

Supplementary Information for

**Fuelling conditions at staging sites can mitigate Arctic warming effects in a migratory bird**

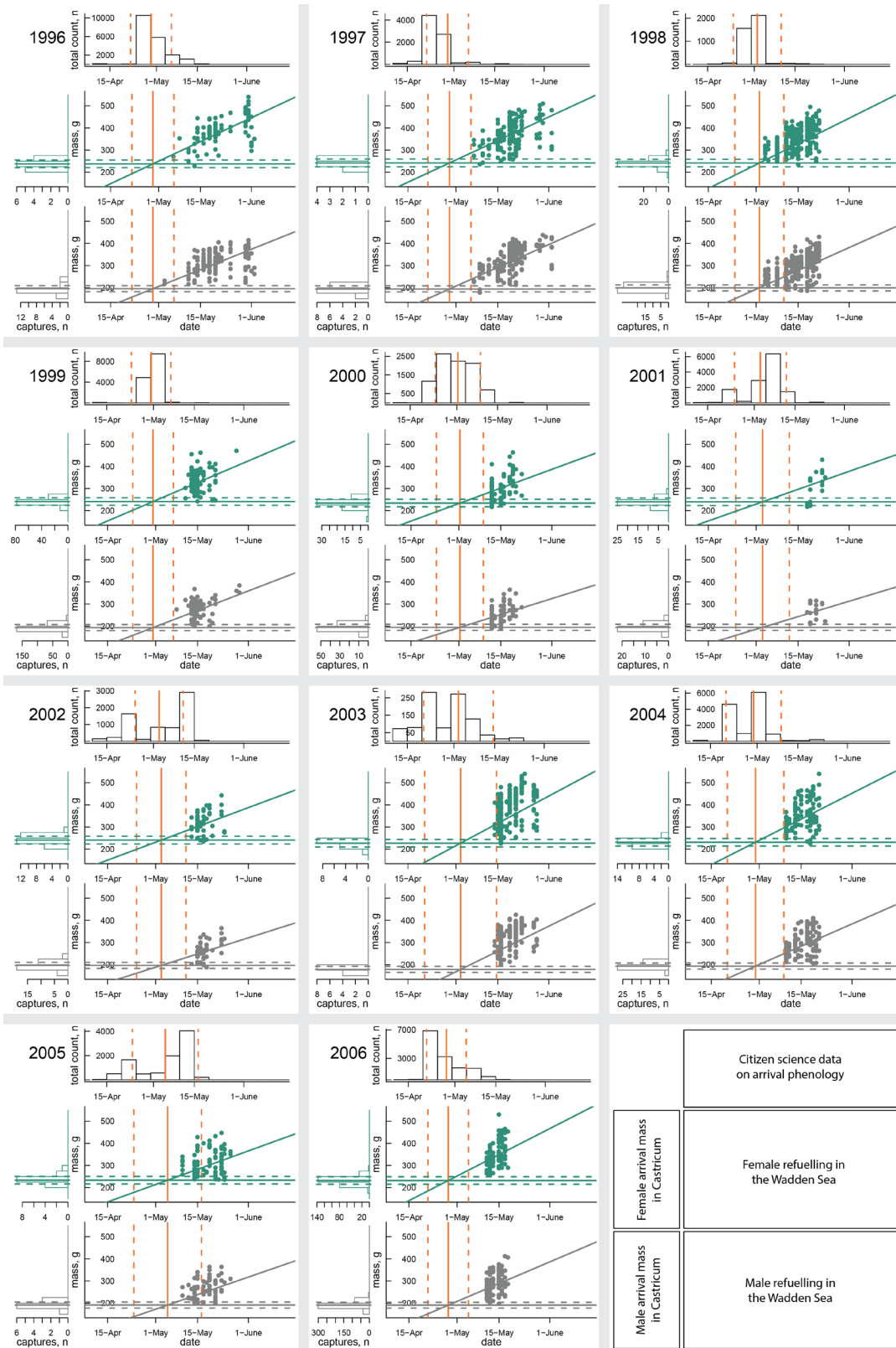
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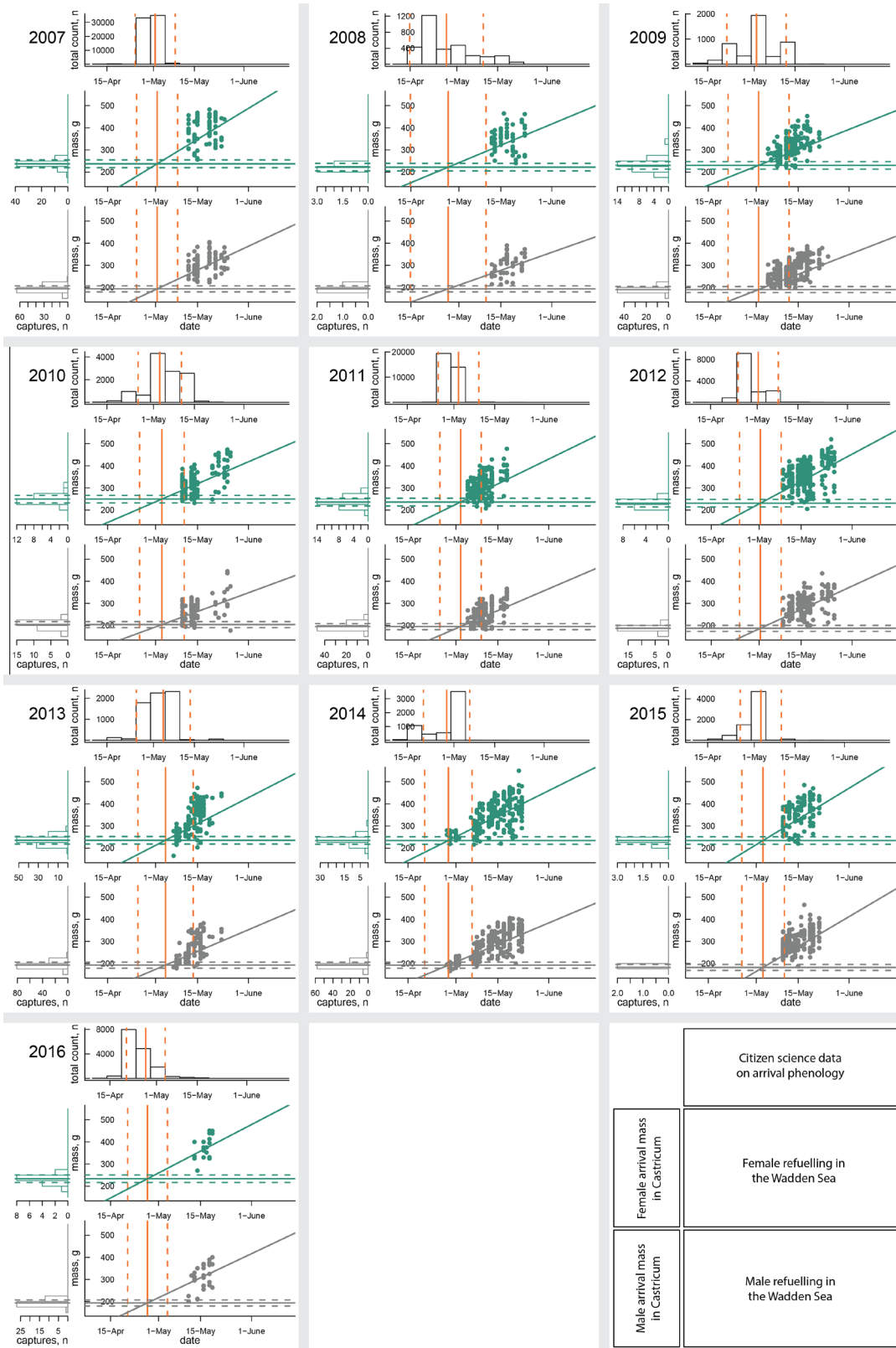
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Supplementary Figure 1 to 2

Supplementary Table 1 to 2



**Supplementary Figure 1.** Raw data and modelled results for citizen science arrival dates in the Netherlands (trektellen.nl), sex-specific arrival mass in captures in Castricum and refuelling in the Wadden Sea for 1996 – 2006. See Fig. 3 for more details.



**Supplementary Figure 2.** Raw data and modelled results for citizen science arrival dates in the Netherlands (trektellen.nl), sex-specific arrival mass in captures in Castricum and refuelling in the Wadden Sea for 2007 – 2016. See Fig. 3 for more details.

**Supplementary Table 1.** *Limosa lapponica taymyrensis* breeding grounds phenology. Snowmelt represents date of snowmelt measured at the Southern Taimyr field site (72.8°N, 106.0°E). Arrival dates are obtained for Khatanga village region (72.0°N 102.5°E) and the appearance of crane-flies and clutch initiation dates were observed at southern Taimyr (72.8°N, 106.0°E).

<b>Year</b>	<b>Snowmelt</b>	<b>First arrival to the breeding grounds</b>	<b>First crane-fly appearance</b>	<b>Clutch initiation</b>
1992		11-Jun-92		
1993		05-Jun-93		
1994	22-Jun-94		06-Jul-94	25-Jun-94; 02-Jul-94
1995	07-Jun-95		28-Jun-95	14-Jun-95
1996	27-Jun-96	04-Jun-96	07-Jul-96	27-Jun-96
1997	06-Jun-97	01-Jun-97		
1998	13-Jun-98	01-Jun-98	30-Jun-98	
1999	04-Jun-99		29-Jun-99	11-Jun-99
2000	14-Jun-00	02-Jun-00	06-Jul-00	14-Jun-00
2001	06-Jun-01	01-Jun-01	25-Jun-01	18-Jun-01
2002	11-Jun-02	29-May-02	22-Jun-02	11-Jun-02
2003	16-Jun-03	04-Jun-03	26-Jun-03	
2004		07-Jun-04		
2005		31-May-05		
2006		01-Jun-06		
2007		28-May-07		
2008	19-Jun-08	02-Jun-08	07-Jul-08	
2009	10-Jun-09	30-May-09	27-Jun-09	11-Jun-09
2010	25-May-10	02-Jun-10	23-Jun-10	13-Jun-10; 22-Jun-10
2011	30-May-11	29-May-11	29-Jun-11	07-Jun-11; 10-Jun-11
2012	03-Jun-12	30-May-12	21-Jun-12	
2013	02-Jun-13	26-May-13	02-Jul-13	
2014	08-Jun-14	24-May-14	19-Jun-14	
2015		03-Jun-15		
2016		29-May-16		

**Supplementary Table 2.** Estimated coefficients from the structural equation model for bar-tailed godwit phenology

<b>Effect of</b>	<b>on</b>	<b>mean</b>	<b>sd</b>	<b>median</b>	<b>2.5%</b>	<b>97.5%</b>	<b><math>P( b &gt;0)</math></b>
Time	Arrival Wadden Sea	-0.046	0.065	-0.047	-0.170	0.084	0.77
Time	Snowmelt	-0.792	0.153	-0.793	-1.090	-0.489	1.00
Time	Arrival to Taimyr	-0.176	0.181	-0.175	-0.530	0.182	0.84
Snowmelt	Arrival to Taimyr	0.198	0.172	0.197	-0.140	0.538	0.88
Arrival Wadden Sea	Arrival to Taimyr	0.240	0.445	0.241	-0.650	1.112	0.71
Time	Crane fly emergence	-0.152	0.354	-0.150	-0.860	0.558	0.68
Snowmelt	Crane fly emergence	0.274	0.302	0.273	-0.320	0.878	0.83
Time	Clutch Initiation	0.116	0.647	0.104	-1.150	1.445	0.57
Snowmelt	Clutch Initiation	0.239	0.489	0.237	-0.760	1.226	0.71
Arrival to Taimyr	Clutch Initiation	1.604	1.239	1.667	-1.07	3.980	0.90
Crane fly emergence	Clutch Initiation	0.036	0.536	0.013	-1.01	1.176	0.51