

## Electronic Supplementary Material

### Variability and repeatability of noctule bat migration in Central Europe: evidence for partial and differential migration

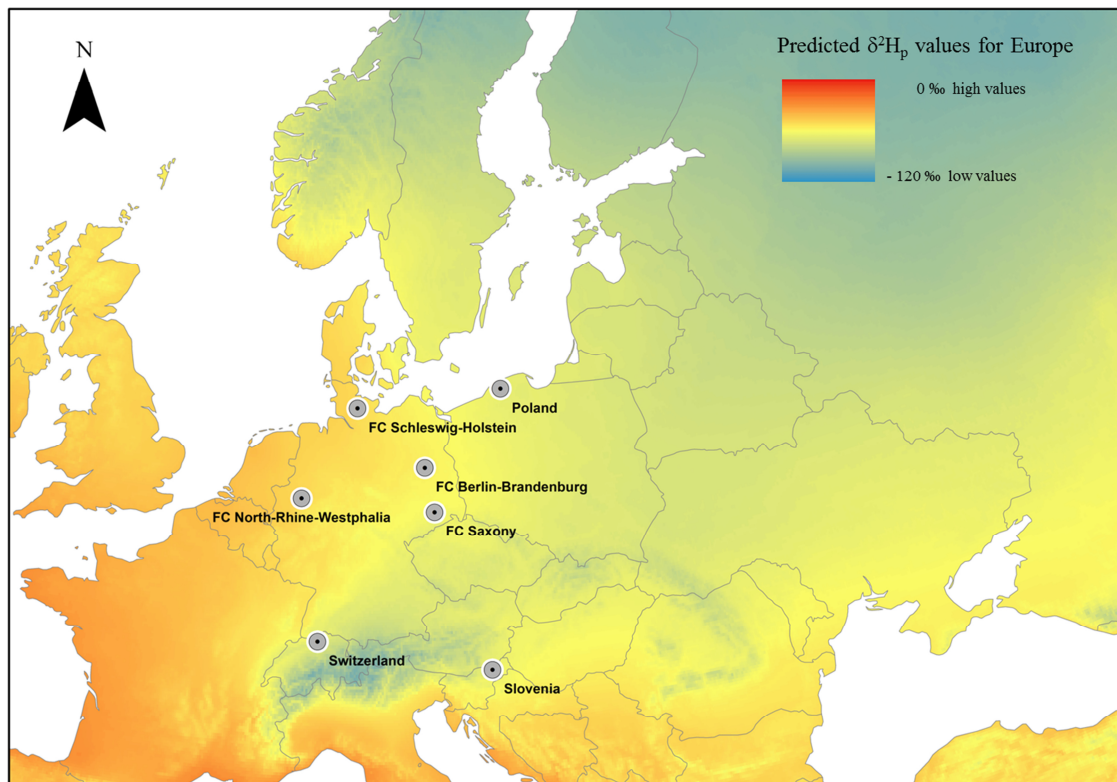
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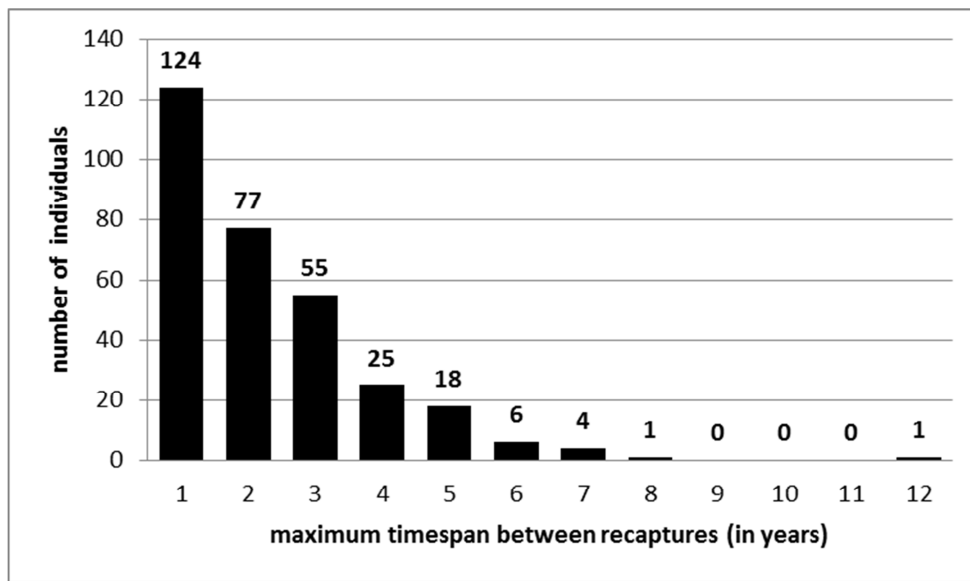
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#### Supplementary Figures

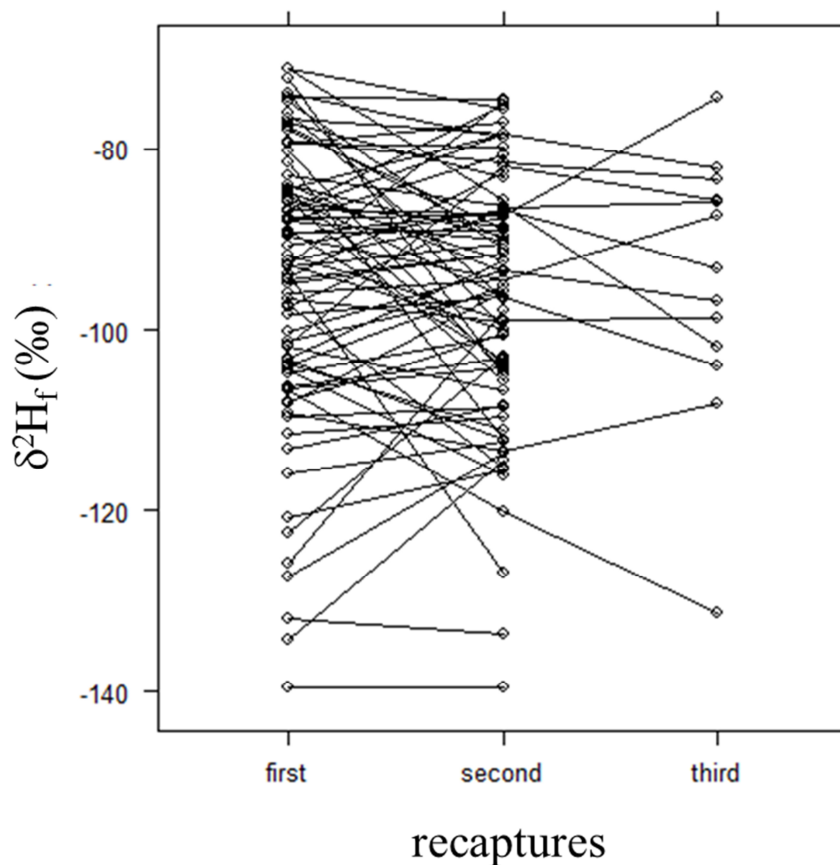
**Figure S1:**  $\delta^2\text{H}_{\text{precipitation}}$  isoscape for Europe predicted by a geostatistical mixed model approximating the relationship between topographic features of a location and its mean annual  $\delta^2\text{H}_p$  values. Sampling areas of hibernating *Nyctalus noctula* across central Europe are indicated by black dots embedded in grey disks.



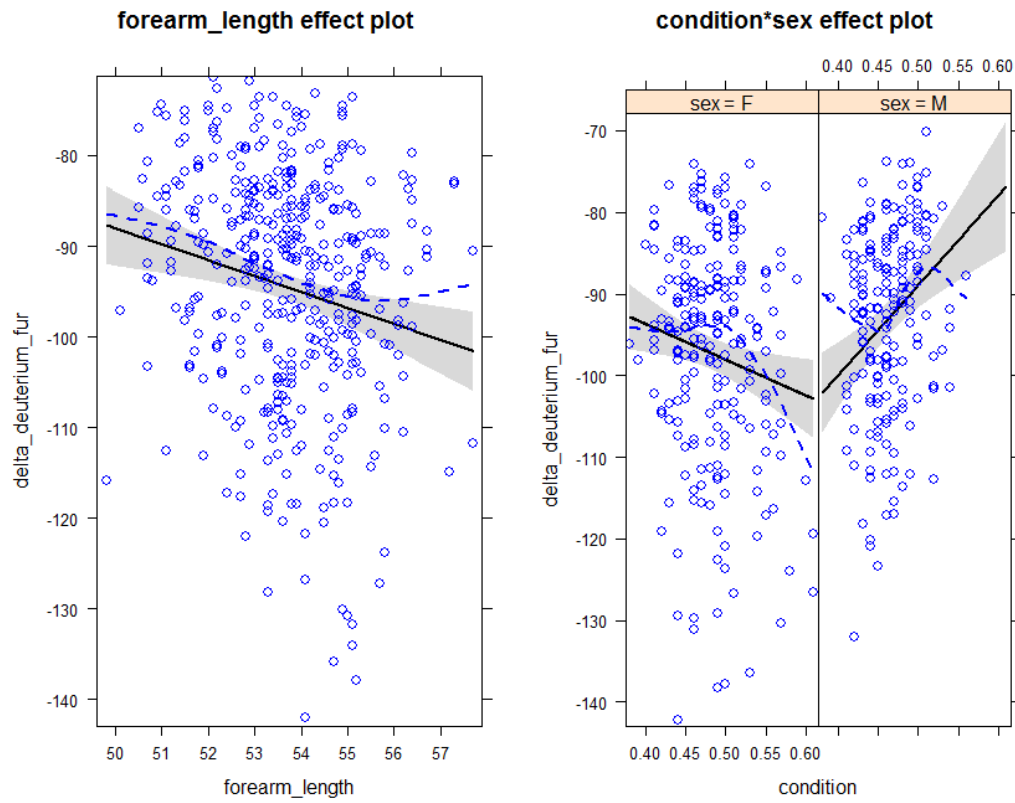
**Figure S2:** Maximum timespan (years) between repeated captures of banded *Nyctalus noctula*.



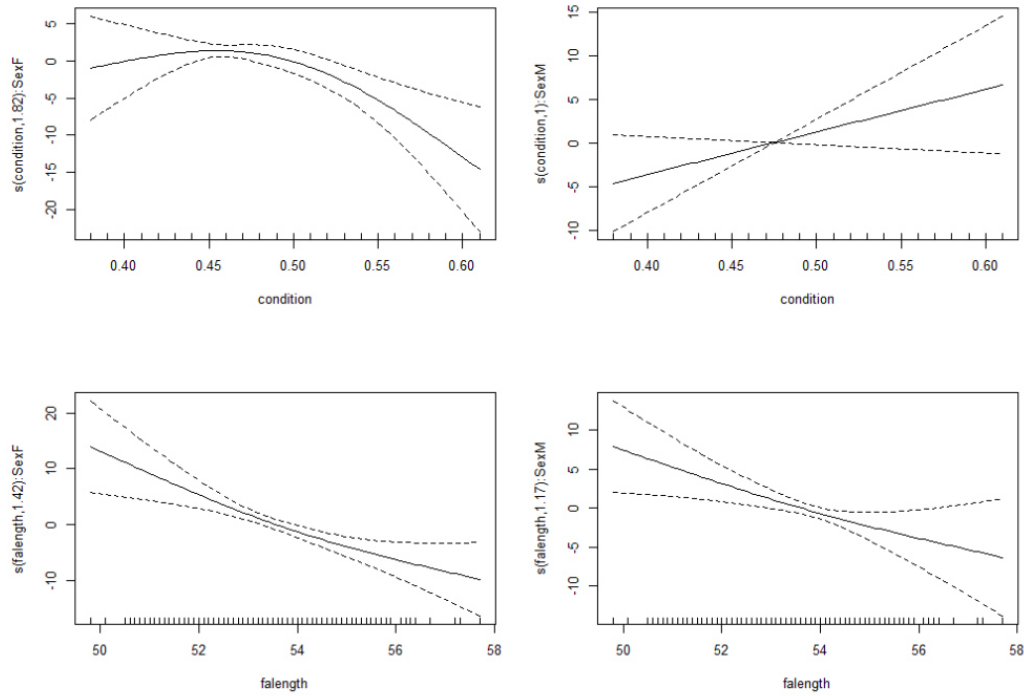
**Figure S3:** Individual variation in measured stable isotope ratios in the non-exchangeable hydrogen of fur keratin (‰) between recapture events of banded noctule bats (*Nyctalus noctula*). Please note that recaptures did not necessarily occur in subsequent years, i.e. some individuals have not been recorded consecutively.



**Figure S4:** Effects plot of the linear mixed effects model assessing the importance of forearm length, body condition and its interaction with sex in explaining the measured stable isotope ratios in the non-exchangeable hydrogen of fur keratin ( $\delta^2\text{H}_f$ ). Gray bands represent 95% confidence limits, partial residuals are indicated as blue circles, and the broken blue line in each panel is a loess smooth of the partial residuals. The observed large variance is partly caused by sample sizes and by pooling forearm length data of males and females.



**Figure S5:** Results of the generalized additive model with three knots fitted to visually check the linearity assumption of the co-variables. The model explored the influence of the explanatory variables ‘forearm length’, ‘body condition’ [body mass (g) divided by forearm length (mm)], and their interaction with ‘sex’ on the dependent variable  $\delta^2\text{H}_f$  (measured stable isotope ratios in the non-exchangeable hydrogen of fur keratin of noctule bats (*Nyctalus noctula*)).



**Supplementary Tables****Table S1:** Information on band number, forearm length, body mass, sex, region, and measured stable isotope ratios in the non-exchangeable hydrogen of fur keratin from 1170 fur samples of noctule bats (*Nyctalus noctula*) sampled from hibernacula across central Europe.

sample	band number	forearm length (mm)	body mass (g)	sex	region	$\delta^2\text{H}$
1	A72461	52.5	22	M	FC Berlin-Brandenburg	-83.1
2	A72462	53.8	25	F	FC Berlin-Brandenburg	-90.6
3	A72463	54.2	26.5	M	FC Berlin-Brandenburg	-79.3
4	A72464	53.4	25	M	FC Berlin-Brandenburg	-115.0
5	A72465	53.3	23.5	M	FC Berlin-Brandenburg	-119.5
6	A72466	55.1	25.5	M	FC Berlin-Brandenburg	-96.5
7	A72467	53.3	24	M	FC Berlin-Brandenburg	-97.4
8	A72469	54.7	25.5	F	FC Berlin-Brandenburg	-97.2
9	A72470	51.5	22	M	FC Berlin-Brandenburg	-78.3
10	A72471	53.5	26	M	FC Berlin-Brandenburg	-93.1
11	A72472	51.1	24.5	M	FC Berlin-Brandenburg	-109.1
12	A72473	54.6	22.5	M	FC Berlin-Brandenburg	-105.8
13	A72474	51.9	22	M	FC Berlin-Brandenburg	-107.9
14	A72475	51.1	26	M	FC Berlin-Brandenburg	-77.8
15	A72476	51	21	M	FC Berlin-Brandenburg	-78.6
16	A72477	52.7	32	F	FC Berlin-Brandenburg	-117.6
17	A72478	51.5	21	F	FC Berlin-Brandenburg	-77.7
18	A72479	53.1	24.5	M	FC Berlin-Brandenburg	-85.9
19	A72480	54.5	29.5	M	FC Berlin-Brandenburg	-95.5
20	A72481	52.8	23.5	M	FC Berlin-Brandenburg	-121.8
21	A72482	52	23	M	FC Berlin-Brandenburg	-75.9
22	A72483	53.5	22	F	FC Berlin-Brandenburg	-93.4
23	A72484	55	23	M	FC Berlin-Brandenburg	-88.7
24	A72485	53.3	29	F	FC Berlin-Brandenburg	-113.6
25	A72486	53.7	26.5	M	FC Berlin-Brandenburg	-106.1
26	A72487	51.6	23.5	M	FC Berlin-Brandenburg	-102.1
27	A72488	56.4	26.5	F	FC Berlin-Brandenburg	-81.9
28	A72489	53.2	23	M	FC Berlin-Brandenburg	-80.4
29	A72490	53.8	29.5	F	FC Berlin-Brandenburg	-87.3
30	A72491	53.6	29.5	F	FC Berlin-Brandenburg	-103.0
31	A72492	52.8	26	M	FC Berlin-Brandenburg	-89.2
32	A72493	56.3	26	F	FC Berlin-Brandenburg	-94.5
33	A72494	51.7	25	M	FC Berlin-Brandenburg	-98.2
34	A72495	51.4	26	M	FC Berlin-Brandenburg	-76.5
35	A72496	53	27.5	F	FC Berlin-Brandenburg	-87.2
36	A72497	51.8	25	M	FC Berlin-Brandenburg	-77.9
37	A72498	53	25	M	FC Berlin-Brandenburg	-88.8
38	A72499	50.7	22	M	FC Berlin-Brandenburg	-90.7
39	A72500	54.8	22.5	F	FC Berlin-Brandenburg	-83.4
40	A72955	54.4	27.5	F	FC Berlin-Brandenburg	-91.6
41	A72956	53.3	24	F	FC Berlin-Brandenburg	-102.2
42	A72957	52.1	24	F	FC Berlin-Brandenburg	-82.0
43	A72959	51.6	24.5	M	FC Berlin-Brandenburg	-94.8
44	A72960	53.1	24.5	M	FC Berlin-Brandenburg	-97.8

45	A72961	55.1	29	M	FC Berlin-Brandenburg	-99.5
46	A72962	56.4	27	M	FC Berlin-Brandenburg	-81.5
47	A72963	53.3	24.5	M	FC Berlin-Brandenburg	-87.9
48	A72964	52.7	25.5	M	FC Berlin-Brandenburg	-83.7
49	A72965	53	30	F	FC Berlin-Brandenburg	-83.6
50	A72966	51.4	22.5	F	FC Berlin-Brandenburg	-79.5
51	A72967	53.9	25	F	FC Berlin-Brandenburg	-114.4
52	A72968	53.2	26.5	M	FC Berlin-Brandenburg	-87.8
53	A72969	56.1	28	F	FC Berlin-Brandenburg	-101.7
54	A72970	53.9	33	F	FC Berlin-Brandenburg	-126.8
55	A72972	52.4	24	M	FC Berlin-Brandenburg	-84.5
56	A72973	54.3	24	F	FC Berlin-Brandenburg	-98.0
57	A72974	54.1	26.5	F	FC Berlin-Brandenburg	-88.9
58	A72975	54.6	23.5	M	FC Berlin-Brandenburg	-82.9
59	A72976	53.8	24.5	M	FC Berlin-Brandenburg	-87.6
60	A72977	53.9	24	F	FC Berlin-Brandenburg	-89.6
61	A72978	55.3	31	F	FC Berlin-Brandenburg	-95.0
62	A72979	53.6	27.5	F	FC Berlin-Brandenburg	-82.8
63	A72980	53.3	29	M	FC Berlin-Brandenburg	-91.1
64	A72981	55.8	32	F	FC Berlin-Brandenburg	-98.8
65	A72985	53.3	23.5	M	FC Berlin-Brandenburg	-108.8
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208	A82402	55.8	28	F	FC Berlin-Brandenburg	-92.1
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210	A82441	53.8	25	F	FC Berlin-Brandenburg	-93.2
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213	A82471	-	-	F	FC Berlin-Brandenburg	-88.6
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257	A72945	52.1	22.5	M	FC Berlin-Brandenburg	-86.8
258	A72947	50.9	21.5	M	FC Berlin-Brandenburg	-87.6
259	A82073	54.2	26.5	M	FC Berlin-Brandenburg	-86.1
260	A82085	50.6	21.5	M	FC Berlin-Brandenburg	-85.7
261	A82134	-	-	M	FC Berlin-Brandenburg	-93.7
262	A82140	-	-	M	FC Berlin-Brandenburg	-75.6
263	A82141	56.7	27	M	FC Berlin-Brandenburg	-85.0
264	A82147	52.9	20	M	FC Berlin-Brandenburg	-79.3
265	A82228	52.8	25.5	M	FC Berlin-Brandenburg	-83.1
266	A82328	54.7	25	M	FC Berlin-Brandenburg	-84.8
267	A82408	53	26.5	M	FC Berlin-Brandenburg	-85.6
268	A82416	-	-	M	FC Berlin-Brandenburg	-90.2
269	A82443	54.2	25	M	FC Berlin-Brandenburg	-94.2
270	A82478	53.3	22.5	M	FC Berlin-Brandenburg	-131.3
271	A82480	-	-	M	FC Berlin-Brandenburg	-85.0
272	A82482	-	-	M	FC Berlin-Brandenburg	-86.3
273	A93644	-	-	M	FC Berlin-Brandenburg	-85.7
274	A93647	54.1	21	M	FC Berlin-Brandenburg	-91.2
275	A93650	55	24	M	FC Berlin-Brandenburg	-105.1
276	A72970	53.6	29	F	FC Berlin-Brandenburg	-94.0
277	A72386	51.8	24	M	FC Berlin-Brandenburg	-94.3
278	A72452	55.3	31	F	FC Berlin-Brandenburg	-110.1
279	A90179	52.5	23.5	M	FC Berlin-Brandenburg	-87.5
280	A72336	55.2	29.5	F	FC Berlin-Brandenburg	-100.2
281	A72500	54.9	26	F	FC Berlin-Brandenburg	-81.5
282	A90115	53.9	25	M	FC Berlin-Brandenburg	-95.9
283	A72468	50.7	22.5	F	FC Berlin-Brandenburg	-92.8
284	A72957	52	26.5	F	FC Berlin-Brandenburg	-78.4
285	A72351	54.6	30	F	FC Berlin-Brandenburg	-89.1
286	A72490	53.8	29	F	FC Berlin-Brandenburg	-94.5
287	A90176	54.6	26	M	FC Berlin-Brandenburg	-105.6
288	A82405	54.8	24	M	FC Berlin-Brandenburg	-86.8
289	A90124	54	25.5	M	FC Berlin-Brandenburg	-105.6
290	A82111	54.3	28	F	FC Berlin-Brandenburg	-106.5
291	A72395	53.9	27	F	FC Berlin-Brandenburg	-79.3
292	A72613	55.1	31.5	F	FC Berlin-Brandenburg	-108.4
293	A72466	55.4	27.5	M	FC Berlin-Brandenburg	-85.4
294	A90171	57.7	25.5	F	FC Berlin-Brandenburg	-112.7
295	A93902	53.1	24.5	M	FC Berlin-Brandenburg	-77.8
296	A93672	53.8	26	F	FC Berlin-Brandenburg	-80.1
297	A81983	55.2	27	F	FC Berlin-Brandenburg	-101.3
298	A90123	54.2	24	M	FC Berlin-Brandenburg	-94.4
299	A93904	52.9	22.5	M	FC Berlin-Brandenburg	-86.3

300	A90196	55.2	25.5	F	FC Berlin-Brandenburg	-91.4
301	A93903	55.2	24.5	M	FC Berlin-Brandenburg	-87.3
302	A93906	51.9	24.5	M	FC Berlin-Brandenburg	-87.6
303	A93905	52.3	24	M	FC Berlin-Brandenburg	-96.2
304	A90146	51.2	23.5	F	FC Berlin-Brandenburg	-93.5
305	A93910	52.1	23	M	FC Berlin-Brandenburg	-108.8
306	A90169	53.4	23.5	M	FC Berlin-Brandenburg	-112.1
307	A93911	53.2	27.5	M	FC Berlin-Brandenburg	-100.4
308	A93912	52.6	29.5	M	FC Berlin-Brandenburg	-85.7
309	A90187	55.5	27	F	FC Berlin-Brandenburg	-86.1
310	A90159	53.3	24	F	FC Berlin-Brandenburg	-85.6
311	A90154	55.1	24	F	FC Berlin-Brandenburg	-86.7
312	A93915	52.6	24.5	M	FC Berlin-Brandenburg	-107.7
313	A72375	53.4	23.5	M	FC Berlin-Brandenburg	-84.1
314	A90127	50.1	21	M	FC Berlin-Brandenburg	-100.3
315	A93917	54.8	26	M	FC Berlin-Brandenburg	-113.8
316	A90182	56.3	27	F	FC Berlin-Brandenburg	-86.4
317	A93918	56.2	26	F	FC Berlin-Brandenburg	-112.3
318	A72491	53.6	26.5	F	FC Berlin-Brandenburg	-106.2
319	A90186	52.2	21.5	M	FC Berlin-Brandenburg	-82.5
320	A72470	51.2	24	M	FC Berlin-Brandenburg	-87.0
321	A81942	53.4	28.5	F	FC Berlin-Brandenburg	-92.5
322	A72986	53.1	23.5	M	FC Berlin-Brandenburg	-84.5
323	A72305	55.5	28	M	FC Berlin-Brandenburg	-83.0
324	A93920	55.7	31.5	F	FC Berlin-Brandenburg	-133.8
325	A90162	52.3	24	M	FC Berlin-Brandenburg	-102.9
326	A93922	54.5	30	F	FC Berlin-Brandenburg	-103.9
327	A93923	53.8	24.5	M	FC Berlin-Brandenburg	-117.2
328	A90130	52.2	23.5	M	FC Berlin-Brandenburg	-100.8
329	A93924	52.5	25	M	FC Berlin-Brandenburg	-84.0
330	A90254	53.8	23.5	M	FC Berlin-Brandenburg	-84.1
331	A81824	53.4	30	F	FC Berlin-Brandenburg	-115.9
332	A93925	53.3	22.5	M	FC Berlin-Brandenburg	-99.6
333	A72462	53.8	26.5	F	FC Berlin-Brandenburg	-93.0
334	A90139	55.2	25.5	F	FC Berlin-Brandenburg	-102.3
335	A90161	53.7	26	F	FC Berlin-Brandenburg	-89.6
336	A72955	54.6	25.5	F	FC Berlin-Brandenburg	-94.6
337	A93931	51.8	22	M	FC Berlin-Brandenburg	-84.2
338	A72330	55	26.5	F	FC Berlin-Brandenburg	-91.8
339	A90268	53.5	25.5	M	FC Berlin-Brandenburg	-103.1
340	A81968	53.5	27	F	FC Berlin-Brandenburg	-111.6
341	A93928	53.9	28	M	FC Berlin-Brandenburg	-81.1
342	A93929	54.5	28	F	FC Berlin-Brandenburg	-93.8
343	A93919	53.1	25.5	M	FC Berlin-Brandenburg	-90.0
344	A90167	53.3	24	F	FC Berlin-Brandenburg	-84.0
345	A17060	54.1	27.5	F	FC Berlin-Brandenburg	-89.1
346	A50181	54.5	24.5	F	FC Berlin-Brandenburg	-101.9
347	A62959	55.2	27	F	FC Berlin-Brandenburg	-97.4
348	A69636	53.7	29.5	F	FC Berlin-Brandenburg	-89.2
349	A81654	52.2	25.5	F	FC Berlin-Brandenburg	-79.4
350	A81657	54.3	27	F	FC Berlin-Brandenburg	-76.8

351	A82228	52.6	26.5	M	FC Berlin-Brandenburg	-77.1
352	A81801	52.1	25.5	F	FC Berlin-Brandenburg	-74.5
353	A81824	53.5	32	F	FC Berlin-Brandenburg	-112.4
354	A81897	51.1	24.5	M	FC Berlin-Brandenburg	-82.6
355	A81917	54.9	26	F	FC Berlin-Brandenburg	-77.4
356	A81968	53.8	29.5	F	FC Berlin-Brandenburg	-109.6
357	A81996	51.6	26	F	FC Berlin-Brandenburg	-89.5
358	A81998	53.3	25.5	F	FC Berlin-Brandenburg	-97.3
359	A82459	52.1	29.5	F	FC Berlin-Brandenburg	-83.9
360	A82472	53.7	28.5	F	FC Berlin-Brandenburg	-74.0
361	A72407	52.2	28.5	F	FC Berlin-Brandenburg	-103.4
362	A72416	53	26	M	FC Berlin-Brandenburg	-79.4
363	A72604	52.1	23	M	FC Berlin-Brandenburg	-78.0
364	A72606	54.2	31	F	FC Berlin-Brandenburg	-100.6
365	A82054	51.8	27.5	M	FC Berlin-Brandenburg	-76.0
366	A82085	50.5	25	M	FC Berlin-Brandenburg	-71.3
367	A82096	54	29.5	F	FC Berlin-Brandenburg	-117.7
368	A82405	54.4	26	M	FC Berlin-Brandenburg	-75.3
369	A82408	53	27	M	FC Berlin-Brandenburg	-81.9
370	A82414	54.5	25	F	FC Berlin-Brandenburg	-96.9
371	A82422	55.1	29	F	FC Berlin-Brandenburg	-138.9
372	A82437	53.7	27.5	M	FC Berlin-Brandenburg	-75.1
373	A72437	53.6	28	M	FC Berlin-Brandenburg	-101.3
374	A72439	53.8	28.5	F	FC Berlin-Brandenburg	-106.6
375	A82111	54.2	27.5	F	FC Berlin-Brandenburg	-104.1
376	A72451	51.1	22	M	FC Berlin-Brandenburg	-85.8
377	A72264	50.5	26	M	FC Berlin-Brandenburg	-78.9
378	A72922	54.3	28	F	FC Berlin-Brandenburg	-96.7
379	A72946	53.8	28.5	F	FC Berlin-Brandenburg	-100.8
380	A72947	50.7	23.5	M	FC Berlin-Brandenburg	-92.3
381	A82127	55	24	F	FC Berlin-Brandenburg	-131.7
382	A82137	56.2	29	F	FC Berlin-Brandenburg	-86.6
383	A82478	53.3	23.5	M	FC Berlin-Brandenburg	-120.2
384	A82484	53.5	28	M	FC Berlin-Brandenburg	-97.3
385	A93647	54.2	26.5	M	FC Berlin-Brandenburg	-74.8
386	A93650	54.9	28	M	FC Berlin-Brandenburg	-72.2
387	A72279	55.6	27	F	FC Berlin-Brandenburg	-116.1
388	A72280	54.2	30	F	FC Berlin-Brandenburg	-104.0
389	A72281	54.9	25.5	F	FC Berlin-Brandenburg	-131.9
390	A72284	53.5	27	F	FC Berlin-Brandenburg	-108.2
391	A72290	57.3	29	F	FC Berlin-Brandenburg	-86.8
392	A72300	55	26	F	FC Berlin-Brandenburg	-95.0
393	A72302	56.2	28	F	FC Berlin-Brandenburg	-107.9
394	A72304	52.8	26.5	F	FC Berlin-Brandenburg	-87.7
395	A72305	55.7	26	M	FC Berlin-Brandenburg	-86.3
396	A72308	52.8	31	F	FC Berlin-Brandenburg	-86.7
397	A72314	54.9	28.5	F	FC Berlin-Brandenburg	-103.7
398	A72320	53.1	26.5	M	FC Berlin-Brandenburg	-80.2
399	A72321	52.7	26	F	FC Berlin-Brandenburg	-120.8
400	A72330	54.8	30	F	FC Berlin-Brandenburg	-99.0
401	A72336	55.4	26	F	FC Berlin-Brandenburg	-93.6

402	A72337	54.2	27	M	FC Berlin-Brandenburg	-96.3
403	A72339	54.1	25.5	M	FC Berlin-Brandenburg	-88.1
404	A72340	53.6	28	M	FC Berlin-Brandenburg	-112.5
405	A72341	54.7	27	F	FC Berlin-Brandenburg	-103.2
406	A72342	53.9	25	M	FC Berlin-Brandenburg	-74.0
407	A72345	51.3	26	M	FC Berlin-Brandenburg	-76.1
408	A72347	55.8	32	F	FC Berlin-Brandenburg	-113.5
409	A72352	54.5	27.5	F	FC Berlin-Brandenburg	-122.4
410	A72368	52.7	24.5	M	FC Berlin-Brandenburg	-77.9
411	A72371	52.9	23.5	F	FC Berlin-Brandenburg	-93.2
412	A72372	55.2	25	M	FC Berlin-Brandenburg	-102.6
413	A72375	53.7	24.5	M	FC Berlin-Brandenburg	-89.8
414	A72381	53.7	23	M	FC Berlin-Brandenburg	-92.3
415	A72386	51.8	22.5	M	FC Berlin-Brandenburg	-82.6
416	A72389	53.3	24	F	FC Berlin-Brandenburg	-88.5
417	A72393	55.7	28	M	FC Berlin-Brandenburg	-85.5
418	A72395	54.1	28	F	FC Berlin-Brandenburg	-79.9
419	A72399	53.6	29	F	FC Berlin-Brandenburg	-95.1
420	A93657	56.1	30	F	FC Berlin-Brandenburg	-103.5
421	A93660	51.6	24	M	FC Berlin-Brandenburg	-100.7
422	A93665	51.1	23.5	M	FC Berlin-Brandenburg	-74.4
423	A93667	54.7	26	M	FC Berlin-Brandenburg	-100.0
424	A93668	53.5	24	M	FC Berlin-Brandenburg	-86.4
425	A93671	50.8	24	M	FC Berlin-Brandenburg	-91.4
426	A93675	54.6	26	M	FC Berlin-Brandenburg	-92.5
427	A93678	54.8	29.5	M	FC Berlin-Brandenburg	-103.4
428	A93679	52.8	23	M	FC Berlin-Brandenburg	-90.2
429	A93684	55.1	26.5	F	FC Berlin-Brandenburg	-110.6
430	A93686	52.8	23.5	M	FC Berlin-Brandenburg	-90.1
431	A93687	50.7	25.5	M	FC Berlin-Brandenburg	-97.6
432	A93697	51.5	21.5	M	FC Berlin-Brandenburg	-78.3
433	A62920	53	26	F	FC Berlin-Brandenburg	-87.0
434	A93946	-	-	NA	FC Berlin-Brandenburg	-100.9
435	A72474	51.8	26	NA	FC Berlin-Brandenburg	-83.9
436	A93906	52	24	NA	FC Berlin-Brandenburg	-89.4
437	A129618	-	-	NA	FC Berlin-Brandenburg	-77.1
438	A90246	54.6	24.5	NA	FC Berlin-Brandenburg	-113.9
439	A72266	52.9	24	NA	FC Berlin-Brandenburg	-84.9
440	A72991	52.7	30.5	NA	FC Berlin-Brandenburg	-122.2
441	A90286	54.9	27	NA	FC Berlin-Brandenburg	-113.2
442	A90252	56.2	27.5	NA	FC Berlin-Brandenburg	-99.4
443	A93984	52.8	24	NA	FC Berlin-Brandenburg	-107.2
444	A72500	54.9	27.5	NA	FC Berlin-Brandenburg	-79.1
445	A90272	56.4	28	NA	FC Berlin-Brandenburg	-81.9
446	A123006	54.5	25	NA	FC Berlin-Brandenburg	-86.2
447	A90191	54	26.5	NA	FC Berlin-Brandenburg	-84.6
448	A93996	54.7	27	NA	FC Berlin-Brandenburg	-113.8
449	A129617	53.6	23	NA	FC Berlin-Brandenburg	-92.4
450	A123220	51.9	22.5	NA	FC Berlin-Brandenburg	-115.2
451	A90169	53.4	25	NA	FC Berlin-Brandenburg	-81.5
452	A72926	-	-	NA	FC Berlin-Brandenburg	-90.9

453	A72308	52.9	27	NA	FC Berlin-Brandenburg	-90.7
454	A93489	-	-	NA	FC Berlin-Brandenburg	-87.2
455	A90166	53.4	25.5	NA	FC Berlin-Brandenburg	-80.5
456	A93922	54.6	27	NA	FC Berlin-Brandenburg	-84.7
457	A72958	53.7	25	NA	FC Berlin-Brandenburg	-84.6
458	A82481	55.8	28	NA	FC Berlin-Brandenburg	-127.3
459	A93988	54	24	NA	FC Berlin-Brandenburg	-97.6
460	A123051	53.8	24.5	NA	FC Berlin-Brandenburg	-83.7
461	A90164	55	29.5	NA	FC Berlin-Brandenburg	-113.9
462	A93929	54.8	28	NA	FC Berlin-Brandenburg	-84.1
463	A129656	54.2	24.5	NA	FC Berlin-Brandenburg	-93.5
464	A123073	54.3	28	NA	FC Berlin-Brandenburg	-87.7
465	A93954	53.4	25	NA	FC Berlin-Brandenburg	-75.7
466	A123205	55.1	27	NA	FC Berlin-Brandenburg	-106.1
467	A12301	-	-	NA	FC Berlin-Brandenburg	-97.6
468	A123041	51.2	21	NA	FC Berlin-Brandenburg	-97.0
469	A82148	53	24.5	NA	FC Berlin-Brandenburg	-76.4
470	A82128	51.8	24.5	NA	FC Berlin-Brandenburg	-97.3
471	A72490	54.1	26.5	NA	FC Berlin-Brandenburg	-89.8
472	A72279	55.8	28.0	NA	FC Berlin-Brandenburg	-104.3
473	A123070	53.8	25	NA	FC Berlin-Brandenburg	-108.5
474	A90221	54.9	25	NA	FC Berlin-Brandenburg	-76.3
475	A129651	53.5	21.5	NA	FC Berlin-Brandenburg	-83.6
476	A93665	51.3	23	NA	FC Berlin-Brandenburg	-87.6
477	A123103	52.8	25	NA	FC Berlin-Brandenburg	-80.6
478	A123050	55.1	25	NA	FC Berlin-Brandenburg	-100.0
479	A90124	53.9	27	NA	FC Berlin-Brandenburg	-85.7
480	A72957	53.1	26	NA	FC Berlin-Brandenburg	-76.7
481	A123204	53	23	NA	FC Berlin-Brandenburg	-93.5
482	A81801	52.2	24	NA	FC Berlin-Brandenburg	-74.4
483	A123072	55.5	26	NA	FC Berlin-Brandenburg	-93.0
484	A93982	51.5	21.5	NA	FC Berlin-Brandenburg	-85.0
485	A72475	51.5	25.5	NA	FC Berlin-Brandenburg	-92.5
486	A72434	53.3	25.5	NA	FC Berlin-Brandenburg	-88.6
487	A90300	53.9	25.5	NA	FC Berlin-Brandenburg	-93.9
488	A72372	55.5	27	NA	FC Berlin-Brandenburg	-95.2
489	A123038	52.7	26	NA	FC Berlin-Brandenburg	-76.7
490	E433302	-	-	F	FC Berlin-Brandenburg	-91.7
491	E438442	-	-	F	FC Berlin-Brandenburg	-116.8
492	E436254	-	-	F	FC Berlin-Brandenburg	-104.2
493	E438484	-	-	F	FC Berlin-Brandenburg	-92.4
494	E436147	-	-	M	FC Berlin-Brandenburg	-90.2
495	E436349	-	-	F	FC Berlin-Brandenburg	-93.8
496	E436350	-	-	M	FC Berlin-Brandenburg	-88.4
497	E436351	-	-	M	FC Berlin-Brandenburg	-83.2
498	E436352	-	-	F	FC Berlin-Brandenburg	-98.3
499	E436353	-	-	M	FC Berlin-Brandenburg	-106.3
500	E436354	-	-	F	FC Berlin-Brandenburg	-100.6
501	E436355	-	-	F	FC Berlin-Brandenburg	-108.0
502	E436356	-	-	M	FC Berlin-Brandenburg	-97.6
503	E436357	-	-	F	FC Berlin-Brandenburg	-98.5

504	E436358	-	-	F	FC Berlin-Brandenburg	-95.7
505	E436359	-	-	F	FC Berlin-Brandenburg	-98.8
506	E436360	-	-	M	FC Berlin-Brandenburg	-116.6
507	E436361	-	-	M	FC Berlin-Brandenburg	-110.4
508	E436362	-	-	F	FC Berlin-Brandenburg	-79.0
509	E436363	-	-	M	FC Berlin-Brandenburg	-91.9
510	E436364	-	-	F	FC Berlin-Brandenburg	-92.8
511	E436365	-	-	M	FC Berlin-Brandenburg	-91.5
512	E436321	-	-	M	FC Berlin-Brandenburg	-98.9
513	E436366	-	-	F	FC Berlin-Brandenburg	-93.1
514	E436367	-	-	M	FC Berlin-Brandenburg	-89.7
515	E436288	-	-	F	FC Berlin-Brandenburg	-100.8
516	E436368	-	-	F	FC Berlin-Brandenburg	-108.7
517	E436251	-	-	F	FC Berlin-Brandenburg	-95.8
518	E436369	-	-	M	FC Berlin-Brandenburg	-92.0
519	E436370	-	-	M	FC Berlin-Brandenburg	-94.4
520	E436371	-	-	M	FC Berlin-Brandenburg	-111.7
521	E436372	-	-	F	FC Berlin-Brandenburg	-83.1
522	E436373	-	-	F	FC Berlin-Brandenburg	-113.3
523	E436374	-	-	M	FC Berlin-Brandenburg	-89.6
524	E436375	-	-	M	FC Berlin-Brandenburg	-94.8
525	E436376	-	-	M	FC Berlin-Brandenburg	-99.4
526	E436377	-	-	M	FC Berlin-Brandenburg	-104.2
527	E436378	-	-	F	FC Berlin-Brandenburg	-98.9
528	E436379	-	-	F	FC Berlin-Brandenburg	-110.1
529	E436242	-	-	F	FC Berlin-Brandenburg	-93.4
530	E438486	-	-	F	FC Berlin-Brandenburg	-118.0
531	E436380	-	-	M	FC Berlin-Brandenburg	-92.3
532	E436381	-	-	F	FC Berlin-Brandenburg	-88.3
533	E436382	-	-	F	FC Berlin-Brandenburg	-95.6
534	E436383	-	-	M	FC Berlin-Brandenburg	-98.8
535	E440472	-	-	M	FC Berlin-Brandenburg	-88.2
536	E436384	-	-	F	FC Berlin-Brandenburg	-109.4
537	E436385	-	-	F	FC Berlin-Brandenburg	-119.9
538	E436386	-	-	M	FC Berlin-Brandenburg	-94.9
539	E436387	-	-	F	FC Berlin-Brandenburg	-115.6
540	E436388	-	-	M	FC Berlin-Brandenburg	-85.7
541	E436389	-	-	F	FC Berlin-Brandenburg	-102.5
542	E436311	-	-	M	FC Berlin-Brandenburg	-106.8
543	E436390	-	-	M	FC Berlin-Brandenburg	-96.6
544	E436391	-	-	F	FC Berlin-Brandenburg	-94.1
545	E436392	-	-	F	FC Berlin-Brandenburg	-94.2
546	E436393	-	-	M	FC Berlin-Brandenburg	-123.4
547	E436256	-	-	F	FC Berlin-Brandenburg	-95.1
548	E436394	-	-	F	FC Berlin-Brandenburg	-92.3
549	E433500	-	-	F	FC Berlin-Brandenburg	-92.3
550	E436395	-	-	F	FC Berlin-Brandenburg	-92.1
551	E436396	-	-	F	FC Berlin-Brandenburg	-101.5
552	E436397	-	-	M	FC Berlin-Brandenburg	-114.8
553	E436398	-	-	F	FC Berlin-Brandenburg	-91.5
554	E436399	-	-	F	FC Berlin-Brandenburg	-97.4

555	E436400	-	-	F	FC Berlin-Brandenburg	-101.7
556	E436401	-	-	F	FC Berlin-Brandenburg	-100.3
557	E436402	-	-	F	FC Berlin-Brandenburg	-97.1
558	E436403	-	-	M	FC Berlin-Brandenburg	-94.5
559	E436404	-	-	F	FC Berlin-Brandenburg	-81.5
560	E436405	-	-	F	FC Berlin-Brandenburg	-99.2
561	E436406	-	-	F	FC Berlin-Brandenburg	-106.5
562	E436407	-	-	F	FC Berlin-Brandenburg	-88.1
563	E436274	-	-	M	FC Berlin-Brandenburg	-95.9
564	E436408	-	-	M	FC Berlin-Brandenburg	-84.6
565	E436409	-	-	M	FC Berlin-Brandenburg	-101.2
566	E436410	-	-	F	FC Berlin-Brandenburg	-94.8
567	E436411	-	-	M	FC Berlin-Brandenburg	-95.5
568	E436412	-	-	M	FC Berlin-Brandenburg	-115.4
569	E436413	-	-	F	FC Berlin-Brandenburg	-97.0
570	E436414	-	-	M	FC Berlin-Brandenburg	-90.9
571	E436415	-	-	M	FC Berlin-Brandenburg	-90.6
572	E427607	-	-	F	FC Berlin-Brandenburg	-100.5
573	E436416	-	-	M	FC Berlin-Brandenburg	-95.9
574	E436417	-	-	F	FC Berlin-Brandenburg	-113.7
575	E436418	-	-	F	FC Berlin-Brandenburg	-94.0
576	E436419	-	-	F	FC Berlin-Brandenburg	-119.5
577	E436420	-	-	M	FC Berlin-Brandenburg	-85.7
578	E436421	-	-	M	FC Berlin-Brandenburg	-98.4
579	E436422	-	-	F	FC Berlin-Brandenburg	-113.7
580	E436423	-	-	M	FC Berlin-Brandenburg	-90.0
581	E436424	-	-	M	FC Berlin-Brandenburg	-127.1
582	E436425	-	-	M	FC Berlin-Brandenburg	-99.1
583	E436426	-	-	M	FC Berlin-Brandenburg	-95.8
584	E436427	-	-	M	FC Berlin-Brandenburg	-102.4
585	E436428	-	-	F	FC Berlin-Brandenburg	-94.5
586	E440352	-	-	F	FC Berlin-Brandenburg	-85.4
587	E436429	-	-	M	FC Berlin-Brandenburg	-96.8
588	E440379	-	-	F	FC Berlin-Brandenburg	-90.1
589	E436430	-	-	F	FC Berlin-Brandenburg	-102.9
590	E436431	-	-	M	FC Berlin-Brandenburg	-102.4
591	E436432	-	-	F	FC Berlin-Brandenburg	-95.5
592	E436433	-	-	M	FC Berlin-Brandenburg	-101.9
593	E436434	-	-	M	FC Berlin-Brandenburg	-107.1
594	E436027	-	-	F	FC Berlin-Brandenburg	-88.0
595	E436435	-	-	M	FC Berlin-Brandenburg	-114.5
596	E436104	-	-	F	FC Berlin-Brandenburg	-113.7
597	E436436	-	-	M	FC Berlin-Brandenburg	-94.4
598	E436437	-	-	F	FC Berlin-Brandenburg	-100.9
599	E436438	-	-	M	FC Berlin-Brandenburg	-86.8
600	E436109	-	-	F	FC Berlin-Brandenburg	-106.9
601	E436439	-	-	F	FC Berlin-Brandenburg	-85.6
602	E436440	-	-	F	FC Berlin-Brandenburg	-92.4
603	E436115	-	-	F	FC Berlin-Brandenburg	-97.9
604	E436441	-	-	F	FC Berlin-Brandenburg	-105.8
605	E433386	-	-	F	FC Berlin-Brandenburg	-97.6



606	E436442	-	-	F	FC Berlin-Brandenburg	-88.3
607	E436443	-	-	F	FC Berlin-Brandenburg	-103.1
608	E436444	-	-	F	FC Berlin-Brandenburg	-97.2
609	E436445	-	-	F	FC Berlin-Brandenburg	-90.1
610	E436446	-	-	F	FC Berlin-Brandenburg	-94.2
611	E436447	-	-	F	FC Berlin-Brandenburg	-99.4
612	E436448	-	-	M	FC Berlin-Brandenburg	-89.9
613	E436449	-	-	M	FC Berlin-Brandenburg	-90.3
614	E436542	-	-	M	FC Berlin-Brandenburg	-100.0
615	E436544	-	-	F	FC Berlin-Brandenburg	-111.8
616	E436545	-	-	F	FC Berlin-Brandenburg	-96.4
617	E436546	-	-	M	FC Berlin-Brandenburg	-83.7
618	E436547	-	-	F	FC Berlin-Brandenburg	-111.9
619	E436548	-	-	F	FC Berlin-Brandenburg	-99.8
620	E436549	-	-	M	FC Berlin-Brandenburg	-102.0
621	E436550	-	-	F	FC Berlin-Brandenburg	-95.0
622	E436551	-	-	M	FC Berlin-Brandenburg	-87.6
623	E436552	-	-	F	FC Berlin-Brandenburg	-93.4
624	E436553	-	-	F	FC Berlin-Brandenburg	-87.7
625	E436554	-	-	M	FC Berlin-Brandenburg	-82.0
626	E436557	-	-	F	FC Berlin-Brandenburg	-107.2
627	E436558	-	-	F	FC Berlin-Brandenburg	-94.5
628	E436559	-	-	M	FC Berlin-Brandenburg	-91.9
629	E436560	-	-	M	FC Berlin-Brandenburg	-107.2
630	E436561	-	-	F	FC Berlin-Brandenburg	-109.3
631	E436562	-	-	F	FC Berlin-Brandenburg	-95.8
632	E436563	-	-	M	FC Berlin-Brandenburg	-115.0
633	E436564	-	-	F	FC Berlin-Brandenburg	-122.2
634	E436565	-	-	F	FC Berlin-Brandenburg	-115.4
635	E436566	-	-	F	FC Berlin-Brandenburg	-96.0
636	E436567	-	-	F	FC Berlin-Brandenburg	-114.0
637	E436568	-	-	F	FC Berlin-Brandenburg	-99.4
638	E436569	-	-	F	FC Berlin-Brandenburg	-77.5
639	E436570	-	-	F	FC Berlin-Brandenburg	-99.7
640	E436571	-	-	M	FC Berlin-Brandenburg	-79.4
641	E436572	-	-	M	FC Berlin-Brandenburg	-129.1
642	E436573	-	-	F	FC Berlin-Brandenburg	-96.6
643	E436574	-	-	F	FC Berlin-Brandenburg	-92.8
644	E436575	-	-	M	FC Berlin-Brandenburg	-92.6
645	E436576	-	-	M	FC Berlin-Brandenburg	-83.3
646	E436577	-	-	F	FC Berlin-Brandenburg	-91.0
647	E436578	-	-	F	FC Berlin-Brandenburg	-104.0
648	E436579	-	-	F	FC Berlin-Brandenburg	-92.3
649	E436580	-	-	M	FC Berlin-Brandenburg	-113.0
650	E436581	-	-	F	FC Berlin-Brandenburg	-116.9
651	E436582	-	-	F	FC Berlin-Brandenburg	-105.9
652	E436583	-	-	F	FC Berlin-Brandenburg	-103.6
653	E436584	-	-	F	FC Berlin-Brandenburg	-92.0
654	E436585	-	-	F	FC Berlin-Brandenburg	-103.3
655	E436586	-	-	M	FC Berlin-Brandenburg	-104.5
656	E436587	-	-	M	FC Berlin-Brandenburg	-115.9

657	E436588	-	-	F	FC Berlin-Brandenburg	-110.5
658	E436589	-	-	M	FC Berlin-Brandenburg	-81.2
659	E436590	-	-	F	FC Berlin-Brandenburg	-95.8
660	E436591	-	-	M	FC Berlin-Brandenburg	-79.5
661	E436592	-	-	F	FC Berlin-Brandenburg	-97.2
662	E436593	-	-	F	FC Berlin-Brandenburg	-122.2
663	E436594	-	-	M	FC Berlin-Brandenburg	-112.1
664	E436595	-	-	F	FC Berlin-Brandenburg	-83.1
665	E436596	-	-	M	FC Berlin-Brandenburg	-82.5
666	E436597	-	-	F	FC Berlin-Brandenburg	-81.0
667	E436598	-	-	M	FC Berlin-Brandenburg	-76.0
668	E436599	-	-	M	FC Berlin-Brandenburg	-89.3
669	E436600	-	-	M	FC Berlin-Brandenburg	-96.3
670	E436601	-	-	F	FC Berlin-Brandenburg	-96.6
671	E436602	-	-	F	FC Berlin-Brandenburg	-82.3
672	E436603	-	-	F	FC Berlin-Brandenburg	-89.4
673	E436604	-	-	F	FC Berlin-Brandenburg	-110.0
674	E436605	-	-	F	FC Berlin-Brandenburg	-90.0
675	E436606	-	-	M	FC Berlin-Brandenburg	-100.9
676	E436607	-	-	M	FC Berlin-Brandenburg	-93.9
677	E436608	-	-	M	FC Berlin-Brandenburg	-108.2
678	E436609	-	-	M	FC Berlin-Brandenburg	-101.2
679	E436610	-	-	F	FC Berlin-Brandenburg	-125.1
680	E436611	-	-	M	FC Berlin-Brandenburg	-94.8
681	E436612	-	-	F	FC Berlin-Brandenburg	-99.5
682	E436613	-	-	M	FC Berlin-Brandenburg	-88.2
683	E436614	-	-	F	FC Berlin-Brandenburg	-103.9
684	E436615	-	-	M	FC Berlin-Brandenburg	-84.9
685	E436616	-	-	M	FC Berlin-Brandenburg	-80.1
686	E436617	-	-	F	FC Berlin-Brandenburg	-93.6
687	E436618	-	-	F	FC Berlin-Brandenburg	-110.0
688	E436619	-	-	M	FC Berlin-Brandenburg	-84.5
689	E433127	-	-	M	FC Berlin-Brandenburg	-92.3
690	E436002	-	-	F	FC Berlin-Brandenburg	-86.4
691	E436090	-	-	F	FC Berlin-Brandenburg	-101.7
692	E436163	-	-	F	FC Berlin-Brandenburg	-80.9
693	E436177	-	-	M	FC Berlin-Brandenburg	-81.4
694	E436232	-	-	M	FC Berlin-Brandenburg	-89.5
695	E436273	-	-	F	FC Berlin-Brandenburg	-104.4
696	E436278	-	-	F	FC Berlin-Brandenburg	-111.1
697	E436307	-	-	F	FC Berlin-Brandenburg	-92.7
698	E436320	-	-	F	FC Berlin-Brandenburg	-87.8
699	E436327	-	-	F	FC Berlin-Brandenburg	-110.3
700	E436334	-	-	M	FC Berlin-Brandenburg	-87.1
701	E436484	-	-	F	FC Berlin-Brandenburg	-95.9
702	E436496	-	-	F	FC Berlin-Brandenburg	-91.6
703	E438164	-	-	F	FC Berlin-Brandenburg	-98.8
704	E440332	-	-	F	FC Berlin-Brandenburg	-122.7
705	NA	-	-	F	FC North Rhine-Westphalia	-113.8
706	NA	-	-	M	FC North Rhine-Westphalia	-84.2
707	NA	-	-	F	FC North Rhine-Westphalia	-83.9

708	NA	-	-	M	FC North Rhine-Westphalia	-82.6
709	NA	-	-	F	FC North Rhine-Westphalia	-98.0
710	NA	-	-	F	FC North Rhine-Westphalia	-90.4
711	NA	-	-	F	FC North Rhine-Westphalia	-109.9
712	NA	-	-	F	FC North Rhine-Westphalia	-103.4
713	NA	-	-	F	FC North Rhine-Westphalia	-101.7
714	NA	-	-	M	FC North Rhine-Westphalia	-84.4
715	NA	-	-	F	FC North Rhine-Westphalia	-106.0
716	NA	-	-	F	FC North Rhine-Westphalia	-81.7
717	NA	-	-	F	FC North Rhine-Westphalia	-77.5
718	NA	-	-	F	FC North Rhine-Westphalia	-76.4
719	NA	-	-	F	FC North Rhine-Westphalia	-101.1
720	NA	-	-	F	FC North Rhine-Westphalia	-106.5
721	NA	-	-	F	FC North Rhine-Westphalia	-108.6
722	NA	-	-	F	FC North Rhine-Westphalia	-98.5
723	NA	-	-	F	FC North Rhine-Westphalia	-85.8
724	NA	-	-	F	FC North Rhine-Westphalia	-87.3
725	NA	-	-	M	FC North Rhine-Westphalia	-84.7
726	NA	-	-	M	FC North Rhine-Westphalia	-96.3
727	NA	-	-	M	FC North Rhine-Westphalia	-112.5
728	NA	-	-	M	FC North Rhine-Westphalia	-96.2
729	NA	-	-	M	FC North Rhine-Westphalia	-80.6
730	NA	-	-	M	FC North Rhine-Westphalia	-85.8
731	NA	-	-	M	FC North Rhine-Westphalia	-90.7
732	NA	-	-	M	FC North Rhine-Westphalia	-76.1
733	NA	-	-	M	FC North Rhine-Westphalia	-85.5
734	NA	-	-	F	FC North Rhine-Westphalia	-105.8
735	NA	-	-	F	FC North Rhine-Westphalia	-101.1
736	NA	-	-	F	FC North Rhine-Westphalia	-95.6
737	NA	-	-	F	FC North Rhine-Westphalia	-83.1
738	NA	-	-	F	FC North Rhine-Westphalia	-97.9
739	NA	-	-	F	FC North Rhine-Westphalia	-96.8
740	NA	-	-	F	FC North Rhine-Westphalia	-89.7
741	NA	-	-	F	FC North Rhine-Westphalia	-86.9
742	NA	-	-	F	FC North Rhine-Westphalia	-110.4
743	NA	-	-	F	FC North Rhine-Westphalia	-89.8
744	NA	-	-	F	FC North Rhine-Westphalia	-106.1
745	NA	-	-	F	FC North Rhine-Westphalia	-96.4
746	NA	-	-	F	FC North Rhine-Westphalia	-130.2
747	NA	-	-	F	FC North Rhine-Westphalia	-74.4
748	NA	-	-	F	FC North Rhine-Westphalia	-93.0
749	NA	-	-	F	FC North Rhine-Westphalia	-110.3
750	NA	-	-	F	FC North Rhine-Westphalia	-83.5
751	NA	-	-	F	FC North Rhine-Westphalia	-104.0
752	NA	-	-	M	FC North Rhine-Westphalia	-89.0
753	NA	-	-	M	FC North Rhine-Westphalia	-98.3
754	NA	-	-	M	FC North Rhine-Westphalia	-114.0
755	NA	-	-	M	FC North Rhine-Westphalia	-93.0
756	NA	-	-	M	FC North Rhine-Westphalia	-93.5
757	NA	-	-	M	FC North Rhine-Westphalia	-74.0
758	NA	-	-	M	FC North Rhine-Westphalia	-87.8

759	NA	-	-	M	FC North Rhine-Westphalia	-82.4
760	NA	-	-	M	FC North Rhine-Westphalia	-99.5
761	NA	-	-	M	FC North Rhine-Westphalia	-92.9
762	A124001	-	-	F	FC Saxony	-101.0
763	A124002	-	-	M	FC Saxony	-95.8
764	A124003	-	-	F	FC Saxony	-99.8
765	A124004	-	-	F	FC Saxony	-107.8
766	A124005	-	-	M	FC Saxony	-81.1
767	A124006	-	-	F	FC Saxony	-102.2
768	A124007	-	-	F	FC Saxony	-97.4
769	A124008	-	-	F	FC Saxony	-107.4
770	A124009	-	-	F	FC Saxony	-97.3
771	A124010	-	-	F	FC Saxony	-96.7
772	A124011	-	-	F	FC Saxony	-85.1
773	A124012	-	-	F	FC Saxony	-101.4
774	A124013	-	-	F	FC Saxony	-89.1
775	A124014	-	-	F	FC Saxony	-99.3
776	A124015	-	-	F	FC Saxony	-89.0
777	A124016	-	-	F	FC Saxony	-85.4
778	A124017	-	-	F	FC Saxony	-95.6
779	A124018	-	-	M	FC Saxony	-89.5
780	A124019	-	-	F	FC Saxony	-92.6
781	A124020	-	-	M	FC Saxony	-91.6
782	A124021	-	-	F	FC Saxony	-94.8
783	A124022	-	-	F	FC Saxony	-86.0
784	A124023	-	-	F	FC Saxony	-90.1
785	A66071	-	-	M	FC Saxony	-102.4
786	A66157	-	-	F	FC Saxony	-101.2
787	A98551	-	-	M	FC Saxony	-88.4
788	A98564	-	-	F	FC Saxony	-109.0
789	A98633	-	-	F	FC Saxony	-104.2
790	NA	-	-	F	FC Saxony	-100.4
791	NA	-	-	F	FC Saxony	-90.5
792	NA	-	-	F	FC Saxony	-101.3
793	NA	-	-	F	FC Saxony	-126.6
794	NA	-	-	F	FC Saxony	-111.2
795	NA	-	-	M	FC Saxony	-102.6
796	NA	-	-	F	FC Saxony	-129.3
797	NA	-	-	F	FC Saxony	-106.5
798	NA	-	-	M	FC Saxony	-100.5
799	NA	-	-	F	FC Saxony	-97.5
800	NA	-	-	M	FC Saxony	-82.7
801	NA	-	-	M	FC Saxony	-86.2
802	NA	-	-	F	FC Saxony	-103.4
803	NA	-	-	F	FC Saxony	-101.4
804	NA	-	-	F	FC Saxony	-101.3
805	NA	-	-	F	FC Saxony	-97.7
806	NA	-	-	M	FC Saxony	-92.4
807	NA	-	-	M	FC Saxony	-98.9
808	NA	-	-	F	FC Schleswig-Holstein	-128.5
809	NA	-	-	F	FC Schleswig-Holstein	-115.7

810	NA	-	-	F	FC Schleswig-Holstein	-117.3
811	NA	-	-	M	FC Schleswig-Holstein	-86.6
812	NA	-	-	M	FC Schleswig-Holstein	-84.7
813	NA	-	-	M	FC Schleswig-Holstein	-93.4
814	NA	-	-	M	FC Schleswig-Holstein	-88.6
815	NA	-	-	M	FC Schleswig-Holstein	-87.0
816	NA	-	-	M	FC Schleswig-Holstein	-82.8
817	NA	-	-	M	FC Schleswig-Holstein	-92.9
818	NA	-	-	M	FC Schleswig-Holstein	-93.7
819	NA	-	-	M	FC Schleswig-Holstein	-90.0
820	NA	-	-	F	FC Schleswig-Holstein	-94.6
821	NA	-	-	F	FC Schleswig-Holstein	-93.9
822	NA	-	-	F	FC Schleswig-Holstein	-120.7
823	NA	-	-	F	FC Schleswig-Holstein	-93.9
824	NA	-	-	F	FC Schleswig-Holstein	-91.5
825	NA	-	-	F	FC Schleswig-Holstein	-111.6
826	NA	-	-	F	FC Schleswig-Holstein	-113.7
827	NA	-	-	F	FC Schleswig-Holstein	-93.3
828	NA	-	-	F	FC Schleswig-Holstein	-101.3
829	NA	-	-	F	FC Schleswig-Holstein	-104.6
830	NA	-	-	F	FC Schleswig-Holstein	-84.6
831	NA	-	-	F	FC Schleswig-Holstein	-85.2
832	NA	-	-	F	FC Schleswig-Holstein	-105.7
833	NA	-	-	F	FC Schleswig-Holstein	-119.1
834	NA	-	-	F	FC Schleswig-Holstein	-95.2
835	NA	-	-	F	FC Schleswig-Holstein	-119.4
836	NA	-	-	F	FC Schleswig-Holstein	-102.7
837	NA	-	-	F	FC Schleswig-Holstein	-95.3
838	NA	-	-	F	FC Schleswig-Holstein	-118.7
839	NA	-	-	F	FC Schleswig-Holstein	-88.1
840	NA	-	-	F	FC Schleswig-Holstein	-94.8
841	NA	-	-	F	FC Schleswig-Holstein	-99.6
842	NA	-	-	F	FC Schleswig-Holstein	-92.1
843	NA	-	-	F	FC Schleswig-Holstein	-97.7
844	NA	-	-	F	FC Schleswig-Holstein	-79.3
845	NA	-	-	F	FC Schleswig-Holstein	-102.7
846	NA	-	-	F	FC Schleswig-Holstein	-87.7
847	NA	-	-	F	FC Schleswig-Holstein	-94.3
848	NA	-	-	F	FC Schleswig-Holstein	-92.2
849	NA	-	-	F	FC Schleswig-Holstein	-104.7
850	NA	-	-	F	FC Schleswig-Holstein	-106.2
851	NA	-	-	F	FC Schleswig-Holstein	-107.2
852	NA	-	-	F	FC Schleswig-Holstein	-98.1
853	NA	-	-	F	FC Schleswig-Holstein	-90.2
854	NA	-	-	F	FC Schleswig-Holstein	-114.0
855	NA	-	-	F	FC Schleswig-Holstein	-95.4
856	NA	-	-	F	FC Schleswig-Holstein	-106.1
857	NA	-	-	F	FC Schleswig-Holstein	-102.4
858	NA	-	-	F	FC Schleswig-Holstein	-97.1
859	NA	-	-	F	FC Schleswig-Holstein	-77.9
860	NA	-	-	F	FC Schleswig-Holstein	-117.6

861	NA	-	-	F	FC Schleswig-Holstein	-86.2
862	NA	-	-	F	FC Schleswig-Holstein	-110.8
863	NA	-	-	F	FC Schleswig-Holstein	-92.0
864	NA	-	-	F	FC Schleswig-Holstein	-88.6
865	NA	-	-	F	FC Schleswig-Holstein	-124.9
866	NA	-	-	F	FC Schleswig-Holstein	-100.8
867	NA	-	-	F	FC Schleswig-Holstein	-113.3
868	NA	-	-	F	FC Schleswig-Holstein	-107.3
869	NA	-	-	F	FC Schleswig-Holstein	-96.8
870	NA	-	-	F	FC Schleswig-Holstein	-104.0
871	NA	-	-	F	FC Schleswig-Holstein	-95.3
872	NA	-	-	F	FC Schleswig-Holstein	-98.8
873	NA	-	-	F	FC Schleswig-Holstein	-88.0
874	NA	-	-	F	FC Schleswig-Holstein	-89.0
875	NA	-	-	F	FC Schleswig-Holstein	-101.8
876	NA	-	-	F	FC Schleswig-Holstein	-105.8
877	NA	-	-	F	FC Schleswig-Holstein	-107.1
878	NA	-	-	F	FC Schleswig-Holstein	-117.8
879	NA	-	-	F	FC Schleswig-Holstein	-97.3
880	NA	-	-	F	FC Schleswig-Holstein	-110.5
881	NA	-	-	F	FC Schleswig-Holstein	-88.1
882	NA	-	-	F	FC Schleswig-Holstein	-95.8
883	NA	-	-	M	FC Schleswig-Holstein	-90.4
884	NA	-	-	M	FC Schleswig-Holstein	-92.5
885	NA	-	-	M	FC Schleswig-Holstein	-103.2
886	NA	-	-	M	FC Schleswig-Holstein	-99.6
887	NA	-	-	M	FC Schleswig-Holstein	-103.7
888	NA	-	-	M	FC Schleswig-Holstein	-113.4
889	NA	-	-	M	FC Schleswig-Holstein	-96.6
890	NA	-	-	M	FC Schleswig-Holstein	-101.0
891	NA	-	-	M	FC Schleswig-Holstein	-100.1
892	NA	-	-	M	FC Schleswig-Holstein	-91.2
893	NA	-	-	M	FC Schleswig-Holstein	-126.5
894	NA	-	-	M	FC Schleswig-Holstein	-96.1
895	NA	-	-	M	FC Schleswig-Holstein	-93.9
896	NA	-	-	M	FC Schleswig-Holstein	-99.3
897	NA	-	-	M	FC Schleswig-Holstein	-103.2
898	NA	-	-	M	FC Schleswig-Holstein	-92.4
899	NA	-	-	M	FC Schleswig-Holstein	-125.4
900	NA	-	-	M	FC Schleswig-Holstein	-98.8
901	NA	-	-	F	FC Schleswig-Holstein	-100.7
902	NA	-	-	F	FC Schleswig-Holstein	-117.8
903	NA	-	-	F	FC Schleswig-Holstein	-109.7
904	NA	-	-	F	FC Schleswig-Holstein	-112.3
905	NA	-	-	F	FC Schleswig-Holstein	-102.4
906	NA	-	-	F	FC Schleswig-Holstein	-109.6
907	NA	-	-	F	FC Schleswig-Holstein	-119.5
908	NA	-	-	F	FC Schleswig-Holstein	-119.4
909	NA	-	-	F	FC Schleswig-Holstein	-116.6
910	NA	-	-	F	FC Schleswig-Holstein	-104.4
911	NA	-	-	F	FC Schleswig-Holstein	-108.4

912	NA	-	-	F	FC Schleswig-Holstein	-97.9
913	NA	-	-	F	FC Schleswig-Holstein	-122.6
914	NA	-	-	M	FC Schleswig-Holstein	-106.3
915	NA	-	-	M	FC Schleswig-Holstein	-107.6
916	NA	-	-	M	FC Schleswig-Holstein	-97.5
917	NA	-	-	M	FC Schleswig-Holstein	-95.4
918	NA	-	-	M	FC Schleswig-Holstein	-113.1
919	NA	-	-	M	FC Schleswig-Holstein	-100.6
920	NA	-	-	M	FC Schleswig-Holstein	-104.7
921	NA	-	-	M	FC Schleswig-Holstein	-119.5
922	NA	-	-	M	FC Schleswig-Holstein	-113.2
923	NA	-	-	M	FC Schleswig-Holstein	-97.6
924	NA	-	-	M	FC Schleswig-Holstein	-111.0
925	NA	-	-	F	FC Schleswig-Holstein	-97.1
926	NA	-	-	F	FC Schleswig-Holstein	-106.6
927	NA	-	-	F	FC Schleswig-Holstein	-90.8
928	NA	-	-	F	FC Schleswig-Holstein	-112.9
929	NA	-	-	F	FC Schleswig-Holstein	-107.7
930	NA	-	-	F	FC Schleswig-Holstein	-86.6
931	NA	-	-	F	FC Schleswig-Holstein	-89.9
932	NA	-	-	F	FC Schleswig-Holstein	-93.9
933	NA	-	-	F	FC Schleswig-Holstein	-90.4
934	NA	-	-	F	FC Schleswig-Holstein	-86.7
935	NA	-	-	F	FC Schleswig-Holstein	-99.1
936	NA	-	-	F	FC Schleswig-Holstein	-106.4
937	NA	-	-	F	FC Schleswig-Holstein	-118.1
938	NA	-	-	F	FC Schleswig-Holstein	-98.8
939	NA	-	-	F	FC Schleswig-Holstein	-87.7
940	NA	-	-	F	FC Schleswig-Holstein	-92.7
941	NA	-	-	F	FC Schleswig-Holstein	-78.2
942	NA	-	-	F	FC Schleswig-Holstein	-92.1
943	NA	-	-	F	FC Schleswig-Holstein	-88.1
944	NA	-	-	F	FC Schleswig-Holstein	-92.1
945	NA	-	-	F	FC Schleswig-Holstein	-82.1
946	NA	-	-	F	FC Schleswig-Holstein	-79.0
947	NA	-	-	F	FC Schleswig-Holstein	-96.3
948	NA	-	-	F	FC Schleswig-Holstein	-86.7
949	NA	-	-	F	FC Schleswig-Holstein	-82.0
950	NA	-	-	F	FC Schleswig-Holstein	-102.6
951	NA	-	-	F	FC Schleswig-Holstein	-118.0
952	NA	-	-	F	FC Schleswig-Holstein	-116.4
953	NA	-	-	F	FC Schleswig-Holstein	-90.9
954	NA	-	-	F	FC Schleswig-Holstein	-102.6
955	NA	-	-	F	FC Schleswig-Holstein	-89.8
956	NA	-	-	M	FC Schleswig-Holstein	-92.5
957	NA	-	-	M	FC Schleswig-Holstein	-85.0
958	NA	-	-	M	FC Schleswig-Holstein	-81.6
959	NA	-	-	M	FC Schleswig-Holstein	-83.5
960	NA	-	-	M	FC Schleswig-Holstein	-84.4
961	NA	-	-	M	FC Schleswig-Holstein	-98.1
962	NA	-	-	M	FC Schleswig-Holstein	-94.1

963	NA	-	-	M	FC Schleswig-Holstein	-80.0
964	NA	-	-	M	FC Schleswig-Holstein	-83.6
965	NA	-	-	M	FC Schleswig-Holstein	-86.4
966	NA	-	-	M	FC Schleswig-Holstein	-83.3
967	NA	-	-	M	FC Schleswig-Holstein	-80.0
968	NA	-	-	M	FC Schleswig-Holstein	-81.7
969	NA	-	-	M	FC Schleswig-Holstein	-83.7
970	NA	-	-	M	FC Schleswig-Holstein	-93.6
971	NA	-	-	F	FC Schleswig-Holstein	-105.3
972	NA	-	-	F	FC Schleswig-Holstein	-112.8
973	NA	-	-	F	FC Schleswig-Holstein	-106.5
974	NA	-	-	F	FC Schleswig-Holstein	-90.2
975	NA	-	-	F	FC Schleswig-Holstein	-113.9
976	NA	-	-	F	FC Schleswig-Holstein	-113.8
977	NA	-	-	F	FC Schleswig-Holstein	-103.0
978	NA	-	-	F	FC Schleswig-Holstein	-112.9
979	NA	-	-	F	FC Schleswig-Holstein	-94.8
980	NA	-	-	F	FC Schleswig-Holstein	-103.3
981	NA	-	-	F	FC Schleswig-Holstein	-101.7
982	NA	-	-	F	FC Schleswig-Holstein	-141.2
983	NA	-	-	F	FC Schleswig-Holstein	-94.5
984	NA	-	-	F	FC Schleswig-Holstein	-104.7
985	NA	-	-	F	FC Schleswig-Holstein	-79.5
986	NA	-	-	F	FC Schleswig-Holstein	-92.6
987	NA	-	-	F	FC Schleswig-Holstein	-93.0
988	NA	-	-	F	FC Schleswig-Holstein	-105.4
989	NA	-	-	F	FC Schleswig-Holstein	-112.1
990	NA	-	-	F	FC Schleswig-Holstein	-97.5
991	NA	-	-	F	FC Schleswig-Holstein	-107.0
992	NA	-	-	F	FC Schleswig-Holstein	-116.5
993	NA	-	-	F	FC Schleswig-Holstein	-106.9
994	NA	-	-	F	FC Schleswig-Holstein	-91.4
995	NA	-	-	F	FC Schleswig-Holstein	-99.3
996	NA	-	-	F	FC Schleswig-Holstein	-79.7
997	NA	-	-	F	FC Schleswig-Holstein	-92.0
998	NA	-	-	F	FC Schleswig-Holstein	-96.2
999	NA	-	-	F	FC Schleswig-Holstein	-103.5
1000	NA	-	-	F	FC Schleswig-Holstein	-101.9
1001	NA	-	-	F	FC Schleswig-Holstein	-91.8
1002	NA	-	-	F	FC Schleswig-Holstein	-98.4
1003	NA	-	-	F	FC Schleswig-Holstein	-107.6
1004	NA	-	-	F	FC Schleswig-Holstein	-107.6
1005	NA	-	-	F	FC Schleswig-Holstein	-97.3
1006	NA	-	-	F	FC Schleswig-Holstein	-106.9
1007	NA	-	-	F	FC Schleswig-Holstein	-80.1
1008	NA	-	-	F	FC Schleswig-Holstein	-91.8
1009	NA	-	-	F	FC Schleswig-Holstein	-106.3
1010	NA	-	-	F	FC Schleswig-Holstein	-106.7
1011	NA	-	-	F	FC Schleswig-Holstein	-94.7
1012	NA	-	-	F	FC Schleswig-Holstein	-98.0
1013	NA	-	-	F	FC Schleswig-Holstein	-107.5



1014	NA	-	-	F	FC Schleswig-Holstein	-97.6
1015	NA	-	-	F	FC Schleswig-Holstein	-105.1
1016	NA	-	-	F	FC Schleswig-Holstein	-95.9
1017	NA	-	-	F	FC Schleswig-Holstein	-105.1
1018	NA	-	-	F	FC Schleswig-Holstein	-99.8
1019	NA	-	-	F	FC Schleswig-Holstein	-95.6
1020	NA	-	-	F	FC Schleswig-Holstein	-98.7
1021	NA	-	-	F	FC Schleswig-Holstein	-78.9
1022	NA	-	-	F	FC Schleswig-Holstein	-85.0
1023	NA	-	-	F	FC Schleswig-Holstein	-84.6
1024	NA	-	-	F	FC Schleswig-Holstein	-93.6
1025	NA	-	-	F	FC Schleswig-Holstein	-117.1
1026	NA	-	-	F	FC Schleswig-Holstein	-99.5
1027	NA	-	-	F	FC Schleswig-Holstein	-95.0
1028	NA	-	-	M	FC Schleswig-Holstein	-86.7
1029	NA	-	-	M	FC Schleswig-Holstein	-103.3
1030	NA	-	-	M	FC Schleswig-Holstein	-94.2
1031	NA	-	-	M	FC Schleswig-Holstein	-120.4
1032	NA	-	-	M	FC Schleswig-Holstein	-126.2
1033	NA	-	-	M	FC Schleswig-Holstein	-96.1
1034	NA	-	-	M	FC Schleswig-Holstein	-113.7
1035	NA	-	-	M	FC Schleswig-Holstein	-97.0
1036	NA	-	-	M	FC Schleswig-Holstein	-92.7
1037	NA	-	-	M	FC Schleswig-Holstein	-99.6
1038	NA	-	-	M	FC Schleswig-Holstein	-87.5
1039	NA	-	-	M	FC Schleswig-Holstein	-91.7
1040	NA	-	-	M	FC Schleswig-Holstein	-95.1
1041	NA	-	-	M	FC Schleswig-Holstein	-89.2
1042	NA	-	-	M	FC Schleswig-Holstein	-103.4
1043	NA	-	-	M	FC Schleswig-Holstein	-91.4
1044	NA	-	-	M	FC Schleswig-Holstein	-92.8
1045	NA	-	-	M	FC Schleswig-Holstein	-159.0
1046	NA	-	-	M	FC Schleswig-Holstein	-95.0
1047	NA	-	-	M	FC Schleswig-Holstein	-98.5
1048	NA	-	-	M	FC Schleswig-Holstein	-86.0
1049	NA	-	-	M	FC Schleswig-Holstein	-97.8
1050	NA	-	-	M	FC Schleswig-Holstein	-104.9
1051	NA	-	-	M	FC Schleswig-Holstein	-93.8
1052	NA	-	-	M	FC Schleswig-Holstein	-96.3
1053	NA	-	-	M	FC Schleswig-Holstein	-111.6
1054	NA	-	-	M	FC Schleswig-Holstein	-101.7
1055	NA	-	-	M	FC Schleswig-Holstein	-94.6
1056	NA	-	-	M	FC Schleswig-Holstein	-83.8
1057	NA	-	-	F	Poland	-95.6
1058	NA	-	-	F	Poland	-96.4
1059	NA	-	-	M	Poland	-116.4
1060	NA	-	-	M	Poland	-106.9
1061	NA	-	-	M	Poland	-89.1
1062	NA	-	-	F	Poland	-104.1
1063	NA	-	-	F	Poland	-99.9
1064	NA	-	-	F	Poland	-119.9

1065	NA	-	-	F	Poland	-103.7
1066	NA	-	-	M	Poland	-114.1
1067	NA	-	-	F	Poland	-121.0
1068	NA	-	-	F	Poland	-99.3
1069	NA	-	-	F	Poland	-95.7
1070	NA	-	-	F	Poland	-108.2
1071	NA	-	-	F	Poland	-104.8
1072	NA	-	-	M	Poland	-100.1
1073	NA	-	-	M	Poland	-102.5
1074	NA	-	-	F	Poland	-109.9
1075	NA	-	-	M	Poland	-94.1
1076	NA	-	-	M	Poland	-113.9
1077	NA	-	-	M	Poland	-99.3
1078	NA	-	-	M	Poland	-96.0
1079	NA	-	-	F	Poland	-94.6
1080	NA	-	-	M	Poland	-92.6
1081	NA	-	-	M	Poland	-111.7
1082	NA	-	-	F	Poland	-100.2
1083	NA	-	-	M	Poland	-105.5
1084	NA	-	-	M	Poland	-92.1
1085	NA	-	-	F	Poland	-94.7
1086	NA	-	-	F	Poland	-124.4
1087	NA	-	-	M	Poland	-91.8
1088	NA	-	-	F	Poland	-102.8
1089	NA	-	-	M	Poland	-92.9
1090	NA	-	-	F	Poland	-100.6
1091	NA	-	-	F	Poland	-109.8
1092	NA	-	-	M	Poland	-97.3
1093	NA	-	-	M	Poland	-115.4
1094	NA	-	-	F	Poland	-127.5
1095	NA	-	-	F	Slovenia	-90.1
1096	NA	-	-	F	Slovenia	-80.2
1097	NA	-	-	F	Slovenia	-96.5
1098	NA	-	-	F	Slovenia	-109.1
1099	NA	-	-	F	Slovenia	-96.2
1100	NA	-	-	F	Slovenia	-109.1
1101	NA	-	-	F	Slovenia	-97.1
1102	NA	-	-	F	Slovenia	-97.6
1103	NA	-	-	F	Slovenia	-95.5
1104	NA	-	-	F	Slovenia	-90.3
1105	NA	-	-	F	Slovenia	-107.7
1106	NA	-	-	F	Slovenia	-115.8
1107	NA	-	-	F	Slovenia	-85.4
1108	NA	-	-	F	Slovenia	-84.3
1109	NA	-	-	F	Slovenia	-103.4
1110	NA	-	-	F	Slovenia	-82.0
1111	NA	-	-	F	Slovenia	-86.1
1112	NA	-	-	F	Slovenia	-81.8
1113	NA	-	-	F	Slovenia	-80.9
1114	NA	-	-	M	Slovenia	-96.7
1115	NA	-	-	M	Slovenia	-100.7

1116	NA	-	-	M	Slovenia	-106.1
1117	NA	-	-	M	Slovenia	-114.2
1118	NA	-	-	M	Slovenia	-100.5
1119	NA	-	-	M	Slovenia	-85.9
1120	NA	-	-	M	Slovenia	-88.1
1121	NA	-	-	M	Switzerland	-128.2
1122	NA	-	-	M	Switzerland	-123.5
1123	NA	-	-	F	Switzerland	-89.0
1124	NA	-	-	M	Switzerland	-128.7
1125	NA	-	-	F	Switzerland	-91.1
1126	NA	-	-	M	Switzerland	-111.0
1127	NA	-	-	M	Switzerland	-112.8
1128	NA	-	-	F	Switzerland	-88.2
1129	NA	-	-	M	Switzerland	-100.2
1130	NA	-	-	F	Switzerland	-98.1
1131	NA	-	-	F	Switzerland	-102.5
1132	NA	-	-	M	Switzerland	-98.5
1133	NA	-	-	M	Switzerland	-98.0
1134	NA	-	-	F	Switzerland	-134.6
1135	NA	-	-	F	Switzerland	-77.3
1136	NA	-	-	M	Switzerland	-105.0
1137	NA	-	-	M	Switzerland	-124.8
1138	NA	-	-	F	Switzerland	-105.7
1139	NA	-	-	F	Switzerland	-111.7
1140	NA	-	-	F	Switzerland	-111.8
1141	NA	-	-	F	Switzerland	-103.8
1142	NA	-	-	F	Switzerland	-100.8
1143	NA	-	-	F	Switzerland	-128.4
1144	NA	-	-	M	Switzerland	-97.8
1145	NA	-	-	F	Switzerland	-88.4
1146	NA	-	-	M	Switzerland	-89.4
1147	NA	-	-	F	Switzerland	-113.9
1148	NA	-	-	M	Switzerland	-91.3
1149	NA	-	-	M	Switzerland	-99.2
1150	NA	-	-	M	Switzerland	-90.7
1151	NA	-	-	M	Switzerland	-100.2
1152	NA	-	-	F	Switzerland	-97.5
1153	NA	-	-	M	Switzerland	-94.8
1154	NA	-	-	F	Switzerland	-98.8
1155	NA	-	-	F	Switzerland	-92.8
1156	NA	-	-	F	Switzerland	-109.7
1157	NA	-	-	F	Switzerland	-102.2
1158	NA	-	-	M	Switzerland	-97.7
1159	NA	-	-	M	Switzerland	-104.5
1160	NA	-	-	F	Switzerland	-96.5
1161	NA	-	-	F	Switzerland	-126.7
1162	NA	-	-	F	Switzerland	-88.1
1163	NA	-	-	F	Switzerland	-91.7
1164	NA	-	-	F	Switzerland	-92.0
1165	NA	-	-	M	Switzerland	-76.9
1166	NA	-	-	F	Switzerland	-105.6

1167	NA	-	-	F	Switzerland	-84.7
1168	NA	-	-	F	Switzerland	-93.3
1169	NA	-	-	M	Switzerland	-93.1
1170	NA	-	-	F	Switzerland	-98.7

**Table S2:** For the origin assignment individual noctule bats (*Nyctalus noctula*) with similar measured stable isotope ratios in the non-exchangeable hydrogen of fur keratin ( $\delta^2\text{H}_f$ ) were pooled into five (arbitrarily chosen) 10‰ bins (columns A-E; range of isotope values in bins: A: -71 – -79 ‰, B: -80 – 89 ‰, C: -90 – -99 ‰, D: -100 – -109 ‰, E: -110 – -119 ‰). Numbers of individuals per sampling region with  $\delta^2\text{H}_f$  values outside of the range covered by our transfer function are given in column X. All data from the federal country (FC) of Schleswig-Holstein, n=47 data points from FC North Rhine-Westphalia and n=157 data points from FC Berlin-Brandenburg have been published in Voigt et al. (2014). Note that numbers for FC Berlin-Brandenburg include 92 recaptures of 79 individuals.

sampling regions	individuals per 10 ‰ bins						$\Sigma$
	A	B	C	D	E	X	
<b>FC Schleswig-Holstein (Germany)</b>	<b>5 (2%)</b>	<b>42 (17%)</b>	<b>93 (37%)</b>	<b>61 (24%)</b>	<b>36 (15%)</b>	<b>12 (5%)</b>	<b>249</b>
<b>FC North Rhine-Westphalia (Germany)</b>	<b>5 (9%)</b>	<b>17 (30%)</b>	<b>18 (32%)</b>	<b>10 (18%)</b>	<b>6 (11%)</b>	<b>1 (2%)</b>	<b>57</b>
<b>FC Berlin-Brandenburg (Germany)</b>	<b>56 (8%)</b>	<b>182 (26%)</b>	<b>218 (31%)</b>	<b>137 (19%)</b>	<b>74 (10%)</b>	<b>37 (5%)</b>	<b>704</b>
<b>FC Saxony (Germany)</b>	-	<b>10 (22%)</b>	<b>15 (33%)</b>	<b>18 (39%)</b>	<b>1 (2%)</b>	<b>2 (4%)</b>	<b>46</b>
<b>Switzerland</b>	<b>2 (4%)</b>	<b>6 (12%)</b>	<b>19 (38%)</b>	<b>10 (20%)</b>	<b>6 (12%)</b>	<b>7 (14%)</b>	<b>50</b>
<b>Poland</b>	-	<b>1 (3%)</b>	<b>14 (37%)</b>	<b>12 (32%)</b>	<b>7 (18%)</b>	<b>4 (11%)</b>	<b>38</b>
<b>Slovenia</b>	-	<b>9 (35%)</b>	<b>8 (31%)</b>	<b>7 (27%)</b>	<b>2 (8%)</b>	-	<b>26</b>
$\Sigma$	<b>68 (6%)</b>	<b>267 (23%)</b>	<b>385 (33%)</b>	<b>255 (22%)</b>	<b>132 (11%)</b>	<b>63 (5%)</b>	<b>1170</b>

**Table S3:** Results of the linear mixed-effects model fit by REML for predicting measured stable isotope ratios in the non-exchangeable hydrogen of fur keratin in *Nyctalus noctula* from ‘forearm length’, ‘body condition’, ‘sex’ and with ‘animal ID’ as random intercept.

Model parameter	Estimate	SE	t-value	P
(Intercept)	18.12	29.68	0.61	0.54
forearm length	-1.76	0.53	-3.32	0.0014
body condition	-43.63	17.38	-2.51	0.0143
sex (males)	-67.54	15.07	-4.48	0.00
body condition : sex (males)	153.42	31.91	4.81	0.00

conditional  $R^2 = 0.70$ , number of observations: 409; number of groups (random effect ‘animal ID’): 334; random effect SD = 10.5, AIC = 3202.6, BIC = 3230.6, logLik = -1594.3

## **Supplementary Methods**

### **Stable isotope analysis**

All fur samples were rinsed with 2:1 chloroform-methanol solution to wash off surface oils and contaminants. Then, samples were dried in a drying oven over 24 hours at 50 °C. A subsample of 1 mg ( $\pm 0.1$  mg) was weighed in a silver foil capsule (IVA Analysetechnik e.K. Meerbusch, Germany). All laboratory procedures were previously described in Popa-Lisseanu et al. (2012). Using laboratory keratin standards with known stable isotope ratios of the non-exchangeable portion of hydrogen, we were able to report only stable isotope ratios of the non-exchangeable hydrogen in fur keratin ( $\delta^2\text{H}_f$ ; see details in Popa-Lisseanu et al., 2012). Based on the repeated analyses of laboratory keratin standards, analytical precision was always better than 1 ‰ (one standard deviation of mean ratios). We assessed variability of  $\delta^2\text{H}_f$  within a given fur sample via repeated measurements (6-8 measurements per sample depending on fur availability) for seven individuals spanning a  $\delta^2\text{H}_f$  range from -75 ‰ to -118 ‰ (mean SD = 0.8 ‰; range: 0.4 ‰ – 1.8 ‰).

### **Noctule bat calibration model**

In order to establish the relationship between  $\delta^2\text{H}_f$  and  $\delta^2\text{H}_p$  values we advanced our previously published calibration data set for noctules incorporating 118 new data points from Central and Eastern Europe. Our joint calibration dataset comprised  $\delta^2\text{H}_f$  values of 335 bats of five non-migratory species ( $n = 224$ ) and *N. noctula* ( $n = 111$ ) captured during their non-migratory period, defined as the period between 1st of May and 15th of July (see Voigt et al., 2014). Noctule bats moult usually before autumn migration (Blohm & Heise, 2008). In the remainder of the text, we used the moulting area as their summer habitat.

### **Testing for differences in the proportion of long-distance migrants between hibernacula**

For each hibernaculum, we randomly sampled ten individuals and determined the number of long-distance migrants. This routine was iterated 1,000 times. The Kruskal-Wallis test was applied to test for significant differences between bootstrapping results ( $p < 0.05$ ), followed by a Post-hoc-test (Dunn's test) for pair-wise comparisons.

### **Mean minimum catchment distance of hibernacula**

In our study, the definition of long-distance migrants is based on the threshold values of the 95% confidence intervals of our transfer function. Translating this into migration distance is challenging due to the heterogenous run of the isoclines in Europe. However, we approximated the distance for each hibernacula by measuring the minimum catchment distance for long-distance migrants from the isocline for regional migrants (stable hydrogen isotope ratio in precipitation water for the specific hibernaculum site  $\pm$  SD of our transfer function) in ArcGIS: Poland 410 km, FC Schleswig-Holstein 230 km, FC Berlin-Brandenburg 480 km, FC North Rhine-Westphalia 545 km, FC Saxony 425 km, Switzerland 105 km, Slovenia 620 km. We only considered cardinal headings between 270° to 90° from the respective hibernacula presuming that *Nyctalus noctula* does not migrate north for hibernation. We give the mean minimum catchment distance (402 km  $\pm$  179 km) as our estimated threshold value between regional and long-distance migrants.

### Morphological correlates of migration

We fitted a LMM exploring the influence of the explanatory variables ‘forearm length’, ‘body condition’ [body mass (g) divided by forearm length (mm)], and their interaction with ‘sex’ on the dependent variable  $\delta^2\text{H}_f$ . Testing for collinearity between the predictor variables was performed by calculating Pearson’s product moment correlation coefficient  $r$  as suggested by Zuur et al. (2010). Since the dataset included repeated measurements of individuals recaptured in different years (334 individuals,  $n = 409$  data points) the variable ‘animal ID’ was considered as random effect. To assess the appropriate model structure, we followed a top-down strategy focusing on the optimal structure of the random component first (Zuur et al., 2009). We applied an analysis of variance (ANOVA) to compare a fixed effects model (GLS) with a mixed effects model including ‘animal ID’ as random factor (package *nlme* (Pinheiro et al., 2013)) using restricted maximum likelihood (REML). Before entering fixed-effect co-variables, we used a generalized additive model with three knots (GAM; package *mgcv* (Wood, 2011)) to visually check the linearity assumption of the co-variables. Based on these results (Fig. S5), we decided to compare two ‘full’ models (ML), one including ‘body condition’ as linear term, one including ‘body condition’ as second-order polynomial via a likelihood ratio test. Since both models had equivalent AIC values ( $\Delta$  AIC 0.41) and were not significantly different from each other ( $p = 0.17$ ) we continued with the most parsimonious model including ‘body condition’ as linear term. We then fitted the full model with the previously identified optimal random structure using ML estimation and used the likelihood ratio test to identify non-significant terms (Zuur et al. 2009). Estimates of the final model were fitted using REML, and the ‘effects’ package (Fox, 2003) was used for visualisation. We visually checked for homogeneity in residuals. All statistical analyses were performed with R 3.4.1 (R Core Team, 2017), and the level of significance was set at 0.05.

### Assumptions and potential biases of the isoscape origin approach

Our isoscape origin model was based on publicly available data on  $\delta^2\text{H}_p$  values across Europe, measured  $\delta^2\text{H}_f$  values and on a LMM established for pre-migratory *N. noctula* as well as sedentary species. Any violation of one or several of the assumptions underlying our approach could affect the accuracy and precision of our spatial model. For a detailed discussion on uncertainties associated with the use of the regression model in *N. noctula* see the discussion in Voigt et al. (2014). In this study, we enhanced our previous calibration data set adding new data and expanding it to Eastern Europe, thus further improving the predictive power of our geospatial models. However, we are aware that we may have accepted the possibility of falsely assigning migratory noctules as sedentary given the absence of detailed information on the migratory background of individuals. This uncertainty might have increased the variance in  $\delta^2\text{H}_f$  values for the respective locations. Yet, we are convinced that the benefits of adding  $\delta^2\text{H}_f$  values to the calibration data set outweighs the drawback of increased variance in  $\delta^2\text{H}_f$  and eventually leads to conservative and more realistic predictions.

Predicted areas of likely summer origin of some individuals exceed the northern boundaries of the distribution range of noctule bats as currently proposed by the IUCN (see Fig. 2 E). We attribute this instance to two contrasting causes: a) Since the spatial coverage of weather stations providing information on  $\delta^2\text{H}_p$  values for our isoscape substantially decreases to the North-East, we acknowledge clear limitations in the predictive power of our models beyond the proposed distribution range of *N. noctula*. However, we only assigned individuals showing  $\delta^2\text{H}_f$  signatures within the range of our calibration data set, but some individuals showed even lower  $\delta^2\text{H}_f$  signatures (Table S2, Column X) potentially indicating origins yet more to the north. b) This adds to our expectation that the true northern boundaries of the geographical range of *N. noctula* may lie further north than currently assumed (yet, certainly not as far north as suggested by our predictions). As an example, noctules have been reported from several sites east of Orenburg and Ufa (Bolshakov et al., 2005), extending the

eastern boundaries given by IUCN by 400-500 km. Our assumption of more northern summer ranges is furthermore supported by a recently discovered northward winter range expansion of *N. noctula* in Eastern Europe (Godlevska, 2015).

While we are convinced that our geographical predictions for individuals are realistic, we do recognize shortcomings in the identification of migrants originating from breeding habitats located within the same isocline as our sampling locations, e.g. noctule bats from southern Scandinavia. These individuals have similar  $\delta^2\text{H}_f$  values as noctules from Germany. Considering that noctule bats from southern Scandinavia may as well be long-distance migrants, the documented proportion of migratory individuals has to be considered as a conservative estimate of the proportion of migrants dependent on central European hibernacula.

## Supplementary Analyses

### Tracking the development of body condition over the course of hibernation:

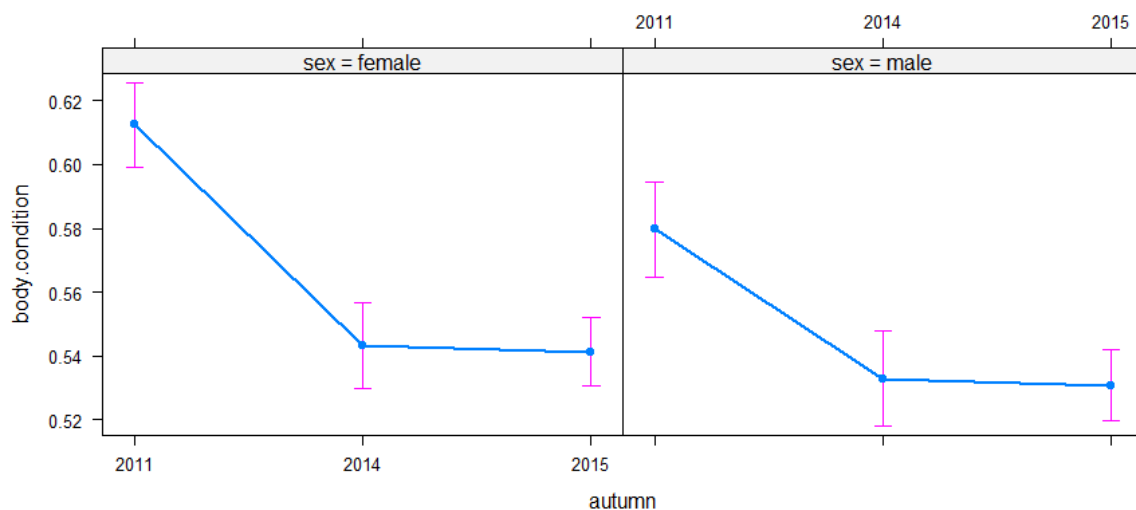
We used additional morphological data of  $n = 161$  individual *Nyctalus noctula* captured at the beginning of hibernation in autumn (between 17<sup>th</sup> and 21<sup>st</sup> of November) and recaptured after hibernation in spring (between 6<sup>th</sup> and 16<sup>th</sup> of March) to answer the question whether the development of body condition over the course of hibernation is sex-specific in noctule bats), i.e. due to mating behaviour of males during winter (Gebhard, 1995) which might cause their fat reserves to deplete even faster. We fitted three linear mixed effects models (random effect: animal ID) exploring the influence of the explanatory variables ‘sex’ and ‘year’ on the dependent variables ‘autumn body condition’ (model 1), ‘spring body condition’ (model 2) and ‘body condition slimming’ over the course of hibernation (calculated as ‘autumn body condition’ minus ‘spring body condition’) (model 3).

**Model 1:** Results of the linear mixed-effects model fit by REML for predicting autumn body condition from ‘sex’, ‘year’ with ‘animal ID’ as random intercept.

Model parameter	Estimate	SE	t-value	P
(Intercept)	0.58	0.01	76.5	<0.001
sex female (vs. male)	0.03	0.01	3.2	0.002
autumn 2014 vs. 2011	-0.05	0.01	-4.4	0.002
autumn 2015 vs. 2011	-0.05	0.01	-5.3	0.001
sex (female): autumn 2014	-0.02	0.01	-1.6	0.16
sex (female): autumn 2015	-0.2	0.01	-1.8	0.12

conditional  $R^2 = 0.83$ , number of observations: 173; number of groups (random effect ‘animal ID’): 161. AIC = -605.13, BIC = -580.18, logLik 310.56, SD random effect = 0.03

**Figure S6:** Effects plot for ‘model 1’: linear mixed-effects model fit by REML for predicting autumn body condition from ‘sex’ and ‘year’ with ‘animal ID’ as random intercept.



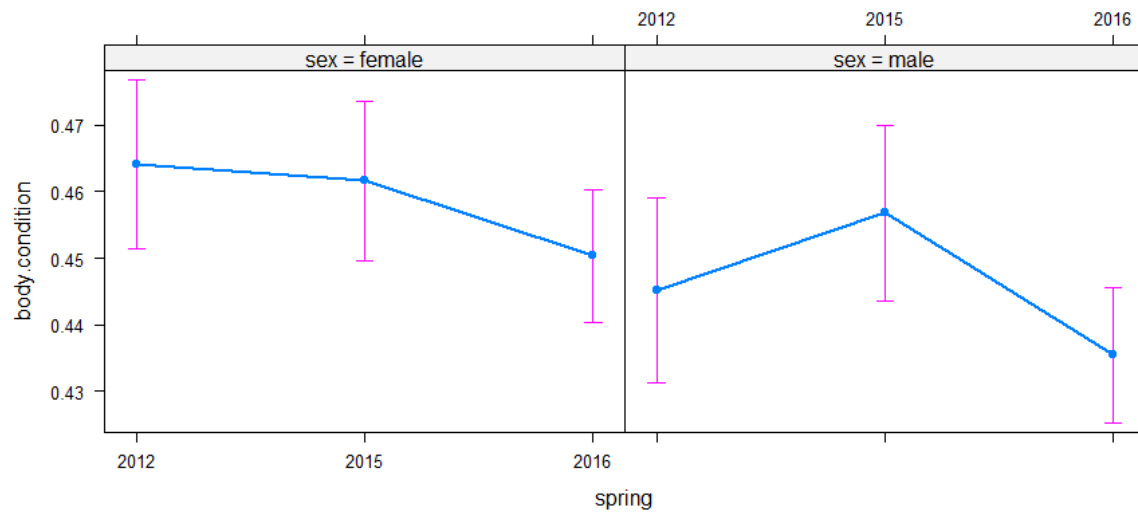


**Model 2:** Results of the linear mixed-effects model fit by REML for predicting spring body condition from ‘sex’ and ‘year’ with ‘animal ID’ as random intercept.

Model parameter	Estimate	SE	t-value	P
(Intercept)	0.45	0.01	63.4	<0.001
sex female (vs. male)	0.02	0.01	2.0	0.05
spring 2015 vs. 2012	0.01	0.01	1.2	0.26
spring 2016 vs. 2012	-0.01	0.01	-1.2	0.28
sex (female): spring 2015	-0.01	0.01	-1.1	0.31
sex (female): spring 2016	-0.004	0.01	-0.34	0.74

conditional  $R^2 = 0.85$ , number of observations: 173; number of groups (random effect ‘animal ID’): 161. AIC= -627.4, BIC= -602.46, logLik 321.7, SD random effect = 0.03

**Figure S7:** Effects plot for ‘model 2’: linear mixed-effects model fit by REML for predicting spring body condition from ‘sex’ and ‘year’ with ‘animal ID’ as random intercept.



**Model 3:** Results of the linear mixed-effects model fit by REML for predicting body condition slimming over the course of hibernation from ‘sex’ and ‘year’ with ‘animal ID’ as random intercept. Winter 2011, 2014, and 2015 refer to the winters 2011/12, 2014/15, and 2015/16, respectively.

Model parameter	Estimate	SE	t-value	P
(Intercept)	0.13	0.004	28.2	<0.001
sex female (vs. male)	0.01	0.01	2.2	0.03
winter 2014 vs. winter 2011	-0.06	0.01	-8.1	<0.001
winter 2015 vs. winter 2011	-0.04	0.01	-6.9	<0.001
sex (female): winter 2014	-0.01	0.01	-1.5	0.18
sex (female): winter 2015	-0.02	0.01	-1.9	0.1

conditional  $R^2 = 0.72$ , number of observations: 173; number of groups (random effect ‘animal ID’): 161. AIC= -759.8, BIC= -734.9, logLik 387.9, SD random effect = 0.01

**Figure S8:** Effects plot for ‘model 3’: linear mixed-effects model fit by REML for predicting body condition slimming over the course of hibernation from ‘sex’ and ‘year’ with ‘animal ID’ as random intercept. Winter 2011, 2014, and 2015 refer to the winters 2011/12, 2014/15, and 2015/16, respectively.



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