Spuren des Klimawandels in der Vogelwelt

Wohin führen sie?

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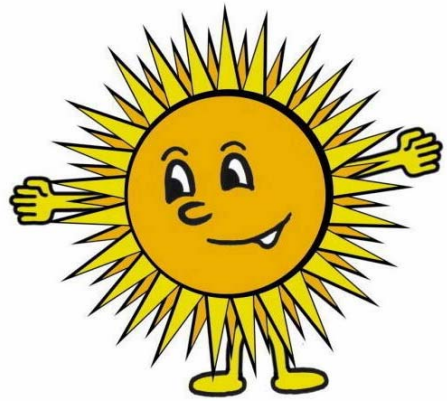
Wilhelmshaven
www.vogelwarte-helgoland.de

Vogelwelt und Klimawandel



- ►verändertes Zugverhalten
- ►verändertes Brutverhalten
- ►demographische Veränderungen
- ►Veränderungen in Brut- und Nichtbrutverbreitung
- ►sich ändernde Vogelgemeinschaften

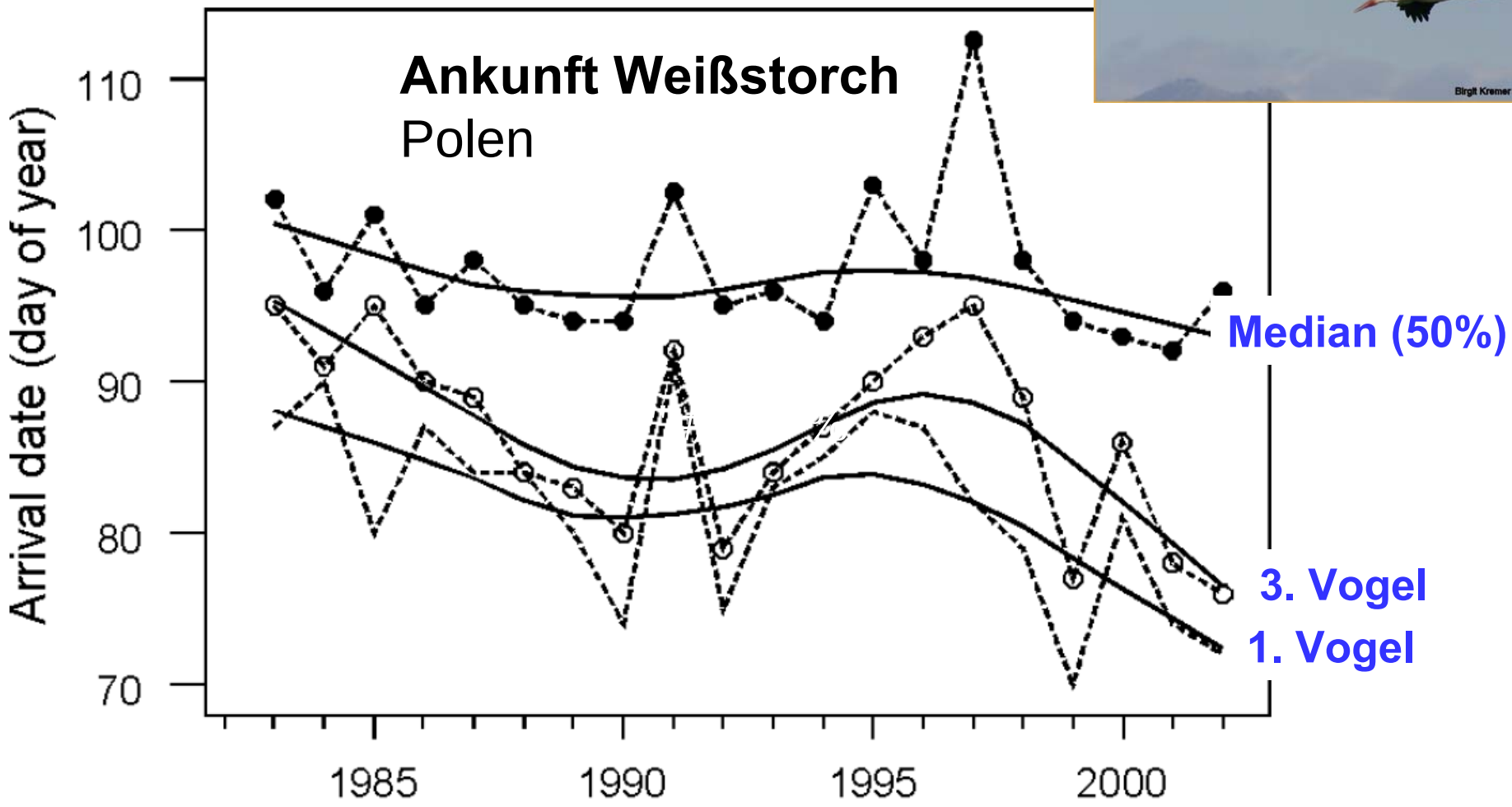
►**Na und ….**

►**Wie (funktional) beeinflusst Klima(wandel) Vögel?**

►**Welches sind die Konsequenzen dieser Veränderungen?**

►**Anpassungsfähigkeit der einzelnen Art**

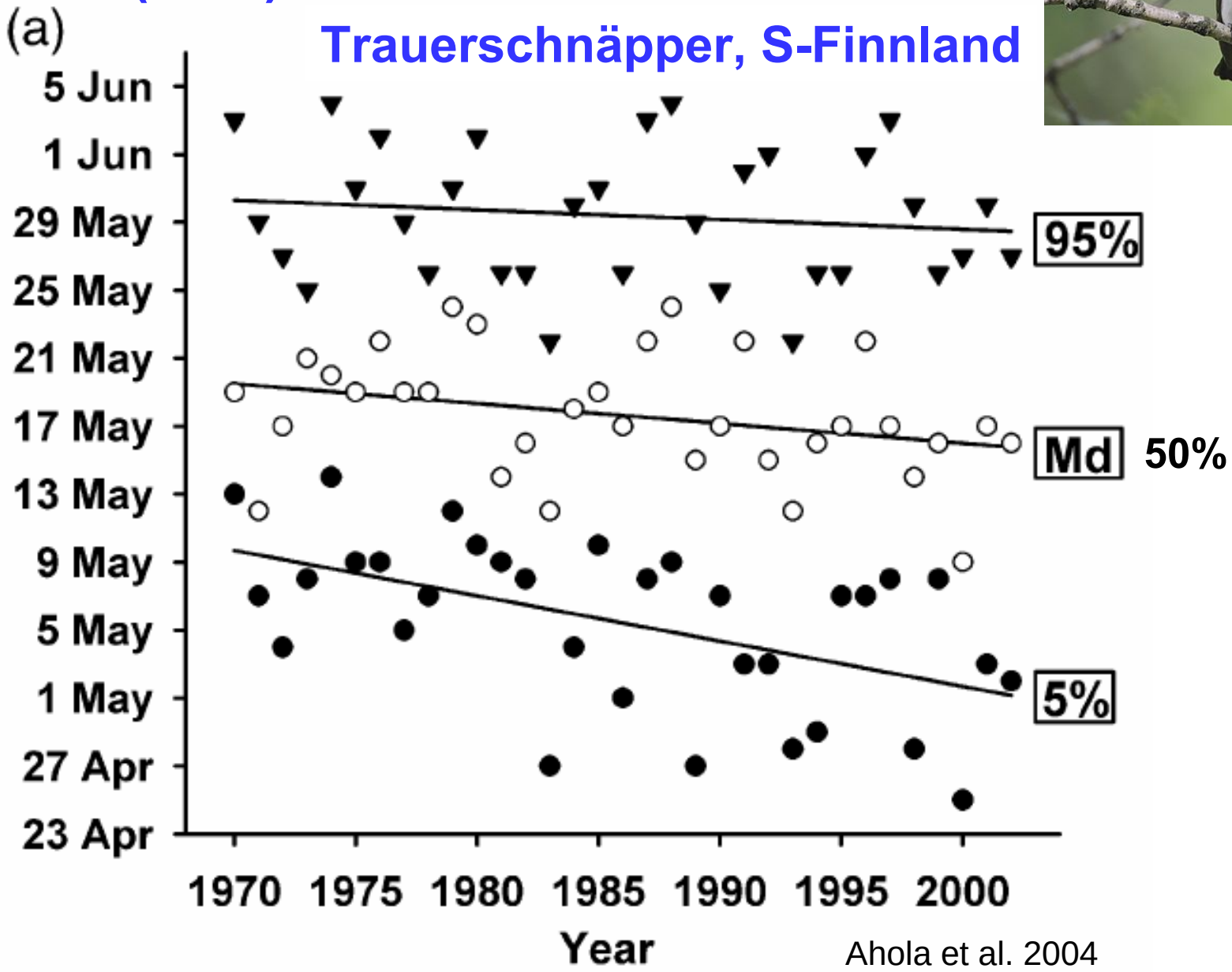
(Erst)Ankunft



Ptaszyk et al. 2003

(Erst)Ankunft

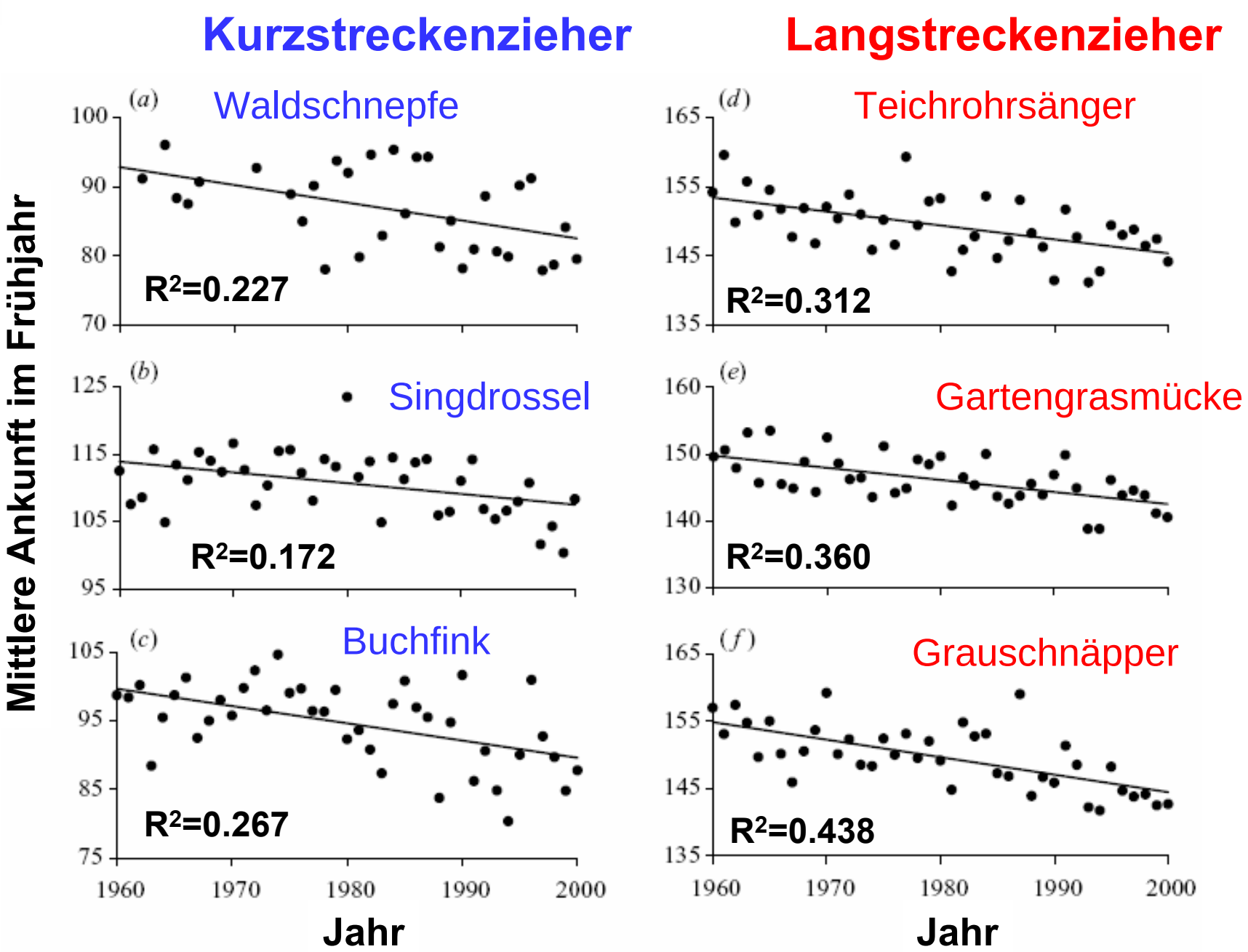
Trauerschnäpper, S-Finnland



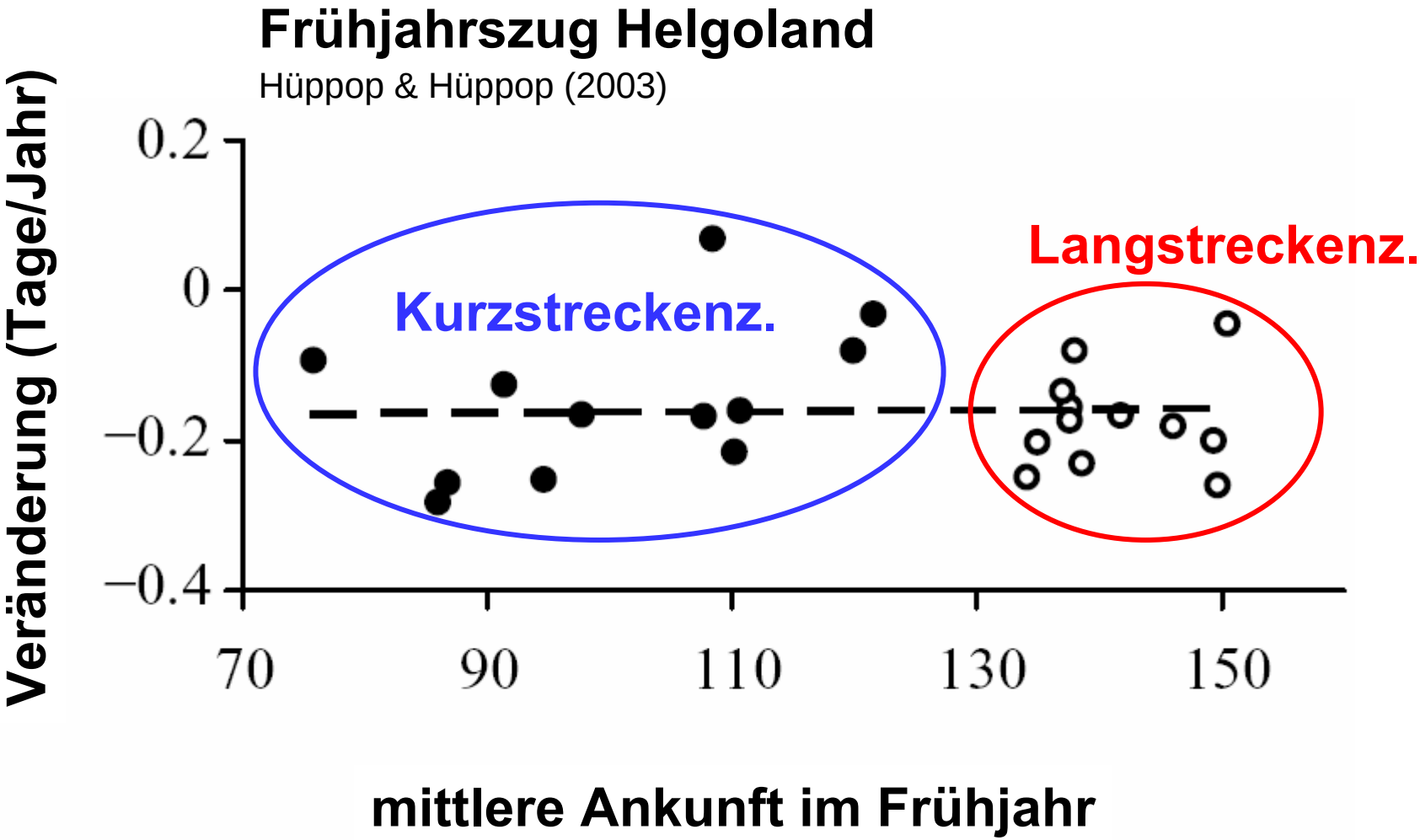
Ahola et al. 2004

Frühjahrszug Helgoland

Hüppop & Hüppop (2003)



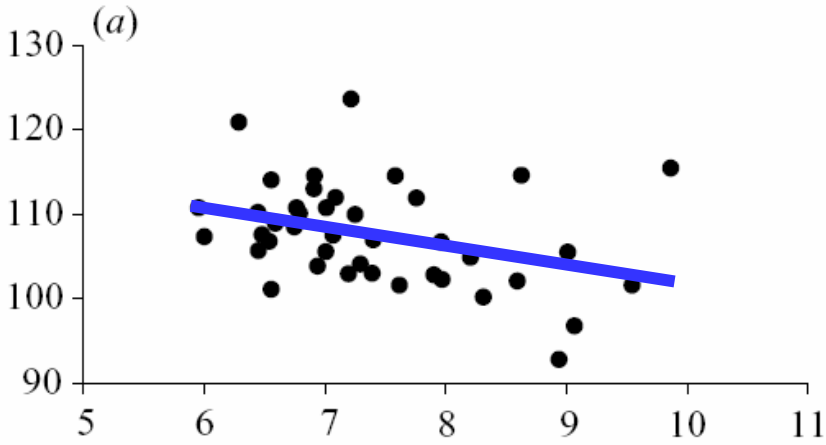
Sind Lang- und Kurzstreckenzieher verschieden?

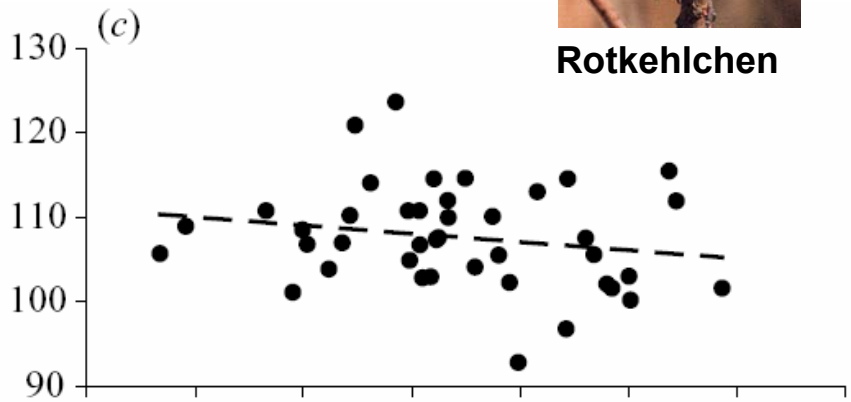


Frühjahrszug Helgoland

Rotkehlchen

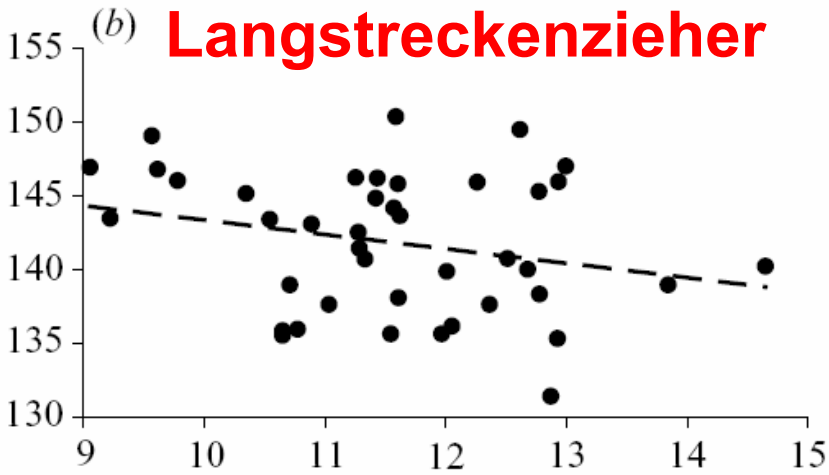
Kurzstreckenzieher





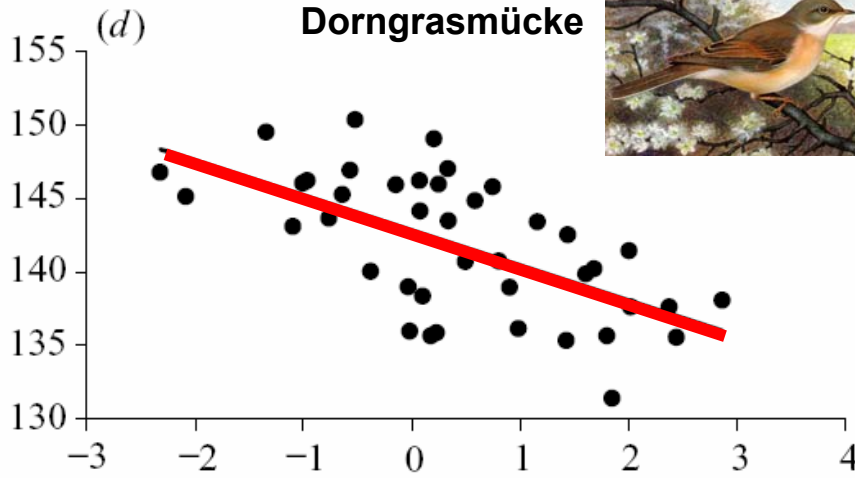
Mittlere Ankunft im Frühjahr

Langstreckenzieher



Temperatur °C

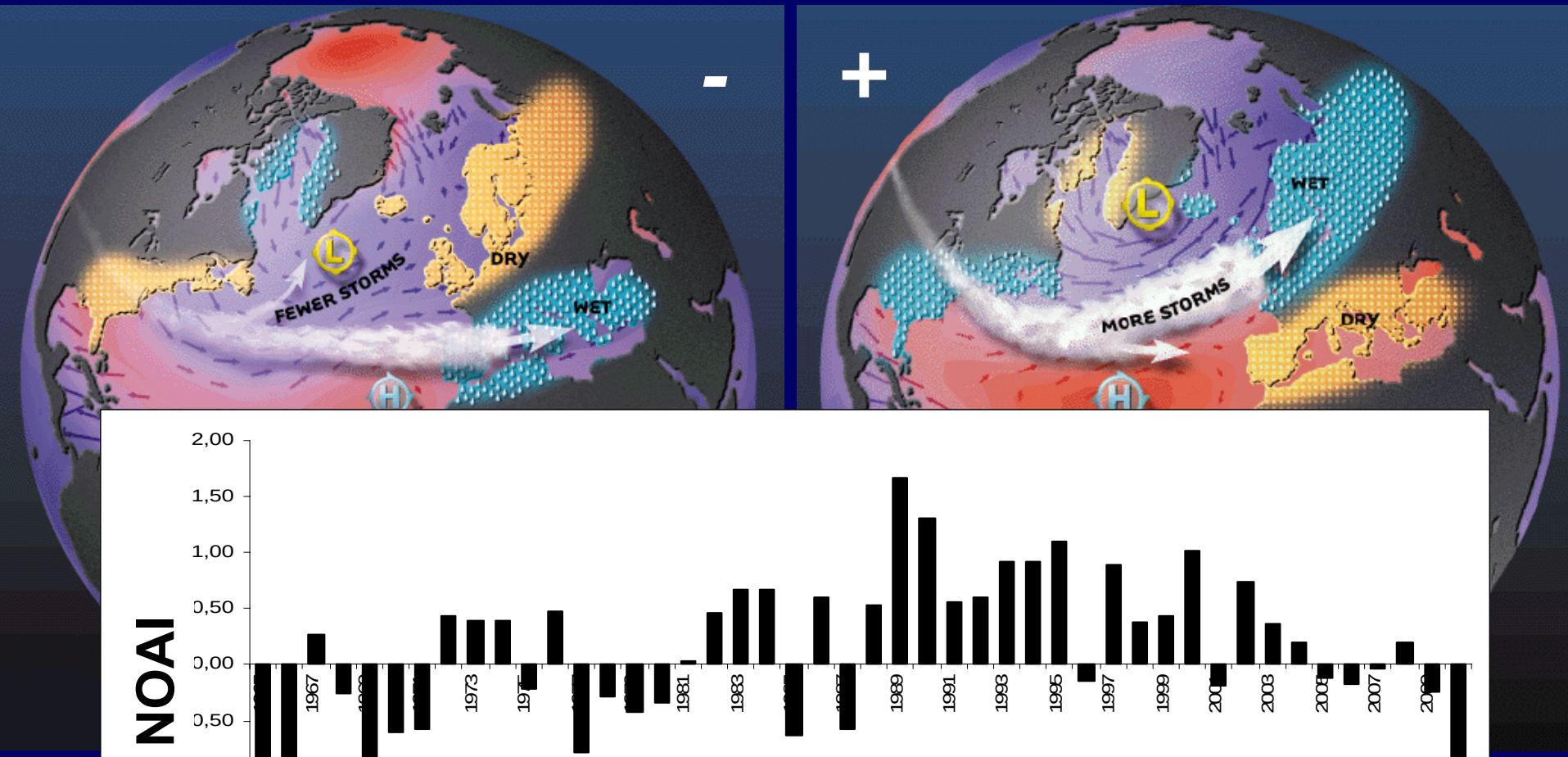
Dorngrasmücke

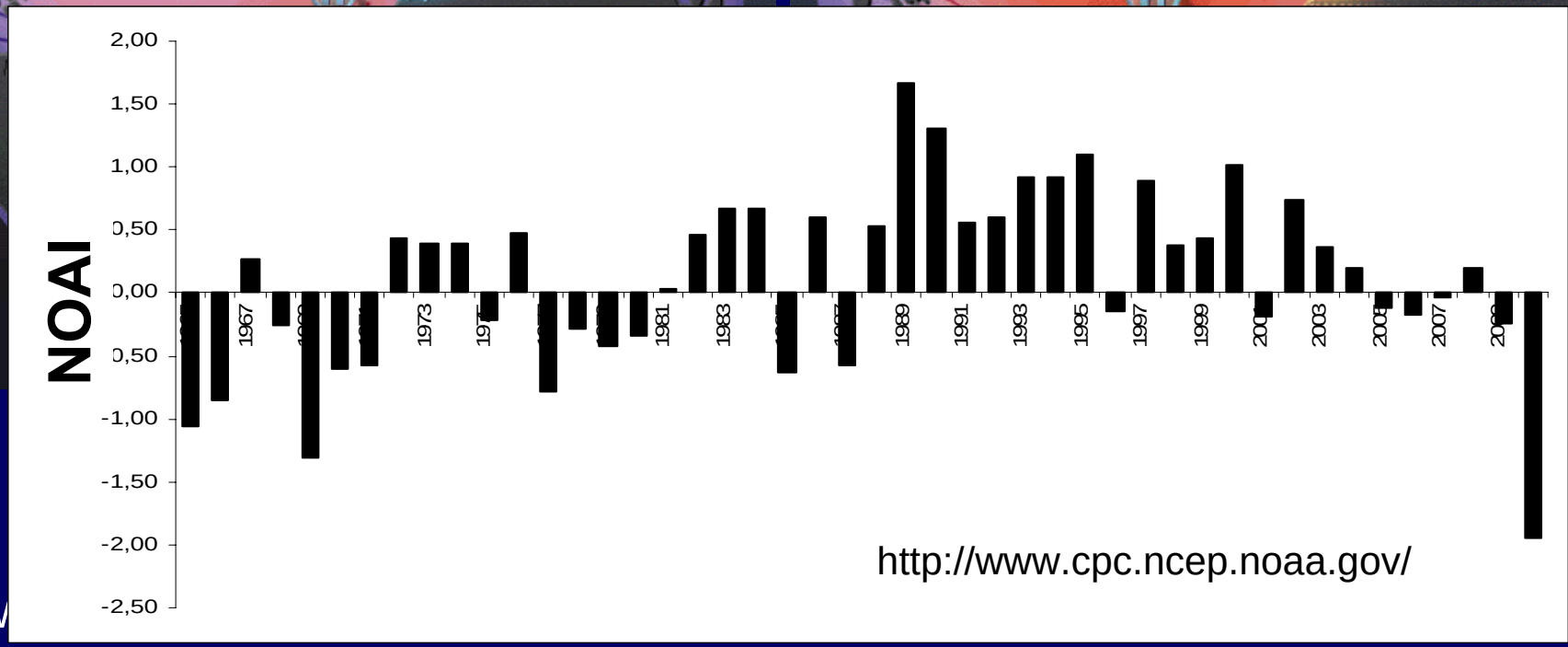


NAOI

Hüppop & Hüppop (2003)

Nordatlantische Oszillation





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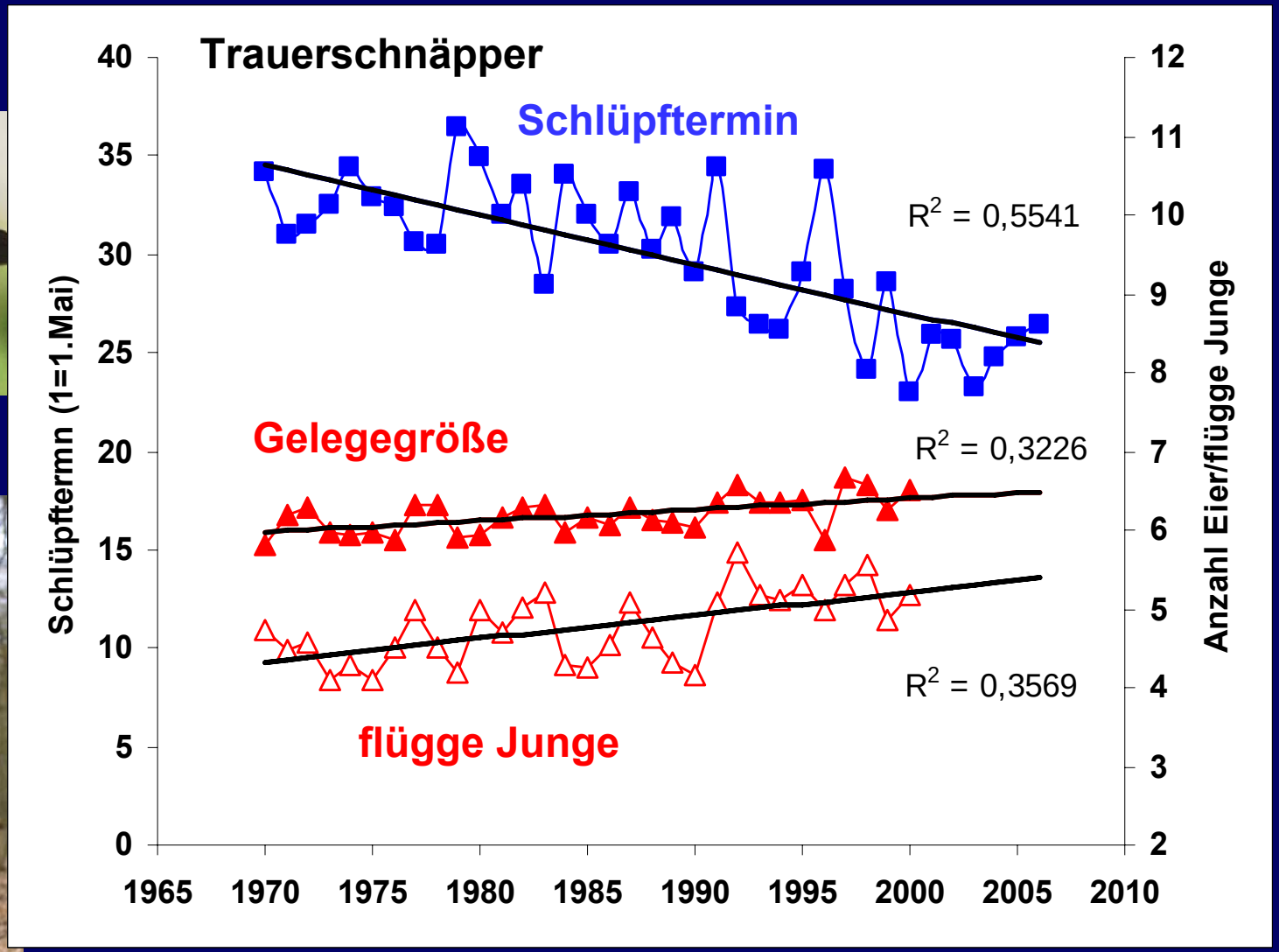
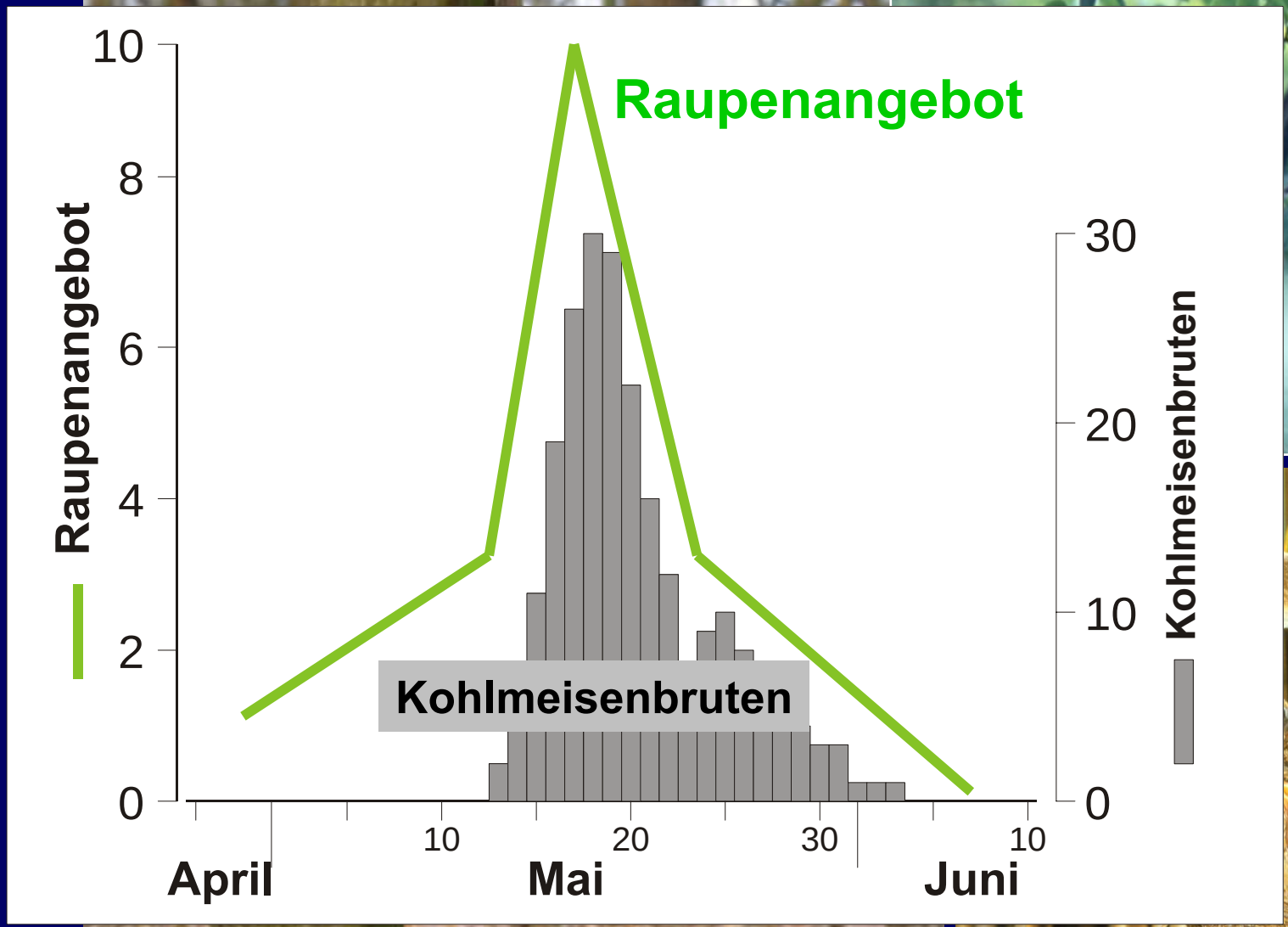
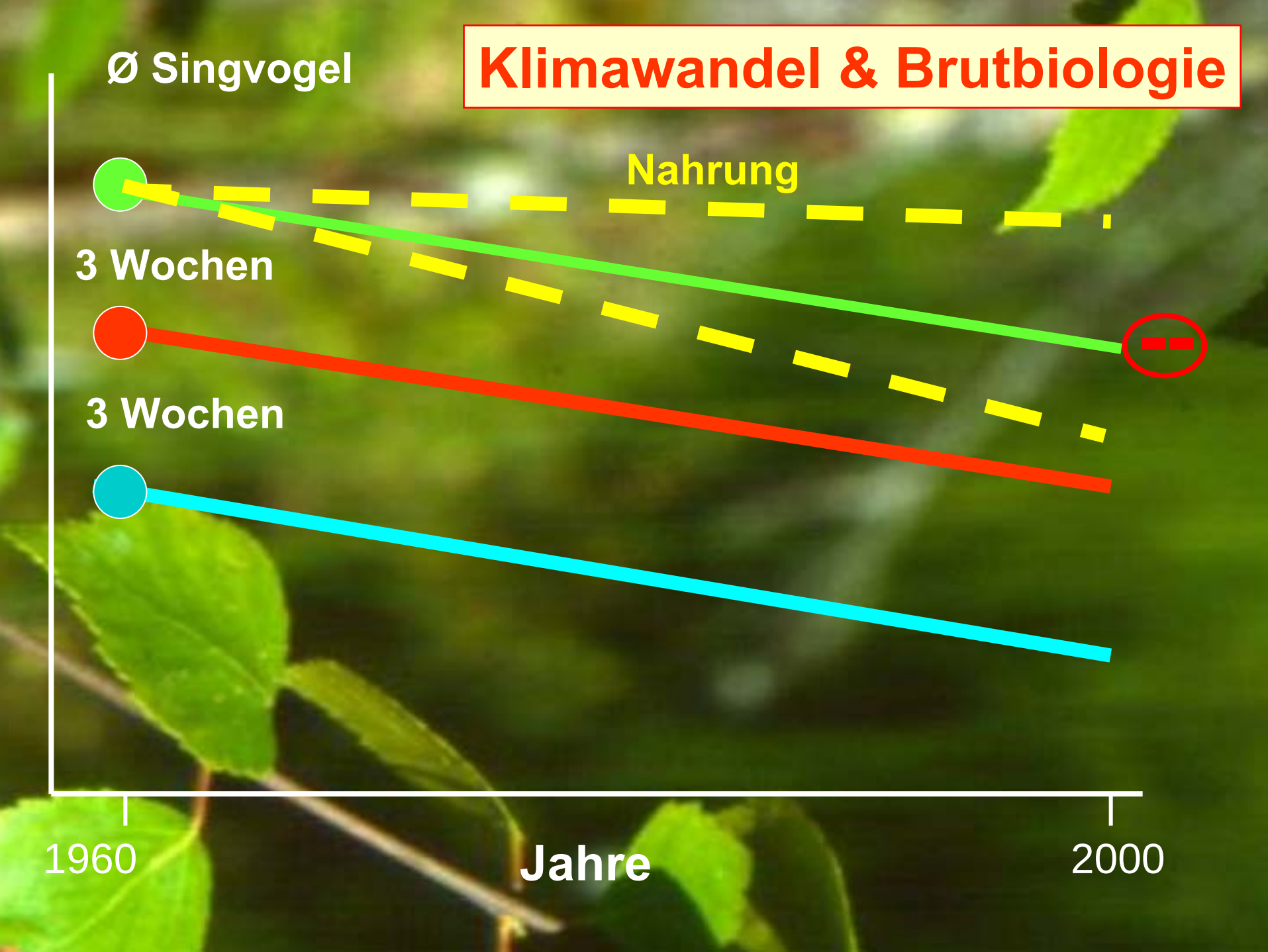
Klimawandel & Brutbiologie



(Bairlein & Winkel 2001; ergänzt)

Klimawandel & Brutbiologie




Klimawandel & Brutbiologie
Ø Singvogel
Nahrung
3 Wochen
3 Wochen
1960
Jahre
2000

Trophische Asynchronie („mis-match“)

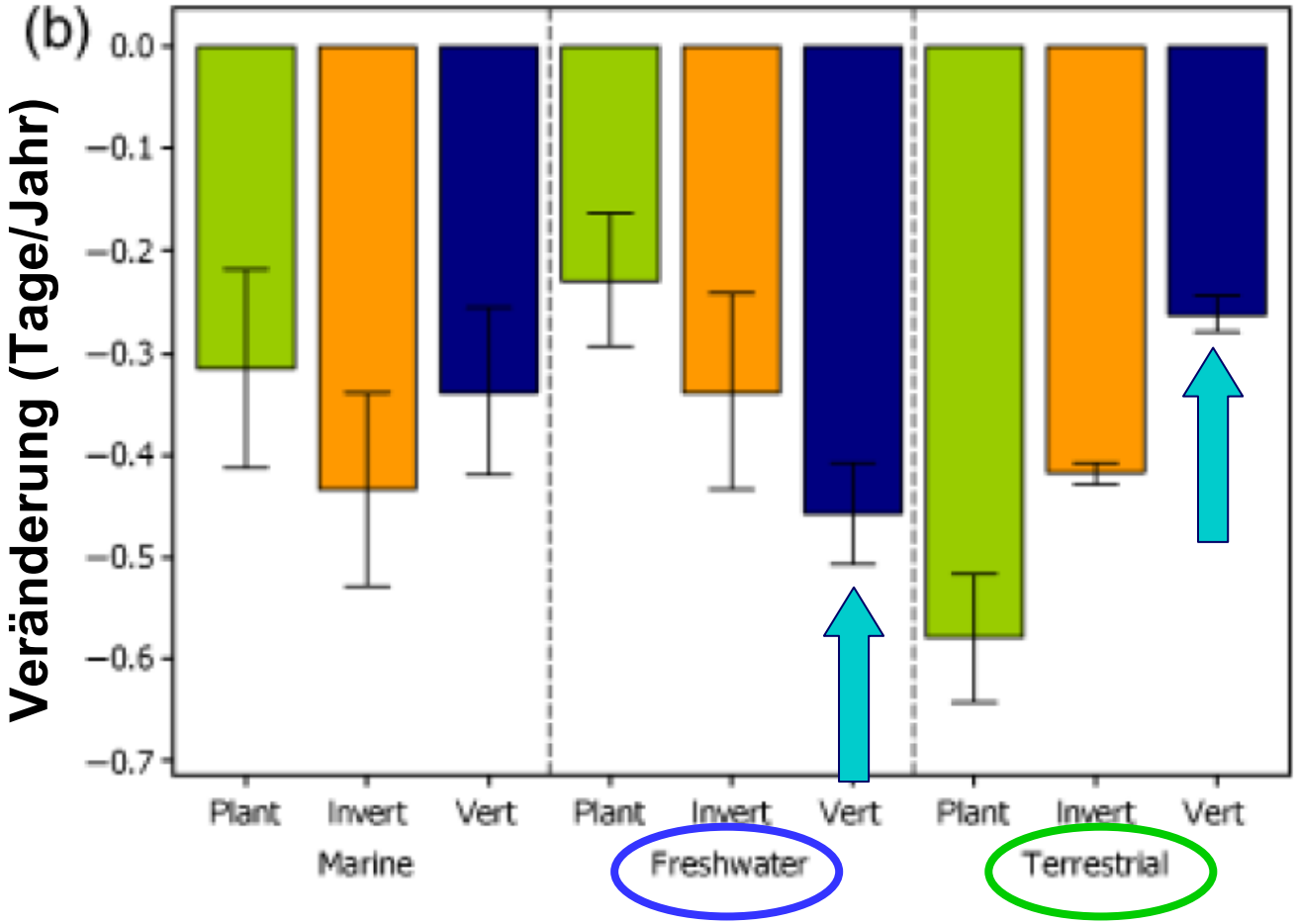
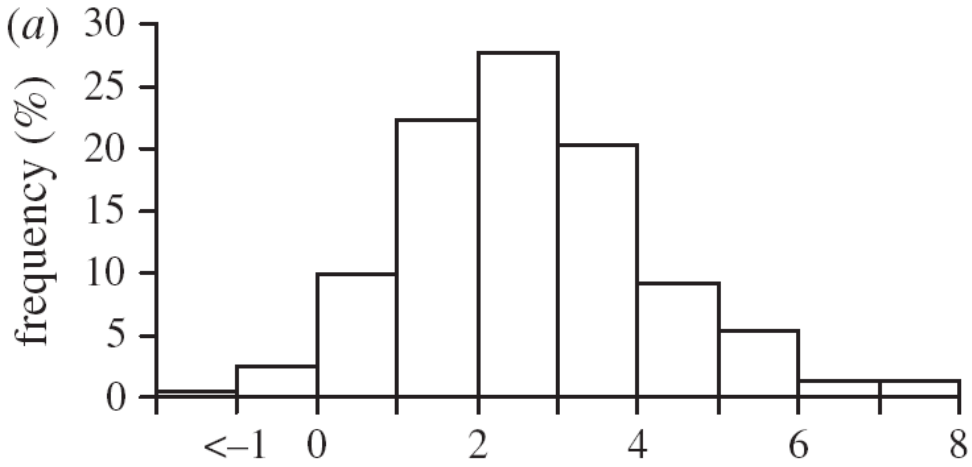


Fig. 2 Phenological change for the UK flora and fauna from 1976 to 2005.

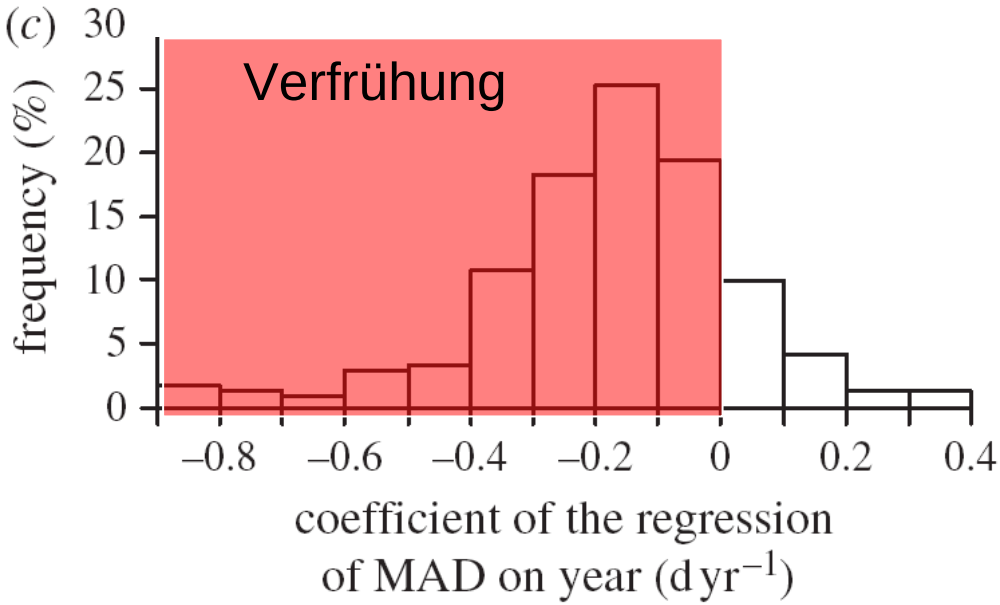
Thackberry et al. 2010

„Mis-match“ & Bestandsveränderungen



Erwärmung im Frühjahr (DD_0, °C/Jahr)

Temperatursumme der Tage mit >0°C vom 1. Januar-Ankunft 1960-2007

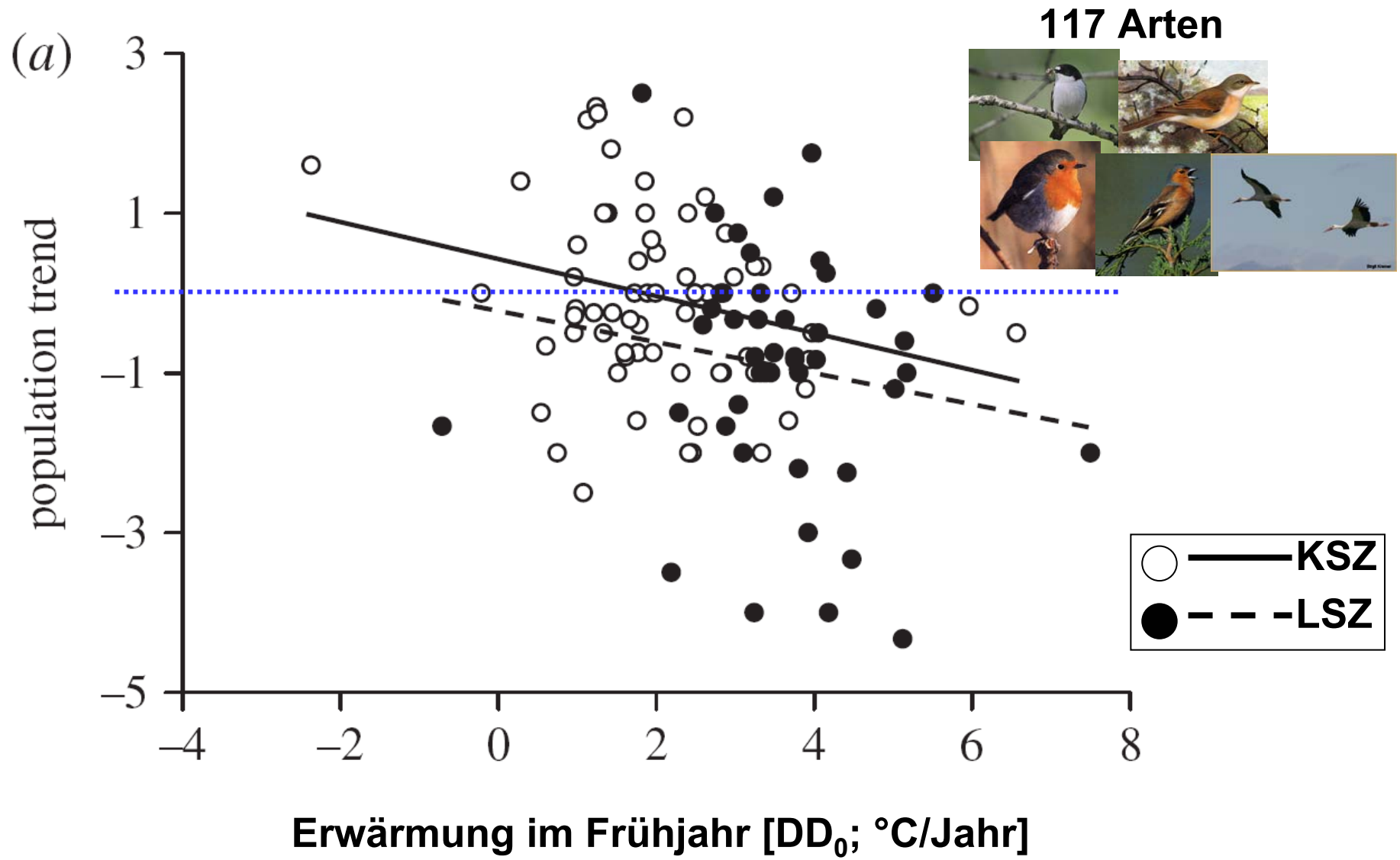


Veränderung der mittleren Ankunft

117 Arten

Saino et al. 2011

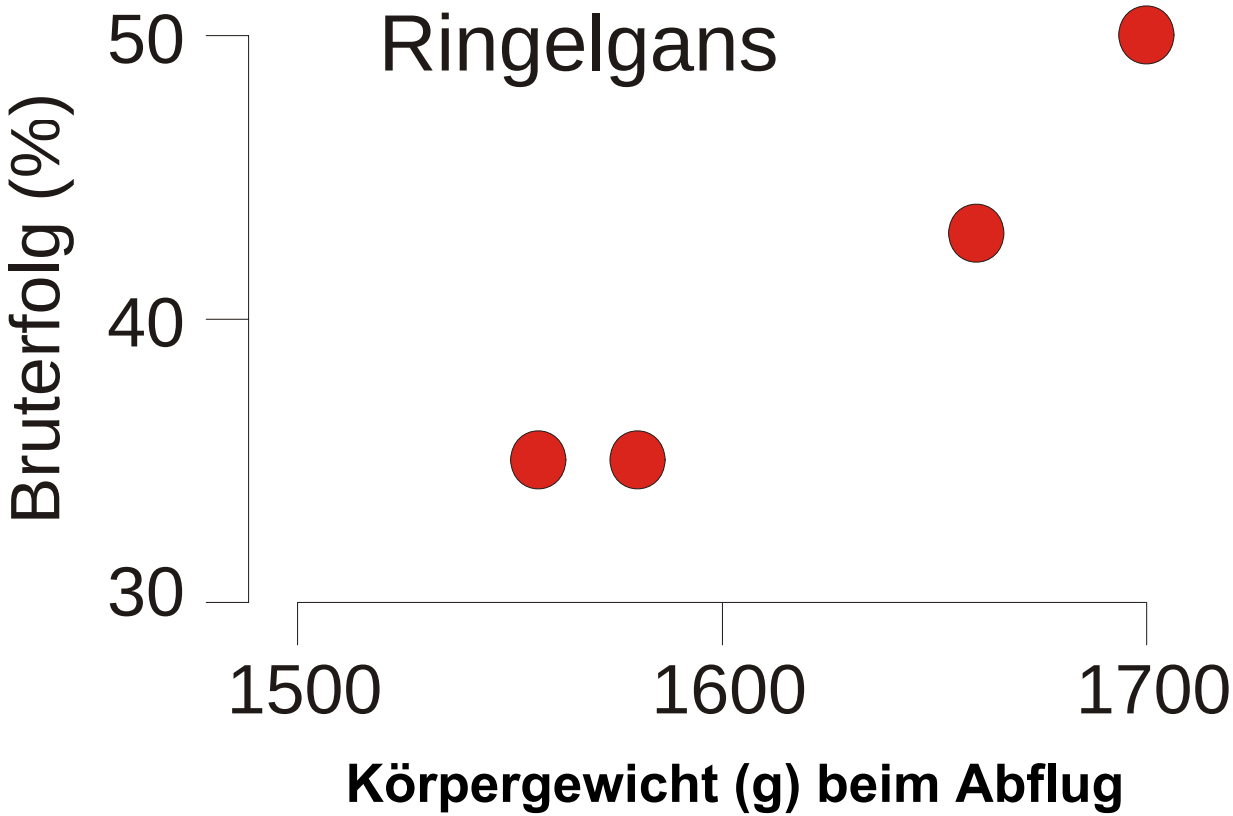
„Mis-match“ & Bestandsveränderungen



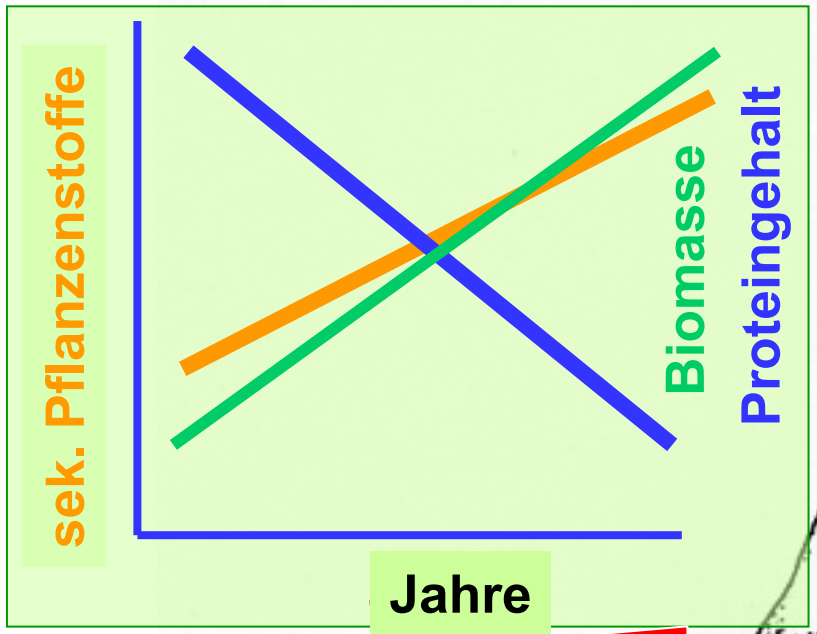
Saino et al. 2011

Nährwert (nutritional) mis-match

- Treibstoff (Fett) für Zug
- Eiweiß für Brüten



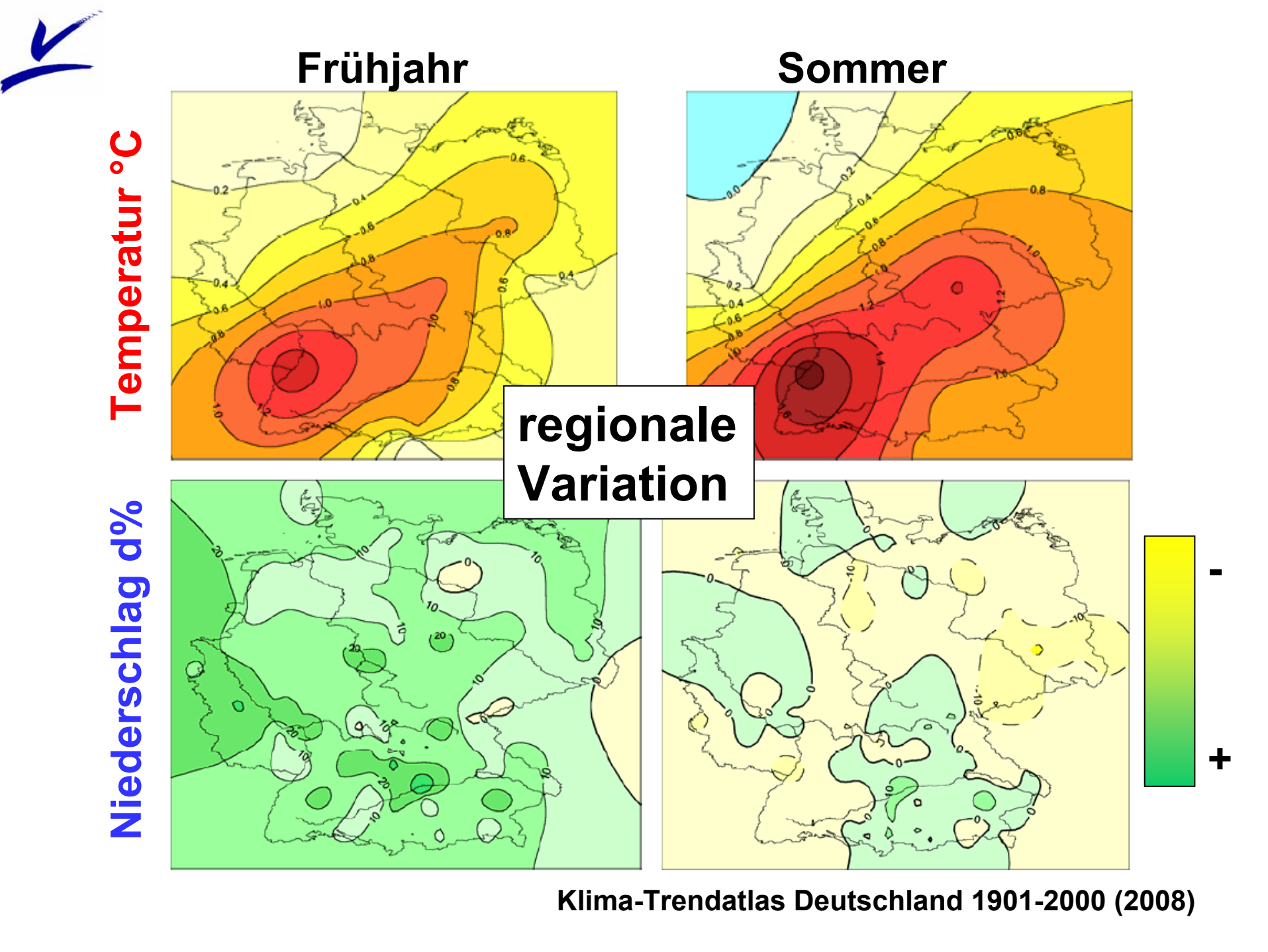
(nach Ebbinge 1989)



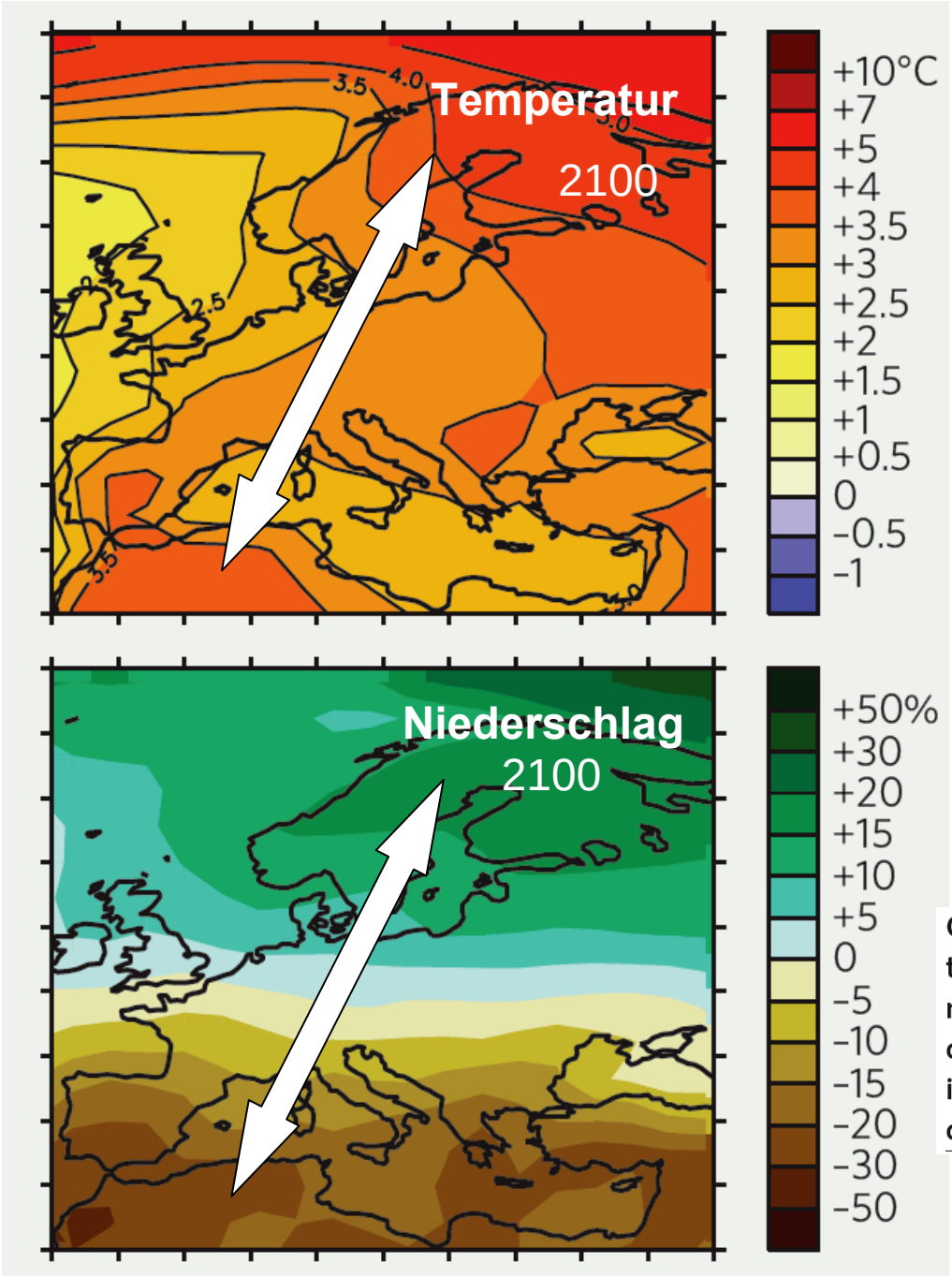
Temp/CO2

Zugfähigkeit
&
Bruterfolg

Ernährungsflaschenhals



Klima-Trendatlas Deutschland 1901-2000 (2008)



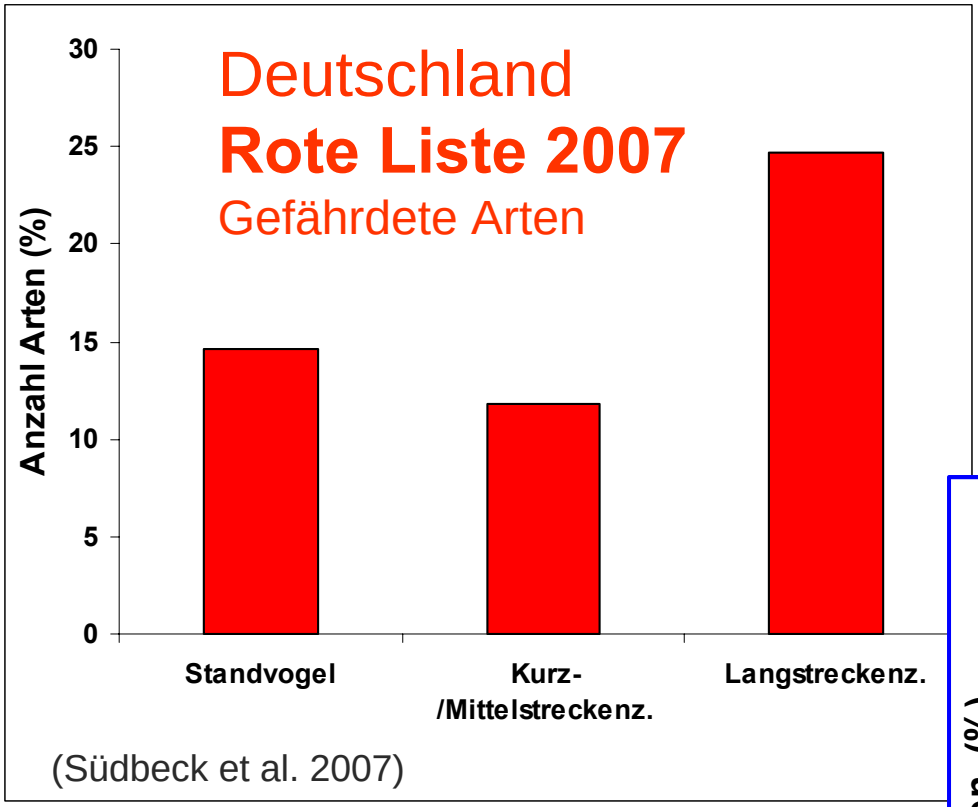
Klimawandel

regionale Variation

Desynchronie in Raum & Zeit

Climate simulations for Europe for the end of the current century suggests warming (top) of more than 3°C relative to the end of the twentieth century. Precipitation projections (bottom) indicate drying of southern Europe and wetter conditions in northern Europe.

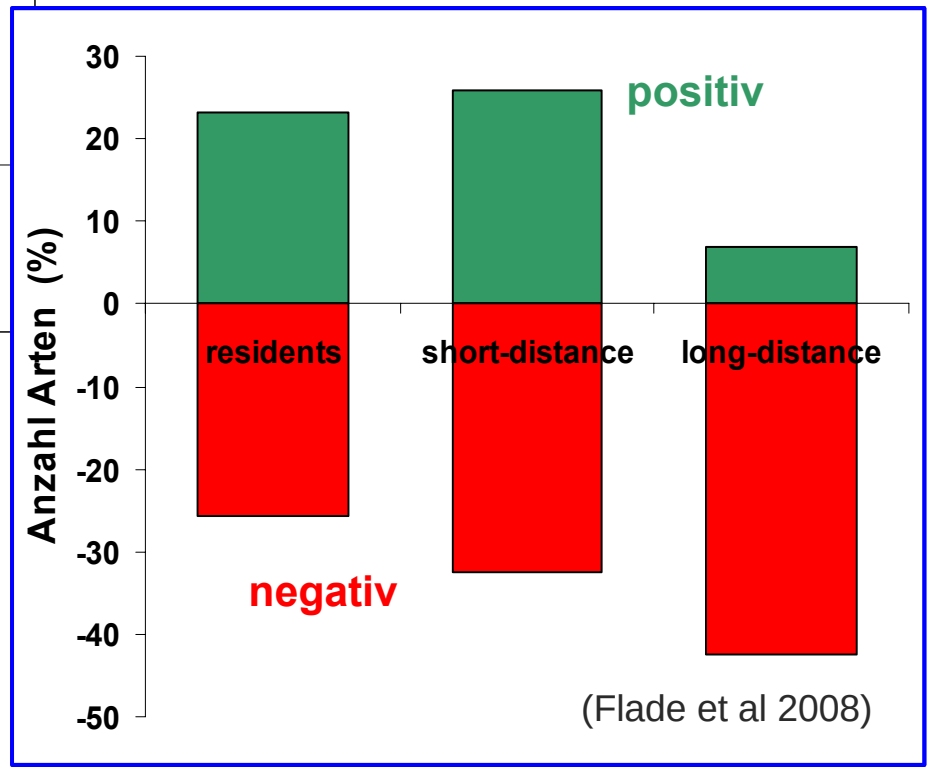
Nature 463, 21 January 2010



(Südbeck et al. 2007)

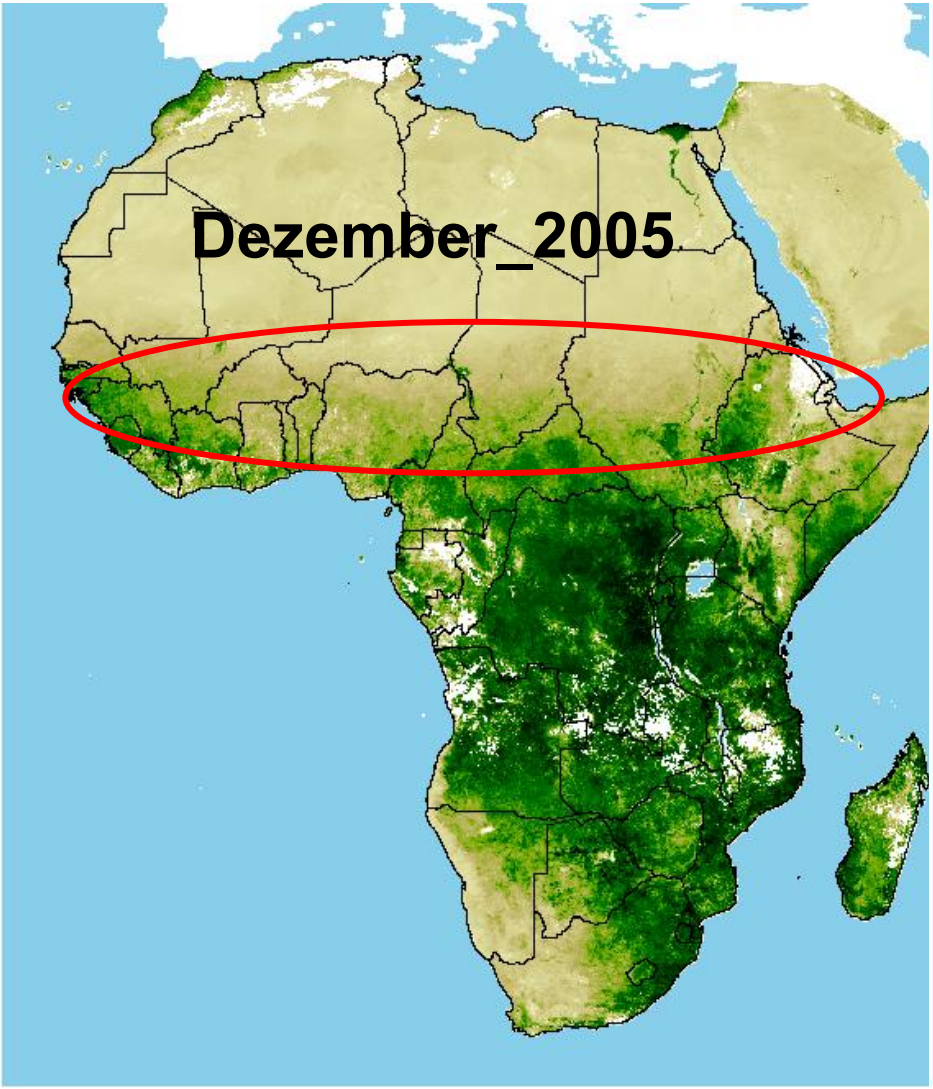
Populationstrends

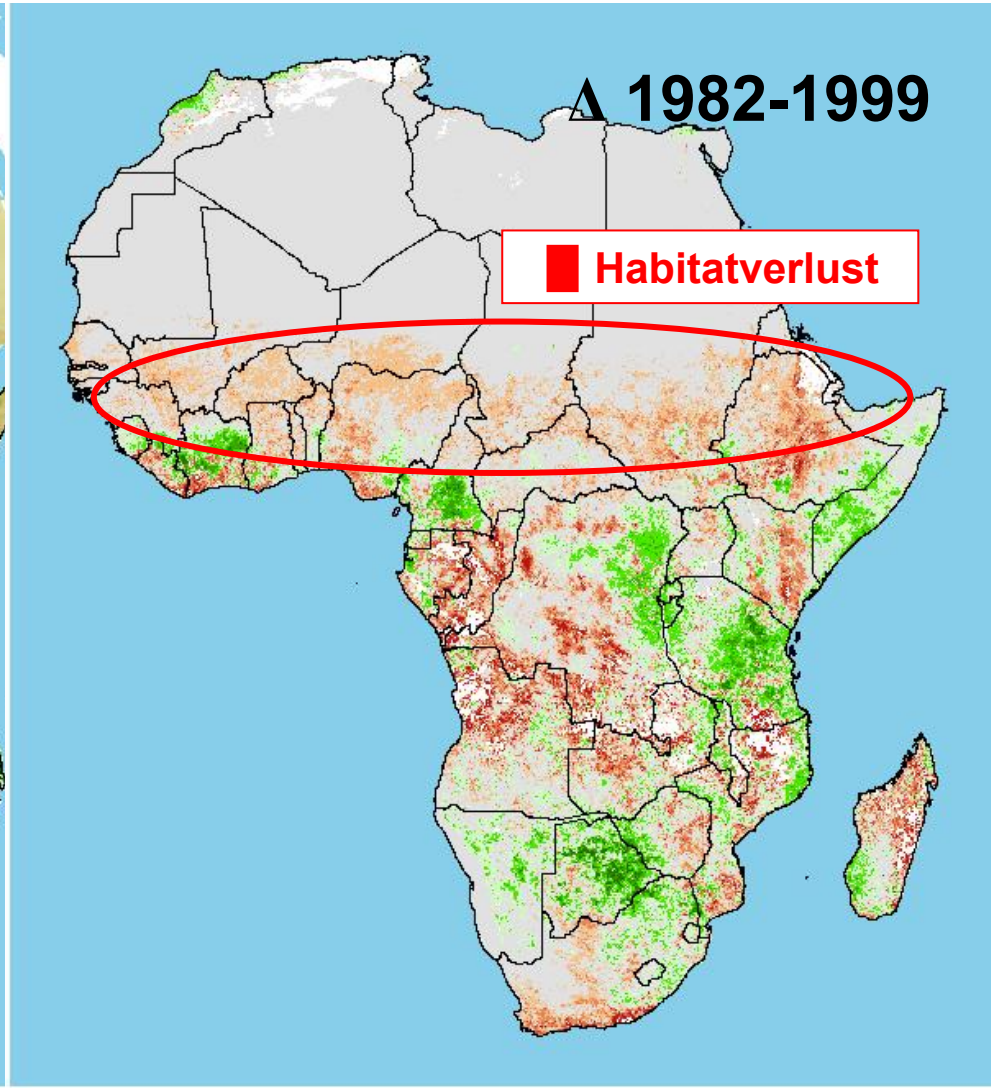
97 häufigste Arten in Deutschland



(Flade et al 2008)

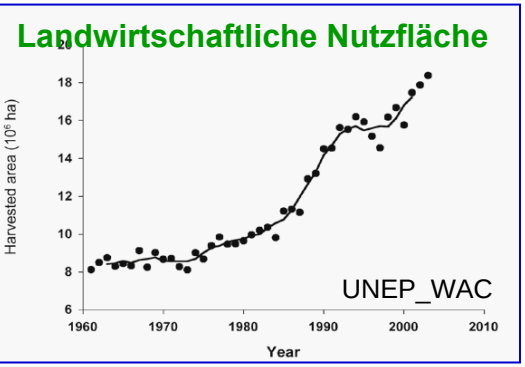
Normalized Difference Vegetation Index (NDVI)





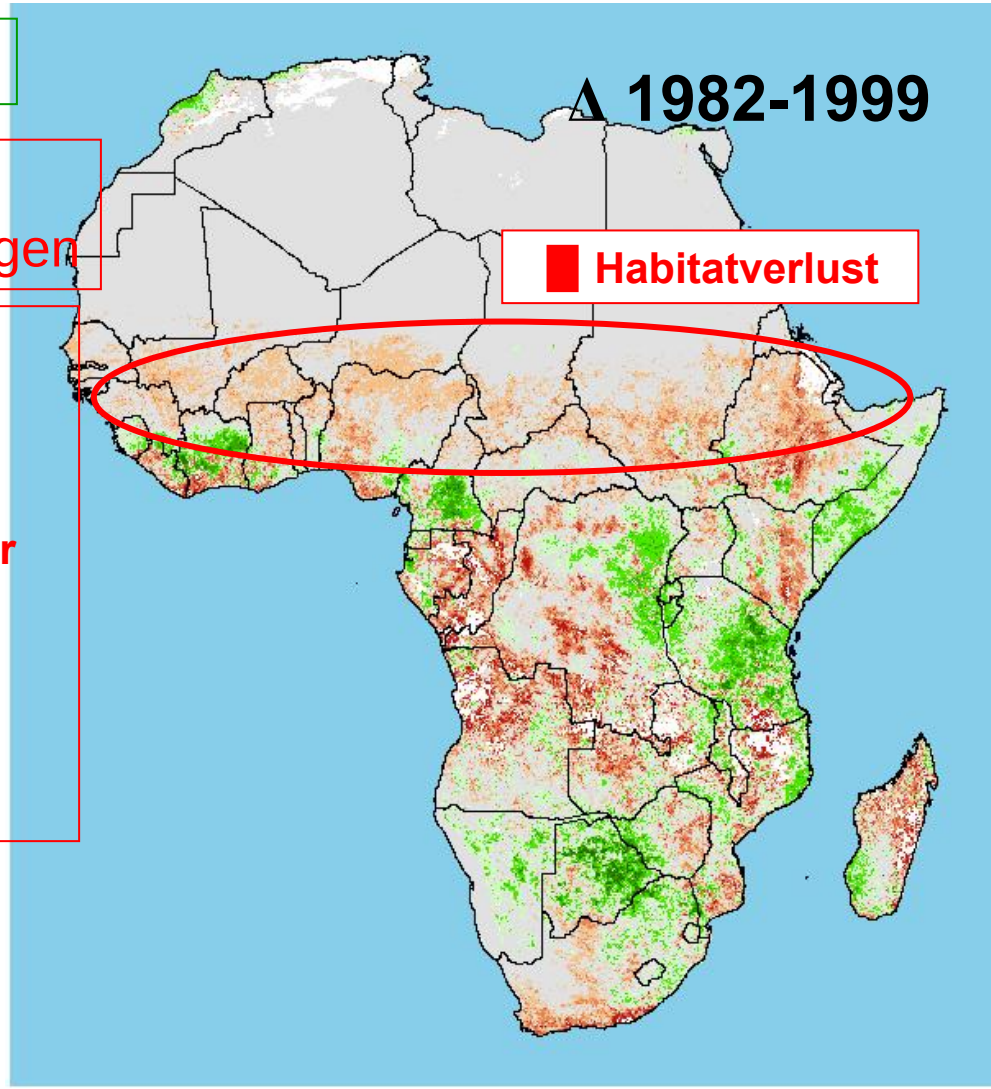
http://edcintl.cr.usgs.gov/adds/adds.html

Normalized Difference Vegetation Index (NDVI)



- **Landnutzung**
- **Klimawandel**
  Mangel an Regen

- **Verlust Feuchtgebiete**
- **zunehmende Nutzung von Flusswasser für Bewässerung**
- **Verlust flussnaher Lebensräume**
- **….**



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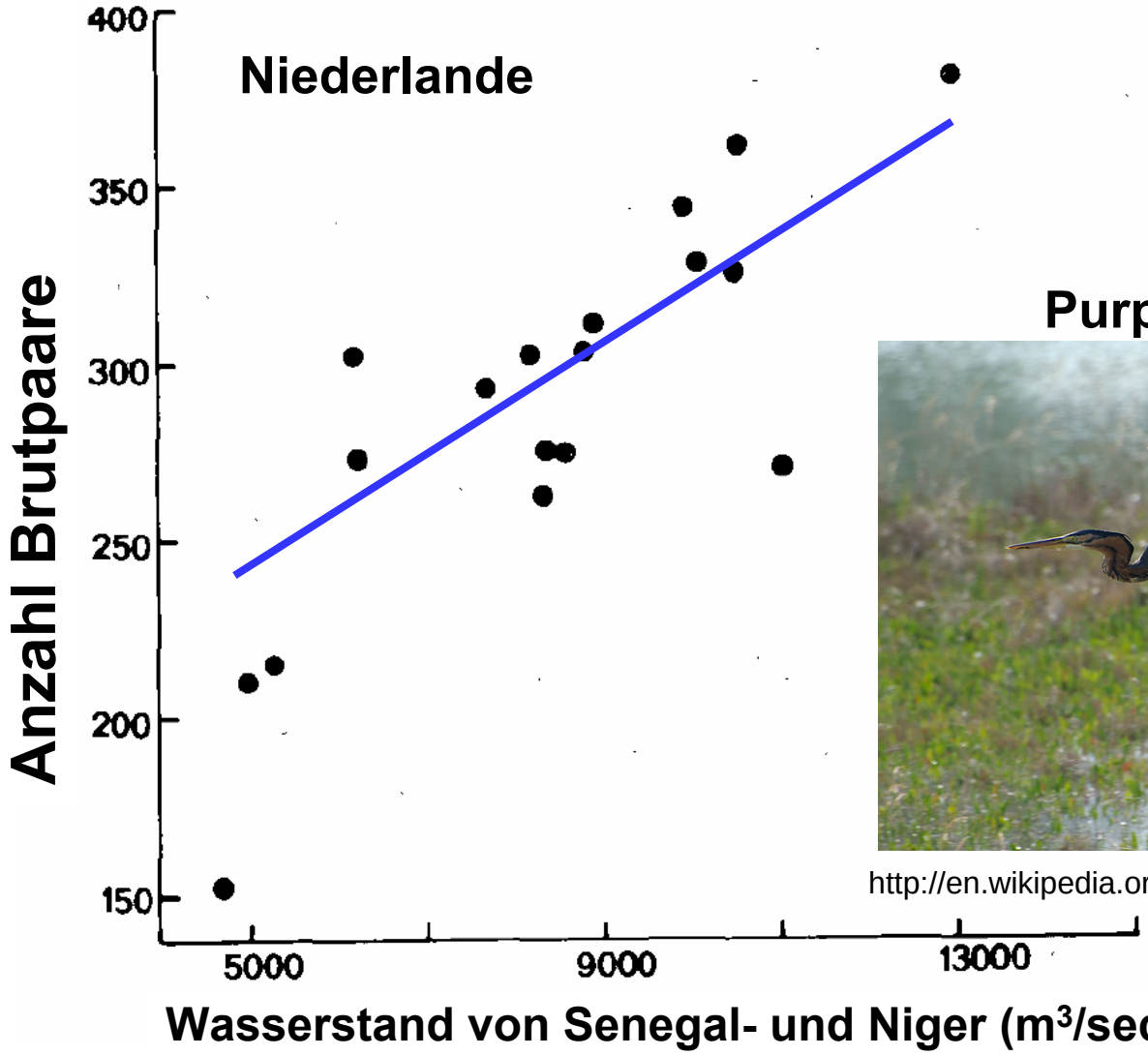
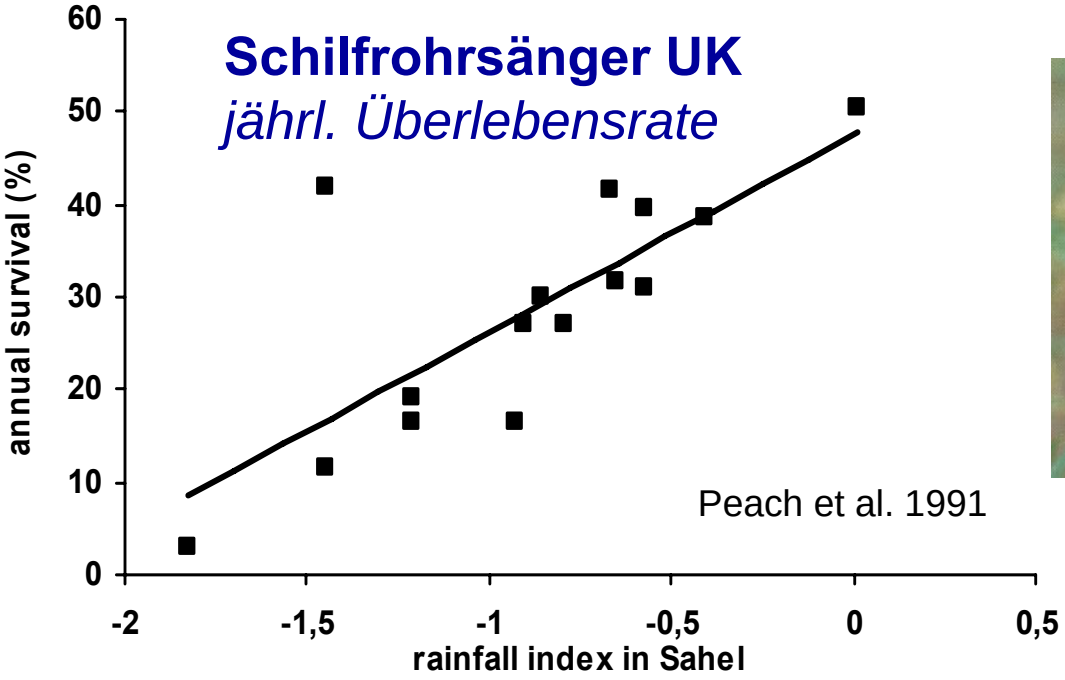
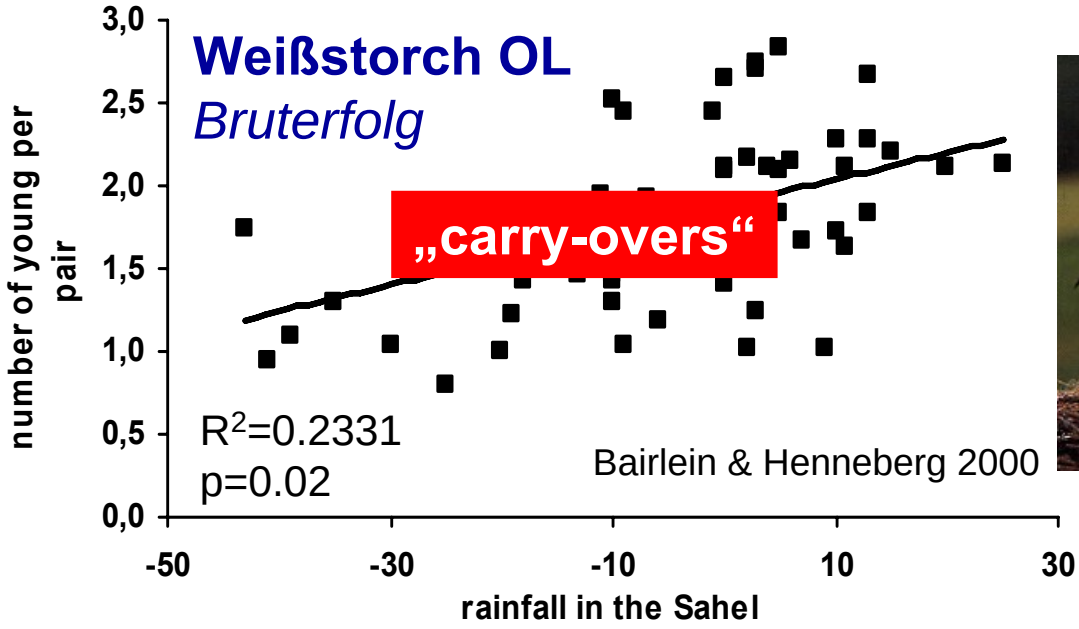


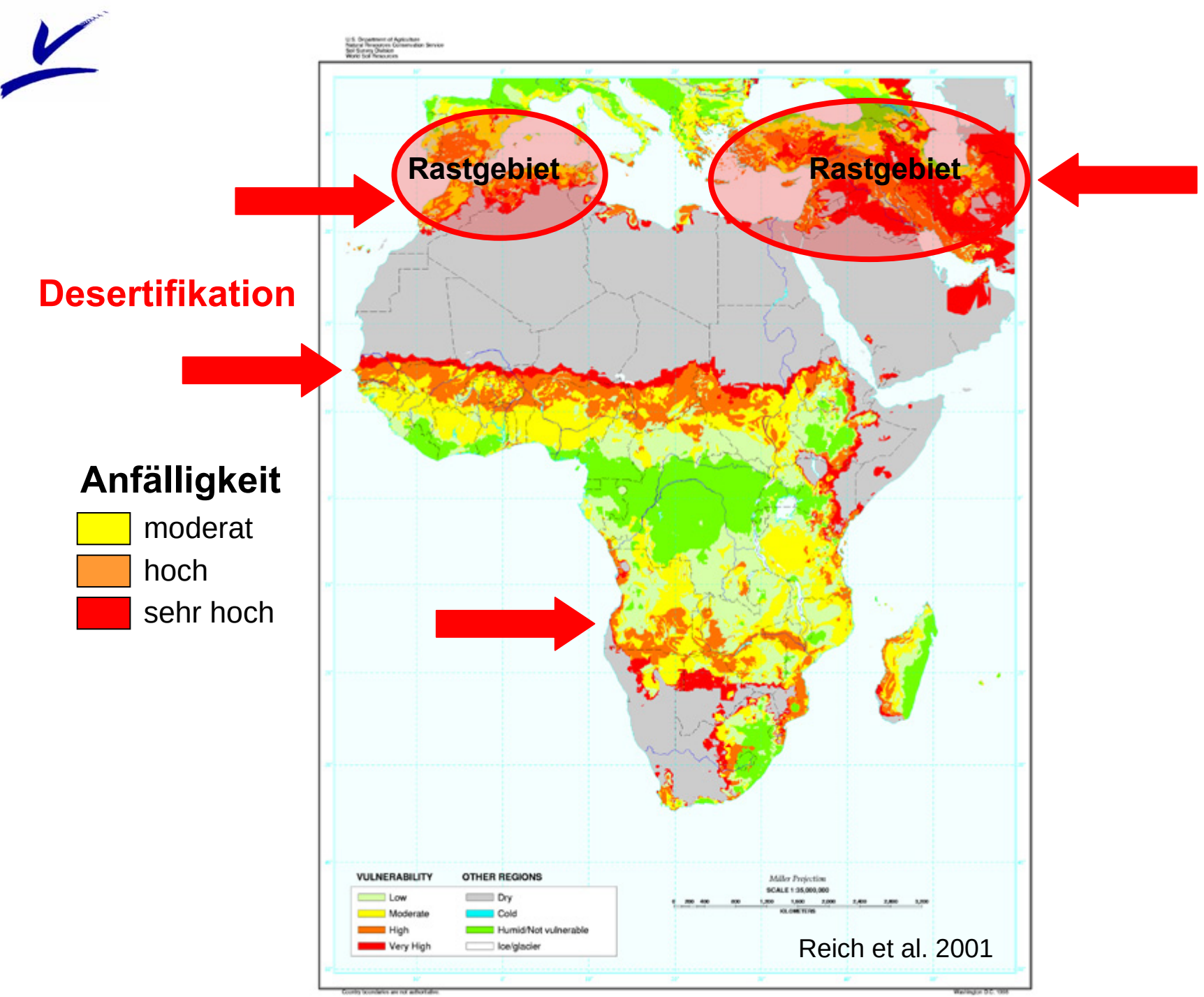
Purpurreiher

http://en.wikipedia.org/wiki/File:Ardea_purpurea-pjt3.jpg

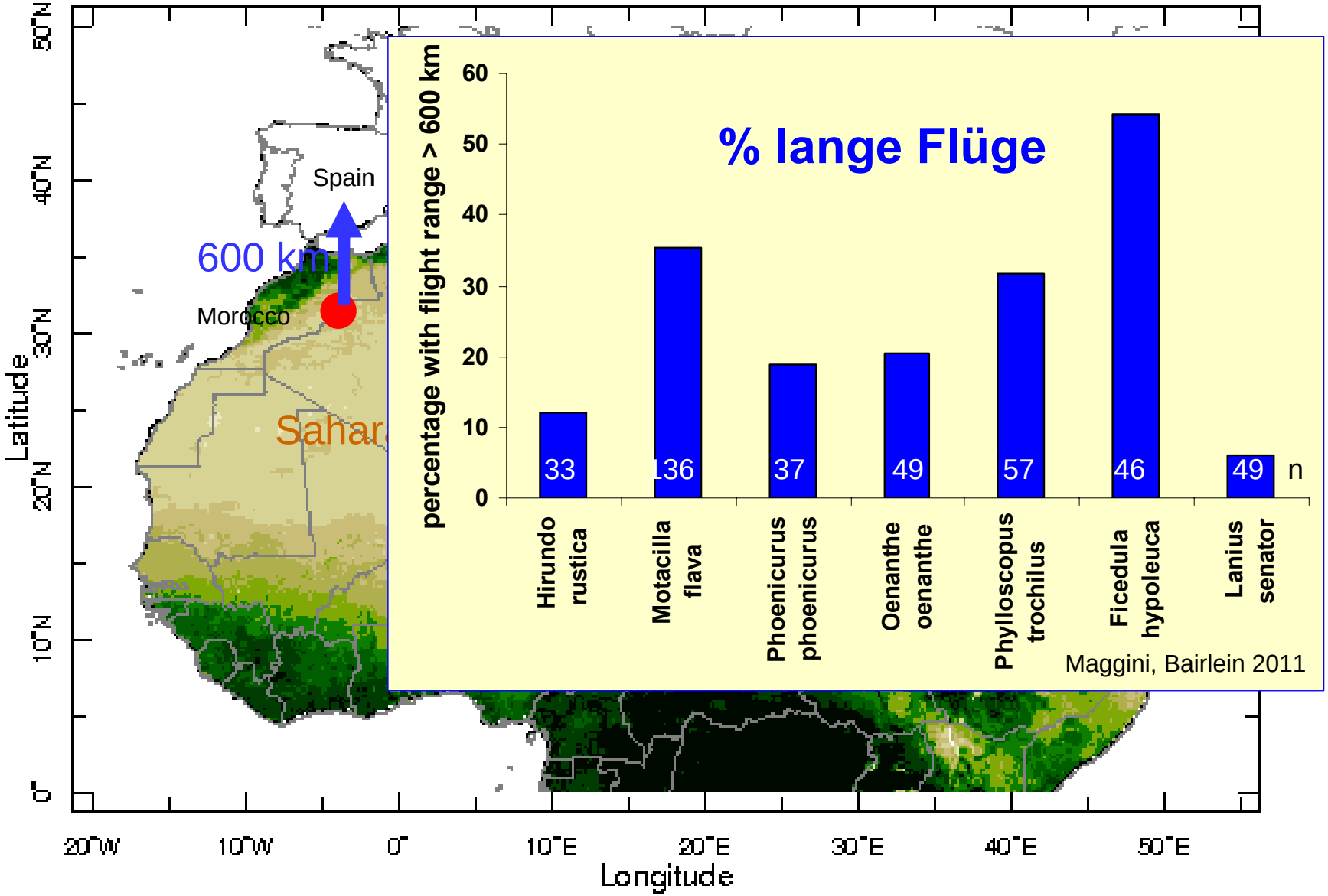
Den Held 1981


Schilfrohrsänger UK
jährl. Überlebensrate
annual survival (%)
60
50
40
30
20
10
0
-2
-1,5
-1
-0,5
0
0,5
rainfall index in Sahel
Peach et al. 1991

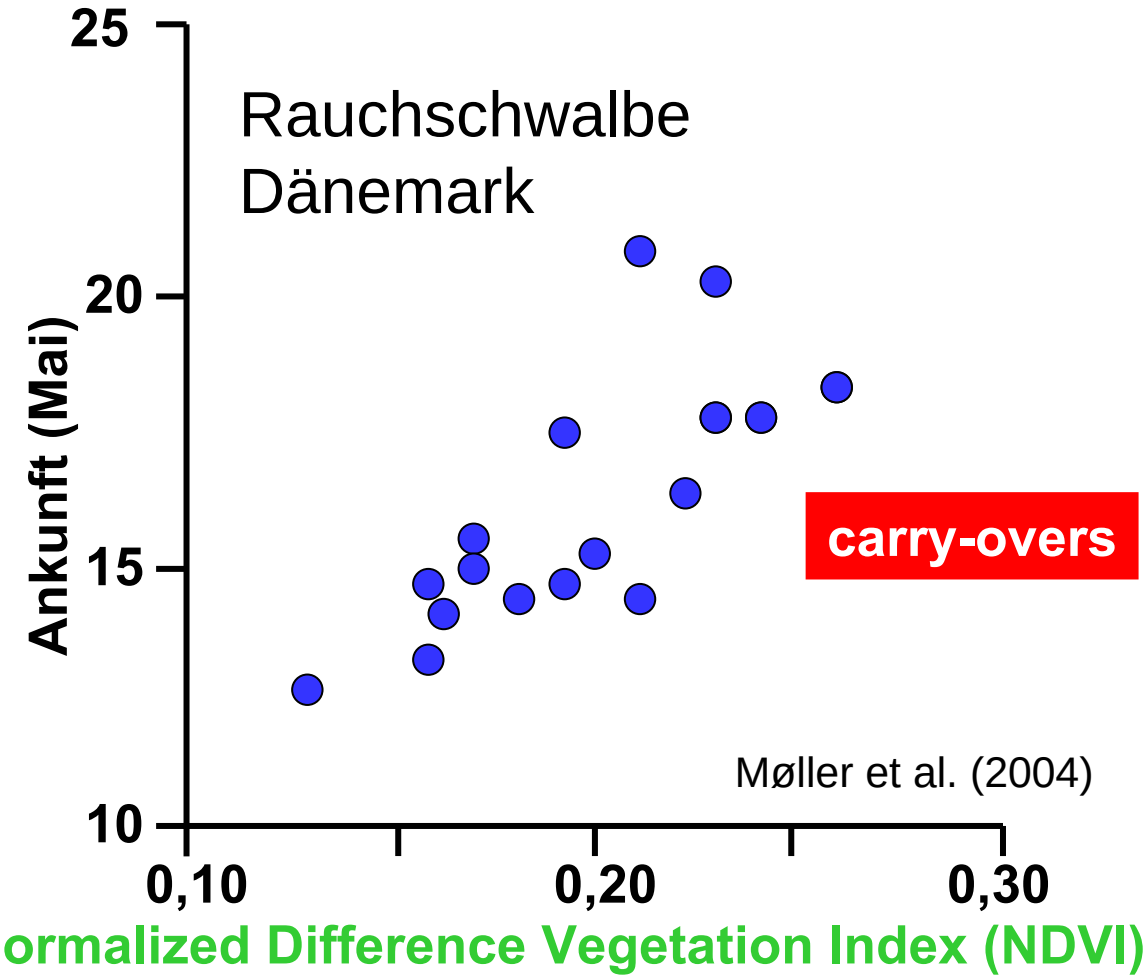

Weißstorch OL
Bruterfolg
number of young per pair
3,0
2,5
2,0
1,5
1,0
0,5
0,0
„carry-overs“
R2=0.2331
p=0.02
Bairlein & Henneberg 2000
-50
-30
-10
10
30
rainfall in the Sahel

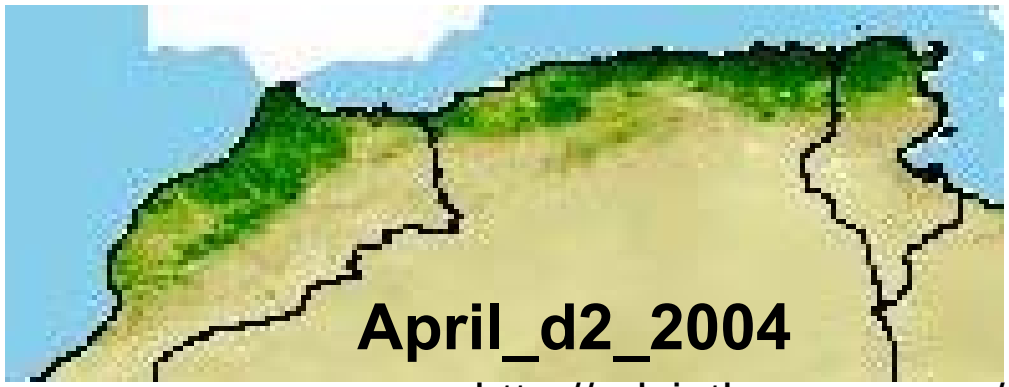

Rastgebiet
Rastgebiet
Desertifikation
Anfälligkeit
moderat
hoch
sehr hoch
VULNERABILITY
Low
Moderate
High
Very High
OTHER REGIONS
Dry
Cold
Humid/Not vulnerable
Ice/glacier
Miller Projection
Reich et al. 2001

Frühjahrszug, S Marokko



Apr



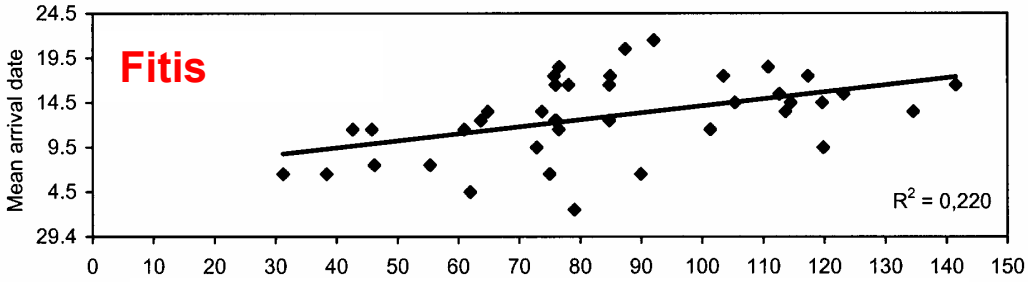


http://edcintl.cr.usgs.gov/adds/adds.html

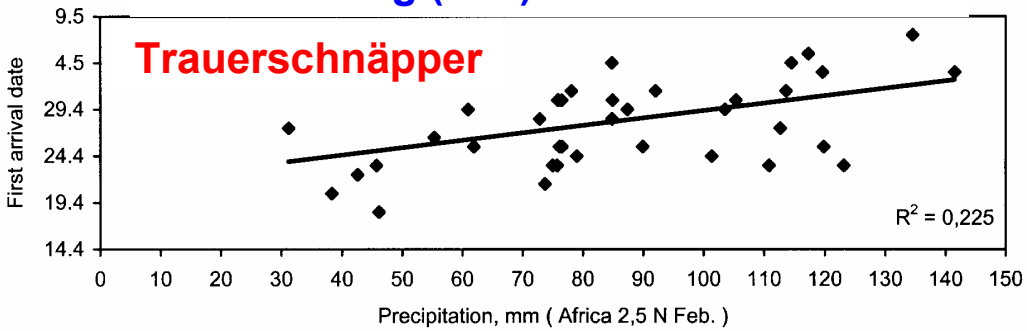
Rybachy, Kurische Nehrung, Russland

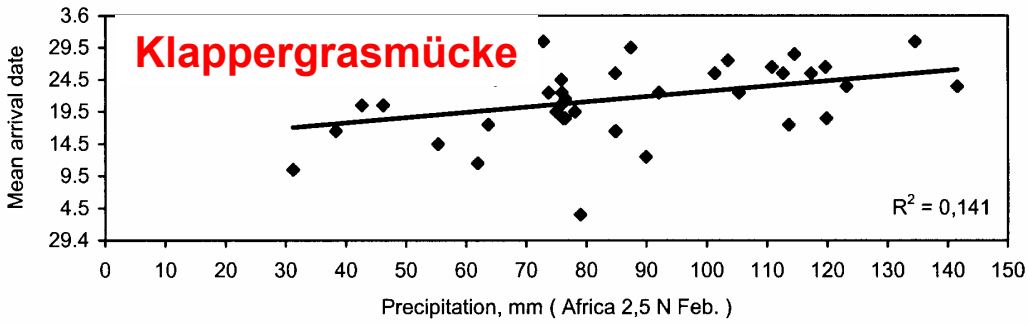
Mittlere Ankunft im Frühjahr, 1959-2002, vs Niederschlag in Afrika

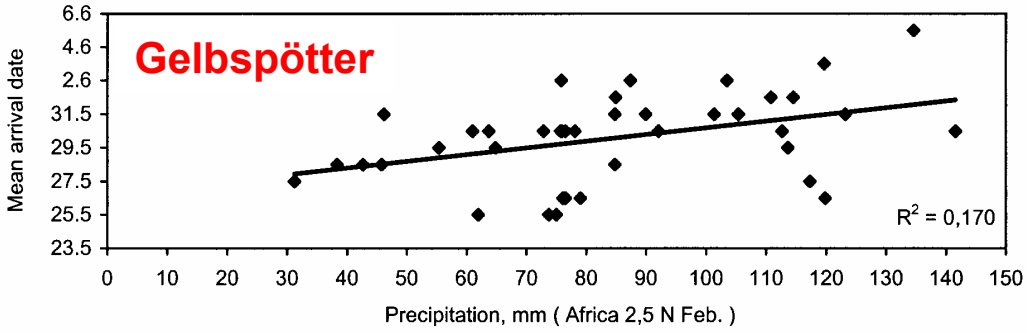
Mittlere Ankunft

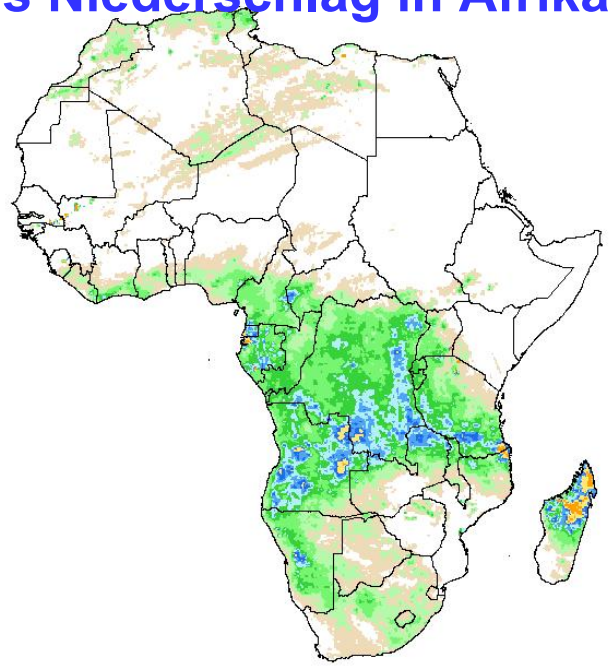


Niederschlag (mm) im Februar in Afrika





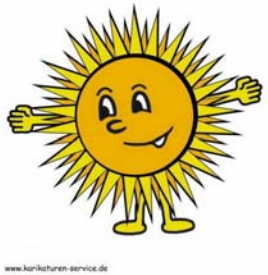




Sokolov & Kosarev 2003

Vogelwelt und Klimawandel

Was ist zu tun?



► besseres Verständnis funktionaler Zusammenhänge

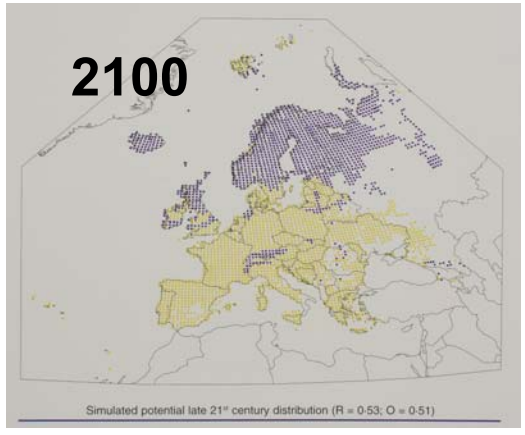
► besseres Verständnis regionaler Zusammenhänge (Konnektivität)

► besseres Verständnis von "carry-over" Effekten

► besseres Verständnis der Anpassungsfähigkeit

► Differenzierung von Wetter/Witterung/Klima gegenüber den vielen anderen Faktoren, i.B. Landnutzung

► Lebensräume bewahren: aktuelle und zukünftige



Huntley et al. 2007