**observations.csv** data on exchange and control observation**s**

**obs\_ID**: unique identity of an observation from the observations.csv

**observer** observer of the video recording: cm=Christina Muck, mb=Martin Bulla, dt=Daniela Tritscher

**year:** year in which nest was found

**nest:** unique identifier of each nest within a year

**file\_name:** file name of the video sequence where the behavior can be observed (file stored in Seewiesen, Germany: ds/grpkemp/field/Barrow/year)

**type:** type of observation: exchange observation (ex) or non-exchange observation (non)

**ex\_non\_ID:** running numbers within nest which indicate the timely order of exchange and non-exchange observations, i.e. the third exchange observation of this nest would get 3, the first non-exchange observation of this nest would get 1, the third non-exchange observation would also get 3…

**pair\_ID:** running numbers within each nest for exchange and non-exchange observation separately. Links specific exchange to non-exchange observation for pairwise comparison (same observation duration).

**start\_time\_video:** time on the video when observation started 30 minutes before incubating parent left the nest (dt\_left)

**capture**: type of incubation bout with respect to the parent removal experiment:

n= bird was not removed,

0= incubation bout in which partner was released from captivity,

1=first incubation bout after observed bird or partner released from captivity, 2= second incubation bout after release, 3= third, 4= fourth,…

**cage:** Was the nest protected by a cage? (y=yes, n=no)

**sex:** sex of the bird sitting on the nest (m=male, f=female)

**sound\_ok:** did the camera system recorded the sound with sufficient quality to score calling behavior (y=yes, n=no)

**bill\_call\_visible:** a data quality indicator - is the bill of the calling bird visible? y = camera is close to nest; 1st presence of non-incubating bird could be visually assessed only when the bird was close to the nest. n = camera catches a wider area; 1st presence of non-incubating bird visible earlier. vfa = camera far from nest – 1st presence of non-incubating bird uncertain because it is hard to see=

**reality\_dt:** the field date and time (yyyy-mm-dd hh:mm:ss) based on RFID data of when the exchange or control observation started. Entered (a) only for observations where video run on a wrong time and (b) used (together with video\_dt) to calibrate such video data.

**video\_dt:** the date and time (yyyy-mm-dd hh:mm:ss) on a video when the exchange or control observation started; Entered (a) only for observations where video run on a wrong time and (b) used (together with reality\_dt) to calibrate such video data.

**timespan\_before\_presence:** Period from the start of the observation until the coming bird is first present (dt\_1st\_presence)

**dt\_1st\_presence:** The date and time (yyyy-mm-dd hh:mm:ss) when the non-incubating (coming) bird appears for the first time – in the manuscript discussed as arrival. NA indicates that the data could not be scored (e.g. bad sound) or that the non-incubating bird never arrived (in control observations).

**type\_p:** Indicates how dt\_1st\_presence scored: a = acoustic, v = visual, b = both acoustic and visual

**dt\_1st\_call:** date and time (yyyy-mm-dd hh:mm:ss) of the first call heard in the observation period (from either one of the two birds)

**first\_who:** Which bird called first? (o= incubating bird (bird **o**n nest), c= **c**oming (returning) bird, un=unknown)

**reply:**  Did the other bird answer the first call? (y=yes, n=no)

**call\_how\_many:** number of calls from both birds (from start of observation until first presence of partner)

**call\_o\_alone:** number of calls during the first calling bout only from the incubating bird (from start of observation until first presence of partner)

**call\_o\_pres\_arrive** number of calls of the incubating bird (from dt\_1st\_presence until dt\_arrive of the partner)

**call\_c\_pres\_arrive** number of calls only from the coming bird (from dt\_1st\_presence until dt\_arrive of the partner)

**dt\_1st\_flyoff:** date and time (yyyy-mm-dd hh:mm:ss) of the first time the bird flew off the nest for any other reason than exchange

**number\_flyoff:** number of the fly-offs

**duration\_flyoff:** total duration of all fly-offs together during an observation period

**dt\_arrive:** date and time (yyyy-mm-dd hh:mm:ss) when the coming bird arrived at the immediate nest site (arriving to the nesting polygon) – in the current manuscript discussed as approach or initiation of nest relief

**type\_a:** How was arrival assessed? a=acoustically, w=walking in, f=flying in.

**direction\_a:** Indicates from which direction the coming bird arrived at the nest

r = right

l = left

b = back f = front

**with\_calling:** Did the bird call when arriving? (y=yes, n=no)

**o\_replies:** Did the incubating bird answer the arriving call of the coming bird? (y=yes, n=no)

**call\_c\_int:** Calling intensity of the coming bird between dt\_arrive and dt\_left) (0= no calls, 1= one or very few calls, 2= few calls, 3=many calls, constant calling)

**call\_o\_int:** Calling intensity of the coming bird between dt\_arrive and dt\_left) (0= no calls, 1= one or very few calls, 2= few calls, 3=many calls, constant calling)

**call\_int\_1:** Calling intensity of both birds together between dt\_arrive and dt\_left) (0= no calls, 1= one or very few calls, 2= few calls, 3=many calls, constant calling)

**dt\_left:** date and time (yyyy-mm-dd hh:mm:ss) when the incubating bird left the nest

**type\_l:** indicates how the incubating bird left the nest (w=walk, f=fly, wf= walk and then fly)

**call\_left:** Did the bird call when leaving the nest? (y=yes, n=no)

**current\_bout:** length of the incubation bout of the incubating bird before the observed exchange in decimal minutes

**next\_bout:** length of the incubation bout of the coming bird after the observed exchange in decimal minutes

**pushoff\_int:** NA=The incubating bird leaves the nest before the return of the off-duty parent. 0= The coming bird arrives while the incubating bird is still on the nest or right next to it. There may be some single calls by either of the two birds, but no exchange ritual. 1= The coming bird arrives at the nest site while the incubating bird sits on the nest. The coming bird shows a flat body posture (bowing) and calls constantly, followed by an immediate departure of the incubating bird. 2= The coming bird arrives at the nest site while the incubating bird sits on the nest. The coming bird shows a flat body posture (bowing), calls constantly, and remains in this position in the nest vicinity (outside the cage if there is one) until the incubating bird leaves the nest, which does not happen immediately but takes a few seconds. 3= The coming bird arrives at the nest site while the incubating bird sits on the nest. The coming bird shows a flat body posture (bowing) and calls constantly while walking up to the incubating bird on the nest cup. The incubating bird does not leave before the coming bird is right next to it, seemingly being pushed off the nest.

**left\_before\_presence:** Did the incubating bird leave the nest before the coming partner was present? (y=yes, n=no)

**call\_int\_c2:** Calling intensity of the coming bird during exchange gap – period between leaving of previously incubating partner until the coming bird sits on the nest

**dt\_on:** date and time (yyyy-mm-dd hh:mm:ss) when the coming bird sits down on the nest

**call\_int\_c3:** calling intensity of the returned parent within 5 minutes after sitting down on the nest

**abnormality:** Was there an abnormality during the observation? If yes, it is specified in the comments (y=yes, n=no, t= technical problems)

**file\_name\_new:** File name of the short video sequence where the exchange is visible (available from Video folder at Open Science Framework)

**comments:**

**Description of the dataset “****time****\_series”**

**time\_series.csv –** datetimes of fly-offs and callings for before arrival and control observations.

**obs\_ID** unique identity of an observation from the observations.csv

**observer** observer of the video recording: cm=Christina Muck, mb=Martin Bulla, dt=Daniela Tritscher

**year** year, in which nest was found

**nest** unique identifier of each nest within a year

**start\_time\_video** time on the video when observation started

**end\_dt** time on the video when observation ended (for exchanges: from start of observation until first appearance of the returning parent)

**type:** type of observation: exchange observation (ex) or non-exchange observation (non)

**partner\_present** Is the partner present during observed behavior? y=yes, n=no

**dt\_behaviour** date and time when a specific behavior was observed

**behaviour** behavior of the observed birdc=call, f= fly-off, n=nothing (usually for non-exchange observations when birds did not show any activity throughout the observation period)

**who** bird showing the observed behavior: o= on nest bird, c= coming bird

**sex** sex of the bird showing the behavior: m=male, f=female

**comments**

**exclusions.csv -** information on why some observations were excluded from the analyses

**obs\_ID**: unique identity of each observation

**year:** year, in which nest found

**nest:** unique identifier of each nest within a year

**type:** type of observation: exchange observation (ex) or non-exchange observation (non)

**capture**: n=bird was not captured,

0= incubation bout in which partner was released again,

1=first incubation bout after observed bird or partner was released, 2= second incubation bout after release, 3= third, 4= fourth,…

**cage:** Was the nest protected by a cage? (y=yes, n=no)

**sound\_ok:** whether the camera system recorded the sound with sufficient quality to score calling behavior (y=yes, n=no)

**left\_before\_presence:** Did the incubating bird leave the nest before the coming partner was present? (y=yes, n=no, NA – not aplicable)

**shorter\_obs:** yes (y) if video was not available for the whole observation period and observation therefore is shorter, no (n) if videos were available and watched as should be. ‘y’ observations excluded from the analyses.

**former\_exchange** was the observation initially identified as an exchange, but later clarified as a non- exchange observation? y=yes, n=no. ‘y’ observations excluded from the analyses.

**close\_to\_exchange** did the non-exchange observations started earlier than 35 min after incubation started or ended less than 60 min prior to the end of the incubation bout of the focal parent? y=yes, n=no. ‘y’ observations excluded from the analyses.

**close\_to\_ex\_comment** indicates how close the close\_to\_exchange observations are (in min)

**current\_bout\_biased** y=yes if was the incubation bout influenced by researcher activity or experiments? y=yes, n=no. ‘y’ observations excluded from the analyses.

**total\_exclusion** y=yes if was the whole observation excluded from all analyses? y=yes, n=no. The reason for exclusion is given in the comments.

**comments**

**nests.csv –** nest metadata

**year:** year, in which nest found

**nest:** unique identifier of each nest within a year

**inc\_start:** datetime (yyyy-mm-dd hh:mm:ss) when incubation started

**hatch\_start:** datetime (yyyy-mm-dd hh:mm:ss) when hatching started (one chick out of an egg)

**end\_state:** datetime (yyyy-mm-dd hh:mm:ss) when incubation started

**end\_datetime:** datetime (yyyy-mm-dd hh:mm:ss) when incubation finished

lat latitude of the nest in decimal format

lon longitude of the nest in decimal format

dist guess-estimated distance of a camera to the nest

view\_at\_nest estimated field of view at nest (based on known or approximated size of cage mashes, bird size, etc.

**birds.csv –** bird identities

**year:** year, in which nest found

**nest:** unique identifier of each nest within a year

**sex** sex of the bird: m=male, f=female

**bird\_ID** unique identity of the bird