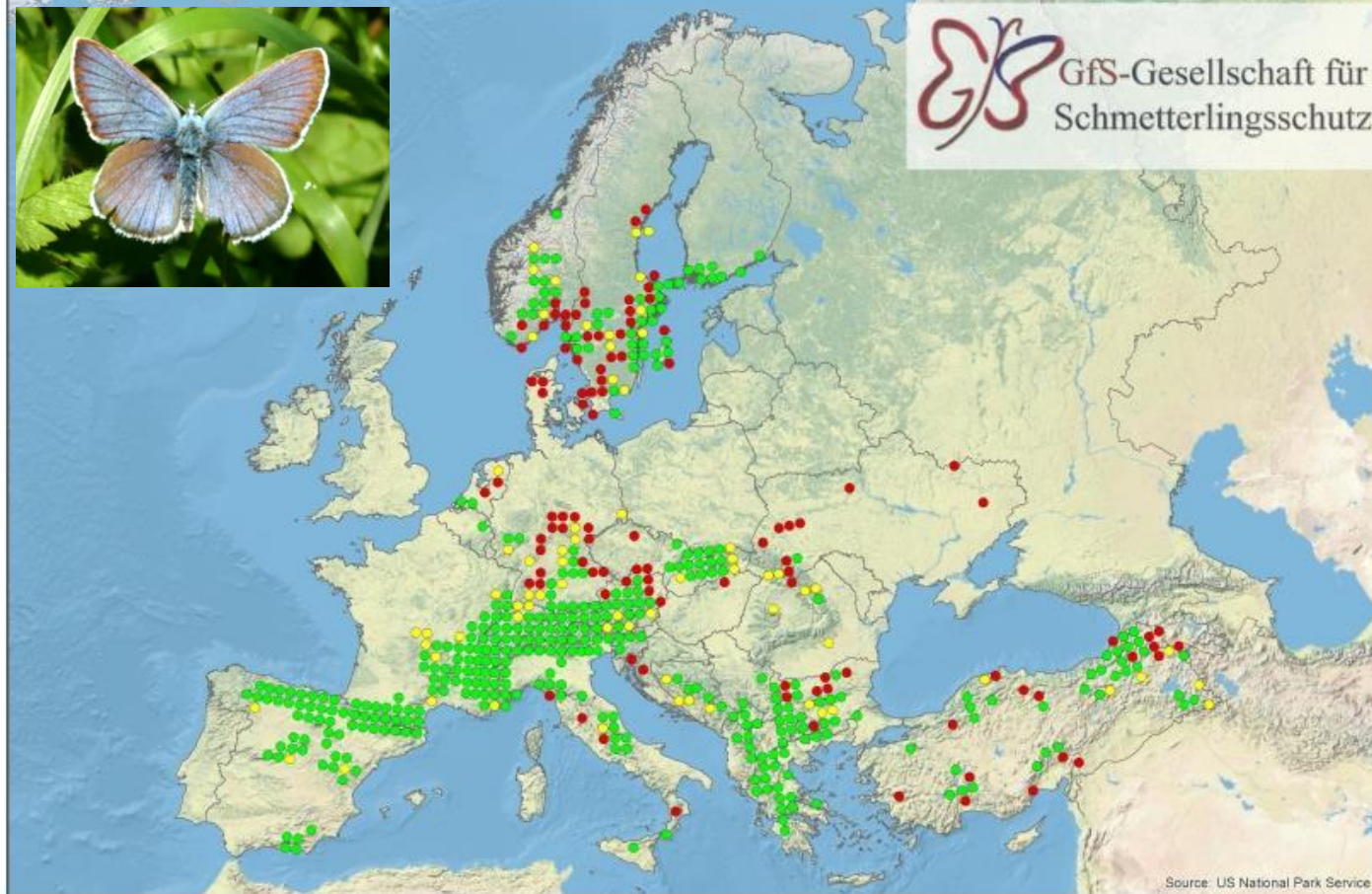




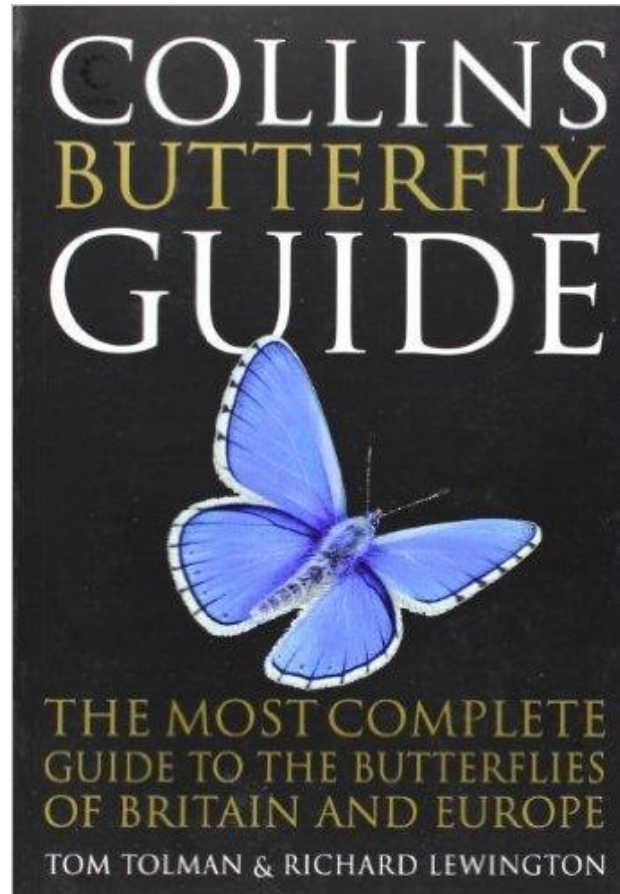
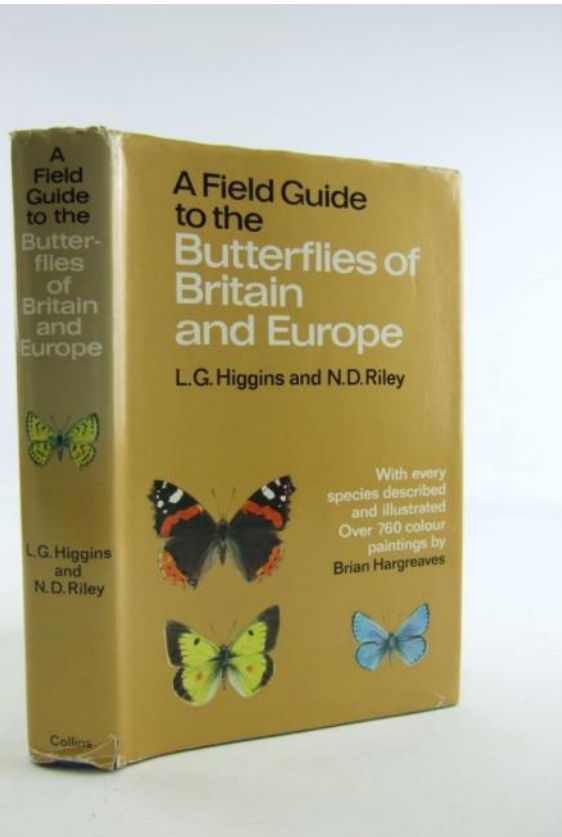
Parnassius apollo

(30.11.2017)
V003

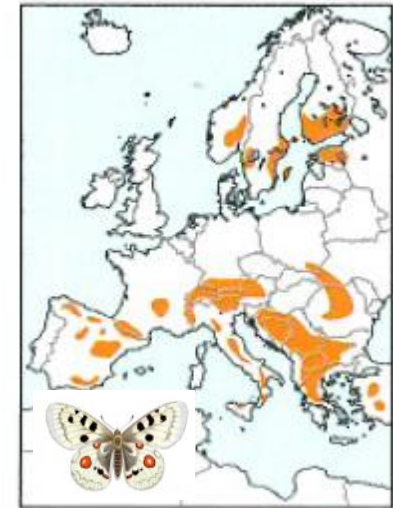
LepiDiv – compiling distribution data for more than just distribution atlases

Martin Wiemers, Alexander Harpke, Oliver Schweiger, Josef Settele

History of distribution maps of European butterflies

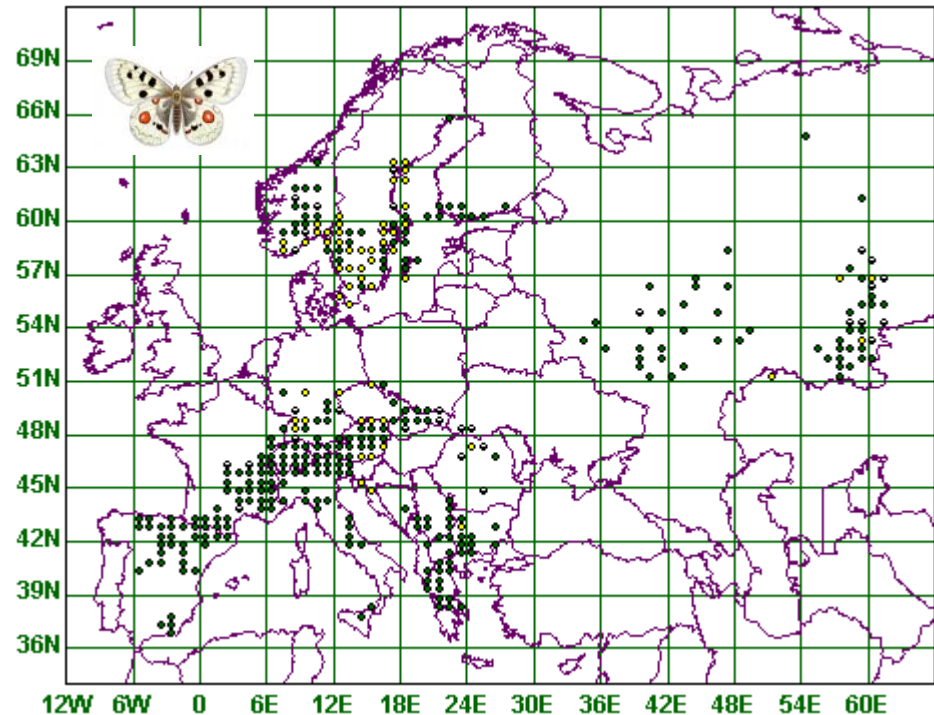
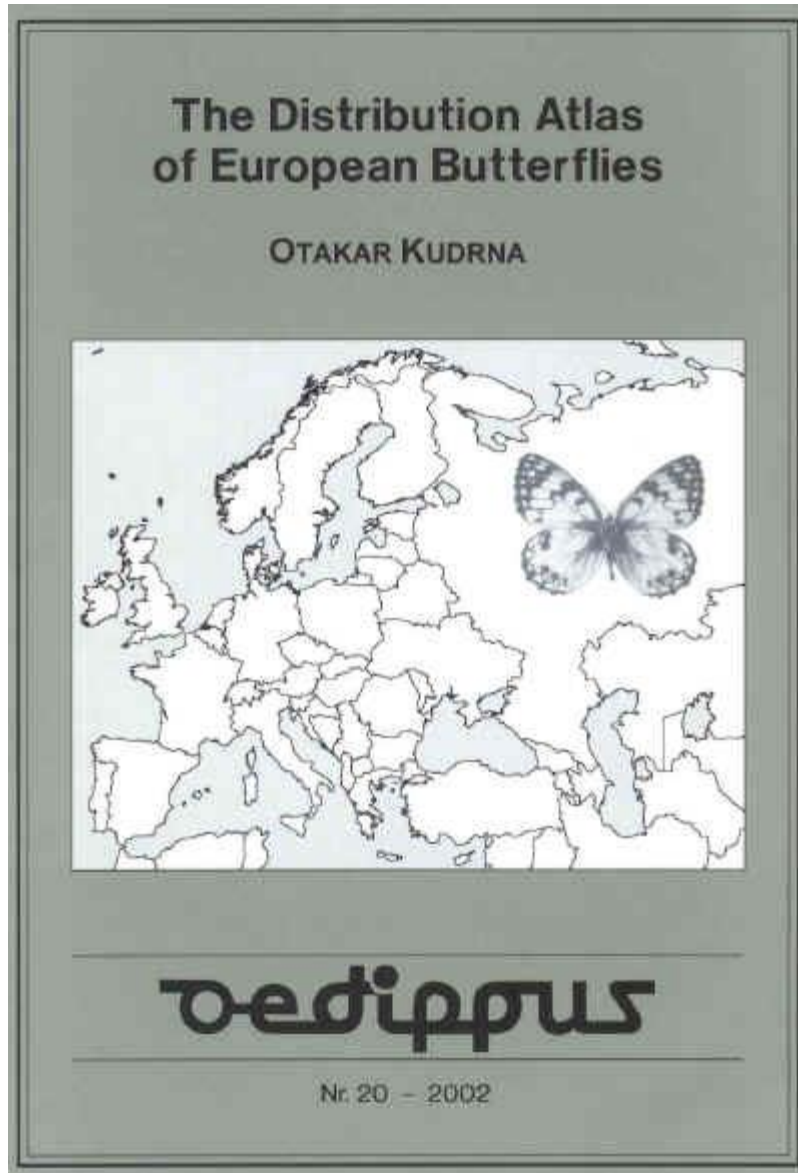


Apollo



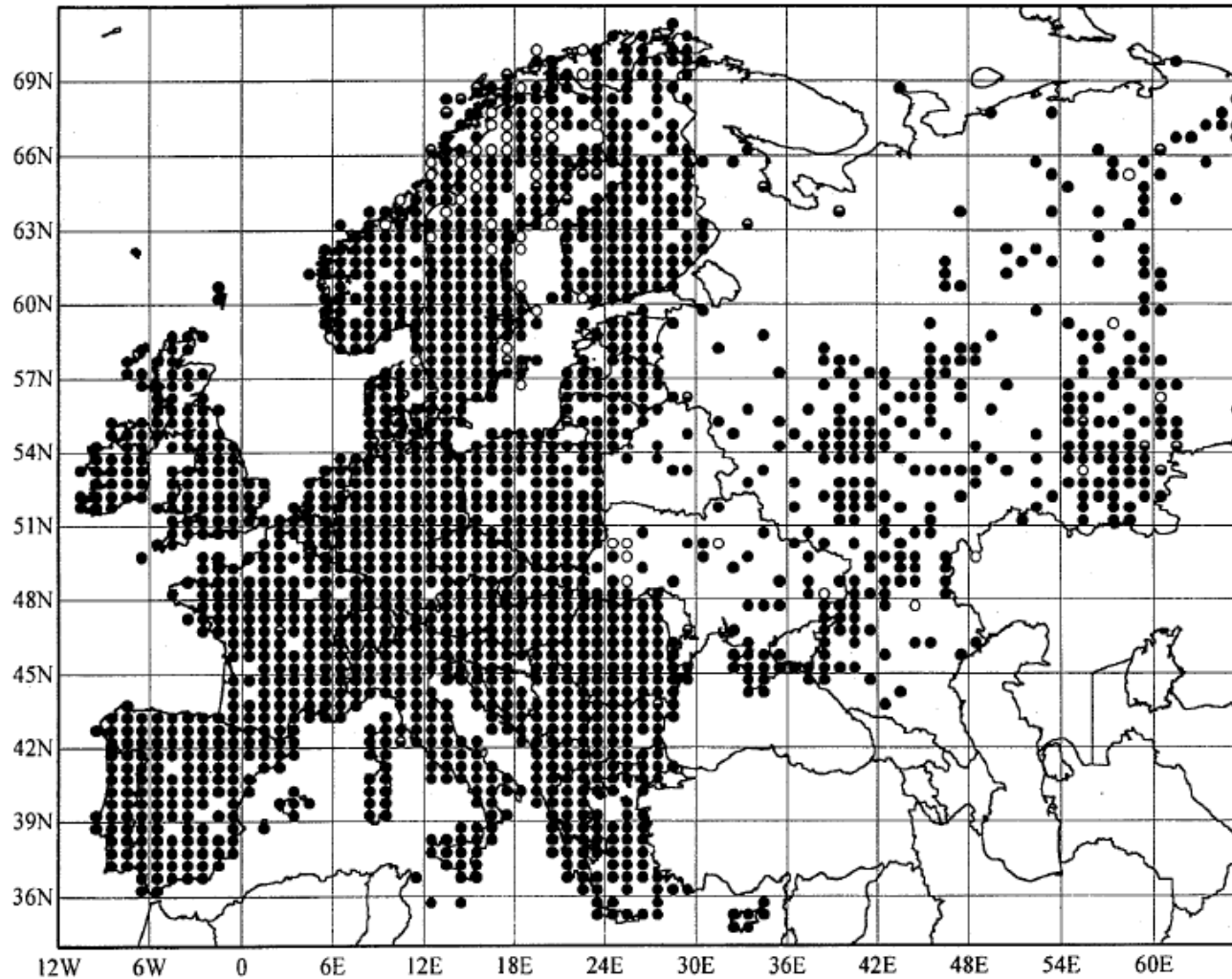
- Hand-drawn range maps

First distribution atlas of European butterflies



- Reference locality system
- 3 Time periods:
 - Until 1950
 - 1951-1980
 - Since 1981

Coverage of Western > Eastern Europe

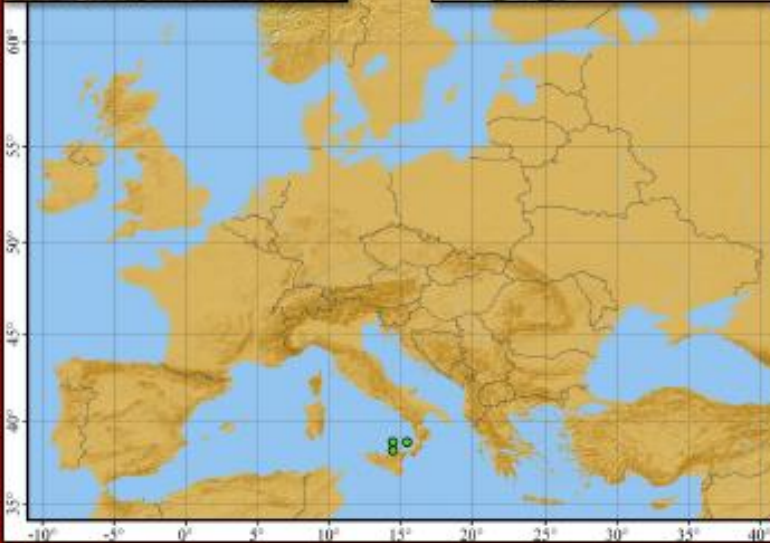


National & regional atlas projects

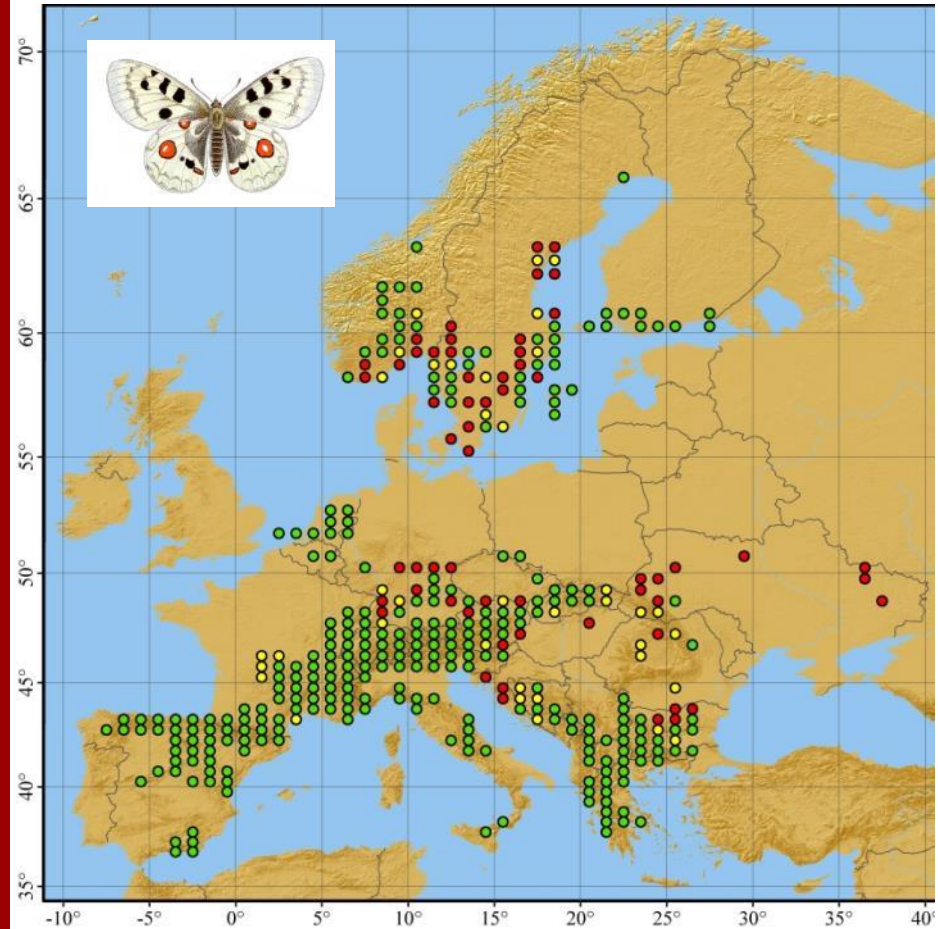
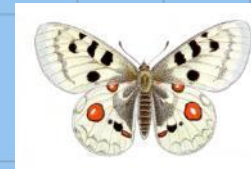


Distribution Atlas of Butterflies in Europe

Otakar Kudrna
Alexander Harpke Kristian Lux
Josef Pennerstorfer Oliver Schweiger
Josef Settele Martin Wiemers



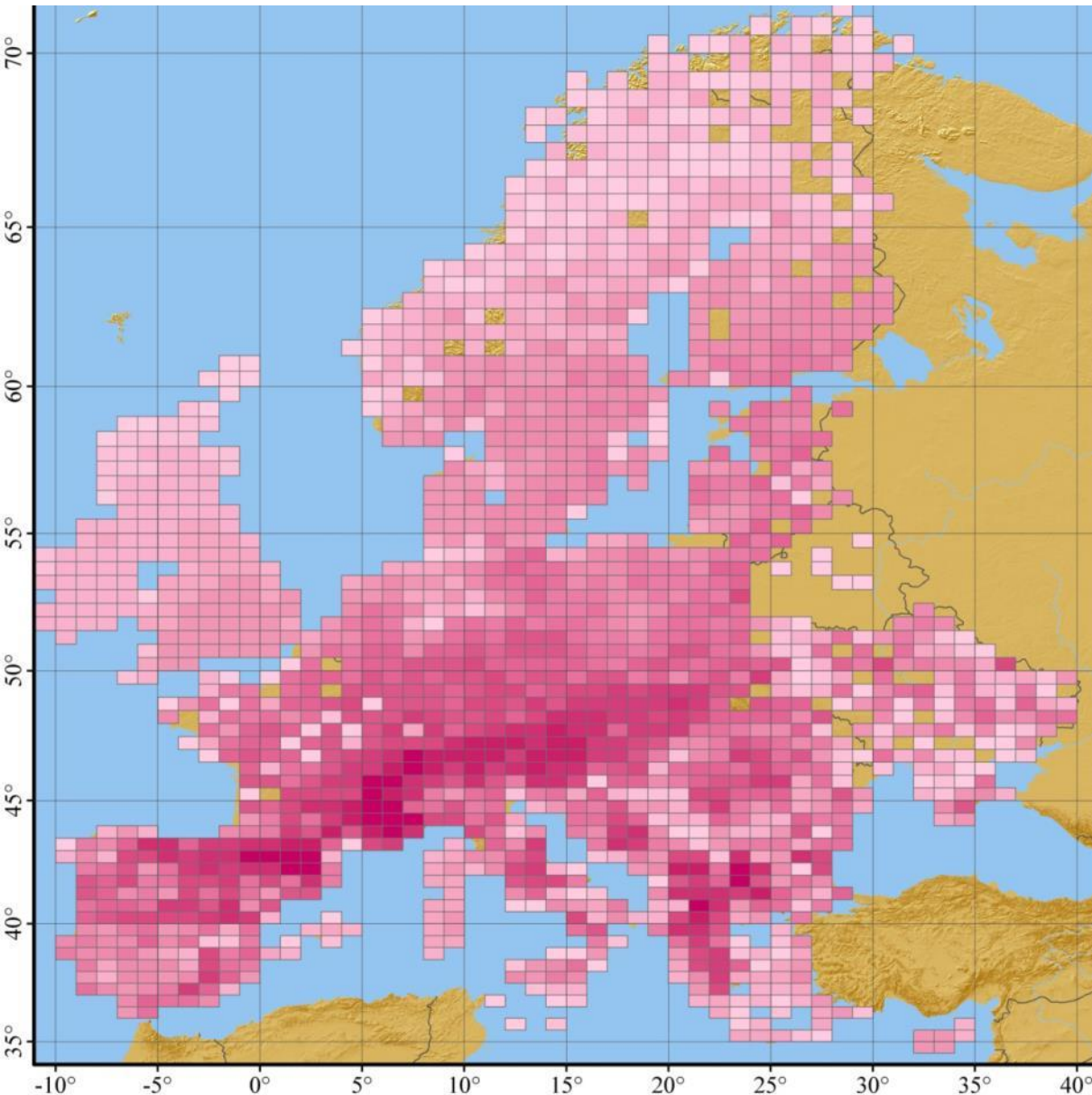
Gesellschaft für Schmetterlingsschutz e.V.



Inclusion of
national
databases

Species richness

Hotspots in the mountains and in the Mediterranean



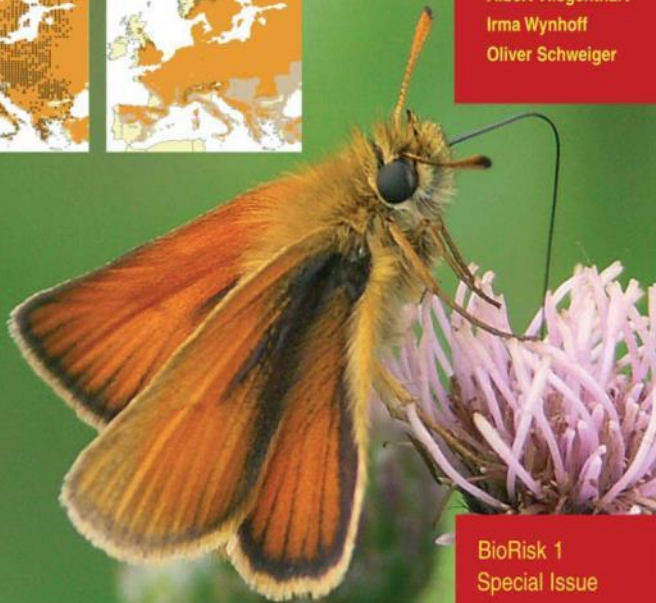
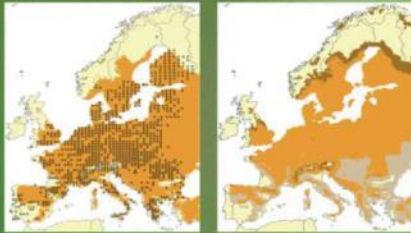
Rare endemic species

Hotspots:

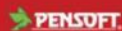
- islands, especially Canary Islands & Madeira
- Mediterranean mountains, especially Sierra Nevada

Climatic Risk Atlas of European Butterflies

Josef Settele
Otakar Kudrna
Alexander Harpke
Ingolf Kühn
Chris van Swaay
Rudi Verovnik
Martin Warren
Martin Wiemers
Jan Hanspach
Thomas Hickler
Elisabeth Kühn
Inge van Halder
Kars Velling
Albert Vliegenthart
Irma Wynhoff
Oliver Schweiger

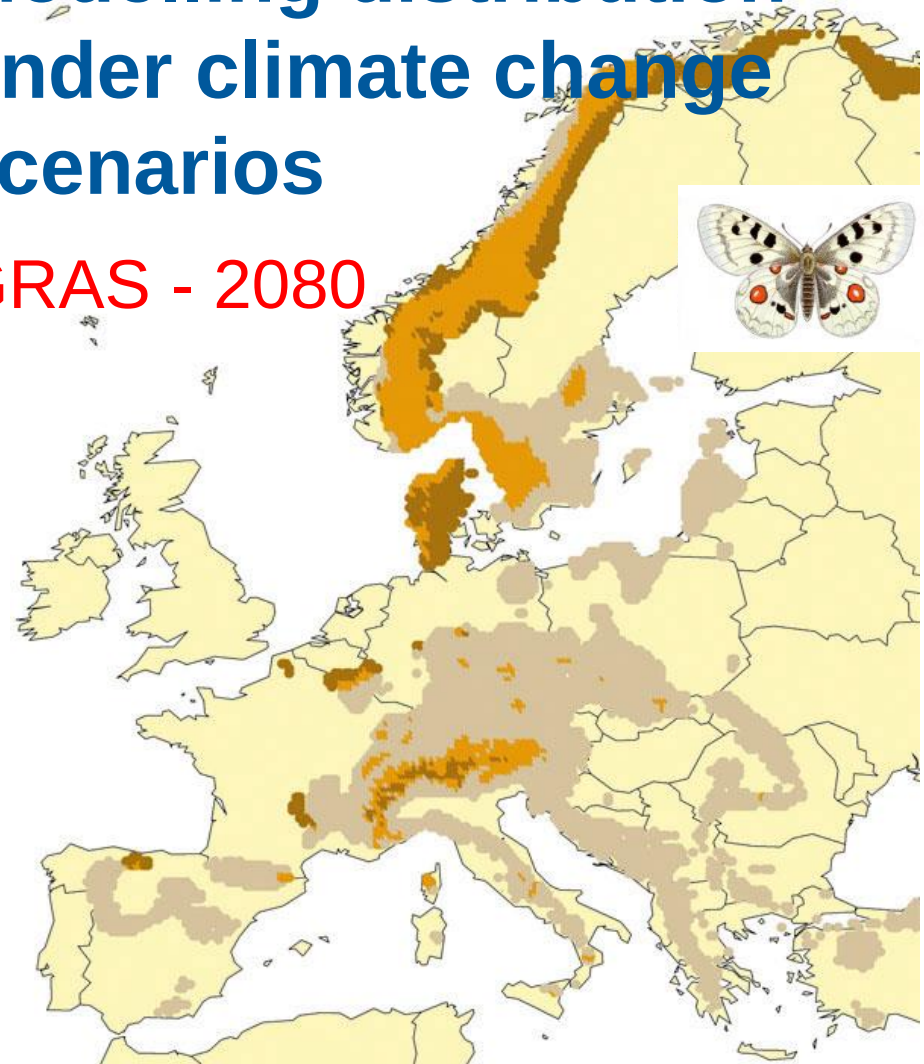


BioRisk 1
Special Issue



Modelling distribution under climate change scenarios

GRAS - 2080



- *But: Problems with spatial resolution in narrow endemics*



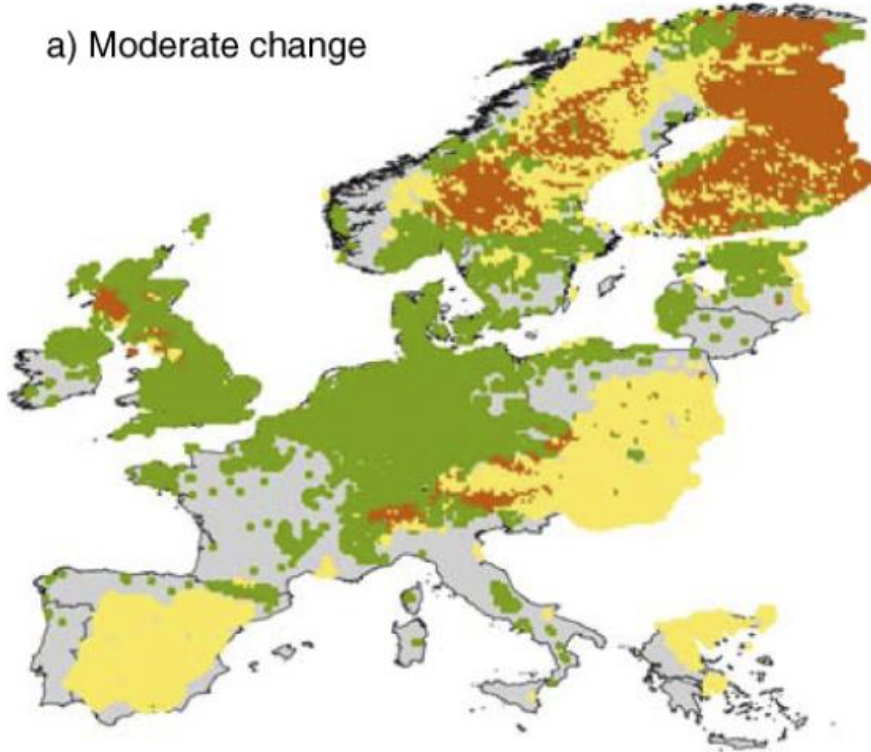
Inclusion of biotic factors: Example of *Boloria titania*



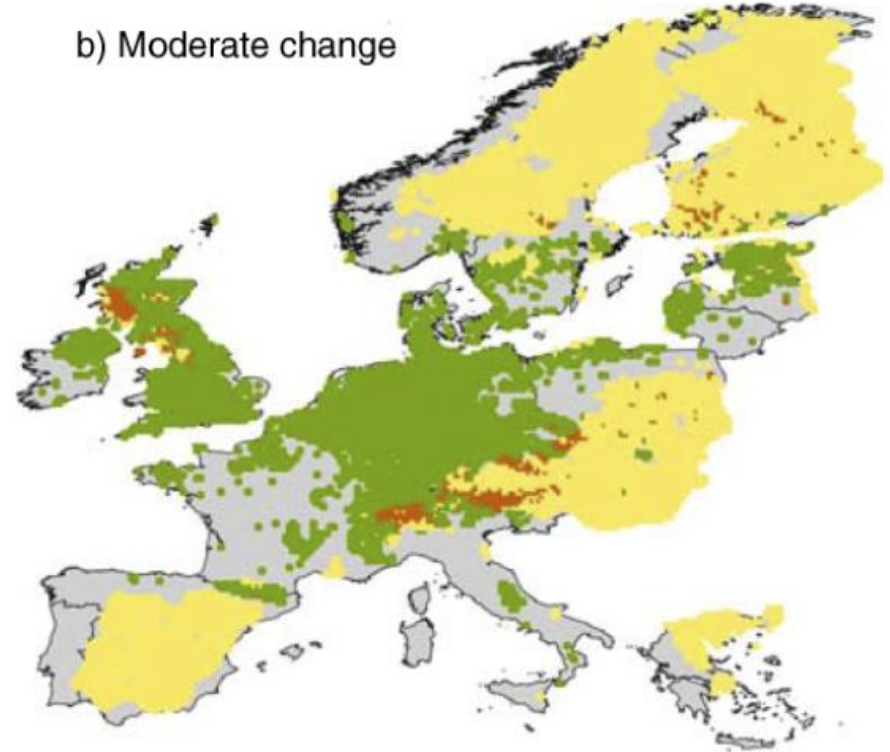
Unlimited dispersal of *P. bistorta*

No dispersal of *P. bistorta*

a) Moderate change



b) Moderate change



Niche space of:

- *Boloria titania*
- *Polygonum bistorta*
- both

Ecology, 89(12), 2008, pp. 3472–3479
© 2008 by the Ecological Society of America

CLIMATE CHANGE CAN CAUSE SPATIAL MISMATCH
OF TROPICALLY INTERACTING SPECIES

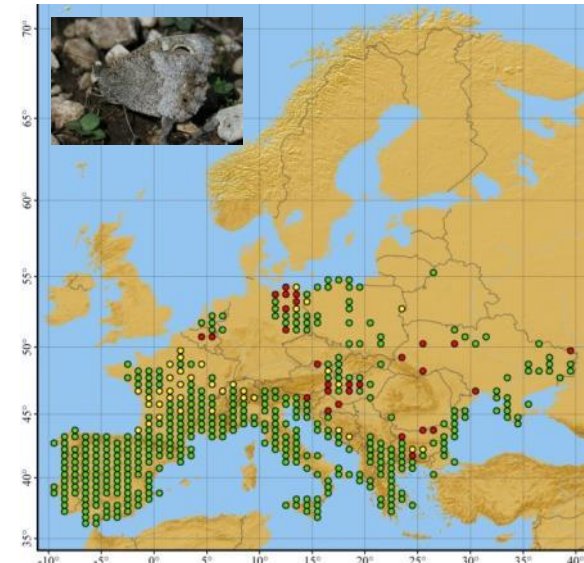
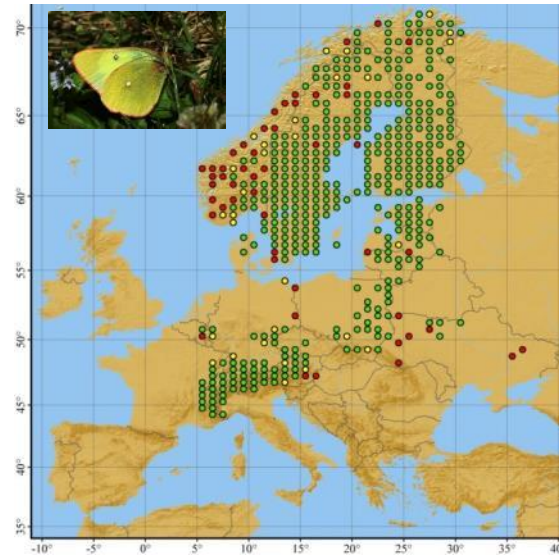
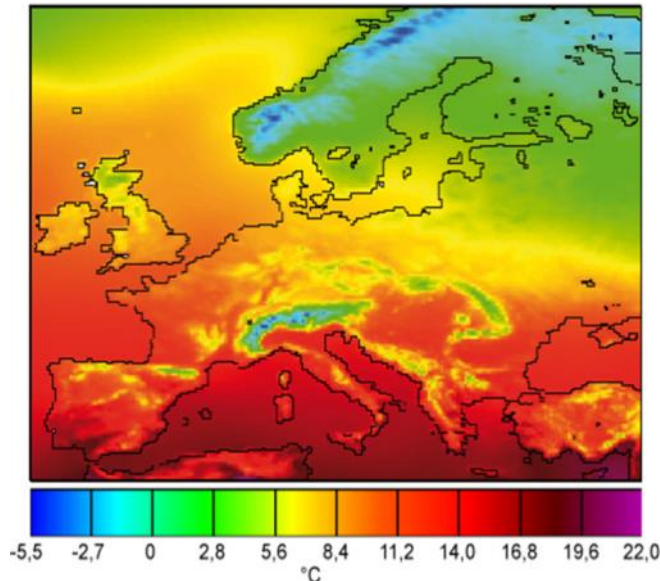
OLIVER SCHWEIGER,^{1,2,4} JOSEF SETTELE,¹ OTAKAR KUDRNA,³ STEFAN KLOTZ,^{1,2} AND INGOLF KÜHN^{1,2}

CLIMBER: Climatic niche characteristics of the butterflies in Europe

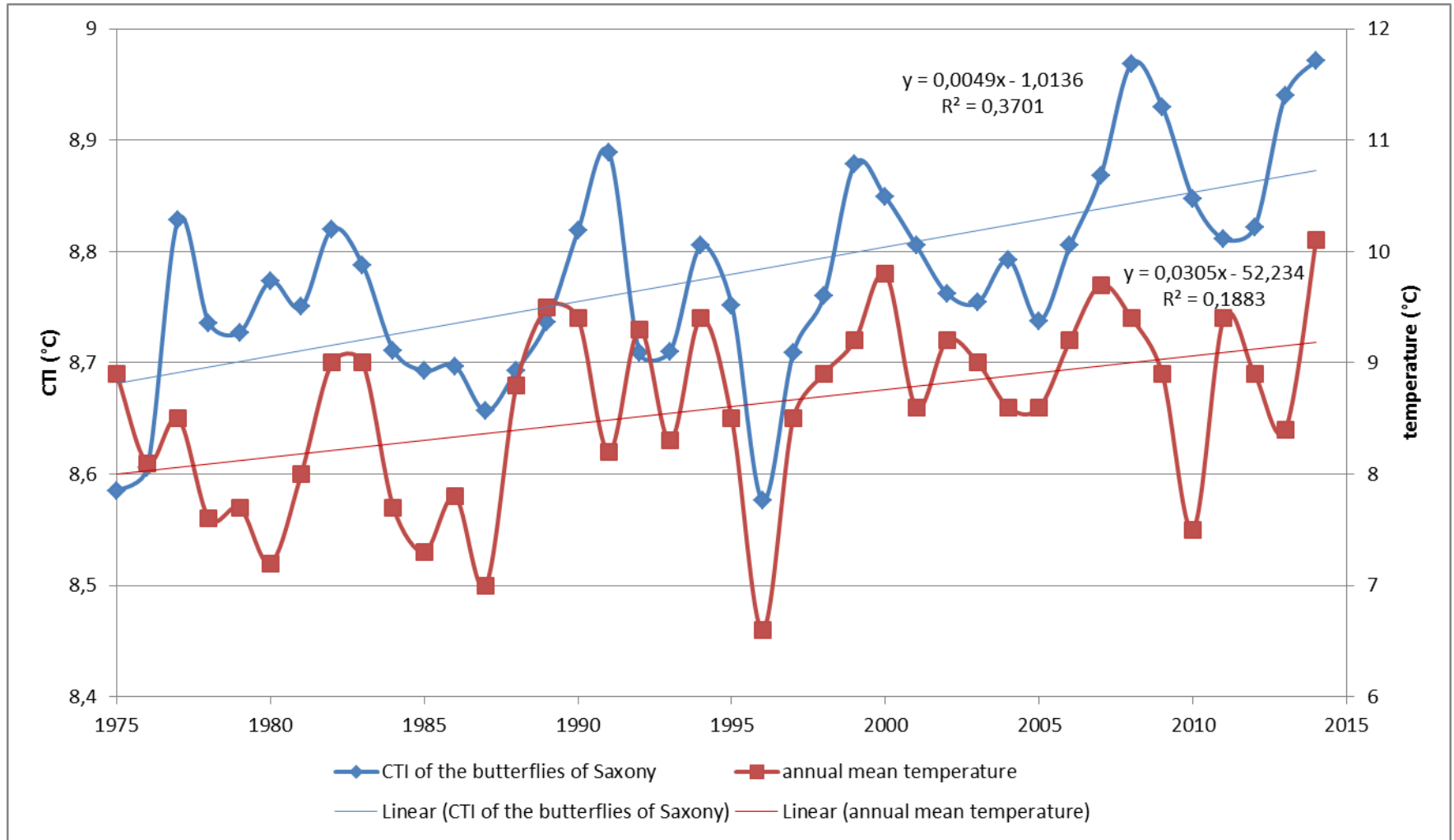
Oliver Schweiger¹, Alexander Harpke¹, Martin Wiemers¹, Josef Settele^{1,2}

STI = 3,6

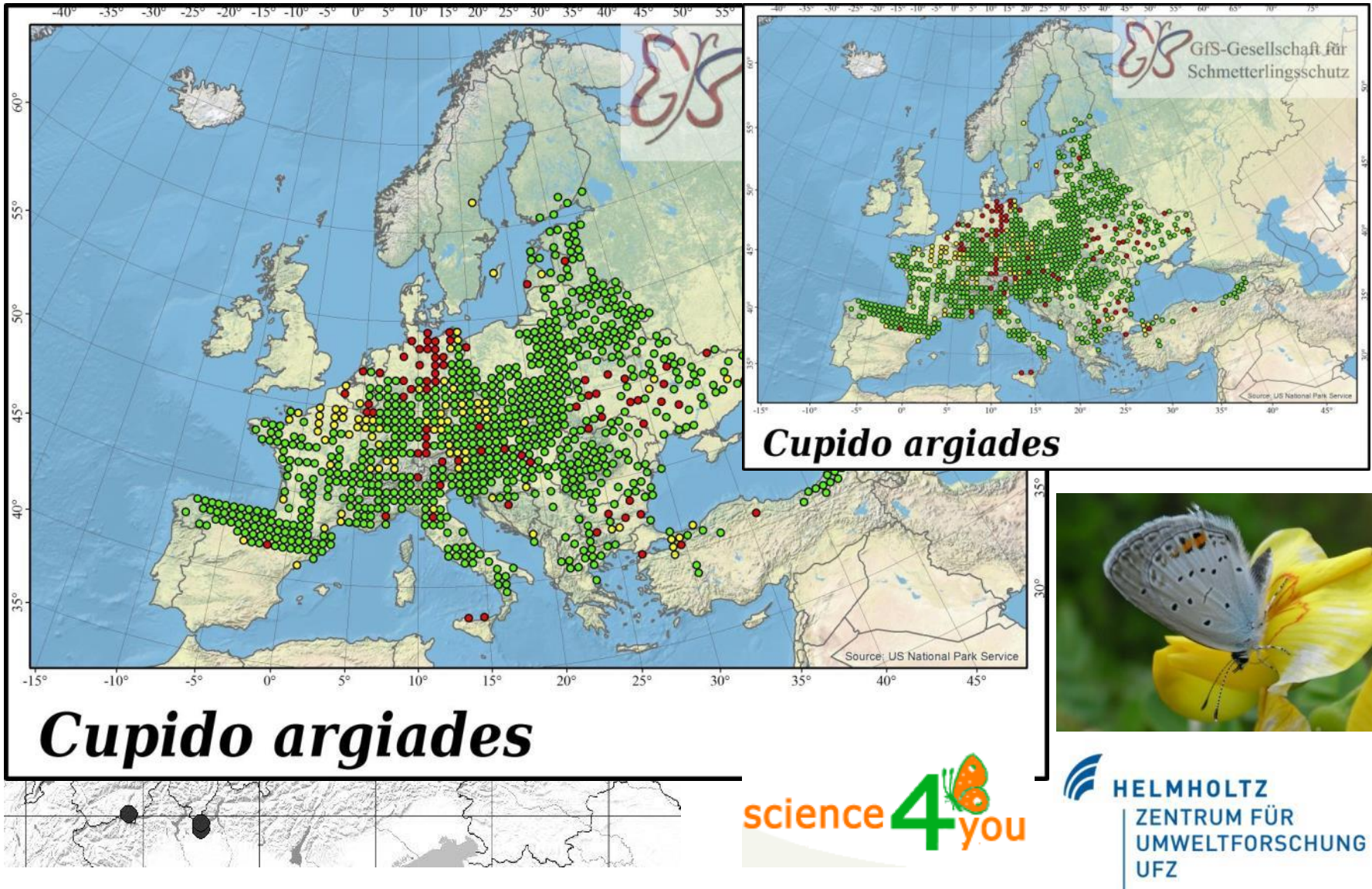
STI = 11,8



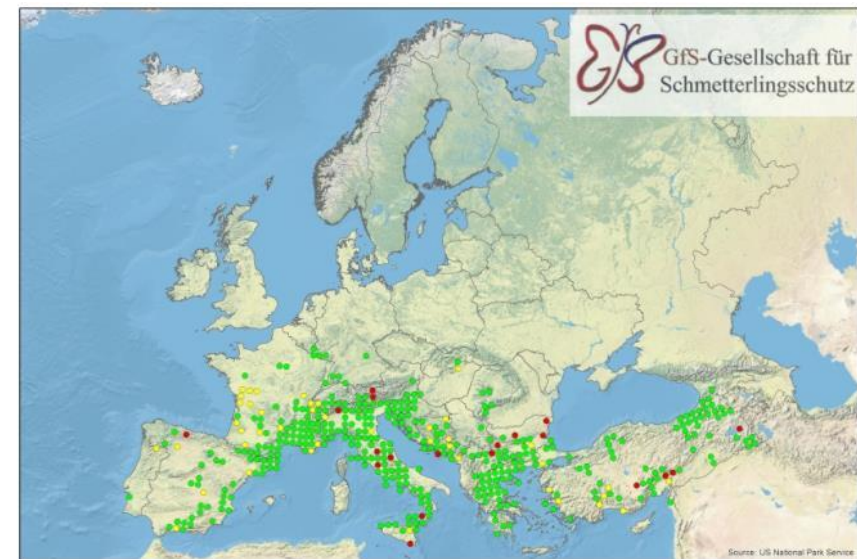
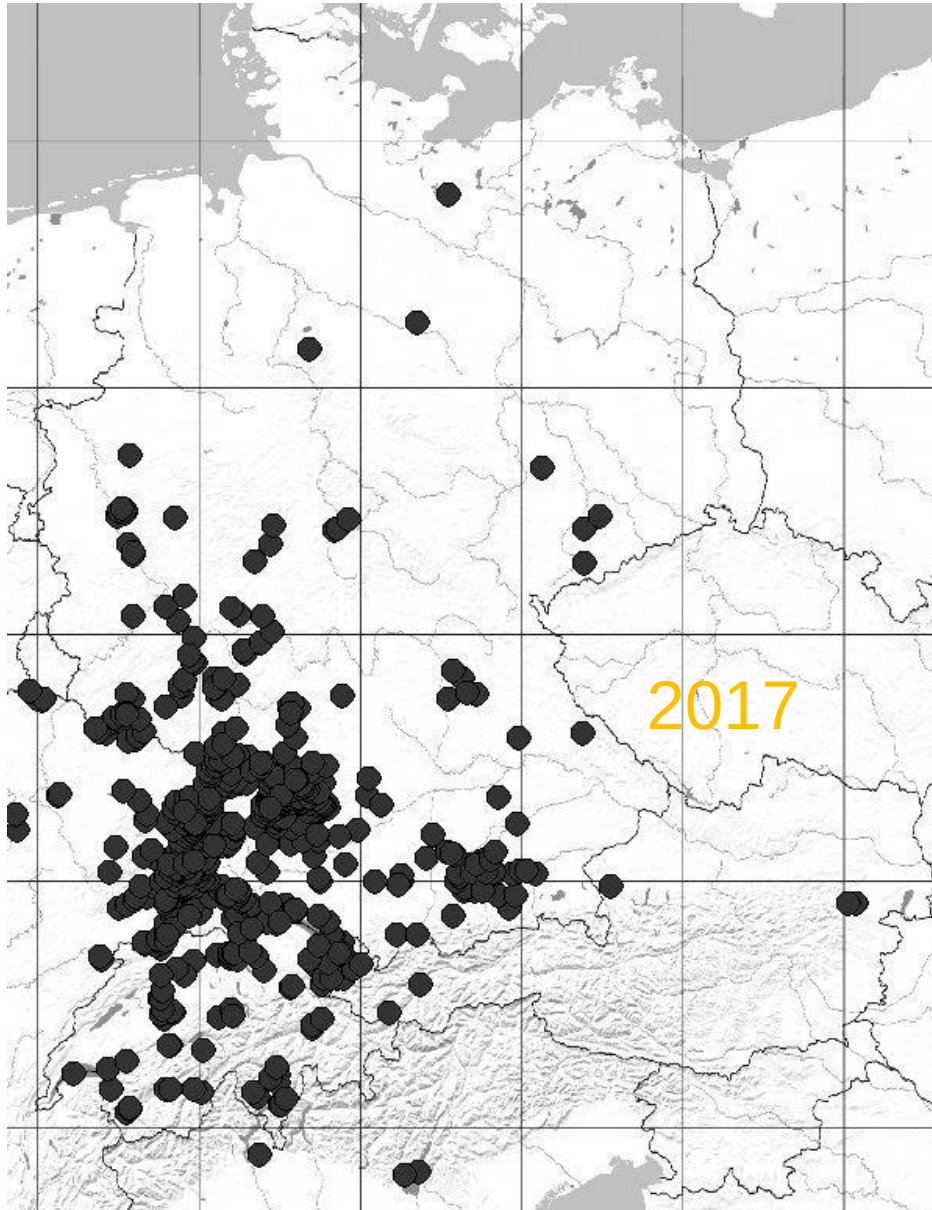
CTI correlation with climatic fluctuations



Range dynamics: *Cupido argiades* in Germany



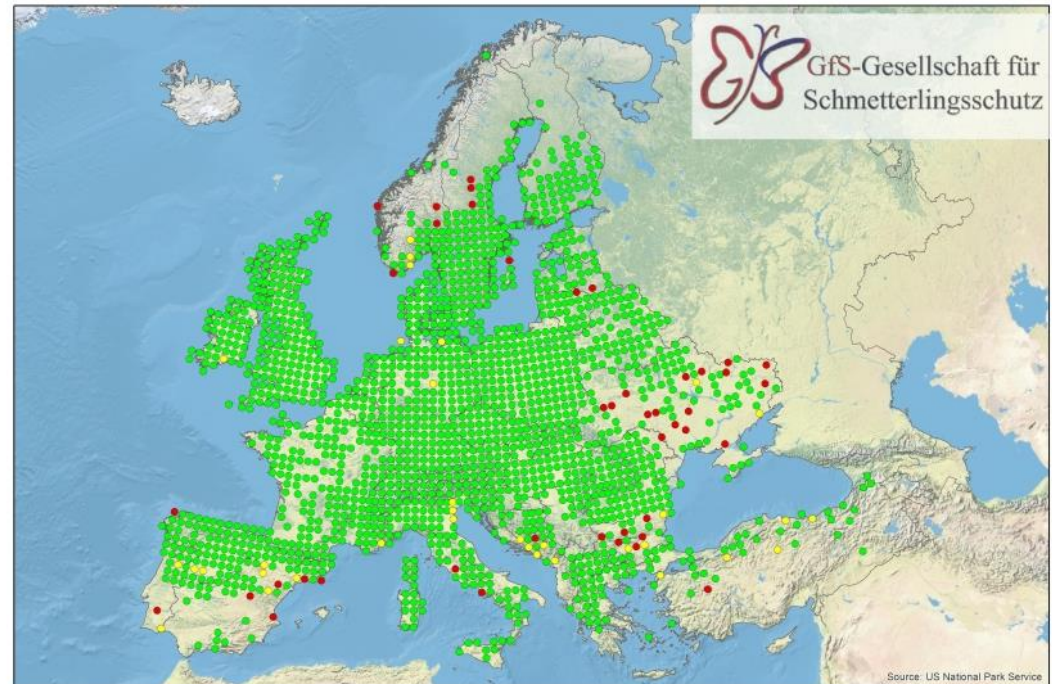
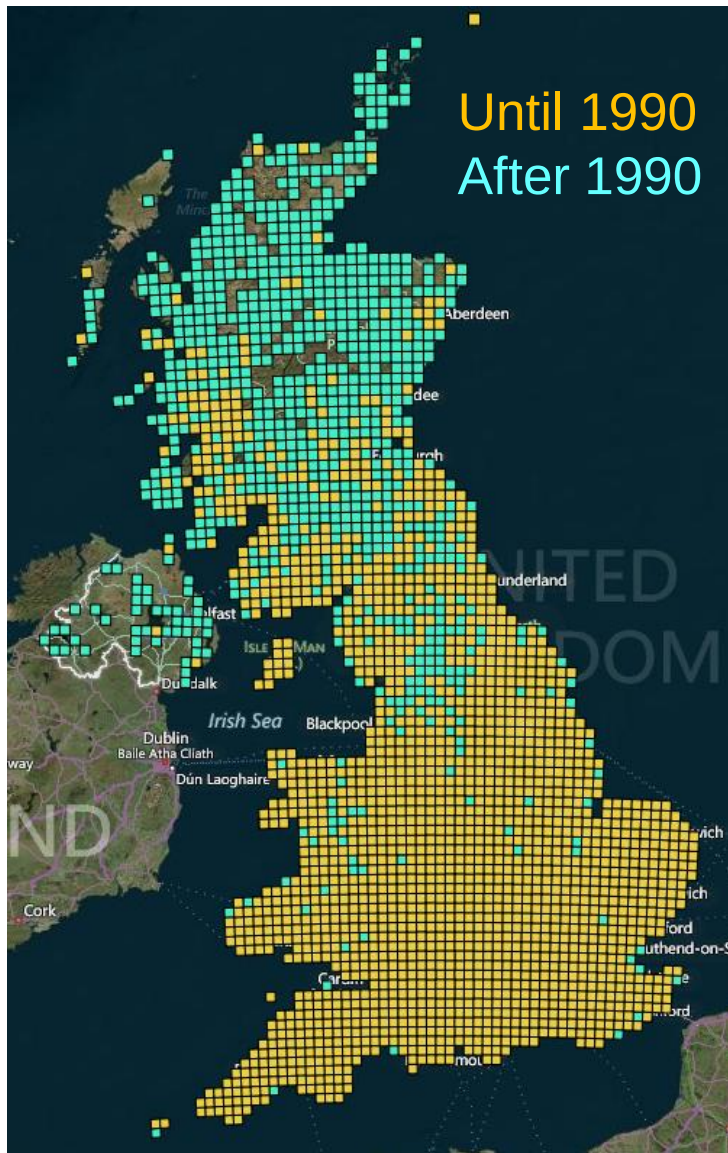
Range expansion of *Pieris mannii* in Central Europe



Pieris mannii

(30.11.2017)
V003

Range expansion of *Aglais io* in the UK

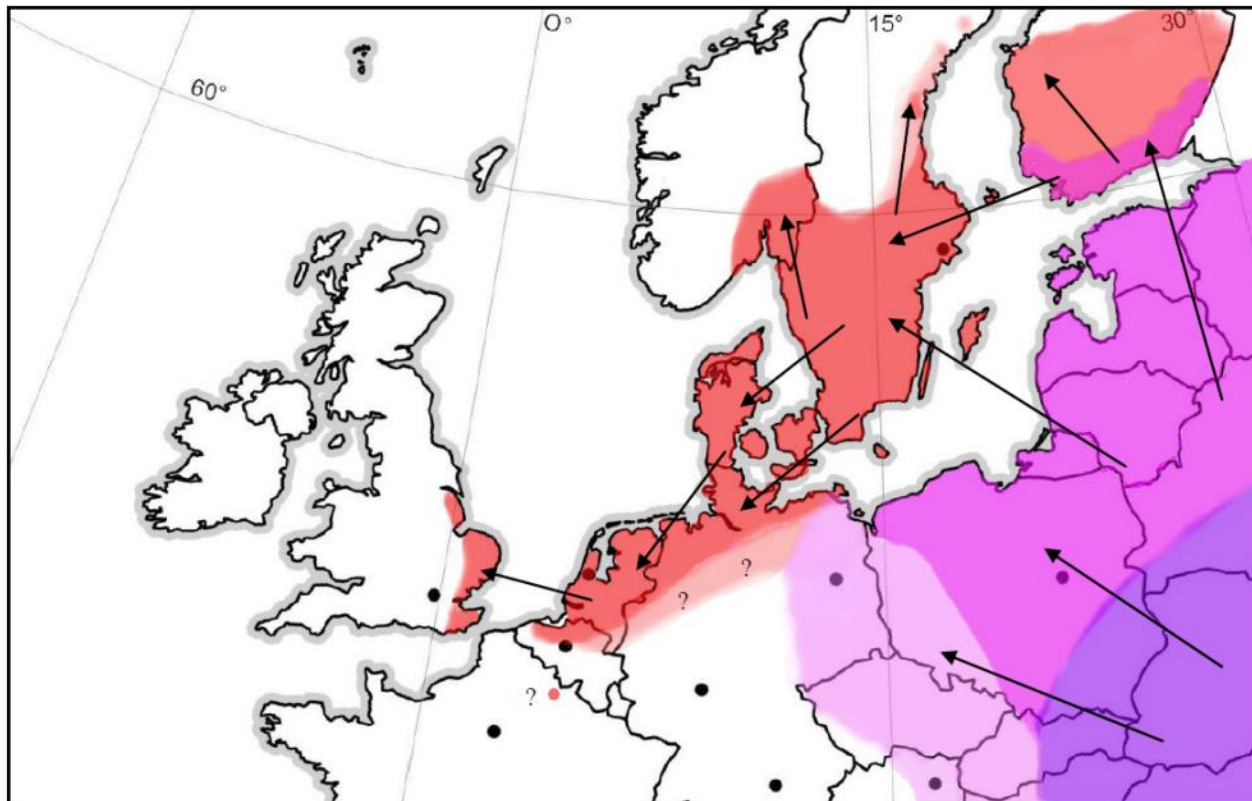


Aglais io

(30.11.2017)
V003

Immigration of *Nymphalis xanthomelas* to NW Europe

NYMPHALIS XANTHOMELAS: L'EXPANSION



Carte de répartition approximative de *Nymphalis xanthomelas* début septembre 2014 dans le Nord de l'Europe



Nymphalis xanthomelas

(30.11.2017)
V003

Manil & Cuvelier (2014) in
Lépidoptères 23: 69-74

Invasive species: e.g. *Cacyreus marshalli*

Geranium Bronze - *Cacyreus marshalli* Butler, 1898

Species group: Butterflies Family: Lycaenidae (Gossamer-winged butterflies) Status: native, Species Rarity: Relatively common

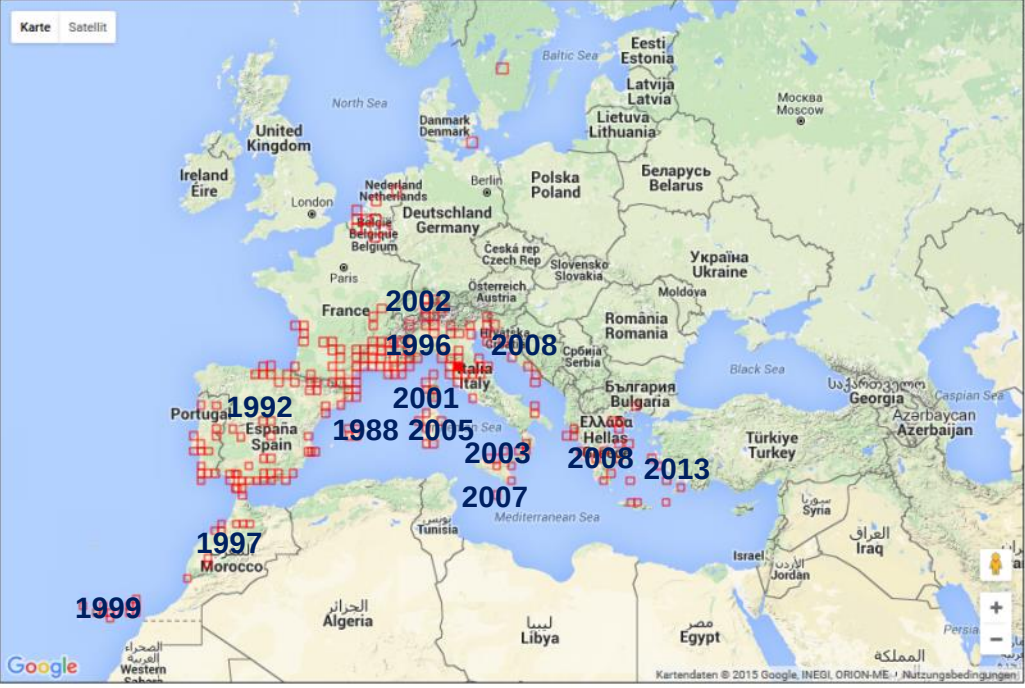
Maps

from 1988-01-01 to 2015-09-25
sort by ☒ Individuals observed ☐ Observations ☐ only approved observations
grid 50km season All second species OK

About this species

- Observations
- Information
- Maps
- Statistics
- Photos

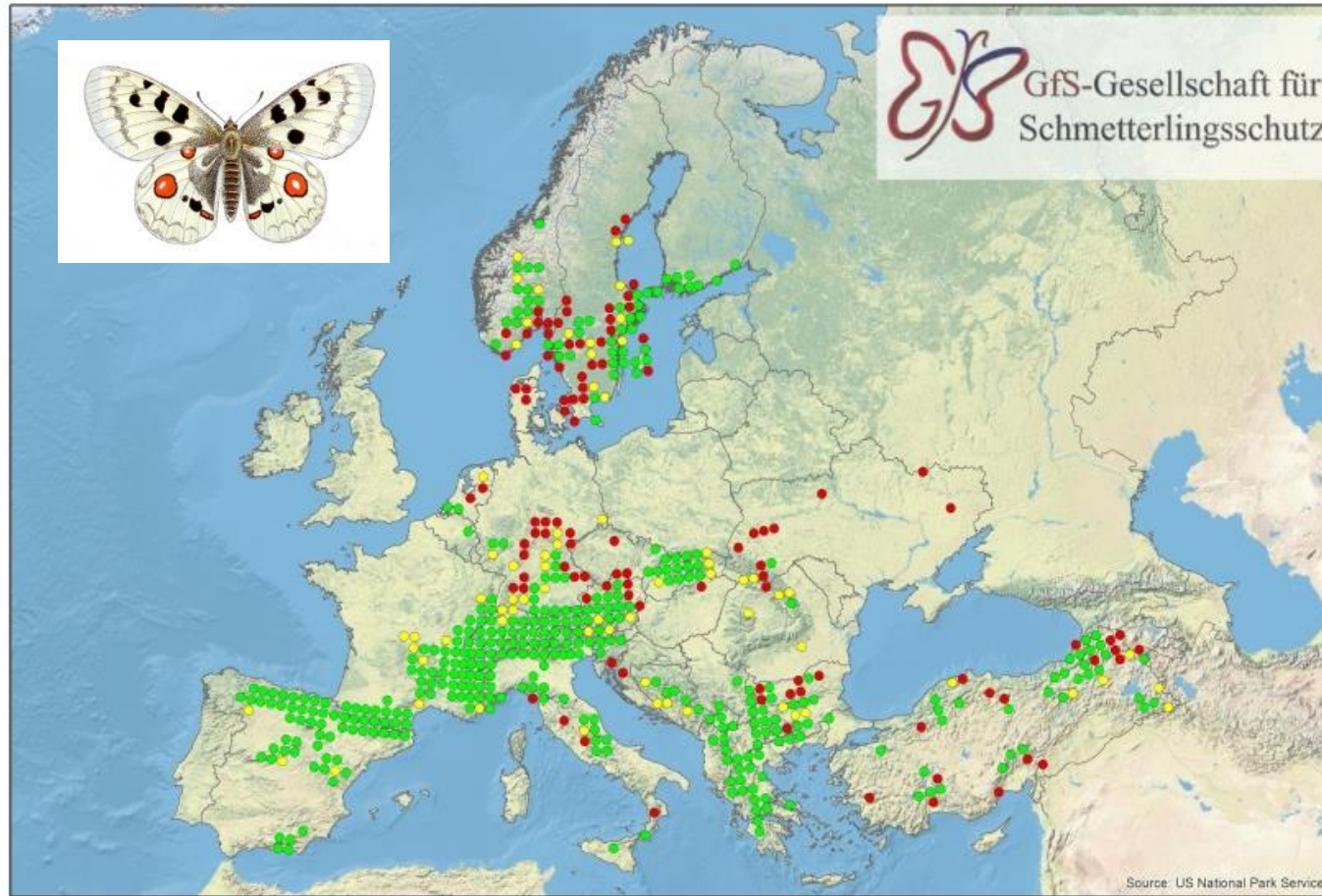
total 1,289 individuals observed
in 243 square(s)
Max : 501
Expires: Fri, 25 Sep 2015 17:03:46



Aims of LepiDiv

- Compile distribution data with improved resolution in space (10x10 km squares) and time (year instead of time periods) in collaboration with national and regional recording schemes
- Improve calculation of climatic niche characteristics
- Dynamic range maps (with flexible time periods)
- Analysis of range and population changes for conservation and climate change research

First results: Online distribution maps



- Use of real coordinates
- UTM grid
- Equal area projection
- Inclusion of Asian Turkey

Parnassius apollo

(30.11.2017)
V003

Kontakt

Imprint/Data Privacy

DE | EN

Search ...



European Butterflies and Moths



Journal Oedippus

Annual Meetings

Projects

LepiDiv Project

Links

Contact

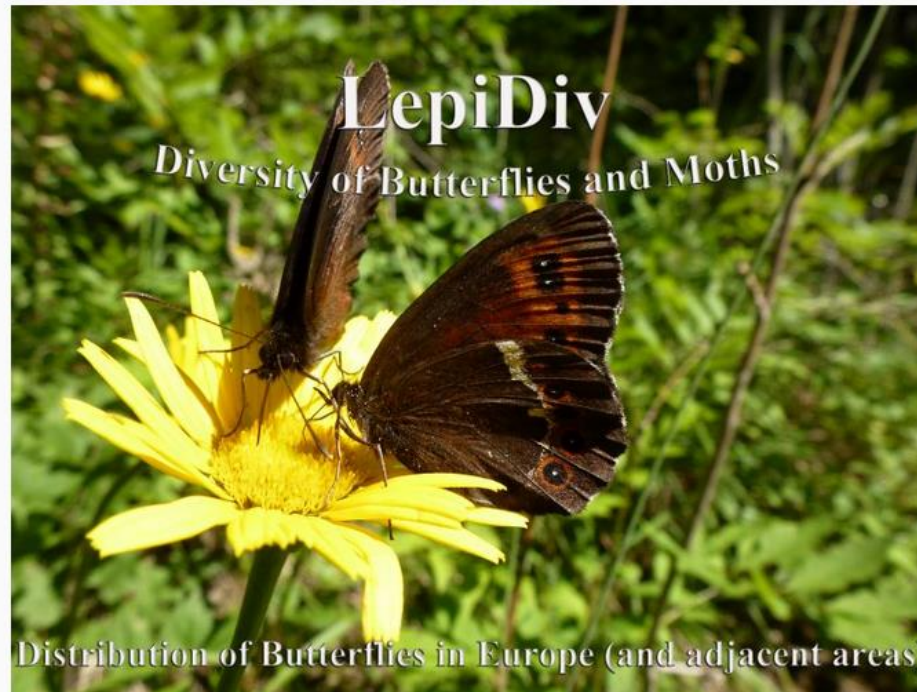
LepiDiv Project



Species list

Distribution maps

Acknowledgements



European Butterflies and Moths



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Species list

Distribution maps

Papilionidae

Pieridae

Nymphalidae

Riodinidae

Lycaenidae

Hesperiidae

WEB-GIS

Acknowledgements

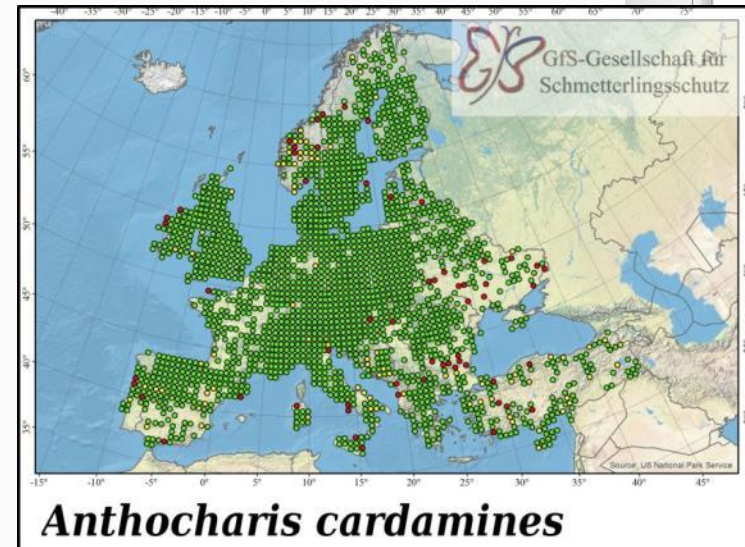
LepiDiv Project > Distribution maps



Gallery of distribution maps of European butterflies

Page index

1. *Aglais io* - *Aricia cramera*
2. *Aricia crassipunctus* - *Brenthis mofidii*
3. *Brintesia circe* - *Coenonympha glycerion*
4. *Coenonympha hero* - *Cupido argiades*
5. *Cupido decoloratus* - *Erebia lefebvrei*
6. *Erebia ligea* - *Erynnis marloyi*
7. *Erynnis tages* - *Hipparchia aristaeus*
8. *Hipparchia blachieri* - *Kirinia climene*
9. *Kirinia roxelana* - *Lycaena thesamon*
10. *Lycaena thetis* - *Melitaea didyma*
11. *Melitaea interrupta* - *Parnassius mnemosyne*
12. *Parnassius nordmanni* - *Plebejus orbitulus*
13. *Plebejus psyloritus* - *Polyommatus cyaneus*
14. *Polyommatus dama* - *Polyommatus karacetinae*
15. *Polyommatus kurdistanicus* - *Pontia chloridice*
16. *Pontia daplidice* (complex) - *Pyrgus melotis*
17. *Pyrgus onopordi* - *Scolitantides orion*
18. *Scolitantides panoptes* - *Vanessa cardui*
19. *Vanessa virginiensis* - *Zizeeria knysna* (complex)



Aglais io



Aglais urticae

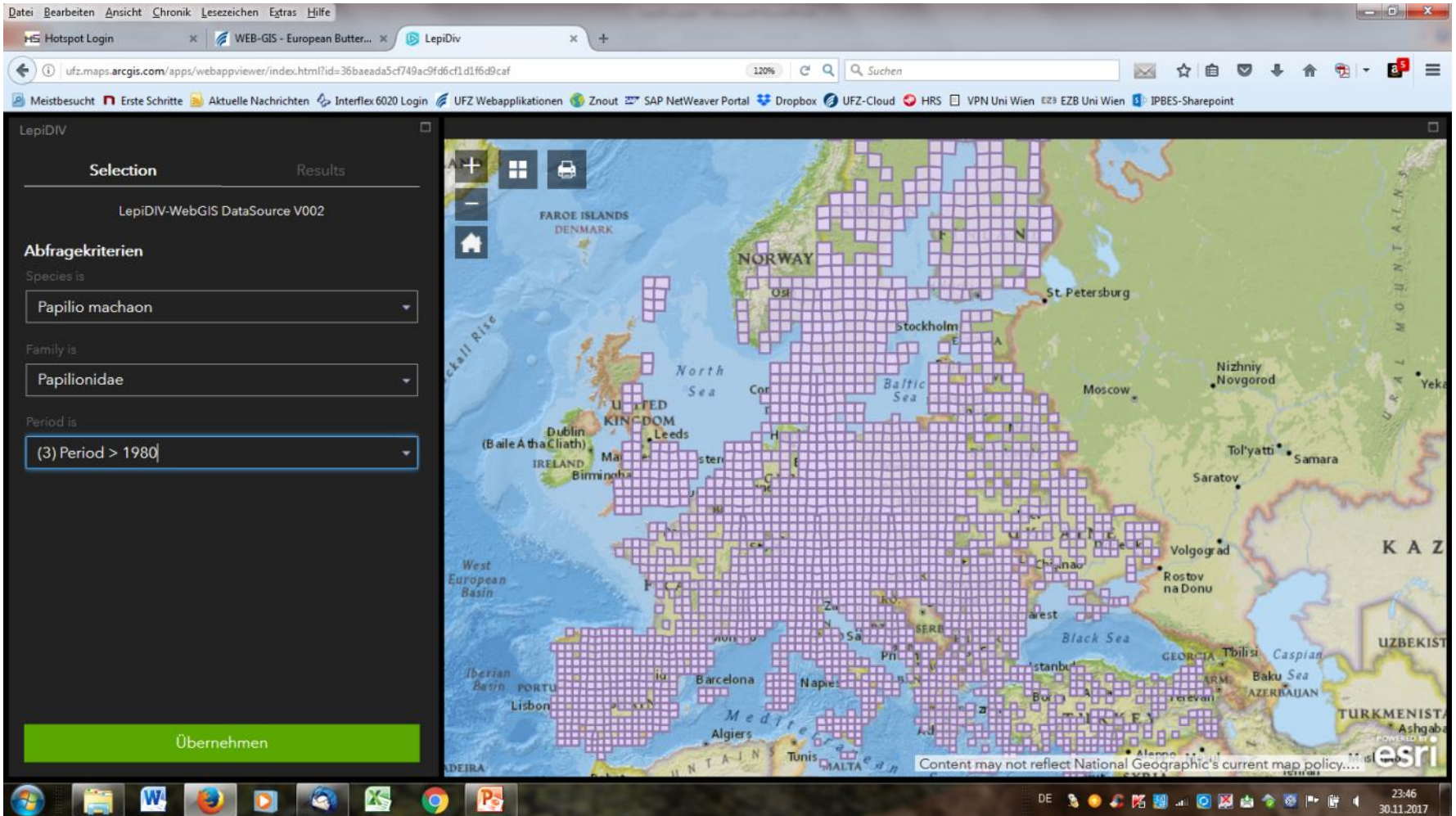


Anthocharis cardamines



Anthocharis damone

New Web-GIS version



Interactive features

- ◆ more dynamic
- ◆ Zoom in
- ◆ own time periods

Butterfly Atlas Germany



Projektbeschreibung

Informationen zum Bearbeitungsstand

Interner Bereich

Datenupload

Start

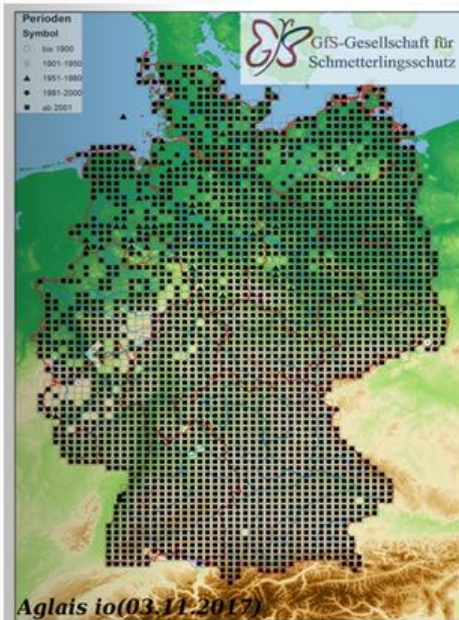


Foto: Joachim Müncheberg



03.11.2017

Weiteres Update des Datenbestandes und Aktualisierung der Verbreitungskarten auf V36. Das Update beinhaltet diverse Korrekturanträge, Einzeldaten und Ergänzungen aus Thüringen.

22.09.2017

Update des Datenbestandes und Aktualisierung der Verbreitungskarten auf V35. Das Update beinhaltet u.A. Daten der Pollichia, eine Aktualisierung des ASK Auszuges aus Bayern und verschiedene Ergänzungen aus Thüringen und Rheinland-Pfalz. Das Layout der Arbeitskarten wurde erneuert und passt sich jetzt dem für den Druck geplanten Layout an.

30.08.2017

Update des Datenbestandes und Aktualisierung der Verbreitungskarten auf V34. Das Update beinhaltet Daten des NLWK Niedersachsen und Mecklenburg-Vorpommern und verschiedene Korrekturen

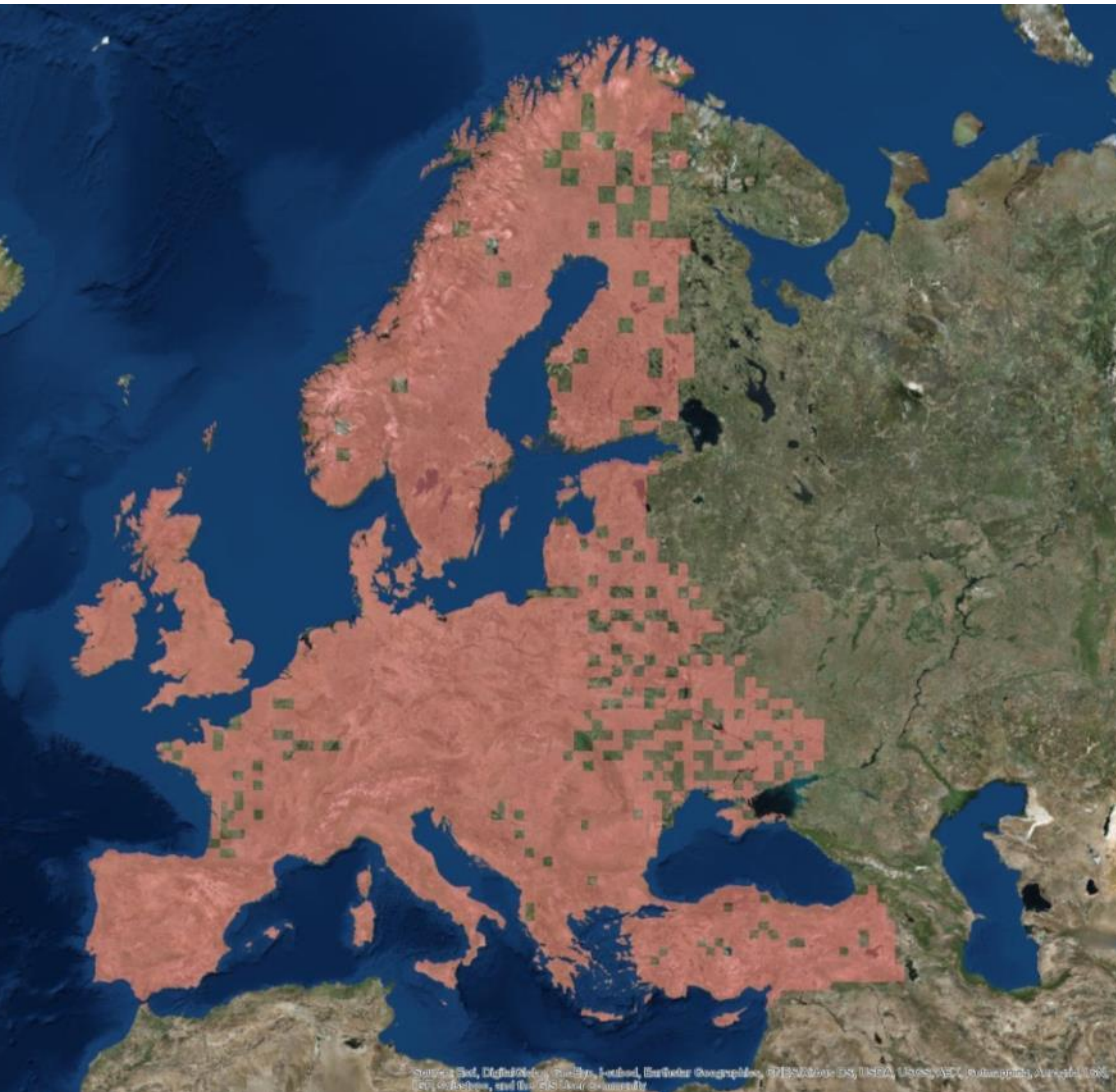
10.08.2017

Update des Datenbestandes und Aktualisierung der Verbreitungskarten auf V33. Das Update beinhaltet Daten des Artenkatasters der Stadt Hamburg und verschiedene Korrekturen

17.07.2017

Update des Datenbestandes und Aktualisierung der Verbreitungskarten auf V32. Das Update beinhaltet Daten des bayerischen Landesamtes für Umwelt

Amount of data & resolution



- 550 Species
- 14 million datasets

Spatial resolution

- CGRS (50km): 25%
- 5x5 km or higher: 75%

Temporal resolution

- Year: 63%
- Day: 30%
- Periods: 7%

Data coverage quality



Countries with basic data included

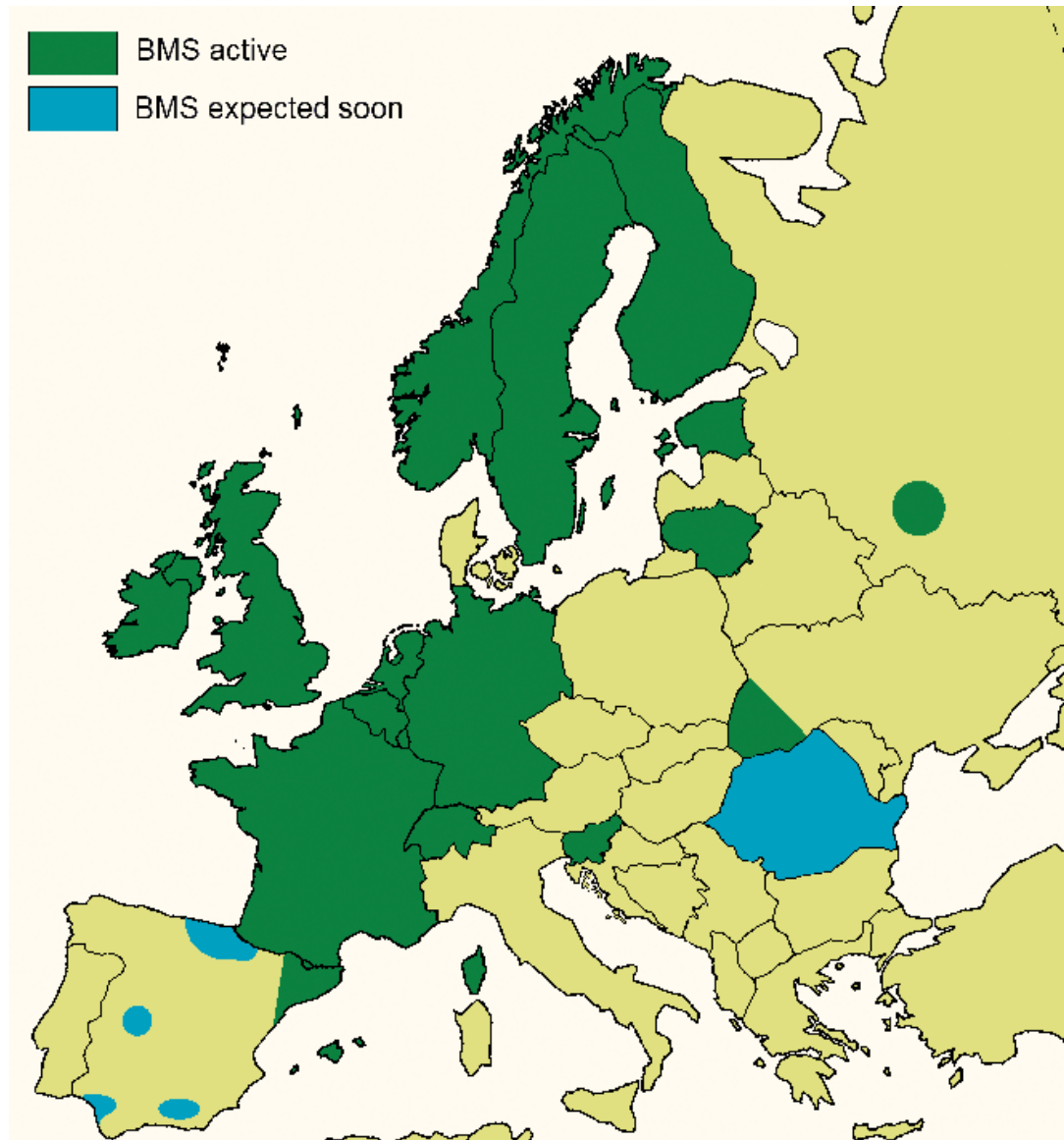


Countries with higher resolution data included



HELMHOLTZ
ZENTRUM FÜR
UMWELTFORSCHUNG
UFZ

Butterfly Monitoring Schemes in Europe



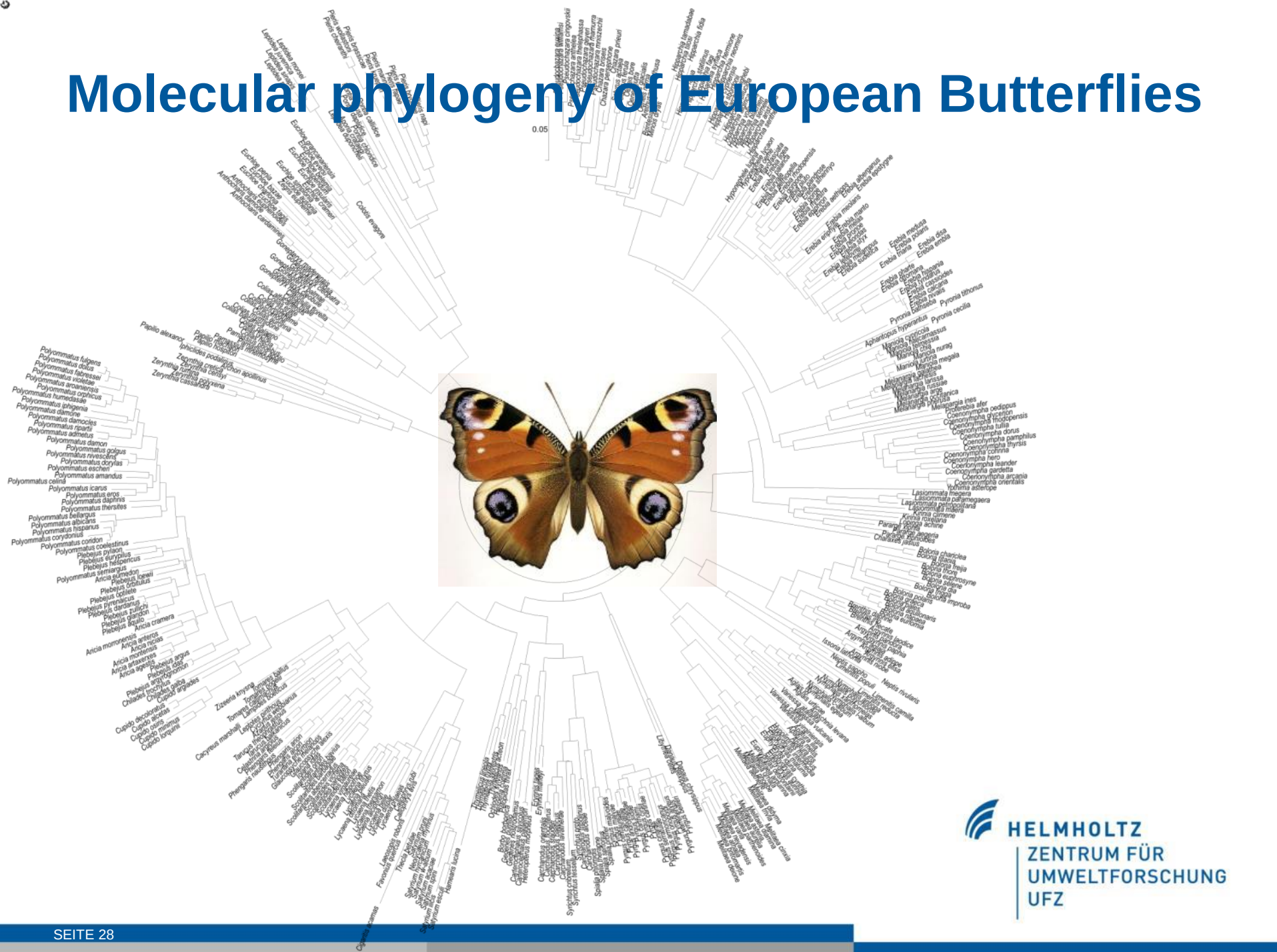
- Source for high resolution data in space & time
- Need for quality checks
- Monitoring range changes due to land use and increasingly to climate change

LepiDiv = Diversity of Butterflies & Moths

More than distribution maps

- Trait database for ecological research:
 - Climatic niche characteristics
 - Morphological characteristics (e.g. size, colour)
 - Larval foodplants
 - Other life history parameters (e.g. development time, egg numbers)
- Facilitate ecological research and conservation
- Further the use of butterflies & moths as model systems

Molecular phylogeny of European Butterflies



A close-up photograph of two butterflies perched on a bright yellow flower. The butterfly on the left is a dark brown species with a lighter band across its wings. The butterfly on the right is a similar dark brown species with prominent eye-like spots on its hindwings. The background is a soft-focus green field of foliage.

LepiDiv

Diversity of Butterflies and Moths

Thank you
for your
attention!

www.european-butterflies.ufz.de

Distribution of Butterflies in Europe (and adjacent areas)