Proceedings B

Supplementary material for 'The influence of weather conditions during gestation on life histories in a wild Arctic ungulate'

Mathieu Douhard[1,2], Leif Egil Loe[2], Audun Stien[3], Christophe Bonenfant[1], R. Justin Irvine[4], Vebjørn Veiberg[5], Erik Ropstad[6], Steve Albon[4]

[1]Université de Lyon, 69000, Lyon; Université Lyon 1; CNRS, UMR 5558, Laboratoire de Biométrie et Biologie Evolutive, 69622 Villeurbanne, France.
[2]Norwegian University of Life Sciences, Department of Ecology and Natural Resource Management, 1432 Aas, Norway.
[3]Norwegian Institute for Nature Research, Department for Arctic Ecology, Fram Centre, 9296 Tromsø, Norway.
[4]The James Hutton Institute, Aberdeen AB15 8QH, UK.
[5]Norwegian Institute for Nature Research, Department for Terrestrial Ecology, 7485 Trondheim, Norway.
[6]Norwegian University of Life Sciences, Department of Production Animal Clinical Sciences, 0033 Oslo, Norway.

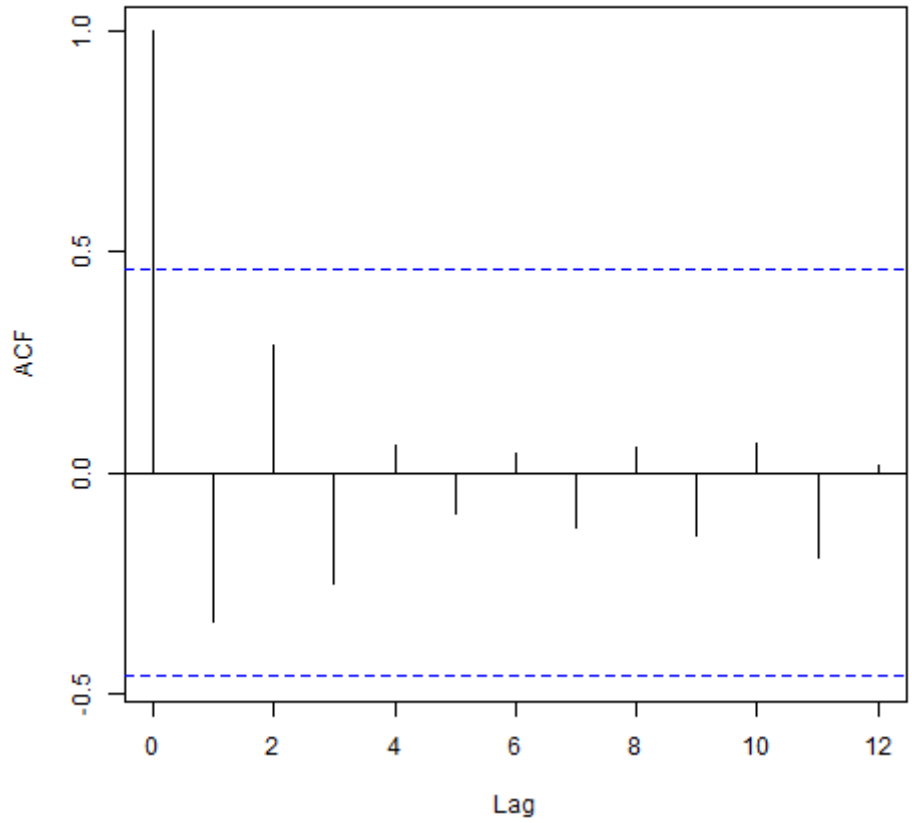

Figure S1. Estimates of the temporal autocorrelation for rain-on-snow events. Temporal autocorrelation function (ACF) include confidence intervals (dashed blue lines) based on uncorrelated series.

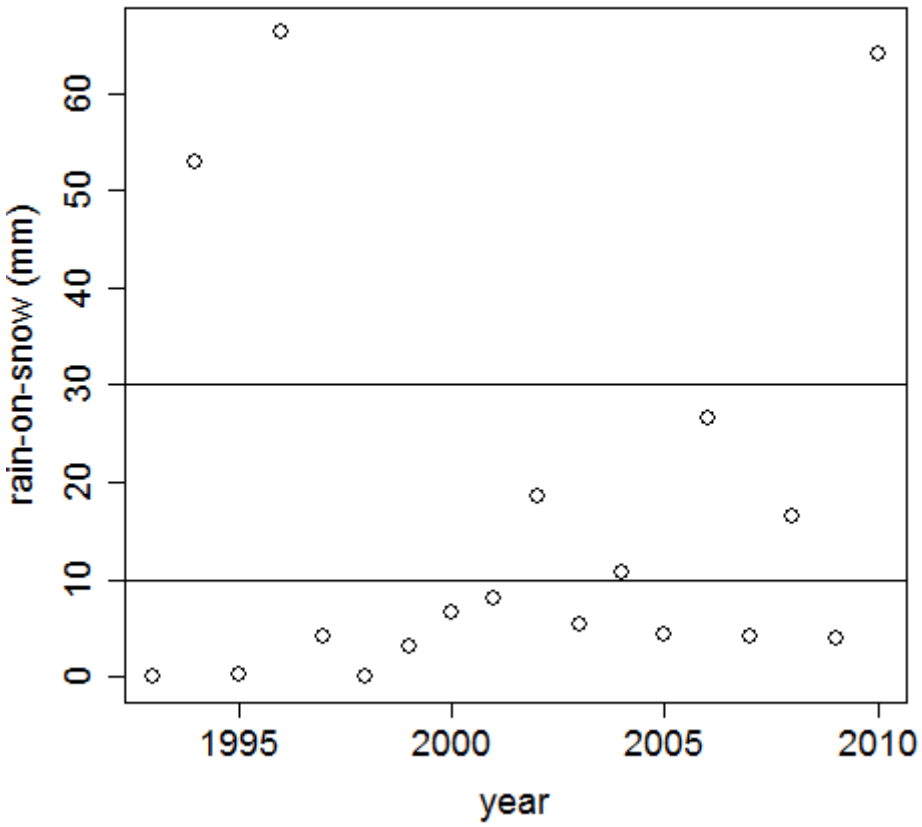

Figure S2. Temporal variation in rain-on-snow (ROS). Based on this graph, three distinct groupings emerged: ROS ≤ 10 mm (low values), 10 mm < ROS ≤ 30 mm (medium values), ROS > 30 mm (high values). Sample sizes for high and medium categories are, however, small so that we combined these two categories into a new category named 'high ROS_{utero}' in the main manuscript.

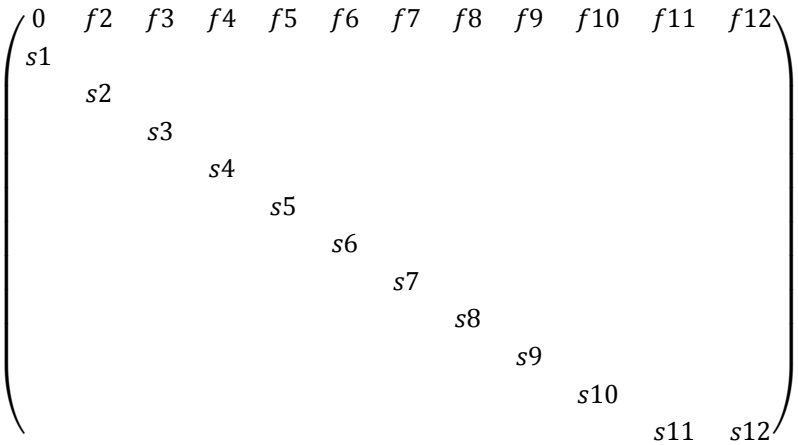

Figure S3. Population projection matrix used for female Svalbard reindeer. f and s values correspond respectively to age-specific recruitment and survival (f2 = recruitment for females aged 2, s1 = survival between 1 and 2 years, etc...). All females ≥ 12 years of age were pooled into a single category. Recruitment should be equal to reproductive success estimated in summer × winter survival of calves × 0.5 (sex ratio). However, because information on calf winter survival is not available, we estimated recruitment as reproductive success in summer × 0.5.

Table S1. Generalized linear mixed model of the probability of reproductive success for female Svalbard reindeer aged 7 years and over. Early reproduction corresponds to the proportion of years in which a female produced a calf between age at first reproduction and 6 years old. All continuous variables were centered and divided by 2 s.d.

	Estimate	**s.e.**	**p-value**
intercept†	-0.263	0.343	0.44
age at last observation	-0.242	0.318	0.44
log ($ROS_{current}$ +1)	-1.189	0.553	0.03
Age	-0.657	0.321	0.04
early reproduction	0.662	0.248	0.007
ROS_{utero}	0.626	0.286	0.02

†Females born under high ROS_{utero} were considered as reference.

Table S2. Generalized linear mixed model of the probability of reproductive success based on 746 observations of 287 female Svalbard reindeer aged between 2 and 6 years. All continuous variables were centered and divided by 2 s.d.

	Estimate	**s.e.**	**p-value**
intercept†	0.300	0.258	0.24
age at last observation	-0.309	0.230	0.18
log ($ROS_{current}$ +1)	-1.393	0.385	< 0.001
Age	2.205	0.245	< 0.001
age²	-2.567	0.457	< 0.001
ROS_{utero}	0.082	0.201	0.68

†Females born under high ROS_{utero} were considered as reference.

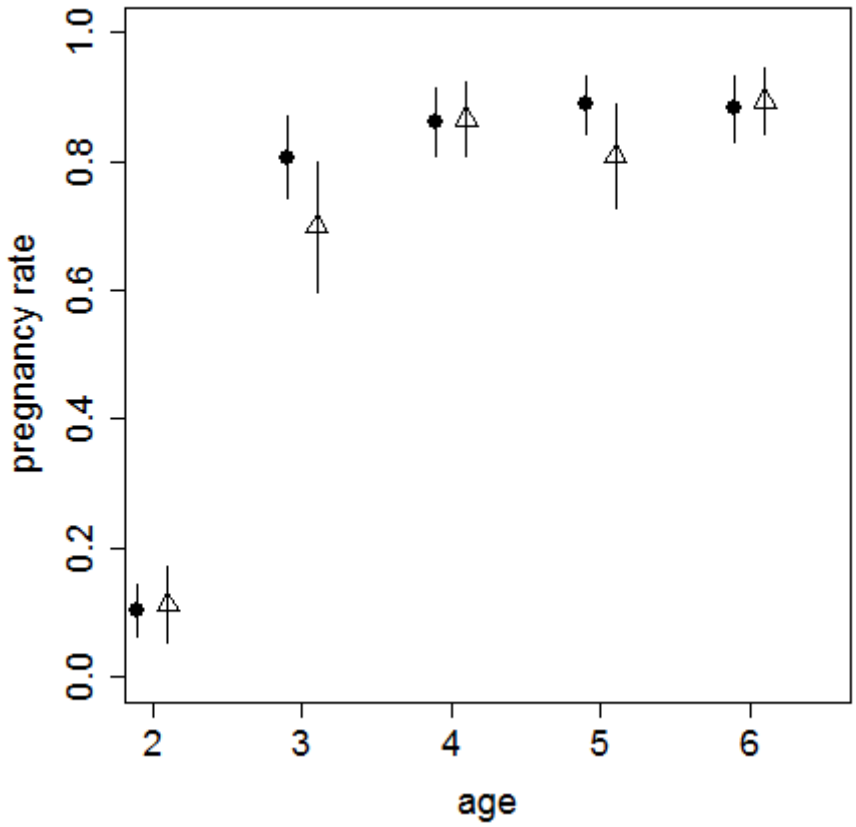

Figure S4. Relationship between pregnancy rate (± s.e.) and age for female reindeer aged 2-6 years that experienced high (open triangles) or low (filled circles) rain on snow in utero. Observations are generated from a generalized linear mixed model with female identity and year as random factors.