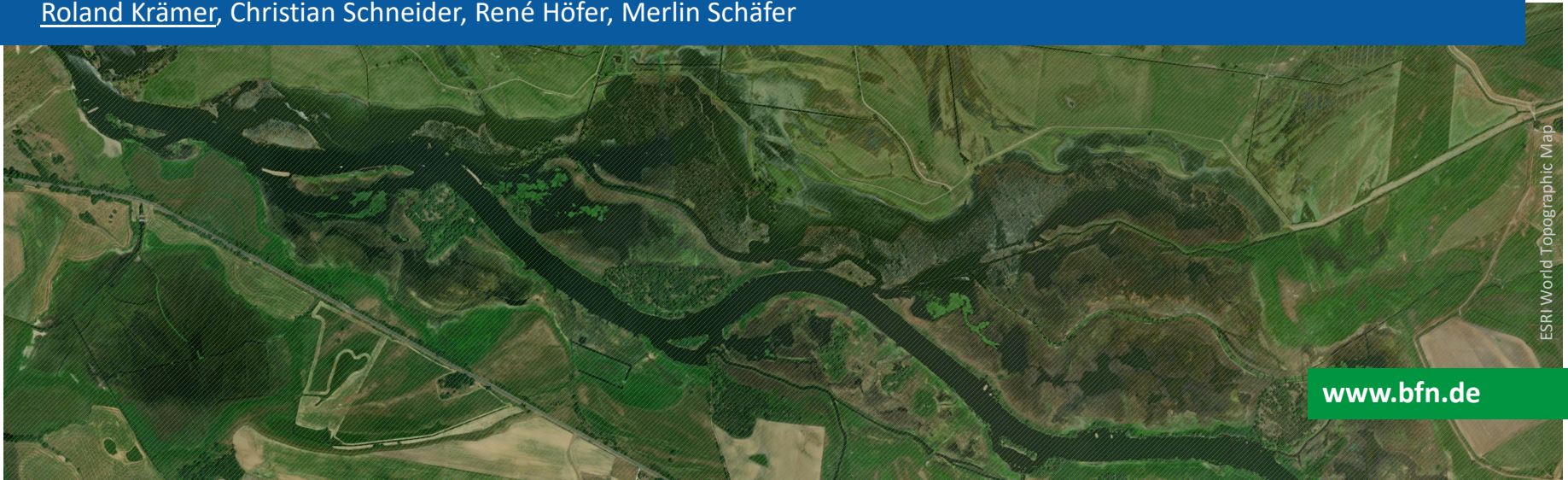


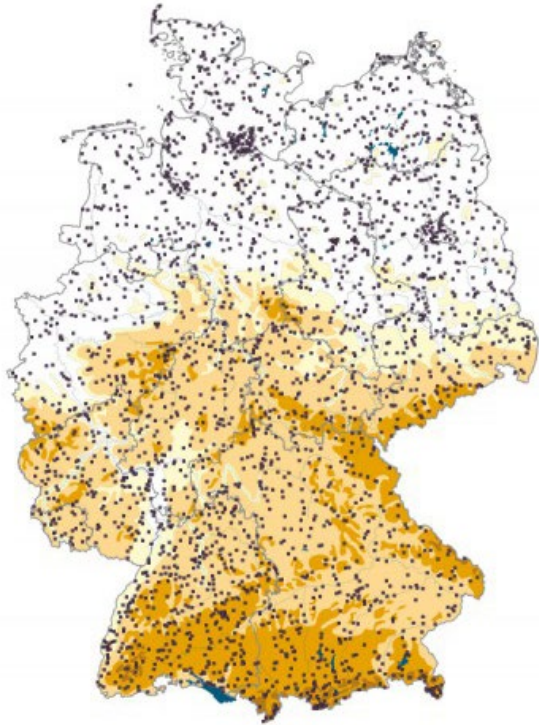
Satellite remote sensing as a key technology for effective biodiversity monitoring and nature conservation

The perspective of a national nature conservation authority

[Roland Krämer](#), Christian Schneider, René Höfer, Merlin Schäfer



Remote Sensing / EO for Biodiversity Monitoring and Conservation



Common Bird Monitoring Sites in Germany by Federation of German Avifaunists (DDA)



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© Peter Runkewitz, Project Flow



**Monitoring:
biodiversity,
landscapes, drivers
and measures**



**Reporting:
from local up to
EU level**



**Research
for policy advice**



**Planning:
nature conservation,
landscape and urban
planning**



**Nature
Conservation (Law)
Enforcement**



EO projects in nature conservation and biodiversity monitoring in Germany - examples



Topics

- Enforcement
- Monitoring
- Planning
- Reporting
- Research

Monitoring of biodiversity, landscapes and drivers

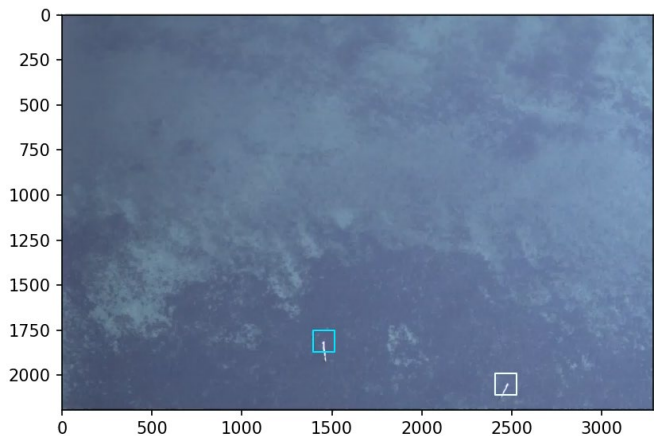


Aktionsprogramm
Natürlicher Klimaschutz
 Natur stärken - Klima schützen

BfN Bundesamt für
 Naturschutz

Potential of satellite remote sensing for complementing long-term biodiversity monitoring for the German Natural Climate Protection Action Programme

Merlin Schäfer, Michael Förster, Annett Frick, Claudia Hildebrandt, Rene Höfer, Roland Krämer, Christian Schneider, Wiebke Züghart



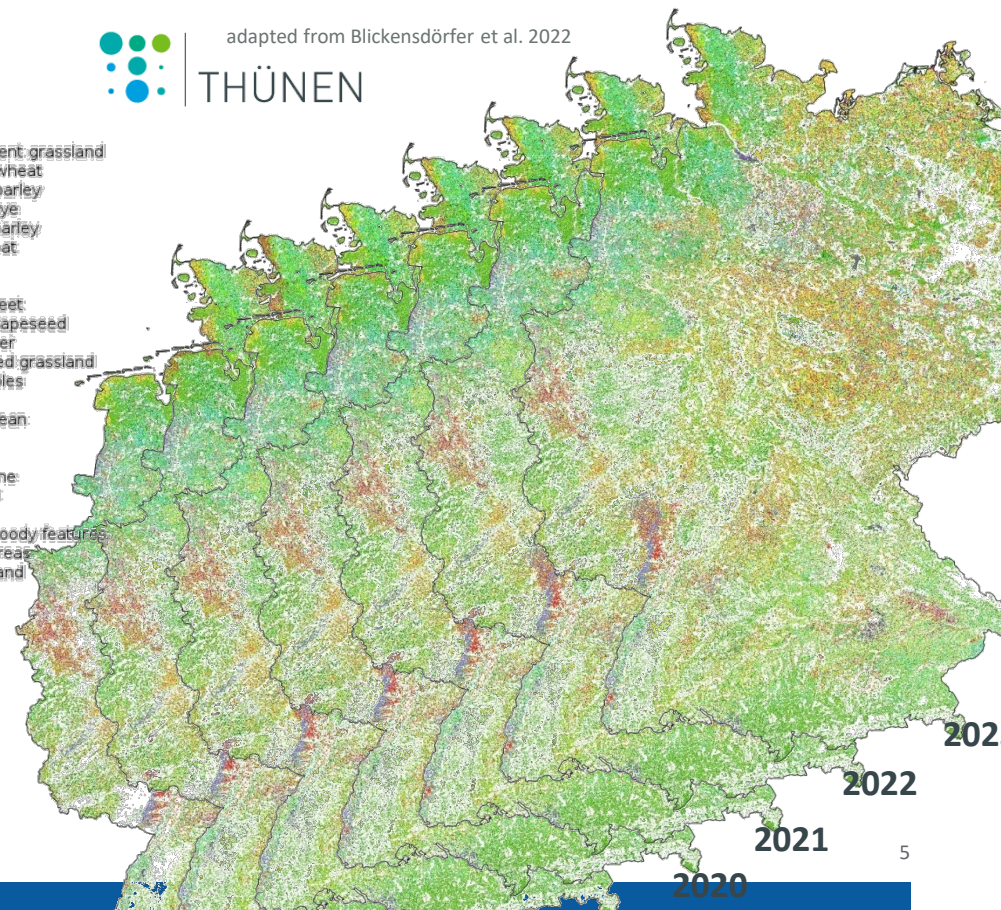
FAU Erlangen 2021



adapted from Blickensdörfer et al. 2022

THÜNEN

- Permanent grassland
- Winter wheat
- Winter barley
- Winter rye
- Spring barley
- Spring oat
- Maize
- Potato
- Sugar beet
- Winter rapeseed
- Sunflower
- Cultivated grassland
- Vegetables
- Peas
- Broad bean
- Lupin
- Soy
- Grapevine
- Orchard
- Hops
- Small woody features
- Other areas
- Fallow land



EO for Reporting: from local up to EU level



Tree cover in 2023



Tree cover loss since 2018



Potential for replanting



- 75 %
- 80 %
- 90 %
- mehr als 90 %



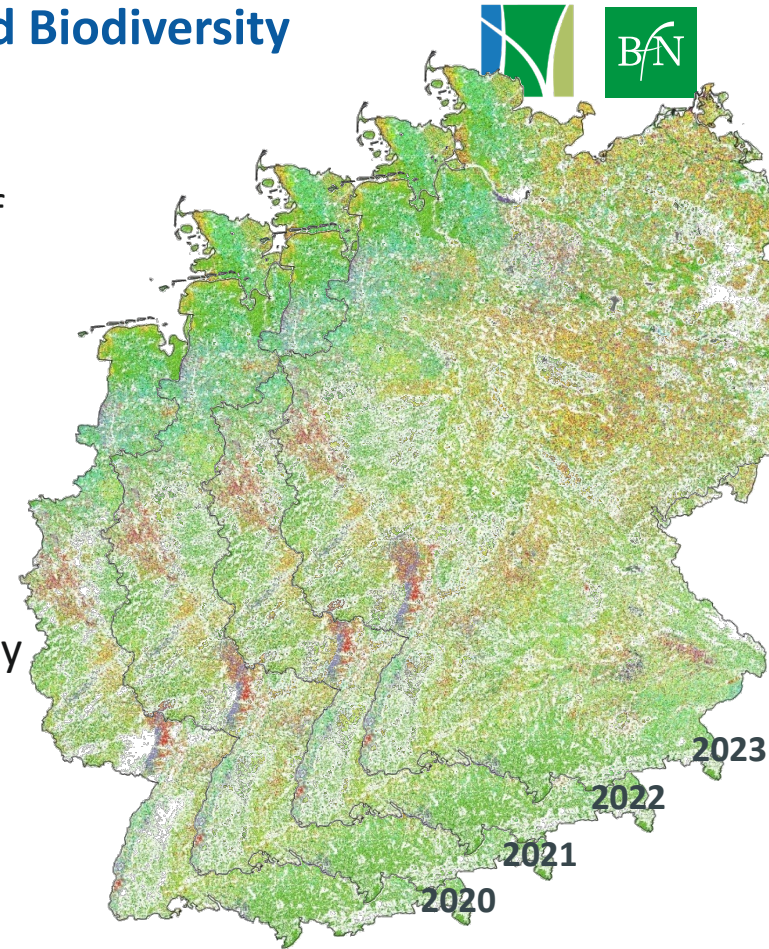
- 100 bis -80%
- 79 bis -60%
- 59 bis -40%
- 39 bis -20%
- 19 bis -15%

Stöckigt et al. 2024

- 100 bis -80%
- 79 bis -60%
- 59 bis -40%

Requirements for EO in Nature Conservation and Biodiversity Monitoring

- Repeated, long-term assessments / products (e.g. by continuation of R&D projects or outcomes of projects)
- Ready-to-use products with biodiversity metrics OR easily reproducible workflows (or both)
- Applicability of products on the national/regional level
- Methods need to be standardised to ensure reliability and comparability over time and space
- Organisational, structural and legal prerequisites of authorities must be taken into account



Challenges for the application of EO in Nature Conservation and Biodiversity Monitoring



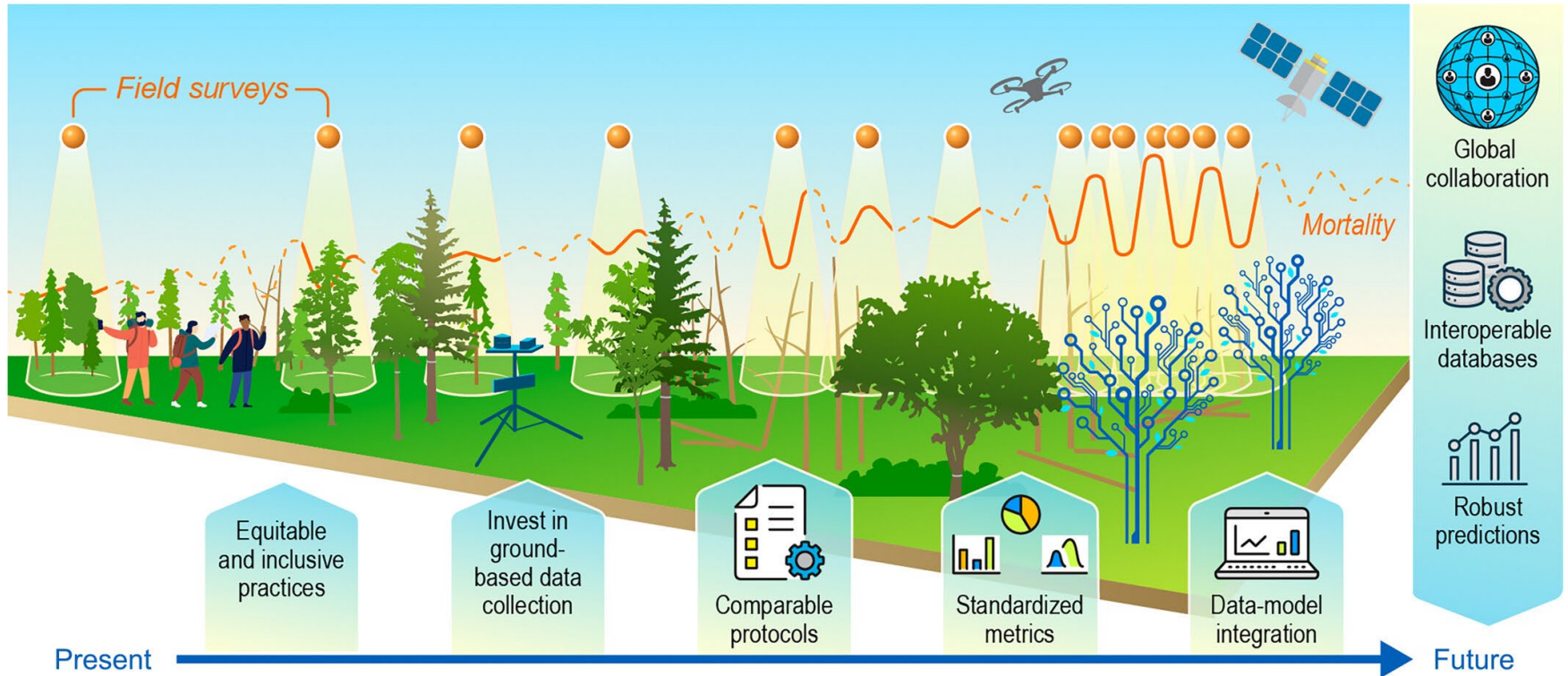
- Lack of coordination and standardisation among EO projects and applications
- Often lack of legal prerequisites for remote sensing being used as a reliable method
- Shortage of specialists
- Lack of confidence or high (organisational, structural) hurdles to introduce new methods or routines
- Data infrastructure and/or data management not ready for e.g. data-intensive tasks
- Trade-offs and agreed transfer between broad indicators and dimensional “raw” data / original biodiversity measures



- High policy relevance/impact
- Comparability (transregional/-national)

- High level of detail (on species, taxa level)
- Reusability (for other objectives)

Outlook on EO for Nature Conservation and Biodiversity Monitoring



Source: International Tree Mortality Network / Senf et al. 2025



National
Monitoring Centre
for Biodiversity



Federal Agency for
Nature Conservation

Thank you!

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