

The ivory gull:

living on the slippery ice edge...



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Research & monitoring priorities:



Gilchrist et al. 2008

Research & monitoring priorities:

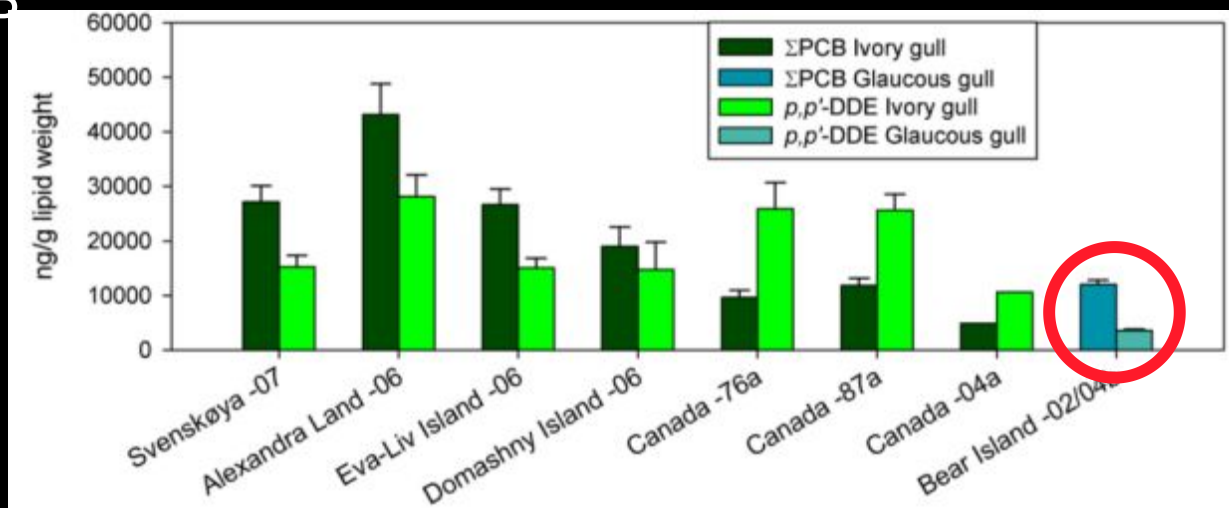
- ✓ (1) Develop a research agenda for each population
- ✓ (2) Develop national and intl monitoring plans



Gilchrist et al. 2008

Research & monitoring priorities:

- ✓ (1) Develop a research agenda for each population
- ✓ (2) Develop national and intl monitoring plans
- ✓ (3) study contaminants with AMAP

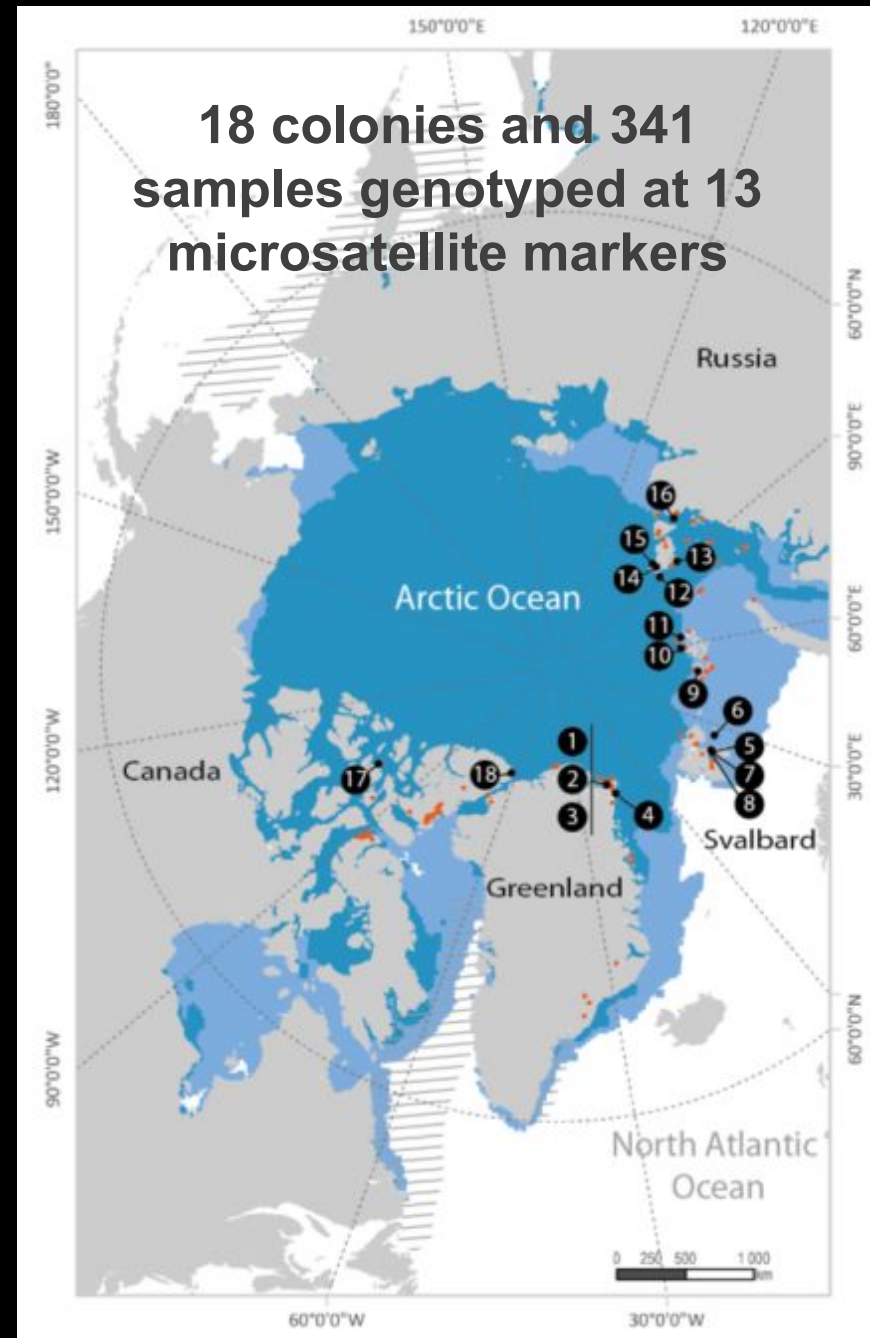


Miljeteig et al. 2009

Research & monitoring priorities:

- ✓ (1) Develop a research agenda for each population
- ✓ (2) Develop national and intl monitoring plans
- ✓ (3) study contaminants with AMAP
- ✓ (4) Determine whether distinct ivory gull populations exist in the circumpolar Arctic

Yannic et al. submitted



Research & monitoring priorities:

✓ (1) Develop a research agenda for each population

✓ (2) Develop national and intl monitoring plans

✓ (3) study contaminants with AMAP

✓ (4) Determine whether distinct ivory gull populations exist in the circumpolar Arctic

✓ (5) Estim. pop. size, productivity, survival rates, migration routes, wintering grounds



Gilchrist et al. 2008

In the following slides...

summarize what has been learned on this species during
the past 10 years

how we can use this new knowledge to better infer/forecast
expected climate-driven impacts

10 years ago...

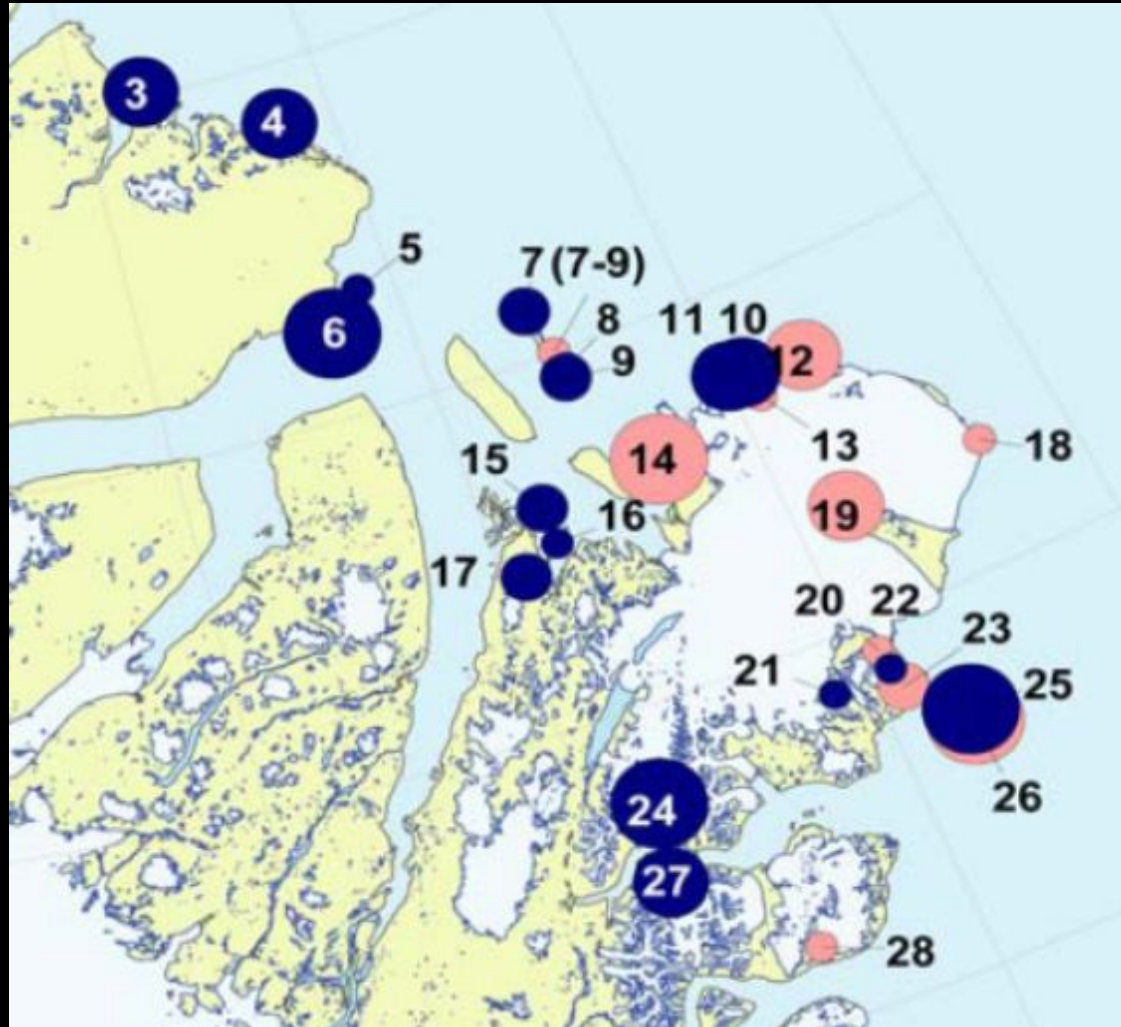


Circumpolar distribution

Canada
Greenland
Svalbard-NO
Russia

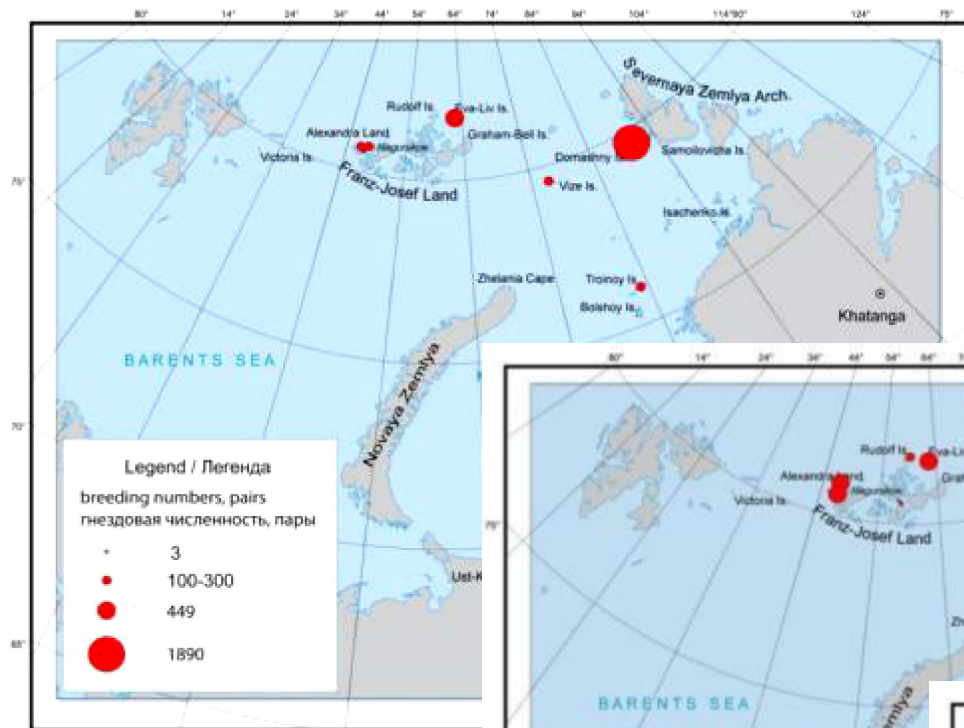


Breeding sites...

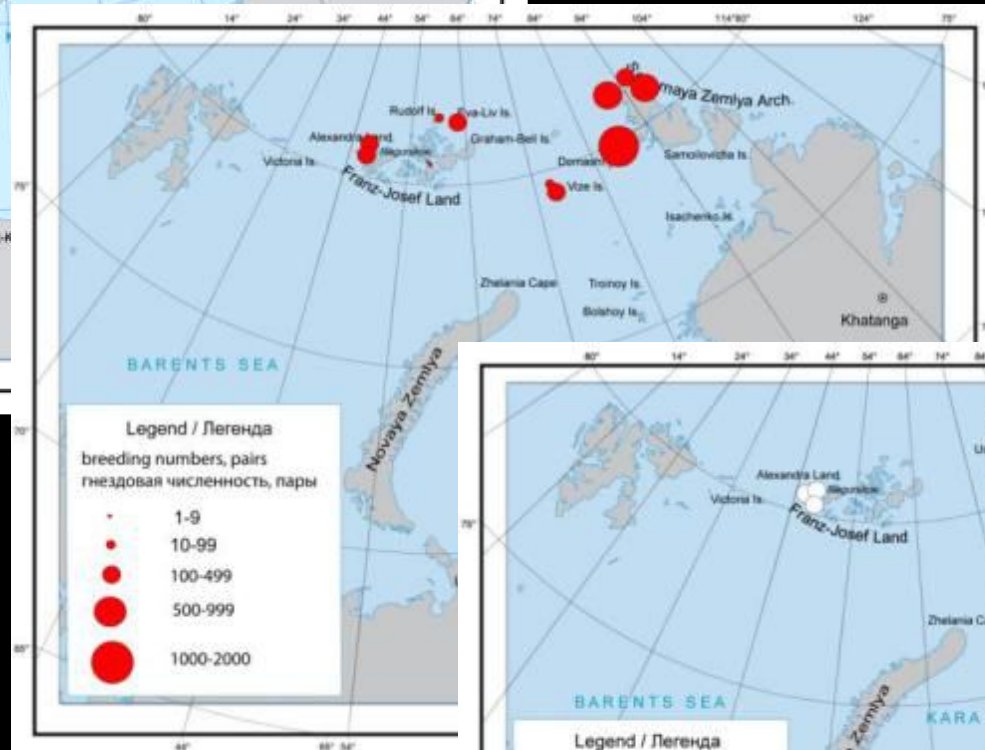


Gilg et al. 2009

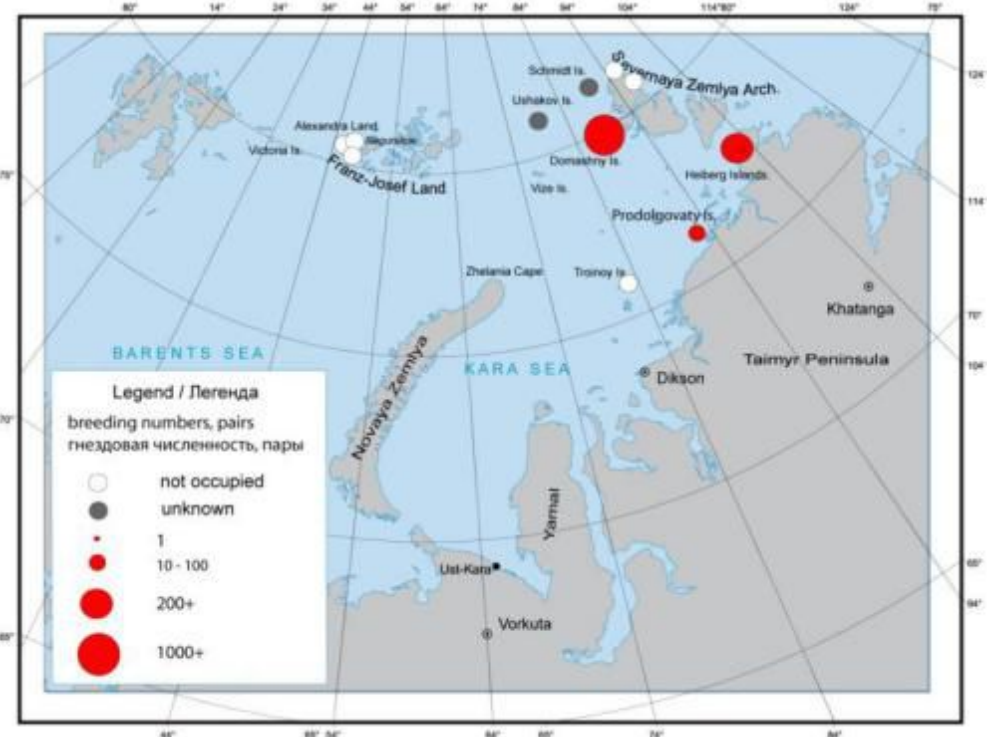
*Population sizes?
(need for long-term and
large-scale monitoring)*



2006



2007



Gavrilo and Strøm

2008

Updated Status (2003-2013):

Canada :



≈ 300 pairs (2-3%)

(≈ 80% decline in 20 years)

Svalbard-NO:



1000-2000 pairs (10-20%)

(uncertain; possibly declining)

Greenland :



> 1000 pairs (> 10%)

(declining South; uncertain North)

Russia:



8000 - 10.000 pairs (≈ 80%)

(some declining, most uncertain)

TOTAL Pop: ≈ 10.000-13.000 pairs (declining)

More on Action 5...

Population dynamics?
(survival rates? site fidelity?)

✓ *Colony monitoring
& CMR programs*

Flyways and timing of migration?
Wintering grounds?

✓ *Satellite tracking*

Offshore “Habitats”?

✓ *Satellite tracking*

Ringling programs

Svalbard (>2007: 250 birds) & **Russia** (>2006: 100 birds)
Greenland (>2003: +500 birds)

- > high survival rates
as in many seabirds
- > high site fidelity
- > 15% of the young
back at breeding sites
after 4-6 years





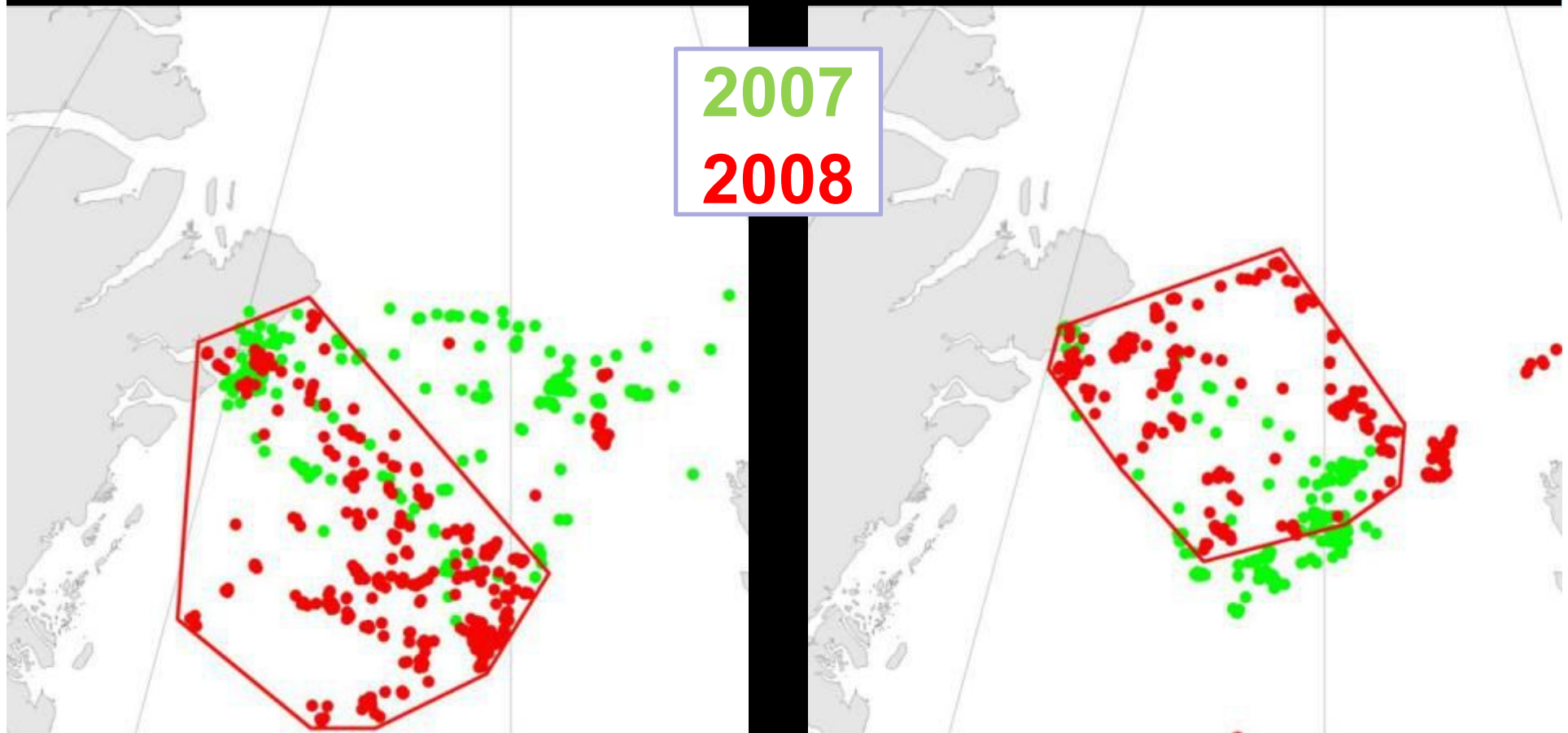
Satellite tracking

Svalbard, Russia & Greenland

2007-2013: ca. 50 birds

>100,000 ARGOS positions

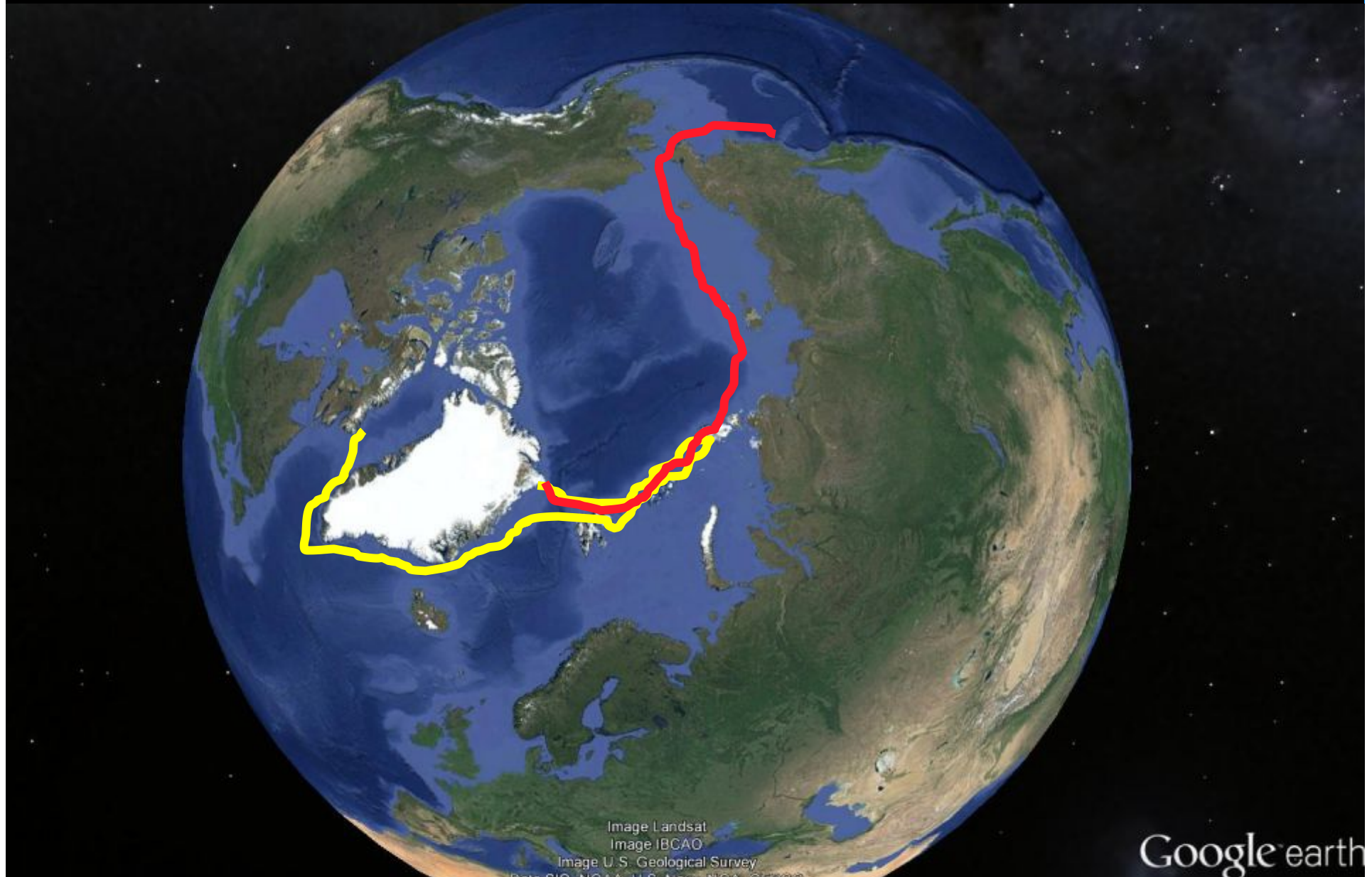
...amazing “home ranges”...



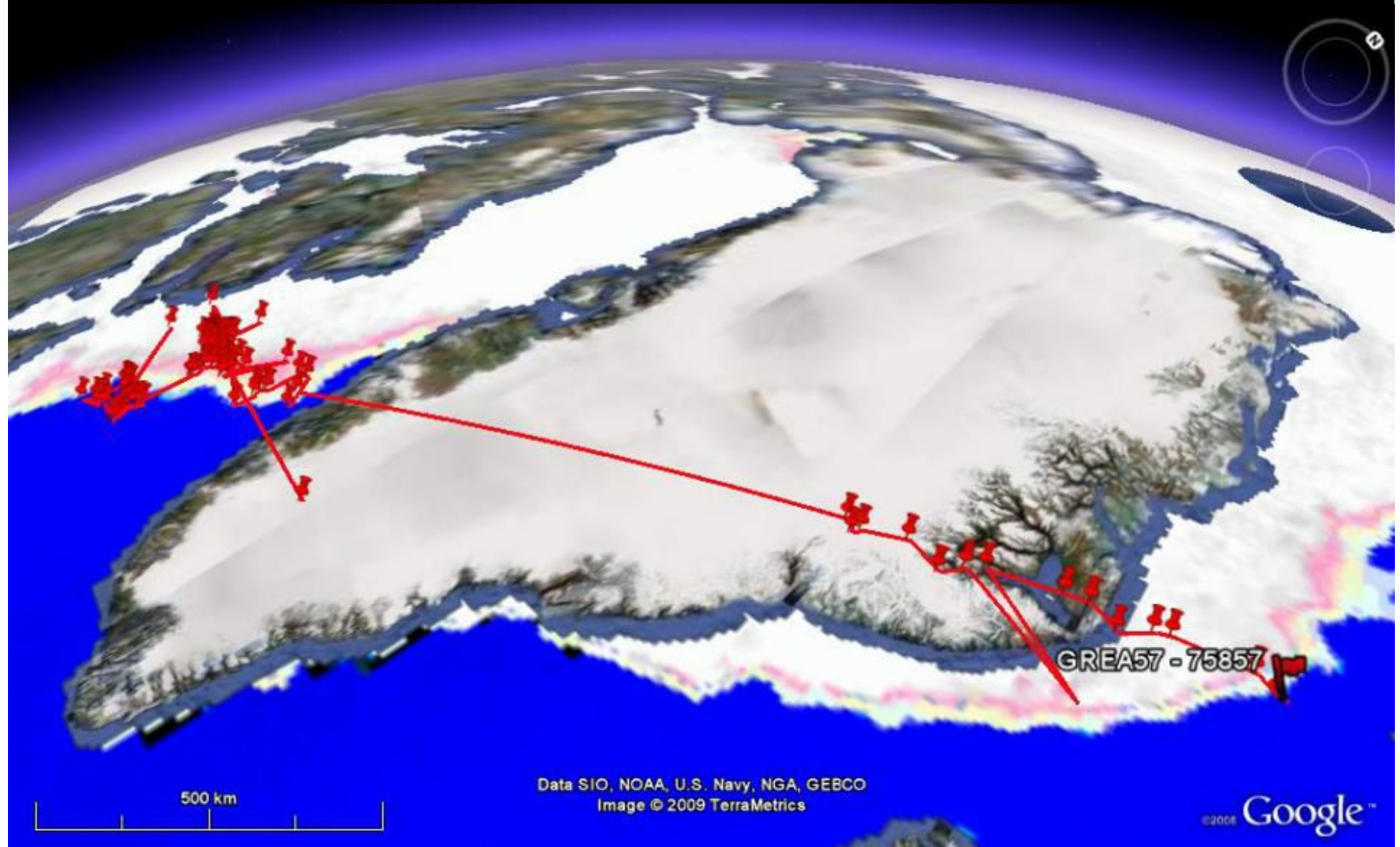
= Iceland (100.000 km²)

= Ireland (70.000 km²)

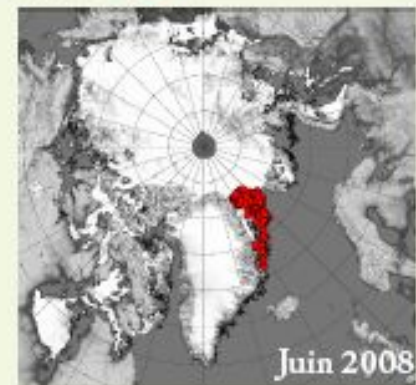
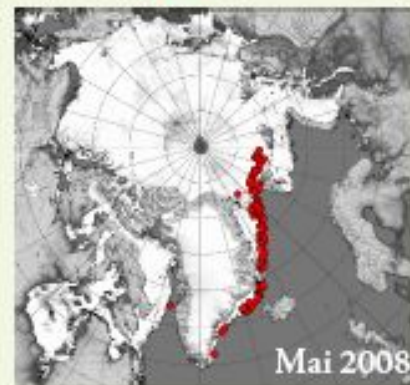
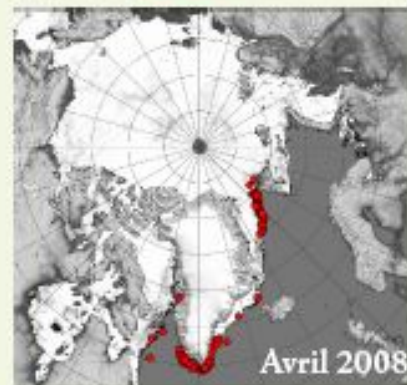
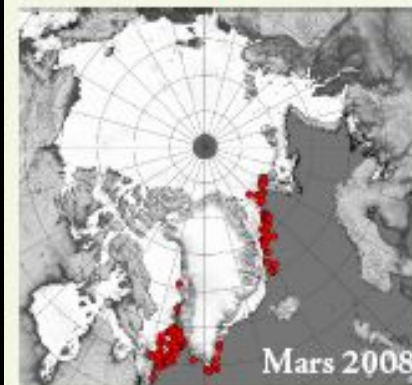
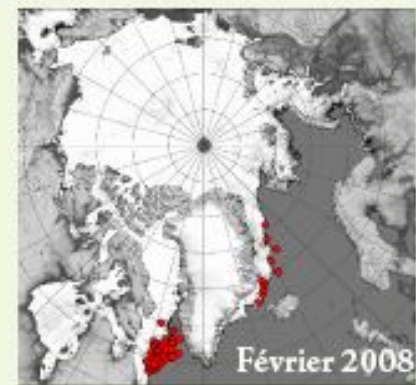
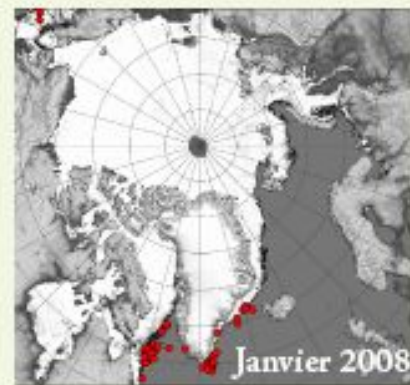
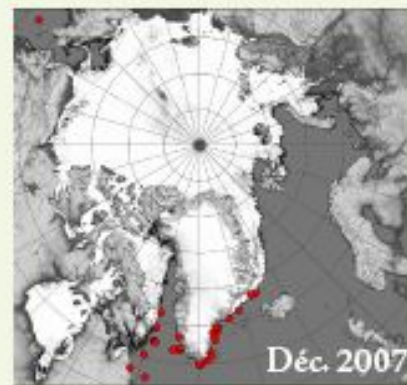
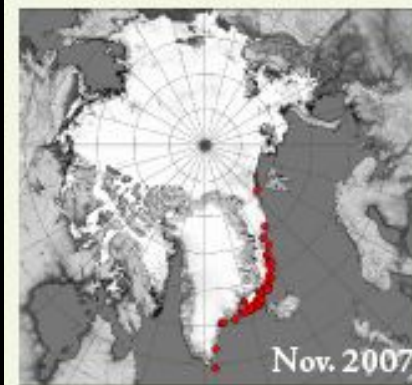
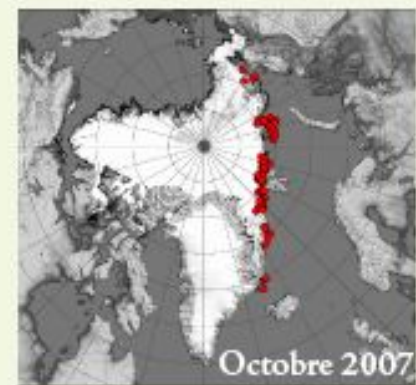
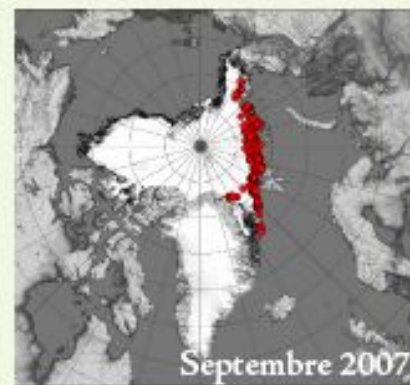
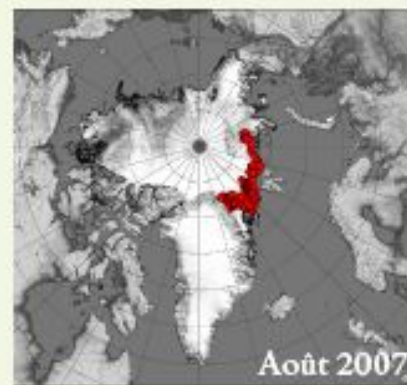
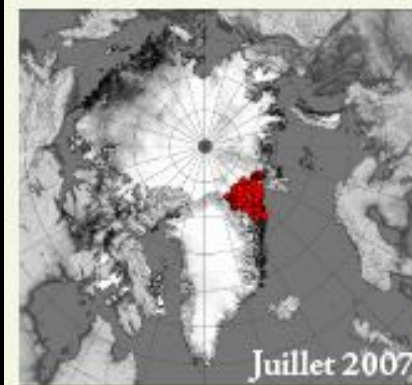
...trans-polar migration route!



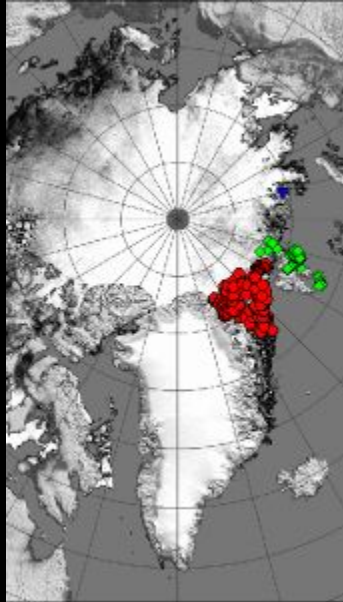
...and flight capabilities!



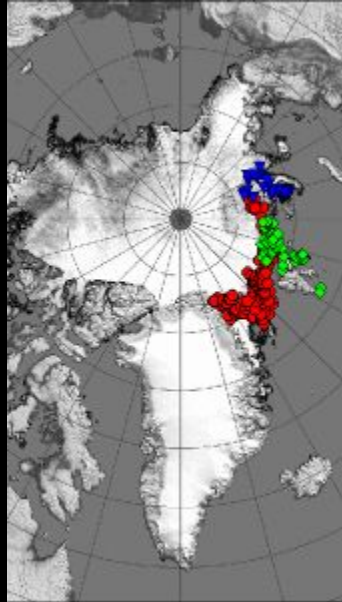
Monthly distribution



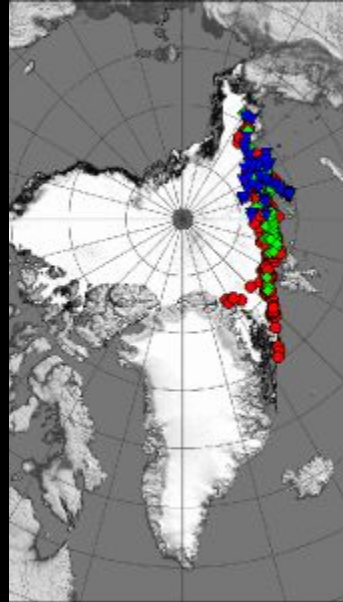
July



August

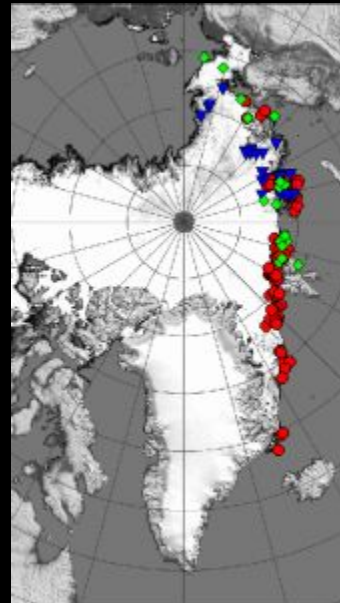


September

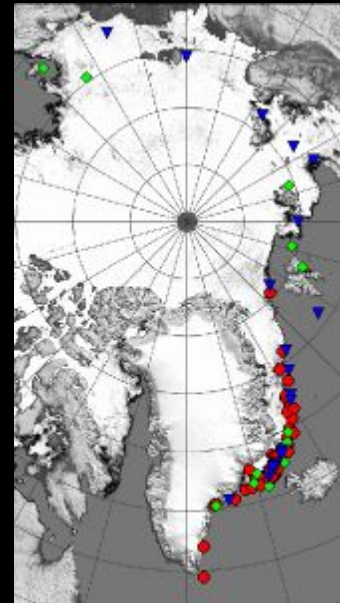


**Post-breeding
dispersal along N
Barents ice edge**

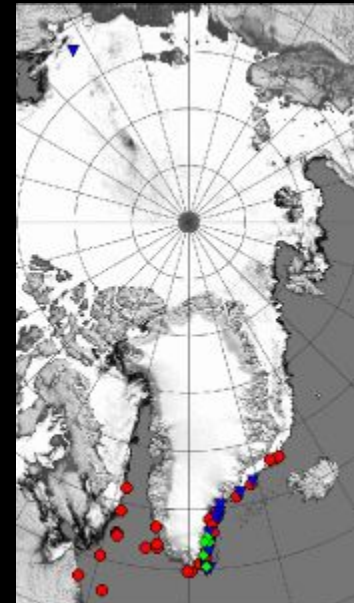
**Migration to the
Labrador ice edge**



October



November



December

Gilg et al. 2010

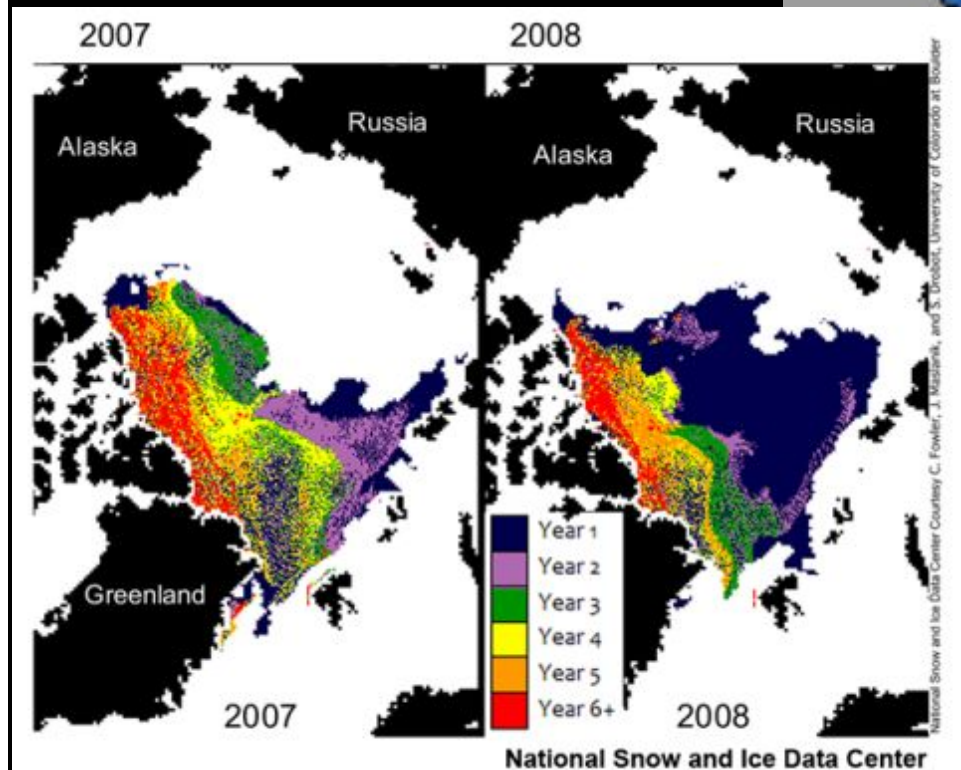
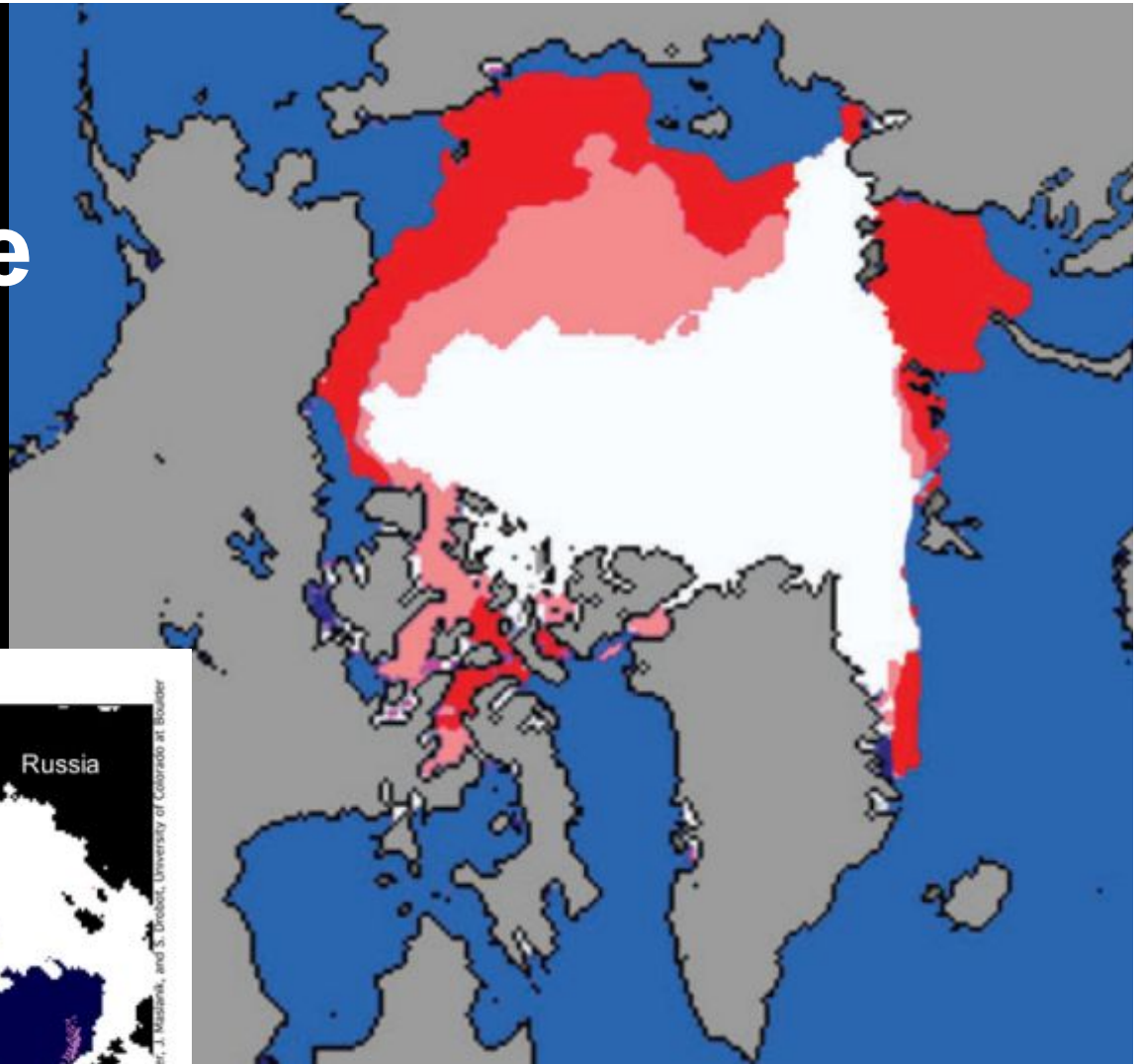
Updated Distribution ranges (2010)



Gilg et al. 2010



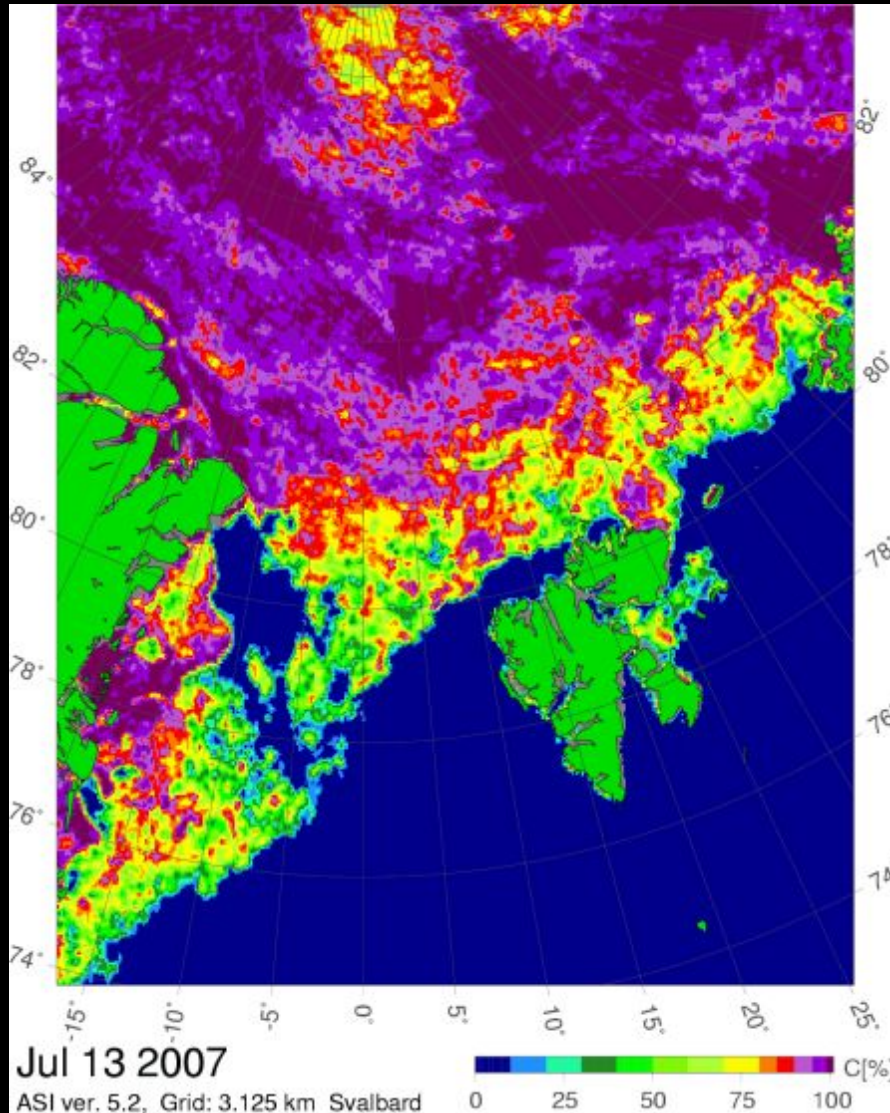
Quantitative and qualitative Changes in sea ice...



Impacts on ivory gulls?

Sea ice remote sensing using AMSR-E

(Advanced Microwave Scanning Radiometer)

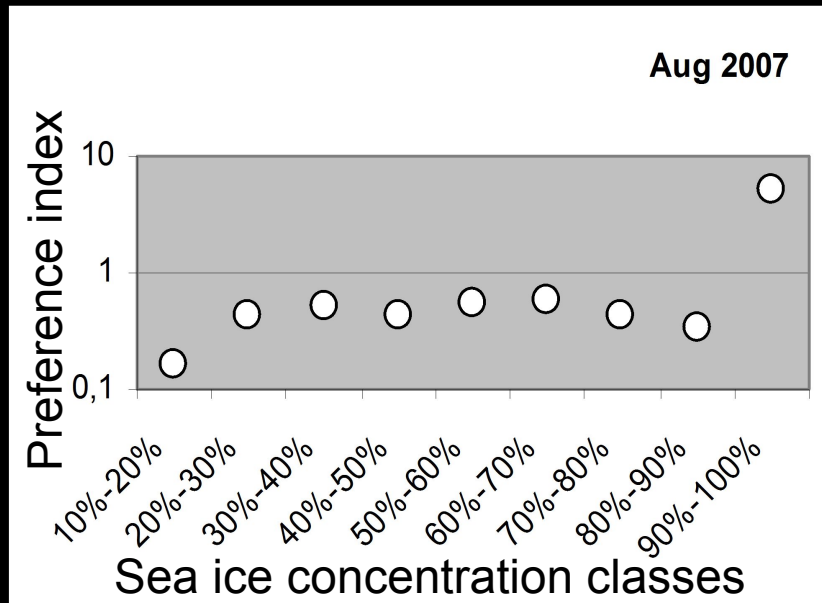


For each of the 100,000 Argos location:

- ✓ Ice concentration (IC) at gull's location (6*6km)
- ✓ IC within 10 and 50 km
- ✓ Distance to ice-edge (and to land)
- ✓ Regional availability of sea ice (extent for each IC class)

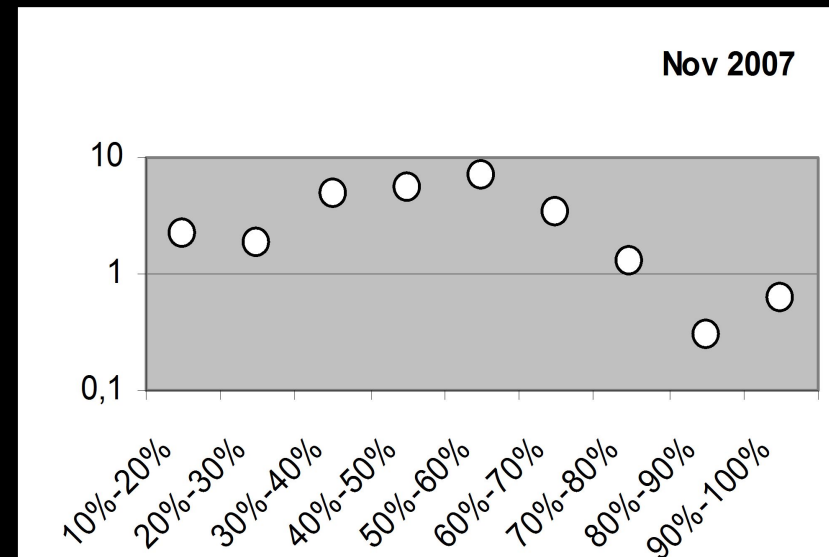
Sea ice

(%IC used / % IC available over the entire Arctic)

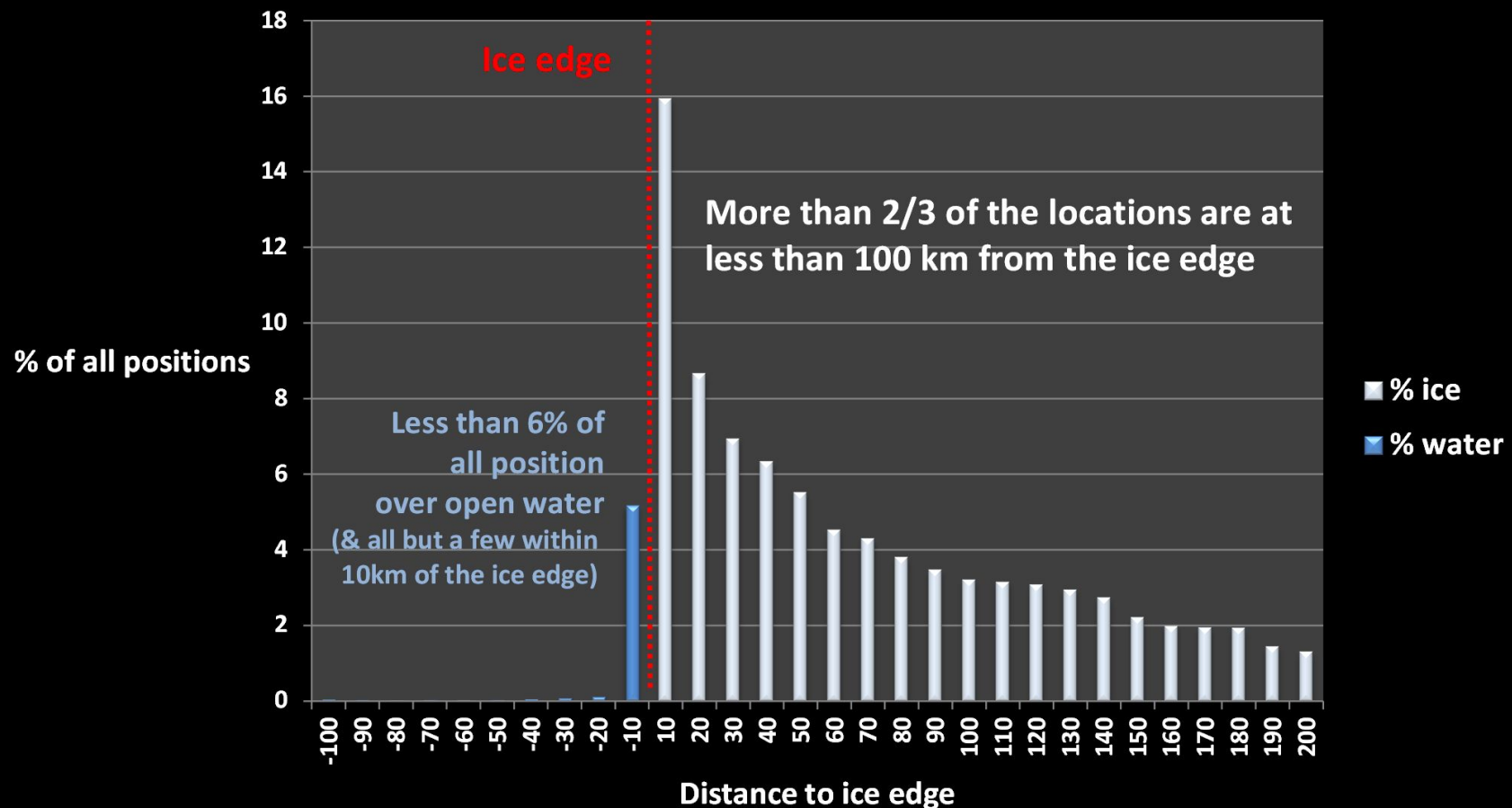


Compact sea ice in the breeding season

Scattered sea ice during migration



IVGU are sea-ice specialists with a clear preference for the ice edge



What type of sea-ice they prefer?

Which scale to consider...

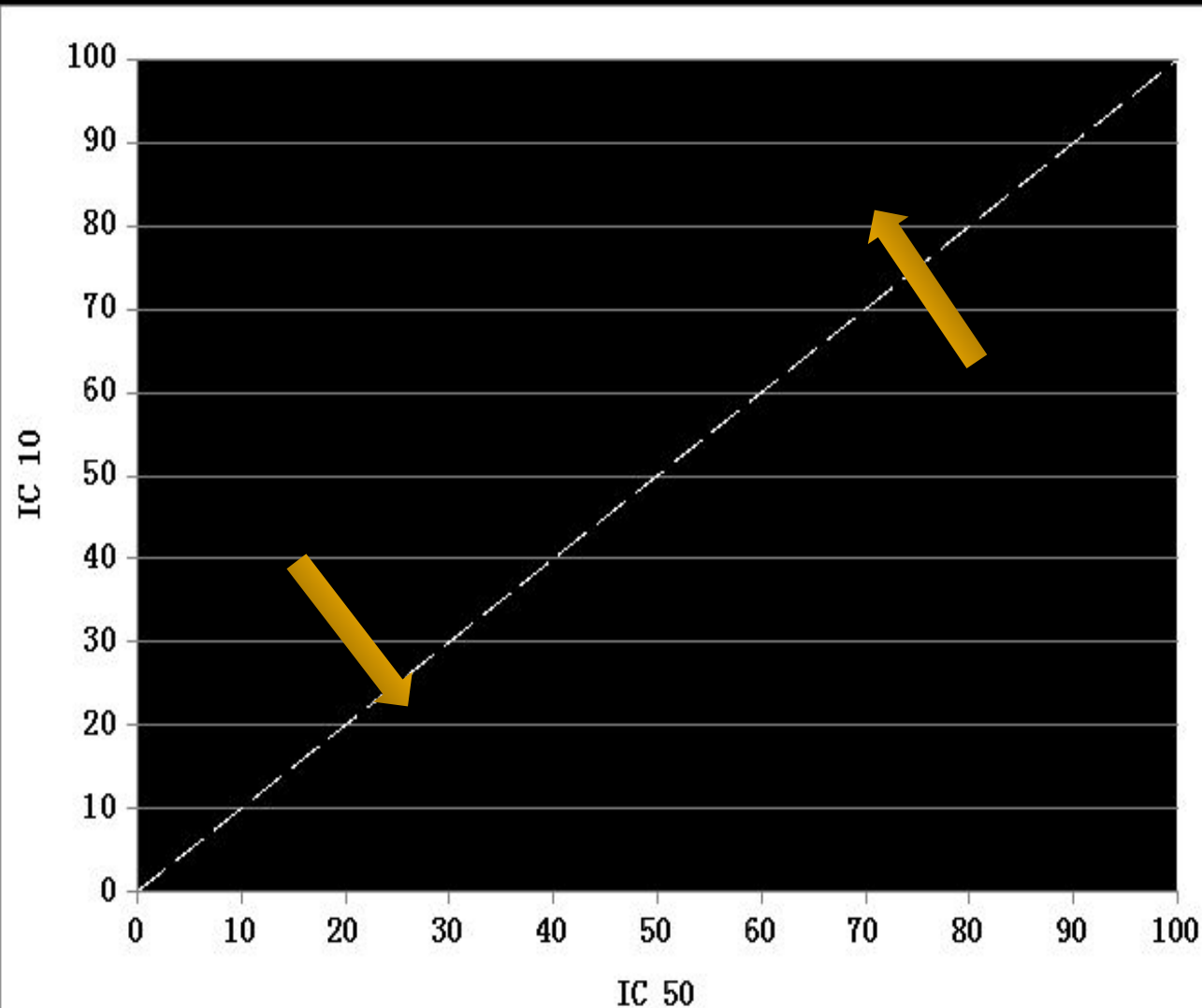
« Used » IC 10 versus « available » IC 50

IC 50

IC 10



Preferences are not uniform/linear

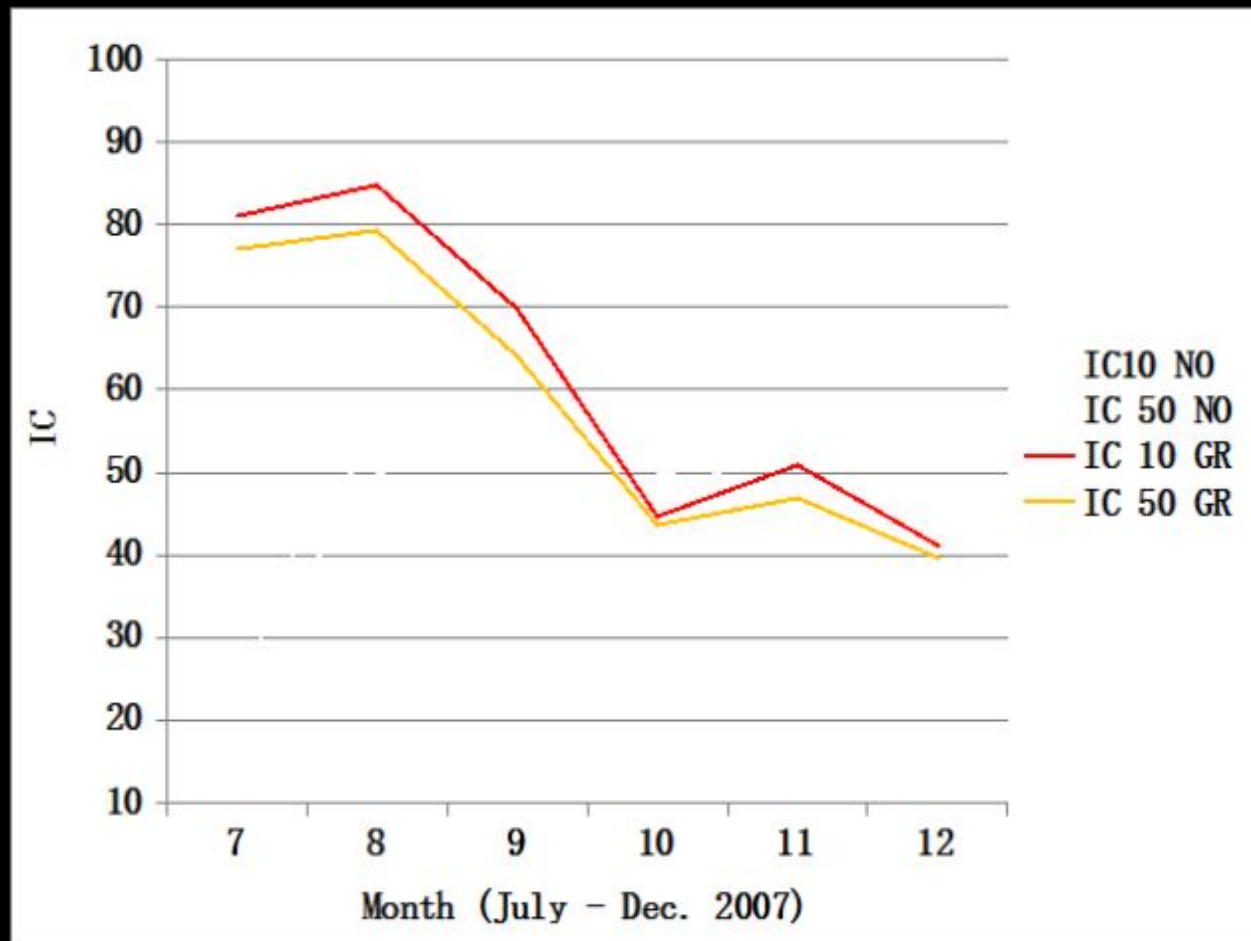


**Blue dotted line
= no preference**

**Red trend
= local preference
for IC10**

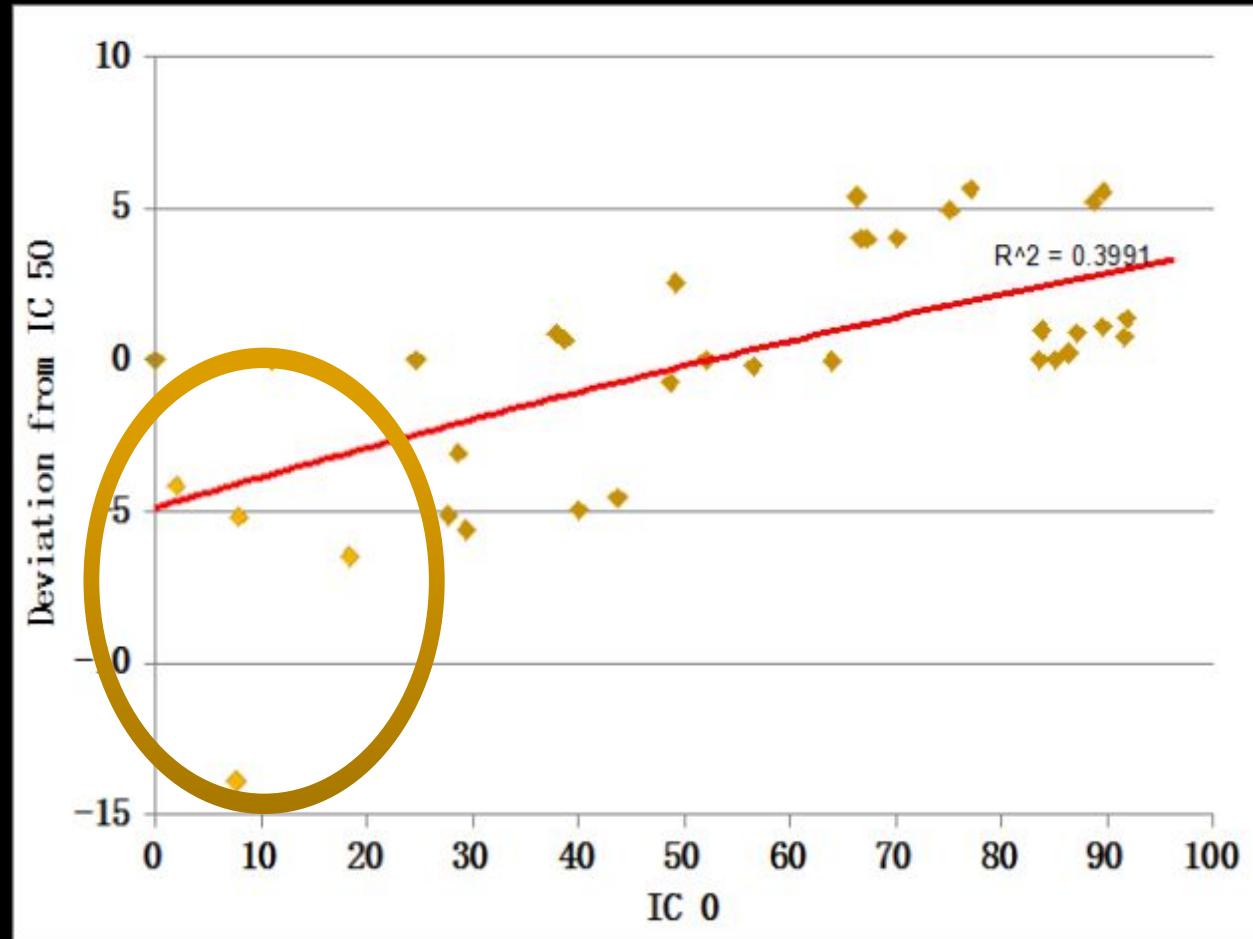
(same trend for the 3
populations)

... not directly related to absolute IC values



**In Summer,
all ivory
gulls are
selecting
denser sea-
ice than
available,
regardless
of the
dominant IC**

Preferences are rather seasonal...



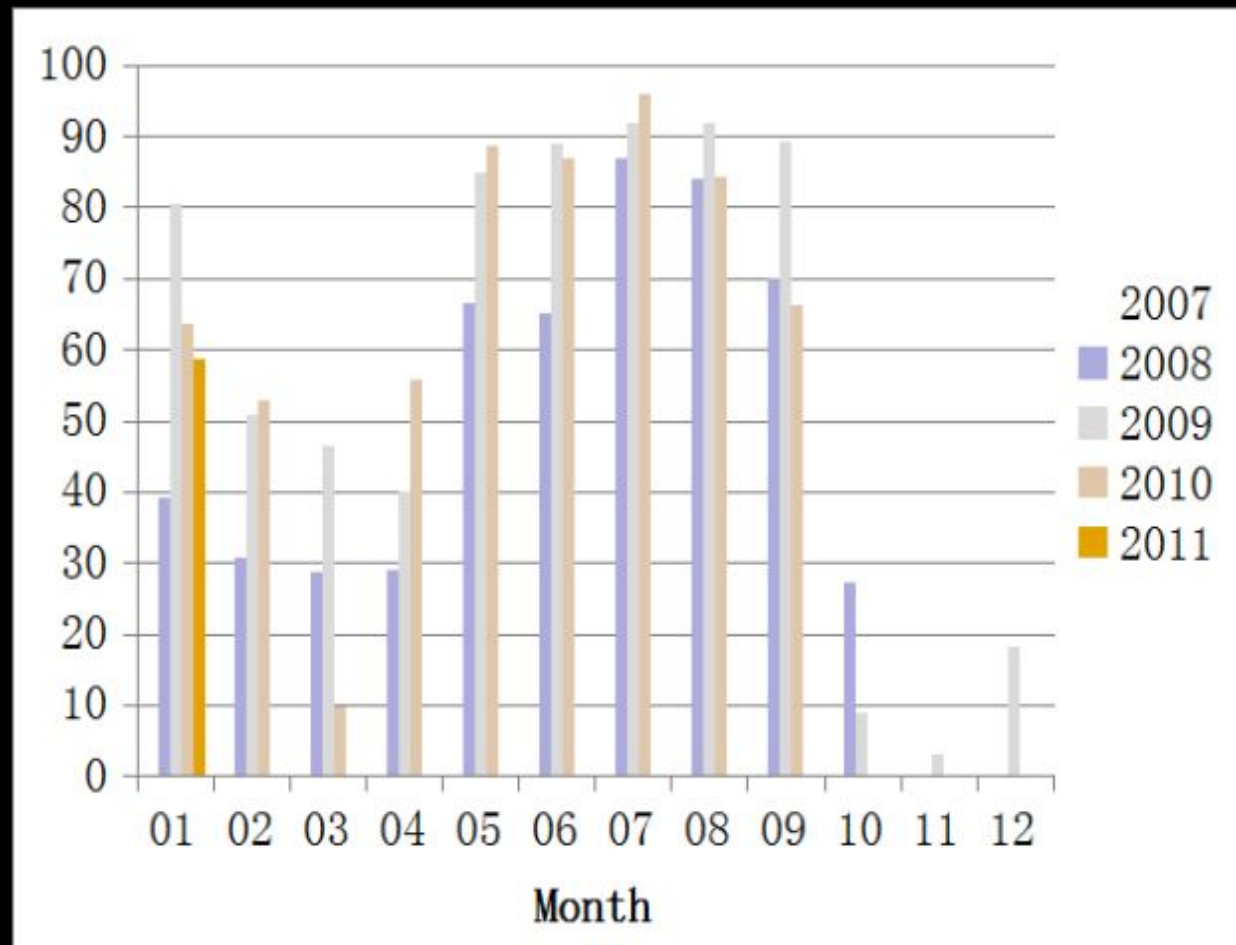
**Winter: for lower
IC than available
at regional scale**
(yellow dots)

**Summer: for
higher IC**
(blue dots)

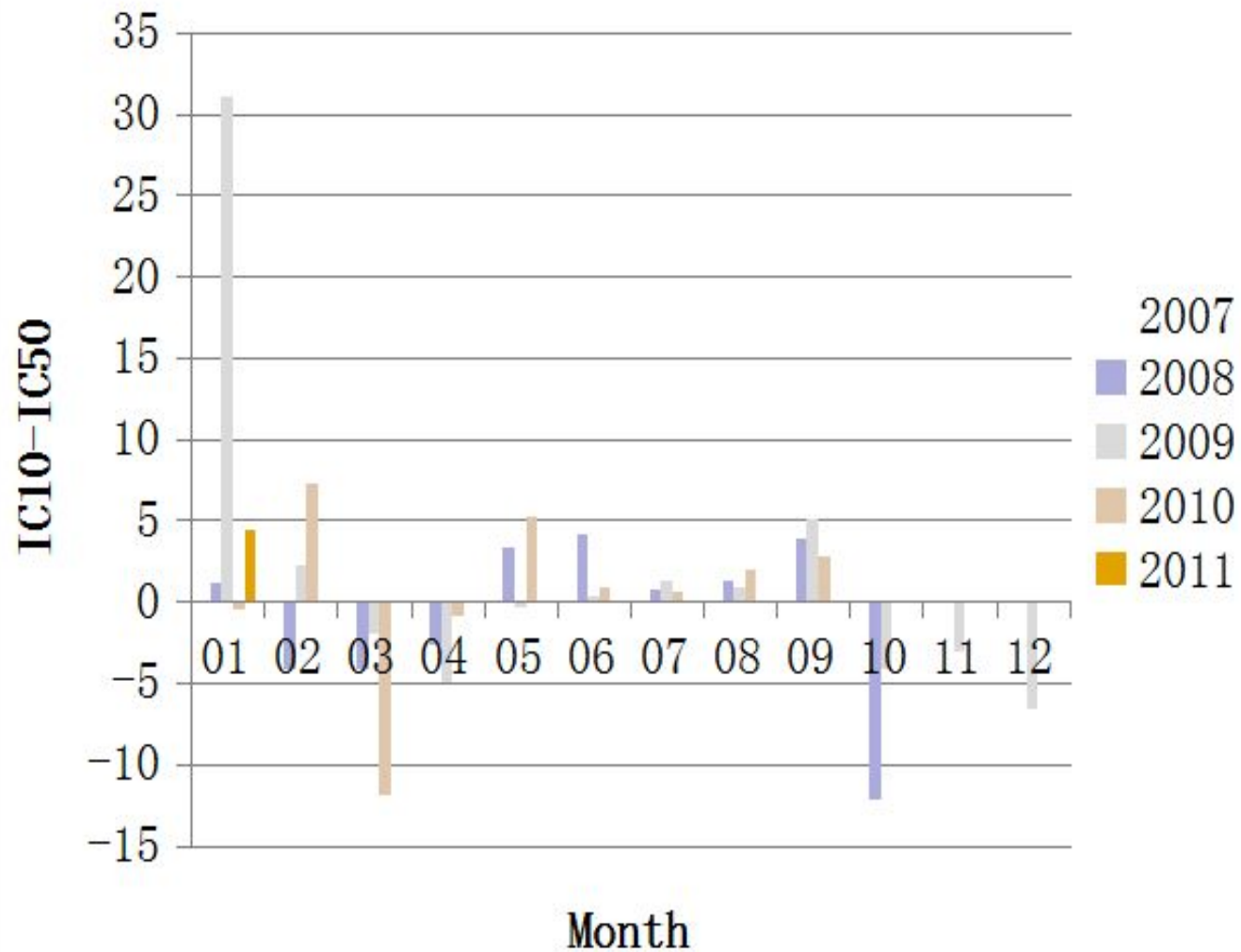
(monthly mean;
GL birds)

Differences in diet? Behaviour?

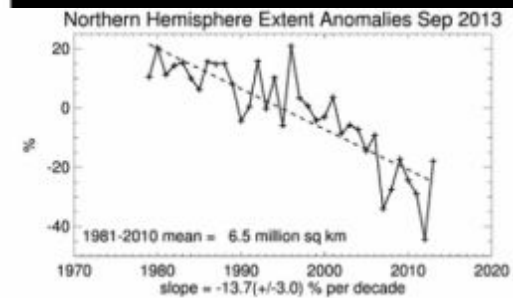
What about years with different ice conditions? (Greenland 2007-2011)



**We can also
compare
monthly means
between years
and see if there
is any
behavioural
change
emerging...**



**E.g. plotting
“anomalies”
makes it easier
to see in which
years/months
the IVGU’s
preferences
were most
pronounced**



Conclusions

- The ivory gull is definitely a sea ice specialist
- It preferentially uses the vicinity of ice edges
- Its preference for some IC varies seasonally
- reduction in summer sea-ice extent
= shrinking feeding areas
= induce local extinctions?
- Any delay in sea-ice rebuild in autumn or the reduction in sea-ice extend in winter could also be very harmful to the species (which mainly avoids the polar night)

Conclusions

- According to our current knowledge and to expected changes in sea-ice dynamics:

the species faces a serious risk of extinction

within this century!

Perspectives: 2050? 2100?

Adapt or die!
(on relatively short term...)

Res. challenges:

1. Monitor future changes in IVGU
(breeding range, survival rates,
migration patterns, habitat use...)
2. Develop IVGU/SEA-ICE models
(linking our best ecological knowledge
to the forecasted changes in
sea-ice dynamics)





Thanks!

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