

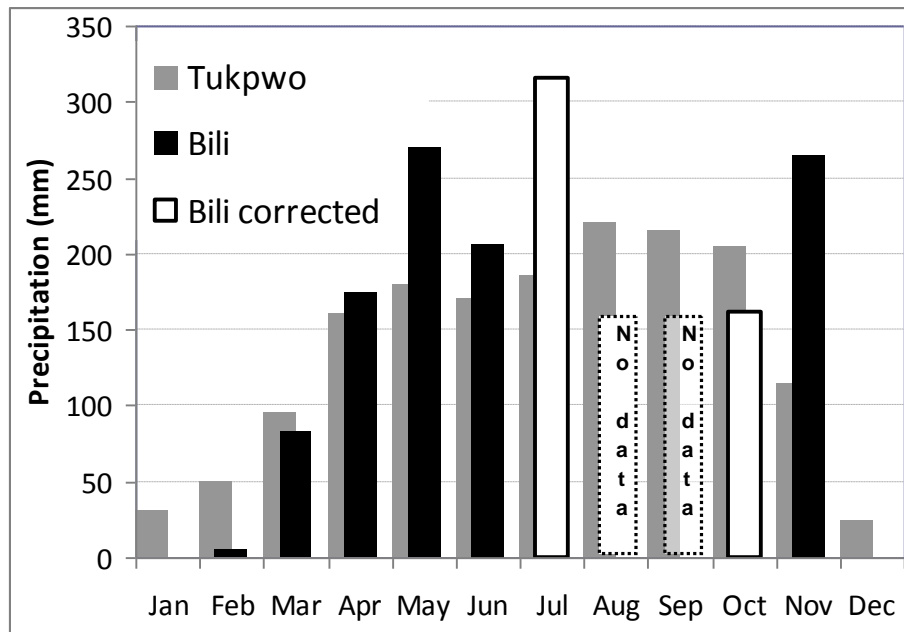
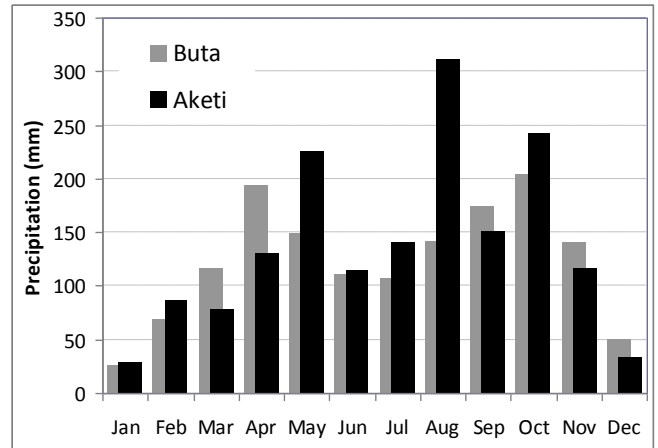
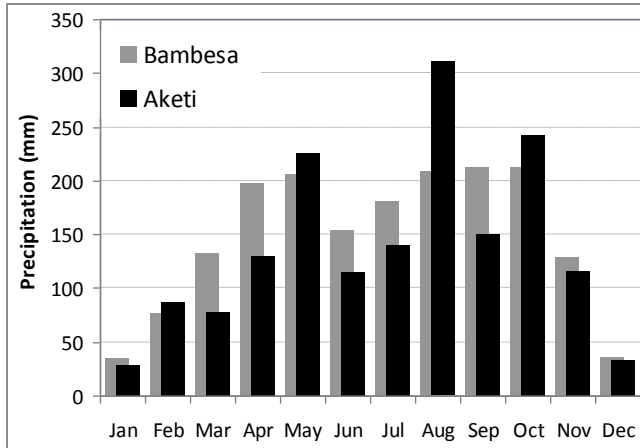
Supplementary Materials

Suppl. table 1. Dates and geographical location of chimpanzee surveys, and days spent and km walked in each forest region. For the final analyses we lumped the regions Buta and Ngume together, as well as Zongia and Lingo.

Region	Location	GPS coordinates	Survey period	Hours in forest	% hours in wet season	Km walked
North Uele	Camp Louis	4°21'72"N, 24°56'72"E	November 2004 – July 2005, August 2006 – February 2007	3276	54	911.7 ¹
	Gangu	4°19'34"N, 24°41'53"E	March – June 2005 August 2006 – February 2007	1243	77	327.4 ²
	Bili South	4°02'42"N, 25°02'11"E	July 2006 – November 2006	208	100	87.6
	Zapay	4°57'01"N, 25°06'31"E	December 2006	92	0	49.9
South Uele	Bongenge	3°13'70"N, 25°51'16"E	April 2008	170	100	46.5
	Malembobi	3°28'76"N, 25°46'55"E	April-May 2008	53	100	18.5
	Leguga	3°21'38"N, 24°57'84"E	March 2008	194	0	48.5
	Lebo-Mongongolo	3°24'43"N, 25°20'65"E	September 2006; August 2008	187	100	31.0
	Zongia	3°35'06"N, 23°45'75"E	November 2007	138	100	35.7
	Lingo	3°24'83"N, 23°30'11"E	November 2007	119	100	38.5
	Mbange E	3°13'73"N, 24°10'25"E	January 2008	272	0	80.9
	Mbange W	3°09'30"N, 24°02'88"E	January – February 2008	159	0	45.5
	Buta	2°48'82"N, 24°44'69"E	September 2008	48	100	25.6
	Ngume	2°45'83"N, 25°20'15"E	October 2008	119	100	39.4
	Akuma	2°29'36"N, 23°56'93"E	June 2008	75	100	23.5
	Total	NA	November 2004 – October 2008	6353	60.5	1810.2

¹ Includes 99 km of transects. ² Includes 61 km of transects.

Suppl. fig. 1–3. (from Hicks, 2010). Averaged monthly rainfall for different sites across the Bili-Uele landscape. As the Bili data for July and October were incomplete, an extrapolation was made using the mean precipitation per day and projecting that mean onto each of the missing days ('Bili corrected'). Tukpwo and Bili are located within 110 km of one another, at roughly the same latitude.



Sources:

Bambesa (1922-1950) and Tukpwo (1930-1954): Gerard P (1960). *Étude écologique de la forêt dense à Gilbertiodendron dewevrei dans la région de l'Uele*. Série Scientifique Number 87. Publications de L'Institut National pour l'Étude Agronomique du Congo Belge (I.N.É.A.C.), Bruxelles.

Buta 1935-1939: Bernard E (1945). *Le Climat Écologique de la Cuvette Centrale Congolaise*. Publications de L'Institut National pour l'Étude Agronomique du Congo Belge (I.N.É.A.C.), Bruxelles. 240 pp.

Aketi (2007-2008) and Bili (2004-2005): Hicks TC (2010). *A Chimpanzee Mega- Culture? Exploring behavioral continuity in Pan troglodytes schweinfurthii across northern DR Congo*. Ph.D. thesis, The University of Amsterdam. 300 pp.

Suppl. table 2. Comparison of frequencies of chimpanzee auditory traits (pant-hoots, tree drum, and other sounds) across the 13 forest regions. The first four forest regions were north of the Uele River, and the following nine were south. (Note: This supplementary table was originally released online with incorrect numbers of vocalizations. This corrected version was added in October 2015. This table is not mentioned in the body of the paper).

Forest region	Hours in forest	No. pant-hoots	Pant-hoots per hour	No. tree drums	Tree drums per hour	No. other sounds	Other sounds per hour	No. total sounds	Total sounds per hour
Camp Louis	3276	295	0.09	229	0.07	34	0.01	558	0.17
Gangu	1243	307	0.25	311	0.25	107	0.09	725	0.58
Bili S	208	11	0.05	3	0.01	1	0.01	15	0.07
Zapay	92	19	0.21	4	0.04	1	0.01	24	0.26
Bongenge	170	6	0.04	4	0.02	0	0	10	0.06
Malembobi	53	0	0	0	0	0	0	0	0
Leguga	194	23	0.12	13	0.07	5	0.03	41	0.21
Lebo - Mongongolo	187	6	0.03	2	0.01	0	0	8	0.04
Zongia-Lingo	257	7	0.03	7	0.03	0	0	14	0.06
Mbange E	272	18	0.07	10	0.04	0	0	28	0.10
Mbange W	159	37	0.23	31	0.20	0	0	68	0.43
Buta-Ngume	167	1	0.01	0	0	0	0	1	0.01
Akuma	75	0	0	0	0	0	0	0	0
All forests north of Uele River	4819	632	0.13	547	0.11	143	0.03	1322	0.27
All forests south of Uele River	1534	98	0.06	67	0.04	5	0.003	170	0.11
All forests	6353	730	0.12	614	0.10	148	0.02	1492	0.24

Suppl. table 3. Simultaneous tests of means for sound production per region based in the model from Table 3, using Tukey Contrasts. Only cases where the null hypothesis of no difference could be rejected are shown.

Regions compared	Estimate	Std. Error	z value	Probability
CampLouis-BiliS	1.633e+00	4.921e-01	3.319	0.031 *
Gangu-BiliS	2.373e+00	4.841e-01	4.901	<0.001 ***
MbangeE-BiliS	2.102e+00	6.124e-01	3.432	0.021 *
MbangeW-BiliS	3.178e+00	6.060e-01	5.244	<0.001 ***
CampLouis-Bongenge	2.944e+00	5.229e-01	5.629	<0.001 ***
Gangu-Bongenge	3.683e+00	5.303e-01	6.945	<0.001 ***
Leguga-Bongenge	2.074e+00	6.187e-01	3.351	0.028 *
MbangeE-Bongenge	3.412e+00	6.495e-01	5.253	<0.001 ***
MbangeW-Bongenge	4.488e+00	6.312e-01	7.110	<0.001 ***
Zongia/Lingo-Bongenge	2.522e+00	6.124e-01	4.119	<0.01 **
MbangeW-Buta-Ngume	3.905e+00	1.100e+00	3.549	0.015 *
Gangu-CampLouis	7.393e-01	8.839e-02	8.365	<0.001 ***
Lebo-CampLouis	-2.926e+00	5.154e-01	-5.676	<0.001 ***
MbangeW-CampLouis	1.544e+00	3.750e-01	4.118	<0.01 **
Lebo-Gangu	-3.665e+00	5.078e-01	-7.218	<0.001 ***
Leguga-Gangu	-1.609e+00	3.644e-01	-4.416	<0.001 ***
Zapay-Gangu	-2.510e+00	5.863e-01	-4.281	<0.001 ***
Leguga-Lebo	2.056e+00	6.124e-01	3.357	0.027 *
MbangeE-Lebo	3.394e+00	6.312e-01	5.377	<0.001 ***
MbangeW-Lebo	4.470e+00	6.250e-01	7.152	<0.001 ***
Zongia/Lingo-Lebo	2.504e+00	6.060e-01	4.133	<0.01 **
MbangeW-Leguga	2.414e+00	4.841e-01	4.987	<0.001 ***
Zapay-MbangeE	-2.239e+00	6.732e-01	-3.327	0.030 *
Zapay-MbangeW	-3.315e+00	6.673e-01	-4.968	<0.001 ***
Zongia/Lingo-MbangeW	-1.965e+00	5.229e-01	-3.759	<0.001 **

Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 Adjusted p values reported, single-step method.

Suppl. table 4. Human evidence (hunting and mining signs, in addition to evidence of human use of forests such as fishing and clearing for fields, and neutral signs of presence) found per km walked in the forest, across the 13 study regions.

Forest region	Km walked	No. hunting signs	Avg. no. hunting signs / km	No. mining signs	Avg. no. mining signs / km	No. signs of human forest-use	Avg. no. signs of human forest use / km	No. neutral signs of presence	Avg. no. signs of presence / km	Total no. signs	Avg. no. signs / km
Camp Louis	911.7	8	0.01	6 ¹	0.01	6	0.01	63	0.07	83	0.09
Gangu	327.4	3	0.01	11 ¹	0.03	2	0.01	6	0.02	22 ²	0.07
Bili S	87.6	29	0.33	0	0	2	0.02	102	1.16	133	1.52
Zapay	49.9	9	0.18	0	0	2	0.04	17	0.34	28	0.56
Bongenge	46.5	12	0.26	0	0	6	0.13	52	1.11	70	1.51
Malembobi	18.5	1	0.05	0	0	0	0	66	3.57	67	3.62
Leguga	48.5	4	0.08	1	0.02	1	0.02	12	0.25	18	0.37
Lebo–Mong.	31.0	6	0.19	0	0	1	0.03	27	0.87	34	1.10
Zongia-Lingo	74.2	39	0.53	6	0.08	5	0.07	17	0.23	67	0.90
Mbange E	80.9	38	0.47	92	1.14	8	0.10	28	0.35	166	2.05
Mbange W	45.5	106	2.33	33	0.73	7	0.15	32	0.70	178	3.91
Buta-Ngume	65	46	0.71	8	0.12	5	0.08	111	1.71	170	2.62
Akuma	23.5	11	0.47	0	0	1	0.04	24	1.02	36	1.53
All N Forests	1376.6	49	0.04	17	0.01	12	0.01	188	0.14	266	0.19
All S Forests	433.6	263	0.61	140	0.32	34	0.08	369	0.85	806	1.86
All Forests	1810.2	312	0.17	157	0.09	46	0.03	557	0.31	1072	0.59

¹ Three of the mines in the Gangu Forest and all of the mines in the Camp Louis Forest were decades old.

² At Gangu, 15 of the 22 items of human evidence (68%), including all of the mines, were found within 5 km of the east edge of the Gangu Forest, between the west bank of the Bo River and the savanna. No human evidence was found further than 10 km west of the Gangu Forest's east boundary; thus the Gangu Forest proper can be considered virtually untouched by humans.

Suppl. table 5. Hunting evidence found per km walked in the forest, across study regions.

Forest region	Km walked	No. cartridges	Avg. no. cartridges / km	No. snares	Avg. no. snares / km	No. hunting camps	Avg. no. hunting camps / km	No. other hunting signs	Avg. no. other hunting signs / km	No. total hunting signs	Avg. no. hunting signs / km
Camp Louis	911.7	0	0	1	0.001	5	0.01	2	0.002	8	0.01
Gangu	327.4	0	0	0	0	2	0.01	1	0.003	3	0.01
Bili S	87.6	9	0.10	7	0.08	4	0.05	9	0.10	29	0.33
Zapay	49.9	1	0.02	5	0.10	3	0.06	0	0	9	0.18
Bongenge	46.5	0	0	2	0.04	3	0.07	7	0.15	12	0.26
Malembobi	18.5	0	0	0	0	0	0	1	0.05	1	0.05
Leguga	48.5	0	0	2	0.04	1	0.02	1	0.02	4	0.08
Lebo - Mongongolo	31.0	0	0	2	0.07	2	0.07	2	0.07	6	0.19
Zongia - Lingo	74.2	24	0.32	4	0.05	7	0.09	4	0.05	39	0.53
Mbange E	80.9	9	0.11	14	0.17	7	0.09	8	0.10	38	0.47
Mbange W	45.5	8	0.18	70	1.54	10	0.22	18	0.40	106	2.33
Buta - Ngume	65	3	0.05	32	0.49	5	0.08	6	0.09	46	0.71
Akuma	23.5	1	0.04	7	0.30	3	0.13	0	0	11	0.47
All N Forests	1376.6	10	0.01	13	0.01	14	0.01	12	0.01	49	0.04
All S Forests	433.6	45	0.10	146	0.34	38	0.09	47	0.11	263	0.61
All Forests	1810.2	55	0.03	159	0.09	52	0.03	59	0.03	312	0.17

Suppl. table 6. Factor-loadings from the PCA analysis of the 17 human evidence items across the different study regions. Higher absolute values for the loadings indicate the factor has more influence on that particular axis. Loadings near 0 indicate that the evidence-type does not contribute, negatively or positively.

Evidence type	Factor loading PC1	Factor loading PC2
Artifact	0.027	-0.010
Battery	0.324	-0.015
Bird hunting	0.300	-0.145
Bus-meat	0.364	0.072
Camp	0.335	0.085
Cartridge	0.185	-0.114
Contact	0.116	0.425
Field	0.134	0.450
Fishing sign	0.239	-0.183
Hunting camp	0.362	-0.167
Hunting sign	0.256	-0.126
Hut	0.108	0.462
Lean-to	-0.106	0.094
Mining	0.204	-0.247
Sign	0.134	0.185
Snare	0.380	-0.054
Village	0.116	0.416