

Electronic Supplementary Material

**Classifying Chimpanzee (*Pan troglodytes*) Landscapes Across Large-Scale
Environmental Gradients in Africa**

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Appendix S1 Vegetation Composition of Chimpanzee Study Sites

We collected detailed data on the vegetation composition of the 43 chimpanzee study sites across equatorial Africa reviewed in this study using a thorough literature review.

Chimpanzee study sites differed widely in their vegetation composition (Table SI).

Table SI Vegetation composition of the chimpanzee study sites encountered in this study. NP = National Park, FR = Forest Reserve, and WR = Wildlife Reserve. See also Inskipp (2005) and Russak (2013).

Site	Vegetation types – <i>present</i>	Vegetation types – <i>abundance (%)</i> ^a	Vegetation types – <i>area (km²/ha)</i> ^a	Hansen data – <i>tree cover (%)</i> ^f	References used (major)
Bafing (Mali)	Forest Woodland Bamboo Bushland Savanna grassland	< 5.0% of forest, other vegetation types not specified. ^b	Not specified.	10.7%	Duvall 2000 Duvall 2008
Bakoun (Guinea)	Forest Woodland Savanna grassland Rocky outcrops	Not specified.	Not specified.	27.3%	Boesch <i>et al.</i> 2017
Bossou (Guinea)	Forest THV Cultivated fields Savanna grassland	> 7.0% of forest (only primary forest specified). Other vegetation types (incl. other forest types) not specified. ^c	1.0 km ² of primary forest (not including other forest types). Area of the other vegetation types not specified.	43.7%	Sugiyama 1995 Matsuzawa <i>et al.</i> 2011* Hockings <i>et al.</i> 2012 Bryson-Morrison <i>et al.</i> 2017
Budongo FR (Uganda)	Forest Swamp Grassland	90.0% forest, and 10.0% swamp.	-	90.5%	Tweheyo and Lye 2003 Reynolds 2005* Munn 2006 Hobaiter <i>et al.</i> 2017 V. Reynolds ^g
Bulindi (Uganda)	Forest Swamp Savanna grassland Cultivated fields	15.0% forest, other vegetation types not specified. ^d	2.0 km ² of riverine forest, other vegetation types (incl. other forest types), not specified.	41.8%	McLennan and Hill 2012 McLennan 2013 McLennan and Ganzhorn 2017

Site	Vegetation types – <i>present</i>	Vegetation types – <i>abundance (%)</i> ^a	Vegetation types – <i>area (km²/ ha)</i> ^a	Hansen data – <i>tree cover (%)</i> ^f	References used (major)
Bwindi-Impenetrable NP (Uganda)	Forest Swamp Bamboo	About 98.0% forest and 1.0–2.0% bamboo and swamp.	Not specified.	77.5%	Howard 1991 Stanford 2002 Nkurunungi and Stanford 2006 Stanford and O'Malley 2008*
Caiquene-Cadique (Guinea-Bissau)	Forest Mangrove Savanna grassland Cultivated fields	85.5% forest, 12.5% cultivated fields, 2.0% savanna grassland. Other vegetation types not specified. ^d	Not specified.	36.3%	Bessa <i>et al.</i> 2015*
Comoé (Ivory Coast)	Forest Savanna grassland	91.0% savanna grassland, and 9.0% of forest. ^b	Not specified.	16.8%	Fisher <i>et al.</i> 2002 Lapiente <i>et al.</i> 2016
Dzanga-Ndoki NP (CAR)	Forest Swamp	Not specified.	Not specified.	99.5%	Blom <i>et al.</i> 2001
Fongoli (Senegal)	Forest Woodland Bamboo Savanna grassland Cultivated fields	2.0% forest, 46.0% woodland, 36.0% savanna grassland, 12.0% bamboo, and 4.0% cultivated fields.	Not specified.	11.8%	Bogart and Pruetz 2008 Pruetz and Bertolani 2009 Bertolani and Pruetz 2011 Stewart and Pruetz 2013*
Gashaka Gumti NP (Nigeria)	Forest Woodland Grassland	72.3% of forest and 27.7% of woodland.	Not specified.	54.6%	Sommer <i>et al.</i> 2012 Pascual-Garrido <i>et al.</i> 2013 Sommer <i>et al.</i> 2016
Gishwati (Rwanda)	Forest Cultivated fields	64.3% forest and 35.7% cultivated fields. ^c	9.0 km ² of forest, and 5.0 km ² of cultivated fields.	38.7%	Chancellor <i>et al.</i> 2012a Chancellor <i>et al.</i> 2012b Chancellor <i>et al.</i> 2017
Gombe NP (Tanzania)	Forest Woodland Savanna grassland Beach Bare land	25.0% forest, 58.0% woodland, and 17.0% of grassland and beach. Bare land area too small to include. ^c	887.0 ha of forest, 2040.0 ha woodland, 599.0 ha of grassland and beach, and 2.9 ha of bare land. ^b	23.2%	Goodall 1986* Pusey <i>et al.</i> 2007 Rudicell <i>et al.</i> 2010 Foerster <i>et al.</i> 2016
Goulougou Triangle (Republic of Congo)	Forest Swamp	94.8% forest and 5.2% swamp.	Not specified.	99.2%	Morgan <i>et al.</i> 2006* Devos <i>et al.</i> 2008
Ishasha River (DRC)	Forest Woodland Savanna grassland	Not specified.	Not specified.	21.3%	Sept 1992 Schoeniger <i>et al.</i> 1999

Site	Vegetation types – <i>present</i>	Vegetation types – <i>abundance (%)</i> ^a	Vegetation types – <i>area (km²/ ha)</i> ^a	Hansen data – <i>tree cover (%)</i> ^f	References used (major)
Issa Valley (Tanzania)	Forest Woodland Swamp Savanna grassland Rocky outcrops	1.5% forest, 8.0% savanna grassland and swamp, 90.5% woodland. Coverage of rocky outcrops not specified.	Not specified.	48.3%	Hernandez-Aguilar 2009 Stewart <i>et al.</i> 2011 Russak 2013
Ituri FR (DRC)	Forest Swamp	100.0% forest. ^c	Not specified.	99.9%	Hart <i>et al.</i> 1986 Thomas 1991
Kahuzi-Biega NP (DRC)	Forest Bamboo Swamp	77.6% forest, 17.6% bamboo, and 4.8% swamp.	25.7 km ² forest, 5.8 km ² bamboo, and 1.6 km ² swamp.	87.5%	Yumoto <i>et al.</i> 1994 Yamagiwa <i>et al.</i> 1996 Basabose 2005 Yamagiwa and Basabose 2009*
Kalinzu FR (Uganda)	Forest Bushland Savanna grassland	75.0% forest, 15.0% savanna grassland and bushland. ^b	Not specified.	57.0%	Howard 1991 Hashimoto <i>et al.</i> 1999 Furuichi <i>et al.</i> 2001* Furuichi and Hashimoto 2004
Kasakati (Tanzania)	Forest Woodland Savanna grassland	10.0% forest, 59.0% woodland, 32.0% savanna grassland.	Not specified.	53.7%	Suzuki 1969 McGrew <i>et al.</i> 1981
Kibale NP (Uganda)	Forest Swamp Woodland Savanna grassland	77.0% forest, 6.0% woodland, 15.0% savanna grassland, and 2.0% swamp. ^b	Not specified.	81.0%	Howard 1991 Emery Thompson <i>et al.</i> 2006 Potts <i>et al.</i> 2009 Watts and Amsler 2013* Gilby <i>et al.</i> 2017
Kpala (Liberia)	Forest Cultivated fields	Not specified.	Not specified.	61.0%	Ohashi 2015
La Belgique (Cameroon)	Forest Swamp	80.0% forest, 20.0% swamp.	Not specified.	90.6%	Tagg <i>et al.</i> 2013
Lac Tumba Landscape (DRC)	Forest Swamp Cultivated fields	35.0–40.0% forest and 60.0–65.0% swamp. Coverage of cultivated fields not specified. ^b	Not specified.	89.2%	Inogwabini <i>et al.</i> 2012
Lagoas de Cufada NP (Guinea-Bissau)	Forest Woodland	44.0% forest, 54.0% woodland, and 2.0%	Not specified.	40.6%	Carvalho <i>et al.</i> 2013 Carvalho <i>et al.</i> 2015a

Site	Vegetation types – <i>present</i>	Vegetation types – <i>abundance (%)</i> ^a	Vegetation types – <i>area (km²/ ha)</i> ^a	Hansen data – <i>tree cover (%)</i> ^f	References used (major)
	Swamp Mangrove Savanna grassland Cultivated fields	of other vegetation types. ^b			Carvalho <i>et al.</i> 2015b
Loango (Gabon)	Forest Swamp Savanna grassland	79.7% forest, 19.7% swamp and savanna grassland.	Not specified.	61.0%	Head <i>et al.</i> 2011* Head <i>et al.</i> 2012 Estienne <i>et al.</i> 2016
Lopé NP (Gabon)	Forest THV Savanna grassland	Not specified.	Not specified.	65.6%	Tutin <i>et al.</i> 1997a Tutin <i>et al.</i> 1997b Tutin 1999
Mahale Mountains NP (Tanzania)	Forest Woodland Bamboo Swamp Savanna grassland	73.0% forest, 23.0% woodland and 3.8% swamp. Coverage of other vegetation types not specified.	Not specified.	59.0%	Matsumoto-Oda 2002 Boesch <i>et al.</i> 2002 Nakamura <i>et al.</i> 2015* Matsumoto 2017
Minkébé NP (Gabon)	Forest Swamp THV	> 60.0% of forest (only undisturbed forest specified). Coverage of other vegetation types (incl. other forest types) not specified.	Not specified.	91.0%	Huijbregts <i>et al.</i> 2003
Monte Alén NP (Equatorial Guinea)	Forest Cultivated fields	Not specified.	Not specified.	87.7%	Garcia and Mba 1997
Moukalaba-Doudou NP (Gabon)	Forest	100.0% forest. ^c	-	83.2%	Wilfried and Yamagiwa 2014
Mount Assirik (Senegal)	Forest Woodland Bamboo Savanna grassland	3.0% forest, 37.0% woodland, 5.0% bamboo, and 55.0% savanna grassland.	140.0 ha of forest (out of 5100.0 ha area). Area of other vegetation types not specified.	12.0%	McGrew <i>et al.</i> 1981 McGrew <i>et al.</i> 2014* McGrew 2015
Ndoki-Likouala (Congo)	Forest Swamp THV Savanna grassland	Not specified.	Not specified.	99.4%	Stokes <i>et al.</i> 2010

Site	Vegetation types – <i>present</i>	Vegetation types – <i>abundance (%)</i> ^a	Vegetation types – <i>area (km²/ ha)</i> ^a	Hansen data – <i>tree cover (%)</i> ^f	References used (major)
	Cultivated fields				
Ngel Nyaki FR (Nigeria)	Forest	100.0% forest. ^c	7.5 km ² of forest.	41.4%	Beck and Chapman 2008 Dutton and Chapman 2014 Dutton <i>et al.</i> 2016
Ngotto Forest (CAR)	Forest Swamp	87.0% forest, and 13.0% swamp. ^b	Not specified.	85.3%	Bastin 1996 Hicks <i>et al.</i> 2005
Nimba Mountains (Guinea)	Forest THV Savanna grassland	86.0% forest and 14.0% THV. Savanna grassland coverage not specified.	Not specified.	69.0%	Koops <i>et al.</i> 2012a* Koops <i>et al.</i> 2012b K. Koops ^g
Odzala NP (Republic of Congo)	Forest Swamp THV	95.0% forest, 4.0% THV, and 1.0% swamp.	Not specified.	96.7%	Bermejo 1999 Devos <i>et al.</i> 2008
Sapo (Liberia)	Forest Swamp	87.0% forest and 13.0% swamp.	Not specified.	76.4%	Anderson 1983 Greengrass 2015
Semliki WR (Uganda)	Forest Woodland Swamp Savanna grassland	7.3% of forest. Coverage of other vegetation types not specified. ^b	Not specified.	34.0%	Hunt and McGrew 2002 Samson and Hunt 2012* Webster <i>et al.</i> 2014
Taï NP (Ivory Coast)	Forest	100.0% forest. ^c	Not specified.	76.1%	Boesch and Boesch-Achermann 2000* Anderson <i>et al.</i> 2002 Kouakou <i>et al.</i> 2009 Janmaat <i>et al.</i> 2013
Tenkere (Sierra Leone)	Forest Woodland Savanna grassland Cultivated field	Not specified.	Not specified.	44.2%	Alp 1993 Alp 1997
Tongo (DRC)	Forest Swamp Woodland Shrubland Bare land Lava flows	Not specified.	Not specified.	66.6%	Lanjouw 2002
Ugalla (Tanzania)	Forest Woodland	2.0% forest, 86.0% woodland, 12.0%	Not specified.	42.0%	Moore 1994 Ogawa <i>et al.</i> 2014

Site	Vegetation types – <i>present</i>	Vegetation types – <i>abundance (%)</i> ^a	Vegetation types – <i>area (km²/ ha)</i> ^a	Hansen data – <i>tree cover (%)</i> ^f	References used (major)
	Savanna grassland	Savanna grassland ^b			Moore <i>et al.</i> 2017

^aWe preferentially used the vegetation composition of the study area, and thus the chimpanzee home range. In case this was not possible, we used vegetation composition of the whole park instead if available.

^bData on vegetation cover for the whole park.

^cCalculations by authors based on area in km² or ha.

^dCalculations by the authors based on published figures (Bessa *et al.* 2015; McLennan and Hill 2012).

^eThe actual percentage of forest cover is not specified in the literature; however, it is implied that the chimpanzee home range consists entirely of forest, and we therefore assumed 100% forest coverage.

^fAnalyses of tree cover (%) within a 5-km buffer of the geographical position of the study site, as specified by the relevant papers, based on Landsat satellite imagery (Hansen *et al.* 2013).

^gData based on findings from expert-based reviews on the environmental determinants of chimpanzee site selection at a specific study site.

*Data used to assess home range size.

Appendix S2 Climatic Conditions of Chimpanzee Study Sites

We recorded the climatic conditions of the 43 chimpanzee study sites encountered in this research during a thorough literature review. Chimpanzee study sites showed considerable variation in their climate (i.e., temperature, rainfall, and rainfall seasonality; Table SII).

Table SII Annual precipitation, annual temperature, and precipitation seasonality (as measured in length of the dry season, i.e., months with <100 mm of rainfall: Hunt and McGrew 2002; Matsuzawa *et al.* 2011; Russak 2013) for the chimpanzee study sites encountered in this study. NP = National Park, FR = Forest Reserve, and WR = Wildlife Reserve. See also Inskipp (2005) and Russak (2013).

Site	Temperature – <i>Annual mean/ mean range^a</i>	Precipitation – <i>Annual mean/ mean range</i>	Dry season	Number of dry months (consecutive)	References used (major)
Bafing (Mali)	28.5°C ^b	900.0–1500.0 mm <i>average 1200.0 mm^c</i>	mid-Dec to Jun	6.5	Duvall 2000 Duvall 2001
Bakoun (Guinea)	24.0°C	1585.0 mm	Nov to Apr	6.0	Hijmans <i>et al.</i> 2005 ^e Boesch <i>et al.</i> 2017
Bossou (Guinea)	23.6°C	2272.0 mm	Nov to Feb	4.0	Lehmann <i>et al.</i> 2007 Matsuzawa <i>et al.</i> 2011* Hockings <i>et al.</i> 2012
Budongo FR (Uganda)	17.0–29.0°C <i>average 23.0 °C^c</i>	1780.0–1900.0 mm <i>average 1840.0 mm³</i>	mid-Dec to mid-Feb June to July	2.0 2.0	Reynolds 2005* Tweheyo <i>et al.</i> 2006
Bulindi (Uganda)	22.4°C	1461.0 mm	Dec to Feb June to July	3.0 2.0	Hijmans <i>et al.</i> 2005 ^e McLennan 2015*
Bwindi-Impenetrable NP (Uganda)	16.3°C	1100.0–2400.0 mm <i>average 1750.0 mm³</i>	Dec to Feb May to July	3.0 3.0	Kajobe and Roubik 2006 Stanford and Nkurunungi 2008*
Caiquene-Cadique (Guinea-Bissau)	27.5°C	1964.0 mm	Nov to mid-May	6.5	Bessa <i>et al.</i> 2015*
Comoé (Ivory Coast)	27.0°C	1010.0 mm	Nov to Apr	6.0	Fisher <i>et al.</i> 2002 Lapuente <i>et al.</i> 2016
Dzanga-Ndoki NP (CAR)	26.4°C	1365.0 mm	Dec to Feb June to July	3.0 2.0	Blom <i>et al.</i> 2001
Fongoli (Senegal)	28.4°C ^d	900.0 mm	Nov to Apr	6.0	Pruetz 2007 Bertolani and Pruetz 2011 Lindshield <i>et al.</i> 2017

Site	Temperature – <i>Annual mean/ mean range^a</i>	Precipitation – <i>Annual mean/ mean range</i>	Dry season	Number of dry months (consecutive)	References used (major)
					Pruetz <i>et al.</i> 2017
Gashaka Gumti NP (Nigeria)	20.9–31.9°C <i>average 26.4 °C^c</i>	1973.0 mm	mid-Nov to mid-Apr	5.0	Fowler and Sommer 2007 Fowler <i>et al.</i> 2011* Sommer <i>et al.</i> 2012 Pascual-Garrido <i>et al.</i> 2013
Gishwati (Rwanda)	15.7–24.2°C ^d <i>average 20.0°C^c</i>	1884.0 mm	June to Aug	3.0	Chancellor <i>et al.</i> 2012a Chancellor <i>et al.</i> 2012b Chancellor <i>et al.</i> 2017
Gombe NP (Tanzania)	19.0–28.0°C ^d <i>average 23.5°C^c</i>	1321.0–1710.0 mm <i>average 1516.0 mm³</i>	May to Oct	6.0	McGrew <i>et al.</i> 1981 Foerster <i>et al.</i> 2016
Goulougo Triangle (Republic of Congo)	21.5–24.2°C <i>average 22.9°C^c</i>	1650.3–1675.7 mm <i>average 1663.0 mm³</i>	Dec to Apr June to July	5.0 2.0	Morgan <i>et al.</i> 2006* Sanz and Morgan 2009 Sanz <i>et al.</i> 2014 Lesnik <i>et al.</i> 2015
Ishasha River (DRC)	23.2°C	750.0 mm	Dec to Mar June to Aug	4.0 3.0	Schoeniger <i>et al.</i> 1999 Hijmans <i>et al.</i> 2005 ^e
Issa Valley (Tanzania)	11.0–35.0°C <i>average 23.0°C³</i>	900.0–1400.0 mm <i>average 1150.0 mm³</i>	May to Sept	5.0	Stewart <i>et al.</i> 2011 Wondra <i>et al.</i> 2016
Ituri FR (DRC)	23.7°C	1839.0 mm	Dec to Feb	3.0	Hijmans <i>et al.</i> 2005 ^e
Kahuzi-Biega NP (DRC)	20.1°C ^b	1586.0 mm	June to Aug	3.0	Basabose and Yamagiwa 2002 Basabose 2005
Kalinzu FR (Uganda)	14.0–28.0°C <i>average 21.0 °C^c</i>	1584.0 mm	Jan to Mar June to Aug	3.0 3.0	Howard 1991 Furuichi and Hashimoto 2004 Kagoro-Rugunda and Kayanja 2011
Kasakati (Tanzania)	19.0–28.0°C <i>average 23.5°C^c</i>	962.0 mm	May to Oct	6.0	Suzuki 1969 McGrew <i>et al.</i> 1981 Moore 1992 Hijmans <i>et al.</i> 2005 ^e
Kibale NP (Uganda)	14.0–27.0°C ^b <i>average 20.5 °C^c</i>	1492.0–1622.0 mm <i>average 1557.0 mm³</i>	Dec to Feb June to July	3.0 2.0	Howard 1991 Lwanga 2003
Kpala (Liberia)	25.1°C	2157 mm	Dec to Feb	3.0	Hijmans <i>et al.</i> 2005 ^e
La Belgique	19.5–26.3°C ^d	1638.0 mm	Dec to Feb	3.0	Hijmans <i>et al.</i> 2005 ^e

Site	Temperature – <i>Annual mean/ mean range^a</i>	Precipitation – <i>Annual mean/ mean range</i>	Dry season	Number of dry months (consecutive)	References used (major)
(Cameroon)	<i>average 22.9 °C^c</i>		July	1.0	Tagg <i>et al.</i> 2013
Lac Tumba Landscape (DRC)	25.3°C	1705 mm	June to Aug	3.0	Hijmans <i>et al.</i> 2005 ^c
Lagoas de Cufada NP (Guinea-Bissau)	26.0°C	2200.0 mm	Nov to May	7.0	Carvalho <i>et al.</i> 2013 Carvalho <i>et al.</i> 2015a Carvalho <i>et al.</i> 2015b
Loango (Gabon)	22.9–27.2°C ^d <i>average 25.1°C^c</i>	2215.0 mm	Dec to Jan May to Sept	2.0 5.0	Head <i>et al.</i> 2012 Estienne <i>et al.</i> 2016
Lopé NP (Gabon)	20.5–30.8°C ^b <i>average 25.7°C^c</i>	1548.0 mm	June to Sept	4.0	Tutin <i>et al.</i> 1997a Tutin <i>et al.</i> 1997b
Mahale Mountains NP (Tanzania)	18.4–28.9°C ^b <i>average 23.7°C^c</i>	1751.0 mm	May to Sept	5.0	Nakamura <i>et al.</i> 2013 Nakamura <i>et al.</i> 2015*
Minkébé NP (Gabon)	24.0°C	1500.0–1800.0 mm <i>average 1650.0 mm³</i>	Dec to Feb June to Aug	3.0 3.0	Huijbregts <i>et al.</i> 2003 Hijmans <i>et al.</i> 2005 ^c
Monte Alén NP (Equatorial Guinea)	19.5–21.9°C <i>average 20.7°C^c</i>	2000.0–3000.0 mm <i>average 2500.0 mm³</i>	Dec to Feb June to Aug	3.0 3.0	Garcia and Mba 1997 Kumpel <i>et al.</i> 2008
Moukalaba-Doudou NP (Gabon)	25.7°C	1777.0 mm	May to Sept	5.0	Hijmans <i>et al.</i> 2005 ^c Wilfried and Yamagiwa 2014
Mount Assirik (Senegal)	23.0–35.0°C ^d <i>average 29.0 °C^c</i>	885.0 mm	Nov to May	7.0	McGrew <i>et al.</i> 1981 McGrew 2015
Ndoki-Likouala (Congo)	24.7°C	1653.0 mm	Dec to Mar June to July	4.0 2.0	Hijmans <i>et al.</i> 2005 ^c Stokes <i>et al.</i> 2010
Ngel Nyaki FR (Nigeria)	23.0°C	1800.0 mm	Nov to mid-Apr	5.5	Hijmans <i>et al.</i> 2005 ^c Akinsoji 2013 Dutton and Chapman 2014
Ngotto Forest (CAR)	24.9°C	1740.0 mm	Nov/Dec to Feb/Mar	3.0 – 5.0	Hicks <i>et al.</i> 2009 Freycon <i>et al.</i> 2015
Nimba Mountains (Guinea)	21.0°C	3244.0 mm	Nov to Feb	4.0	Hijmans <i>et al.</i> 2005 ^c Koops <i>et al.</i> 2012a*
Odzala NP (Republic of Congo)	20.4–31.5°C <i>average 26.0°C^c</i>	1957.0 mm	Dec to Apr June to July	5.0 2.0	Devos <i>et al.</i> 2008
Sapo (Liberia)	25.4°C	3043.0 mm	Jan	1.0	Hijmans <i>et al.</i> 2005 ^c
Semliki WR	18.0–33.0°C ^b	1352.0 mm	Jan to Feb	2.0	Hunt and McGrew 2002

Site	Temperature – <i>Annual mean/ mean range^a</i>	Precipitation – <i>Annual mean/ mean range</i>	Dry season	Number of dry months (consecutive)	References used (major)
(Uganda)	<i>average 25.5°C^c</i>		May to July	3.0	Webster <i>et al.</i> 2014
Taï NP (Ivory Coast)	24.0–30.0°C <i>average 27.0°C^c</i>	1800.0 mm	Nov to Feb July to Aug	4.0 2.0	Anderson <i>et al.</i> 2002 Kolongo <i>et al.</i> 2006 Kouakou <i>et al.</i> 2009
Tenkere (Sierra Leone)	27.0°C	2223.0 mm	mid-Nov to mid-May	6.0	Alp 1993 Hijmans <i>et al.</i> 2005 ^e
Tongo (DRC)	17.1°C	1753.0 mm	Dec to Feb May to Aug	3.0 4.0	Lanjouw 2002 Hijmans <i>et al.</i> 2005 ^e
Ugalla (Tanzania)	14.0–34.0°C ^d <i>average 24.0°C^c</i>	980.0 mm	May to Oct	6.0	Ogawa <i>et al.</i> 2014

^aWe preferentially used mean annual temperature or mean annual temperature range. In case this was not possible, we used monthly or daily mean temperatures or temperature range.

^bData for mean monthly temperature or temperature range.

^cCalculations by the authors based on temperature and/or precipitation range.

^dData for mean daily temperature or temperature range.

^eData based on analyses of the WorldClim – Global Climate Data database (Hijmans *et al.* 2005).

*Data used to assess chimpanzee home range size.

Appendix S3 GPS-Referenced Location of Chimpanzee Study Sites

We gathered data on the GPS-referenced locations of the 43 chimpanzee study sites across equatorial Africa reviewed in our study during a thorough literature review; latitude and longitude for each site are specified in decimal degrees (Table SIII).

Table SIII Coordinates (latitude and longitude) of the chimpanzee study sites encountered in this study used for extracting the Hansen tree cover data (Hansen *et al.* 2013), as well as the WorldClim – Global Climate Data (Hijmans *et al.* 2005). NP = National Park, FR = Forest Reserve, and WR = Wildlife Reserve. See also Inskipp (2005) and Russak (2013).

Site	Longitude	Latitude		Site	Longitude	Latitude
Bafing ^a (Mali)	−10.43	12.97		La Belgique ^a (Cameroon)	13.15	3.42
Bakoun ^a (Guinea)	−12.50	11.90		Lac Tumba Landscape ^a (DRC)	18.19	0.53
Bossou ^a (Guinea)	−8.50	7.65		Lagoas de Cufada NP ^a (Guinea-Bissau)	−15.03	11.72
Budongo FR ^a (Uganda)	31.50	1.73		Loango ^a (Gabon)	9.55	−2.07
Bulindi ^a (Uganda)	31.47	1.47		Lopé NP ^a (Gabon)	11.58	−0.17
Bwindi-Impenetrable NP ^a (Uganda)	29.70	−1.00		Mahale Mountains NP ^a (Tanzania)	29.92	−6.25
Caiquene-Cadique ^a (Guinea-Bissau)	−15.08	11.22		Minkébé NP ^b (Gabon)	13.00	1.72
Comoé ^a (Ivory Coast)	−3.73	9.12		Monte Alén NP ^a (Equatorial Guinea)	9.82	1.53
Dzanga-Ndoki NP ^a (CAR)	16.33	2.92		Moukalaba-Doudou NP ^b (Gabon)	10.54	−2.31
Fongoli ^a (Senegal)	−12.22	12.67		Mount Assirik ^a (Senegal)	−12.77	12.88
Gashaka Gumti NP ^a (Nigeria)	11.58	7.32		Ndoki-Likouala ^b (Congo)	16.27	2.33
Gishwati ^a (Rwanda)	29.37	−1.82		Ngel Nyaki FR ^a (Nigeria)	11.07	7.23

Site	Longitude	Latitude		Site	Longitude	Latitude
Gombe NP ^a (Tanzania)	29.63	-4.67		Ngotto Forest ^a (CAR)	17.07	4.02
Goualougo Triangle ^a (Republic of Congo)	16.88	2.56		Nimba Mountains ^a (Guinea)	-8.45	7.62
Ishasha River ^a (DRC)	29.65	-0.62		Odzala NP ^a (Republic of Congo)	14.92	0.77
Issa Valley ^a (Tanzania)	30.58	-5.39		Sapo ^b (Liberia)	-8.41	5.41
Ituri FR ^a (DRC)	28.55	1.71		Semliki WR ^a (Uganda)	30.37	0.88
Kahuzi-Biega NP ^a (DRC)	28.75	-2.08		Taï NP ^a (Ivory Coast)	-7.33	5.87
Kalinzu FR ^a (Uganda)	30.12	-0.30		Tenkere ^b (Sierra Leone)	-12.02	9.72
Kasakati ^a (Tanzania)	29.92	-5.38		Tongo ^a (DRC)	29.12	-1.28
Kibale NP ^a (Uganda)	30.42	0.45		Ugalla ^a (Tanzania)	30.70	-5.88
Kpala ^a (Liberia)	-8.67	7.20				

^aCoordinates based on published data as outlined in Tables SI and SII for this specific chimpanzee study site.

We converted coordinates specified in degrees decimal minutes (DDM) and degrees minutes seconds (DMS) to decimal degrees (DD) latitude and longitude for inclusion in the analyses, and to be consistent across study sites.

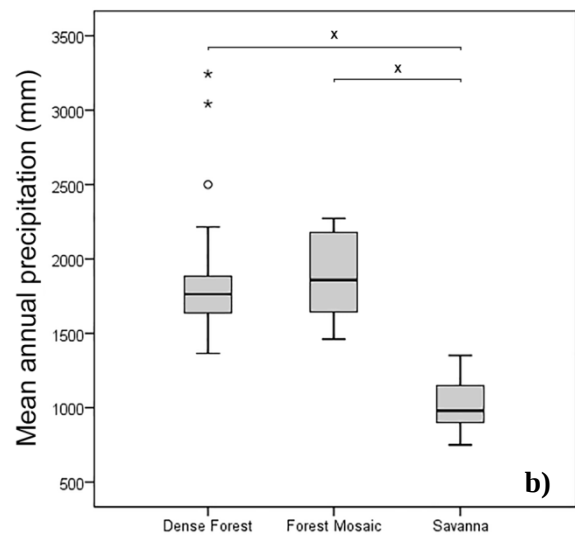
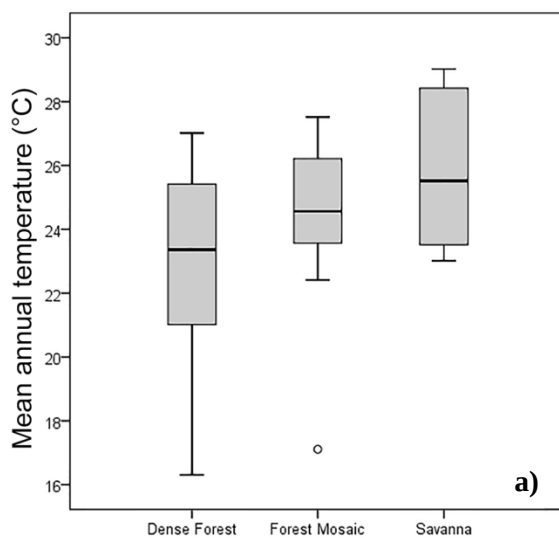
^bCoordinates derived from park locations or other publications not outlined in Tables SI and SII for this specific chimpanzee study site (Minkébé NP, Moukalaba-Doudou NP, Sapo and Tenkere: WDPa; Ndoki-Likouala: Kuroda *et al.* 1996).

Appendix S4 Environmental Characteristics of Chimpanzee Researcher-Classified Dense Forest, Forest Mosaic, and Savanna Sites

We used descriptive statistics, boxplots, scatterplots, Kruskal–Wallis tests, *post hoc* Mann–Whitney *U* tests and Bonferroni corrections ($\alpha = 0.05/3 = 0.0167$; Abdi 2007; IBM SPSS Statistics, version 22) to examine the differences and similarities in environmental characteristics at the 9 chimpanzee researcher-classified savanna sites, 12 forest mosaic sites, and 22 dense forest sites. We found that dense forest, forest mosaic, and savanna sites differed in their environmental conditions, but also showed considerable overlap (Table SIV, Figs. S1 and S2). Annual rainfall (Kruskal–Wallis test: $N_1 = 9$, $N_2 = 12$, $N_3 = 22$, $H = 21.0$, $df = 2$, $P < 0.001$), length of the longest consecutive dry season (Kruskal–Wallis test: $N_1 = 9$, $N_2 = 12$, $N_3 = 22$, $H = 12.6$, $df = 2$, $P = 0.002$), forest cover (Kruskal–Wallis test: $N_1 = 8$, $N_2 = 7$, $N_3 = 17$, $H = 23.6$, $df = 2$, $P < 0.001$), and Hansen tree cover (Hansen *et al.* 2013; Kruskal–Wallis test: $N_1 = 9$, $N_2 = 12$, $N_3 = 22$, $H = 23.8$, $df = 2$, $P < 0.001$) differed significantly between researcher-defined chimpanzee dense forest, forest mosaic, and savanna sites (Fig. S1). However, based on the overlap in environmental variables assessed across categories, we argue that no natural groupings can be observed from the data and that there is no clear separation of dense forest, forest mosaic, and savanna chimpanzee study sites across any of the sets of variables. Note that the scatterplots presented in Fig. S2 are additional to the scatterplots presented in journal publication Fig. 1.

Table SIV Mean, standard deviation (St. dev), range, and sample size (*N*) of vegetation cover and climate at chimpanzee researcher-classified dense forest, forest mosaic, and savanna field study sites: mean annual temperature (T_{ann}), mean annual rainfall (P_{ann}), length of the longest consecutive dry season (Dry_{long}), total number of dry months (Dry_{all}), forest cover (defined by chimpanzee researchers), and Hansen tree cover (from Landsat derived maps of global tree cover: Hansen *et al.* 2013). Nonoverlapping ranges of environmental variables are specified in bold.

Variable	Measure	1. Savanna	2. Forest		2a. Forest Mosaic	2b. Dense Forest
T_{ann} (°C)	<i>Mean ± St. dev</i>	25.8 ± 2.5	23.6 ± 2.7		24.3 ± 2.8	23.2 ± 2.7
	<i>Range</i>	23.0–29.0	16.3–27.5		17.0–27.5	16.3–27.0
	<i>N</i>	9	34		12	22
P_{ann} (mm)	<i>Mean ± St. dev</i>	1021 ± 184	1888 ± 411		1880 ± 290	1892 ± 470
	<i>Range</i>	750–1352	1365–3244		1461–2272	1365–3244
	<i>N</i>	9	34		12	22
Dry_{long} (no.)	<i>Mean ± St. dev</i>	5.5 ± 1.3	4.1 ± 1.4		4.9 ± 1.4	3.6 ± 1.1
	<i>Range</i>	3.0–7.0	1.0–7.0		3.0–7.0	1.0–5.5
	<i>N</i>	9	34		12	22
Dry_{all} (no.)	<i>Mean ± St. dev</i>	6.1 ± 0.7	5.1 ± 1.5		5.3 ± 1.4	4.9 ± 1.5
	<i>Range</i>	5.0–7.0	1.0–7.0		3.0–7.0	1.0–7.0
	<i>N</i>	9	34		12	22
Forest cover (%)	<i>Mean ± St. dev</i>	5.0 ± 3.4	76.9 ± 23.7		50.7 ± 26.7	87.7 ± 10.8
	<i>Range</i>	1.5–10.0	15.0–100		15.0–85.5	64.3–100
	<i>N</i>	8	24		7	17
Hansen tree cover (%)	<i>Mean ± St. dev</i>	27.9 ± 16.9	68.9 ± 23.2		48.9 ± 18.3	79.7 ± 17.9
	<i>Range</i>	10.7–53.7	23.3–99.9		23.2–89.2	38.7– 99.9
	<i>N</i>	9	34		12	22



Chimpanzee habitat

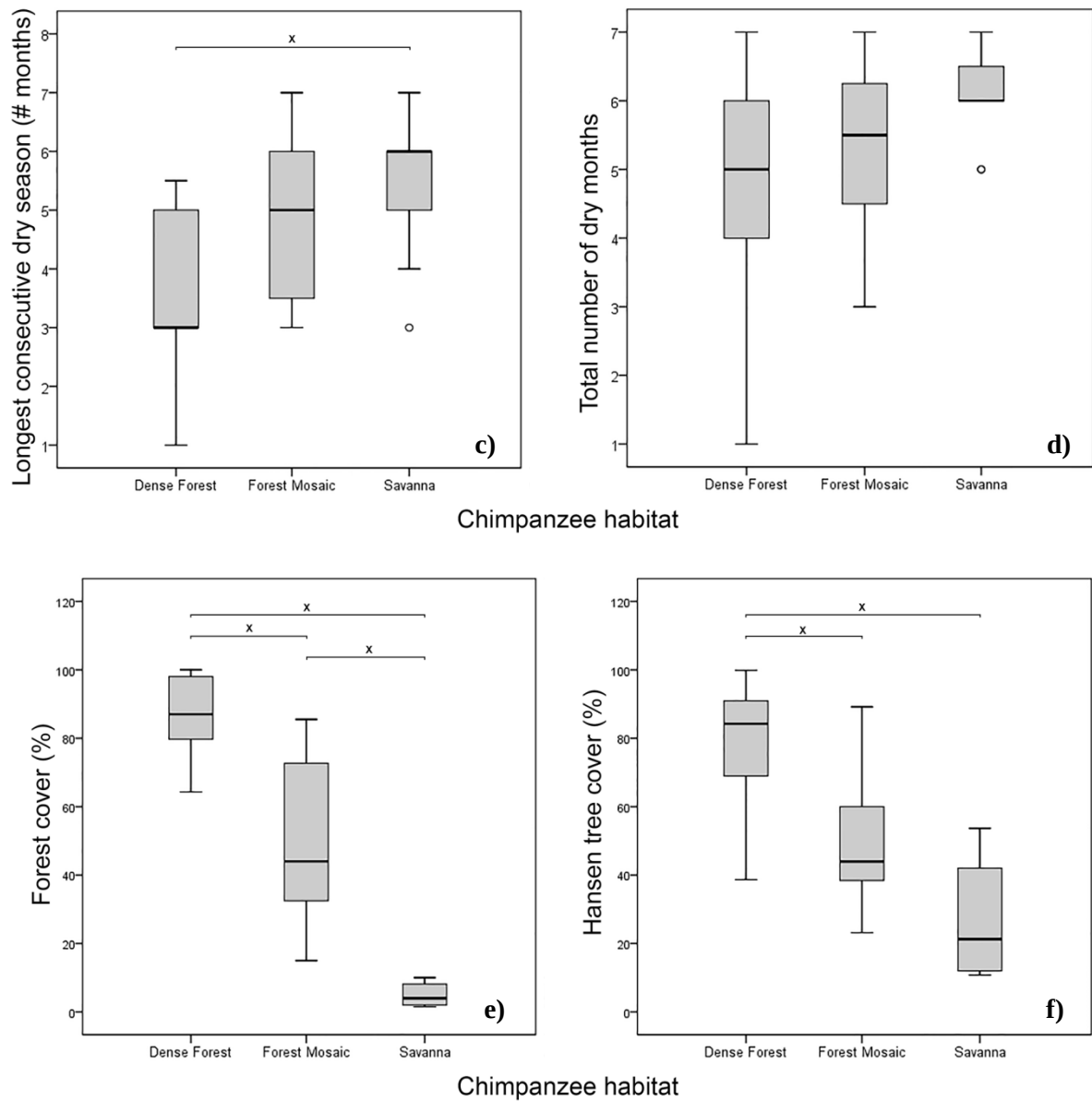
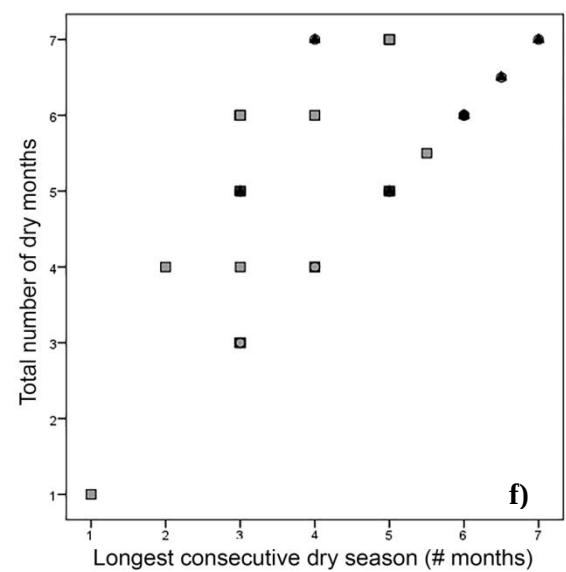
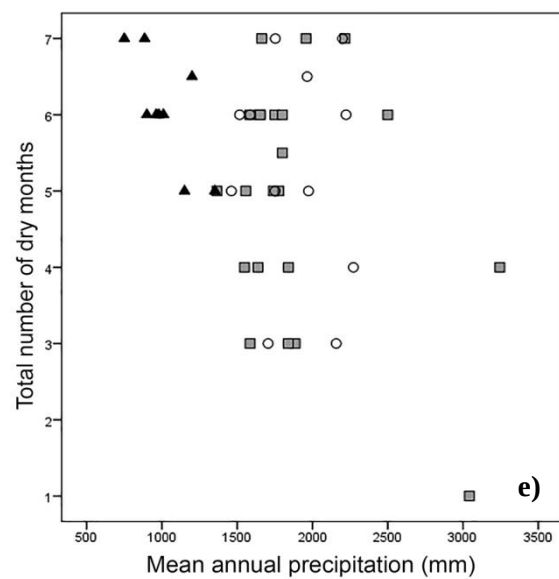
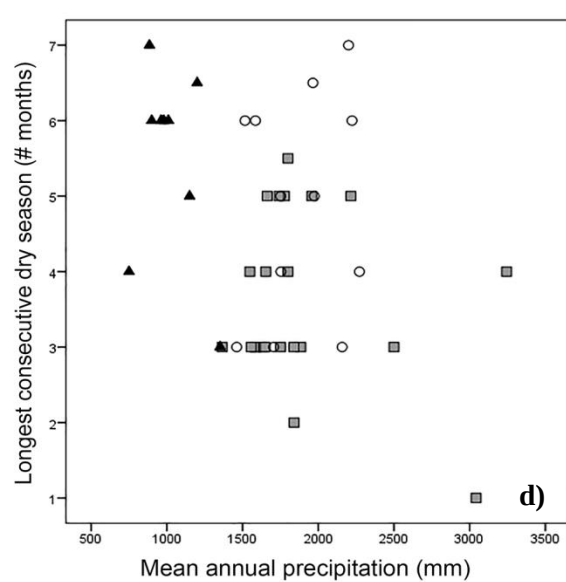
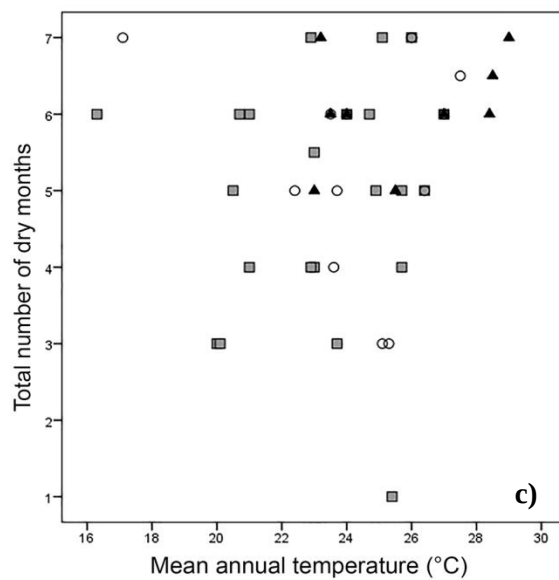
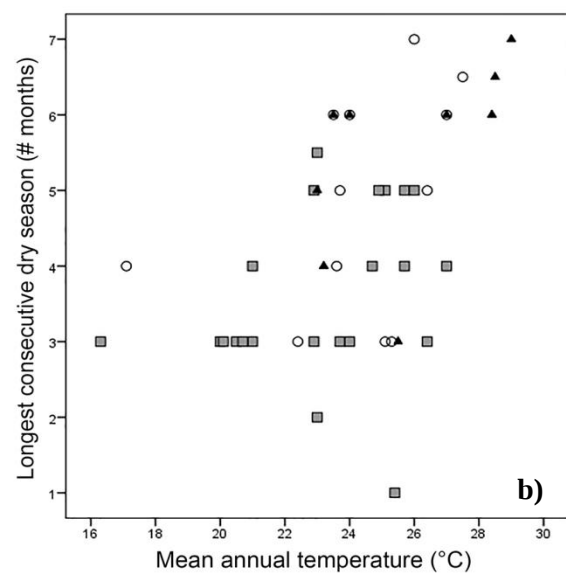
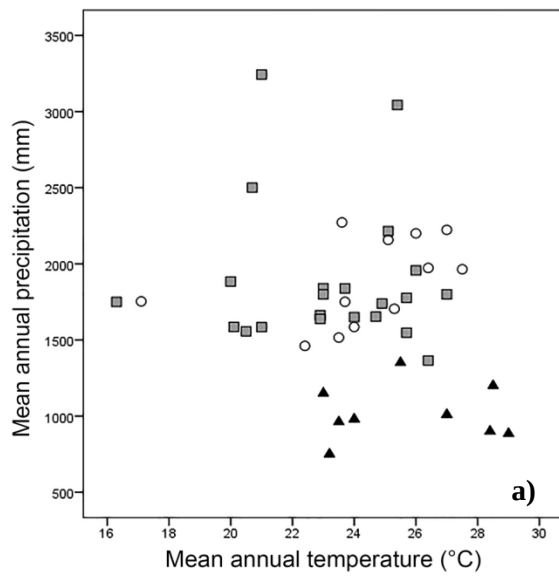


Fig. S1 Range of vegetation cover and climate across chimpanzee dense forest, forest mosaic, and savanna sites as classified by researchers. **(a)** Mean annual temperature (°C). **(b)** Mean annual precipitation (mm). **(c)** Length of the longest consecutive dry season (# months). **(d)** Total number of dry months. **(e)** Forest cover (%), as defined by chimpanzee researchers. **(f)** Hansen tree cover (%), satellite-derived; Hansen *et al.* 2013). Black bars depict the median, gray boxes indicate the upper and lower quartiles, and the whiskers depict the range; outliers are specified with open circles or “*”, and “x” indicates a significant difference (*post hoc* Mann–Whitney *U* tests with Bonferroni correction).



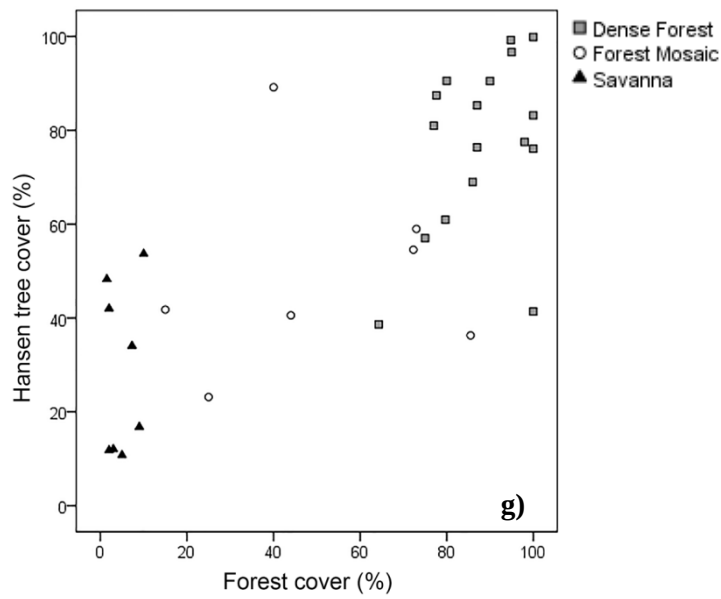


Fig. S2 Relationships of vegetation cover and climate at chimpanzee study sites, labeled with the landscape classifications used by researchers. **(a)** Mean annual temperature (°C) vs. mean annual precipitation (mm). **(b)** Mean annual temperature vs. length of the longest consecutive dry season (# months). **(c)** Mean annual temperature vs. total number of dry months. **(d)** Mean annual precipitation vs. length of the longest consecutive dry season. **(e)** Mean annual precipitation vs. total number of dry months. **(f)** Length of the longest consecutive dry season vs. total number of dry months. **(g)** Forest cover (% as defined by chimpanzee researchers) vs. Hansen tree cover (% satellite-derived; Hansen *et al.* 2013).

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