25	1200	*	-3.7 to 3.4	-0.1 to 0.1	*	Castaldi et al., 2010
Forest/ plantation/ woodland	Republic of Congo	25.3	1400	*	*	4.6	*	Serca et al., 1994
Forest/ plantation/ woodland	Republic of Congo	25	1200	13.3	*	*	*	Epron et al., 2004
Forest/ plantation/ woodland	Republic of Congo	25	1400	9.1 to 15.7	*	*	*	Epron et al., 2006
Forest/ plantation/ woodland	Republic of Congo	25	1274	23.9 to 24.3	*	*	*	Nouvellon et al., 2008
Forest/ plantation/ woodland	Republic of Congo	25	1266	17.2 to 27.1	*	*	*	Nouvellon et al., 2012
Forest/ plantation/ woodland	Republic of Congo	25.7	1430	50.6 to 74.1	*	*	*	Epron et al., 2013
Forest/ plantation/ woodland	Republic of Congo	25	1350	29.3 to 130.9	*	*	*	Versini et al., 2013
Forest/ plantation/ woodland	Rwanda	21	1246	11.8 to 14.8	*	*	*	Nsabimana et al., 2009
Forest/ plantation/ woodland	Rwanda	17	1660	*	*	6.4 to 13.7	*	Gharahi Ghehi et al., 2012
Forest/ plantation/ woodland	Zimbabwe	*	*	*	-1.2 to 2.0	*	*	Mapanda et al., 2010
Savannah/grassland	Botswana	*	*	8.0	*	*	*	Thomas et al., 2014
Savannah/grassland	Botswana	21.0 to 23.5	331	3.3 to 6.4	*	*	*	Thomas, 2012
Savannah/grassland	Burkina Faso	29.5	926	14.1 to 21.3	2.8 to 3.5	*	*	Brümmer et al., 2009
Savannah/grassland	Ghana	26.5	787	*	-1.1 to 0.3	*	*	Prieme and Christensen, 1999
Savannah/grassland	Mali	27.6	1100	*	-0.2	*	*	Delmas et al., 1991
Savannah/grassland	Republic of Congo	25	1200	32.5 to 39.7	*	*	*	Caquet et al., 2012
Savannah/grassland	Republic of Congo	23.6	1600	3.7 to 4.3	-2.2 to -2.3	*	*	Delmas et al., 1991

Savannah/grassland	South Africa	17.9	740	*	0.3 to 2.5	*	*	Zepp et al., 1996
Savannah/grassland	South Africa	*	550	12.9 to 24.2	*	*	*	Fan et al., 2015
Savannah/grassland	Zimbabwe	17.5 to 18.5	760 to 840	*	*	0.3 to 0.8	*	Reese et al., 2006
Streams/rivers	Botswana	*	*	*	2741.9	*	*	Gondwe and Masamba, 2014
Streams/rivers	Cameroon	*	*	54.5 to 66.0	*	*	*	Brunet et al., 2009
Streams/rivers	Central African Republic	*	1500	5.7	5.7	0.2	*	Bouillon et al., 2012
Streams/rivers	Ivory Coast	*	*	7.9 to 27.3	58.6 to 97.4	*	*	Kone et al., 2009; Borges et al., 2015
Streams/rivers	Gabon	*	*	*	123.5 to 272.6	2.1 to 4.5	*	Borges et al., 2015
Streams/rivers	Kenya	*	*	29.9 to 49.1	33.2 to 80.2	1.0 to 4.5		Borges et al., 2015
Streams/rivers	Madagascar	*	*	31.2 to 84.0	76.2 to 265.0	0.6 to 1.9		Borges et al., 2015
Streams/rivers	Republic of Congo	*	*	49.5 to 228.9	29.3 to 1082.4	0.6 to 3.1	*	Wang et al., 2013; Mann et al., 2014; Borges et al., 2015
Streams/rivers	Zambia	*	1450	39.6 to 67.6	97.3 to 793.0	0.3	*	Teodoru et al., 2015; Borges et al., 2015
Wetlands/floodplains/lagoons/reservoir	Zambia	*	1450	-4.8 to 9.9	6.8 to 125.6			Teodoru et al., 2015
Wetlands/floodplains/lagoons/reservoir	Botswana	*	*	*	1480.4 to 1787.0	*	*	Gondwe and Masamba, 2014
Wetlands/floodplains/lagoons/reservoir	Ivory Coast	*	*	-11.9 to 161.7	*	*	*	Kone et al., 2009
Wetlands/floodplains/lagoons/reservoir	Republic of Congo	*	*	*	246.4	*	*	Tathy et al., 1992
Wetlands/floodplains/lagoons/reservoir	Mali	*	*	*	3.1	*	*	Delmas et al., 1991
Wetlands/floodplains/lagoons/reservoir	Zimbabwe	*	*	65.0 to 232.0	-26.3 to 1235.2	0.5 to 3.5	*	Nyamadzawo et al., 2014
Termite mound	Burkina Faso	29.5	926	13.5 to 21.3	3.0 to 3.7	*	*	Brümmer et al., 2009
Termite mound	Zimbabwe	18	850	0.002	0.1	0.01	*	Nyamadzawo et al., 2012
Salt pan	Botswana	*	*	0.7	*	*	*	Thomas et al., 2014

Table S2 Summary of *in situ* carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) fluxes and N₂O emission factor (%) in agricultural ecosystems

Ecosystem type	Country	Temp (°C)	Rainfall (mm)	CO ₂ (Mg CO ₂ ha ⁻¹ yr ⁻¹)	CH ₄ (kg CH ₄ ha ⁻¹ yr ⁻¹)	N ₂ O (kg N ₂ O ha ⁻¹ yr ⁻¹)	N ₂ O emission factor (%)	Reference
Croplands	Burkina Faso	29.5	926	9.2 to 16.5	-0.9	*	*	Brümmer et al., 2009
Croplands	Kenya	*	1750	*	*	1.0 to 1.3	*	Hickman et al., 2014
Croplands	Kenya	*	1750	*	*	0.2 to 0.5	0.01 to 0.1	Hickman et al., 2015
Croplands	Madagascar	16	1300	*	*	0.4	0.47	Chapuis-Lardy et al., 2009
Croplands	Malawi	24	930	15.0	*	*	*	Kim, 2012
Croplands	Mali	27.6	1100	*	*	0.9 to 2.4	0.3 to 4.1	Dick et al., 2008
Croplands	Republic of Congo	23.6	1600	1.7 to 3.7	-1.3 to -1.8	*	*	Delmas et al., 1991
Croplands	Senegal	29.7	670	*	*	0.05 to 0.1	*	Dick et al., 2006
Croplands	Tanzania	24.5	626 to 905	3.4 to 14.8	*	*	*	Sugihara et al., 2012
Croplands	Tanzania	*	*	17.6 to 20.2	-1.7 to 5.6	0.6 to 1.1		Kimaro et al., 2015
Croplands	Uganda	21.9	1224	111.1 to 141.2	*	*	*	Koerber et al., 2009
Croplands	Zimbabwe	19.1	940	*	*	0.5 to 1.4	*	Rees et al., 2012
Croplands	Zimbabwe	*	*	*	*	0.9 to 7.1	*	Chikowo et al., 2004
Croplands	Zimbabwe	19.1	940	*	*	0.3 to 0.8	*	Rees et al. 2013
Croplands	Zimbabwe	*	*	*	*	0.5	*	Mapanda et al., 2010
Croplands	Zimbabwe	18.6	750	19.0 to 44.9	13.4 to 66.7	0.3 to 112.0	*	Nyamadzawo et al., 2014b
Croplands	Zimbabwe	18.9	748	1.9 to 10.4	-0.04 to 49.1	0.2 to 3.9	*	Mapanda et al., 2012
Croplands	Zimbabwe	21	725	*	*	0.5 to 2.7	0.3 to 1.0	Masaka et al., 2014
Croplands	Zimbabwe	*	*	*	3.2 to 11.9	0.8 to 3.5	*	Mapanda et al., 2010
Rice paddy	Zimbabwe	18.6	750	6.5	12.5	0.2	*	Nyamadzawo et al., 2013
Vegetable gardens	Burkina Faso	27	900	80.7 to 132.0	*	125.7 to 177.6	*	Lompo et al., 2012
Vegetable gardens	Niger	30.3	542	73.3 to 100.8	*	53.4 to 176.0	*	Predotova et al., 2010
Agroforestry	Senegal	25.8	370	*	*	0.2 to 2.7	*	Dick et al., 2006
Agroforestry	Sudan	28.2	698	*	*	23.6 to 26.7	*	Goenster et al., 2014
Agroforestry	Kenya	24	1880	*	*	0.3 to 6.4	*	Millar et al., 2004
Agroforestry	Malawi	24	930	38.6	*	*	*	Kim, 2012