





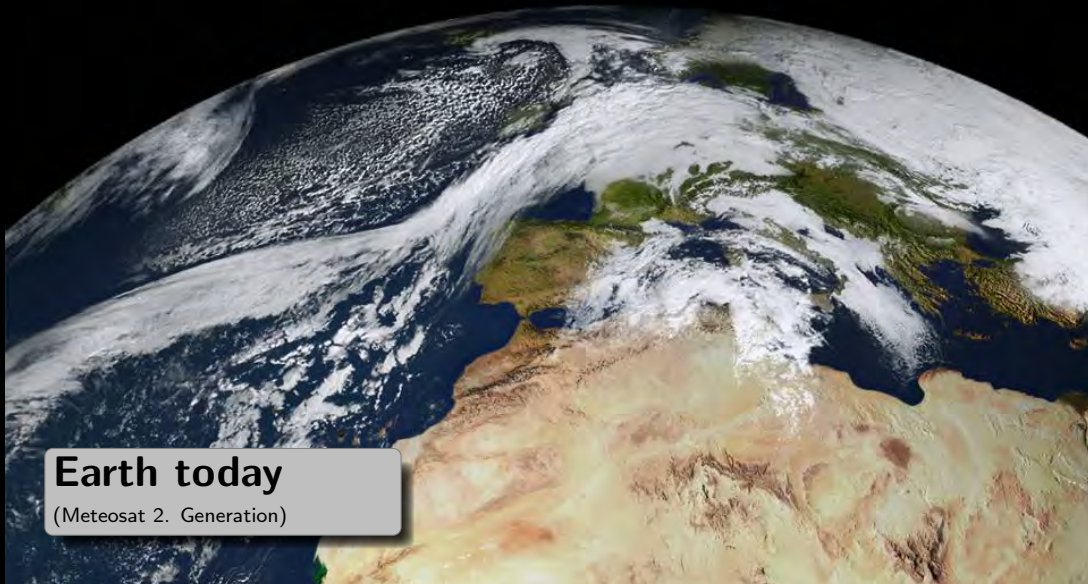
GEO BON & CEOS Biodiversity Overview of activities and aims

DryLands Workshop, Bonn, July 2014



Earth in the 60ies

(TIROS I, April 1960)



Earth today

(Meteosat 2. Generation)

Very High Resolution (0.5-2.5m)

(WorldView-2 2009, Dakar, Senegal)



[Data](#) ▾[News](#) ▾[Community](#) ▾[About](#) ▾

Global Biodiversity Information Facility

Free and Open Access to Biodiversity Data

Biodiversity Data

(GBIF data portal, July 2014)

442,045,294

OCCURRENCES

1,454,695

SPECIES

15,264

DATASETS

614

DATA PUBLISHERS

Sharing biodiversity
data for re-use

[Learn about GBIF](#)

[Publish your data through GBIF](#)

[Technical infrastructure](#)

Providing evidence for
research and decisions

[Using data through GBIF](#)

[Enabling biodiversity science](#)

[Supporting global targets](#)

Collaborating as a
global community

[Current Participants](#)

[How GBIF is funded](#)

[Enhancing capacity](#)



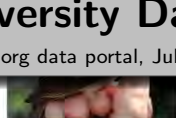
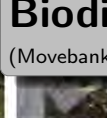
Biodiversity Data

(GBIF data portal, July 2014)

User login

Username: *

Password: *

[Create new account](#)[Request new password](#)

Biodiversity Data

(Movebank.org data portal, July 2014)

Welcome to Movebank!

Welcome to Movebank! Movebank is a free, online database of animal tracking data hosted by the **Max Planck Institute for Ornithology**. We help animal tracking researchers to manage, share, protect, analyze, and archive their data. Movebank is an international project with over four thousand users, including people from research and conservation groups around the world.

How does Movebank work? The animal tracking data accessible through Movebank belongs to researchers all over the world. These researchers can choose to make part or all of their study information and animal tracks visible to other registered users, or to the public.

[Browse existing tracks on Movebank](#)

[Add data to Movebank](#)

[Manage Argos data in Movebank](#)

What is animal tracking? Animal tracking data helps us understand how individuals and populations move within local areas, migrate across oceans and continents, and evolve through millennia. This information is being used to address environmental challenges such as climate and land use change, biodiversity loss, invasive species, and the spread of infectious diseases. [Read more](#)

News

The Animal Tracker App from Movebank is out!

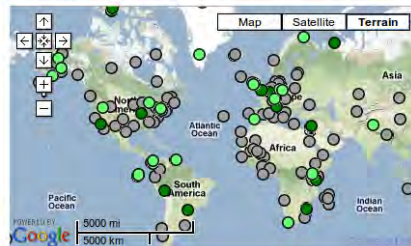
Submitted by sod on Thu, 06/26/2014 - 20:58

We've just released the beta Animal Tracker app for **Android**, **iPhone** and **iPad**. Now you can "follow" animals as their locations are updated in near-real time and even contribute images of the animals or their habitat if you are in the area.

[Read more](#) 205 reads

Tracking Data

Browse tracking data



Featured Studies

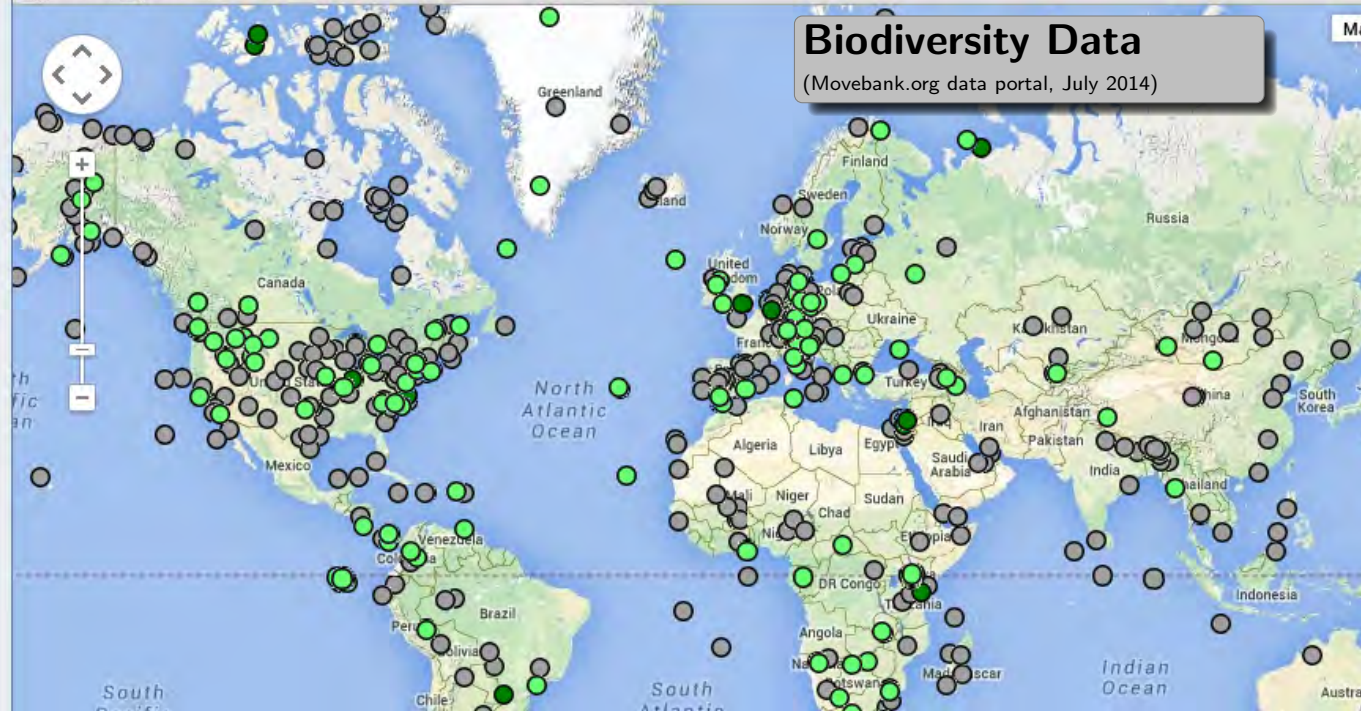
Migratory Burchell's zebra in northern Botswana

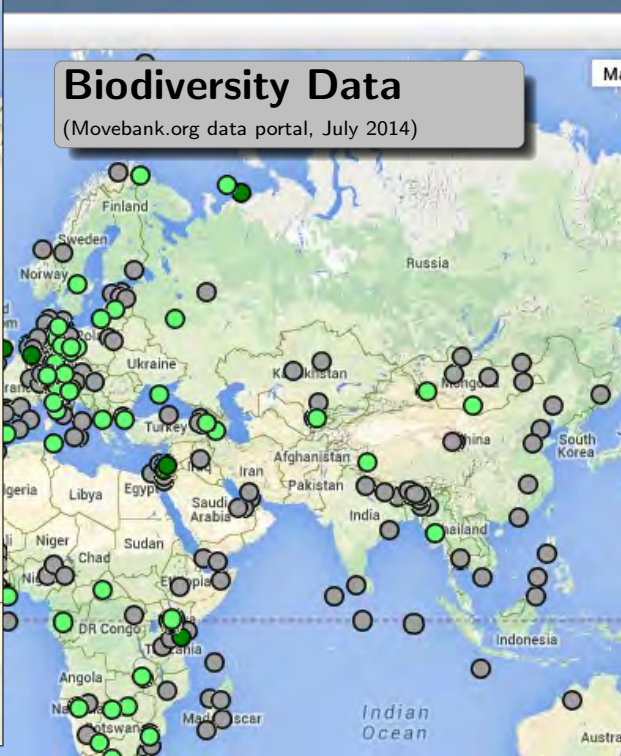
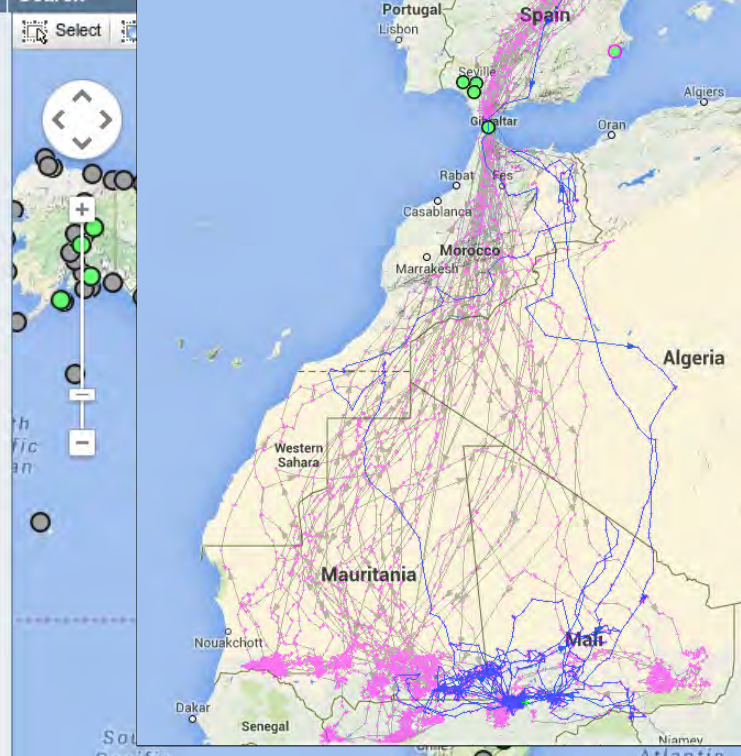
Submitted by sod on Thu, 08/29/2013 - 19:27

In 1968, a fence was constructed in northern Botswana to keep domestic livestock safe from zebras living at the Okavango Delta, this was an unfortunate development, because the fence blocked access to the Makgadikgadi grasslands, where they went every year at the start of the rainy season to spend the summer foraging on protein- and nutrient-rich grasses. For 36 years, the zebras could not migrate.

Biodiversity Data

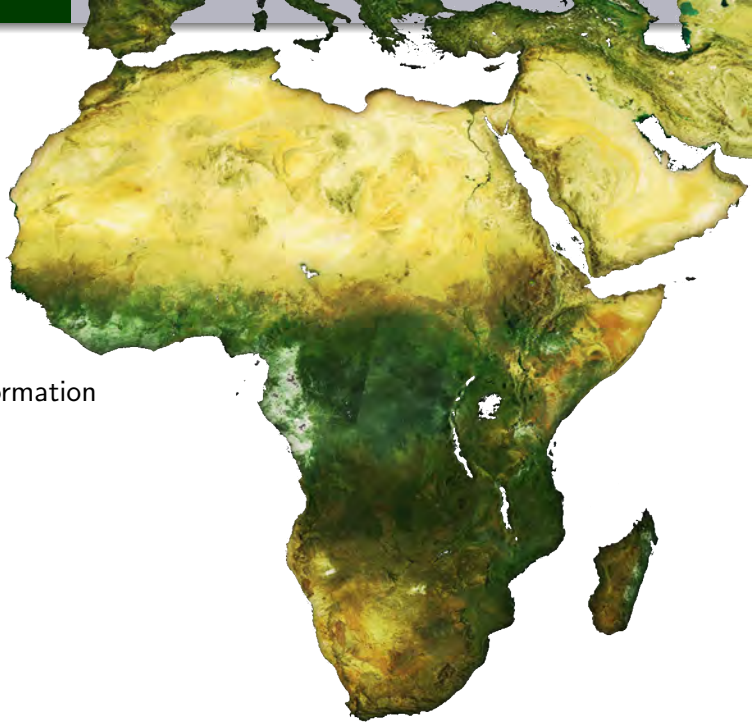
(Movebank.org data portal, July 2014)





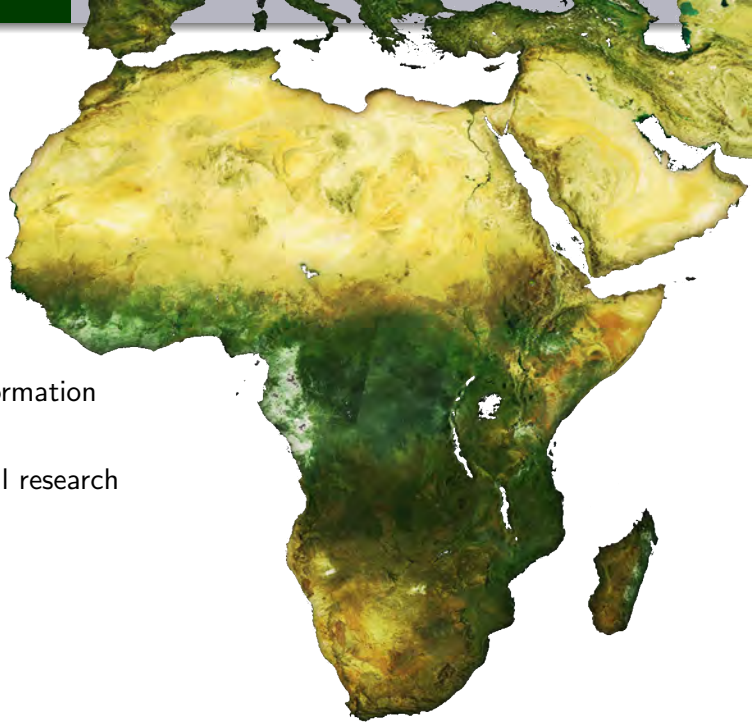
a lot of data

- but not yet a lot of (interdisciplinary) information



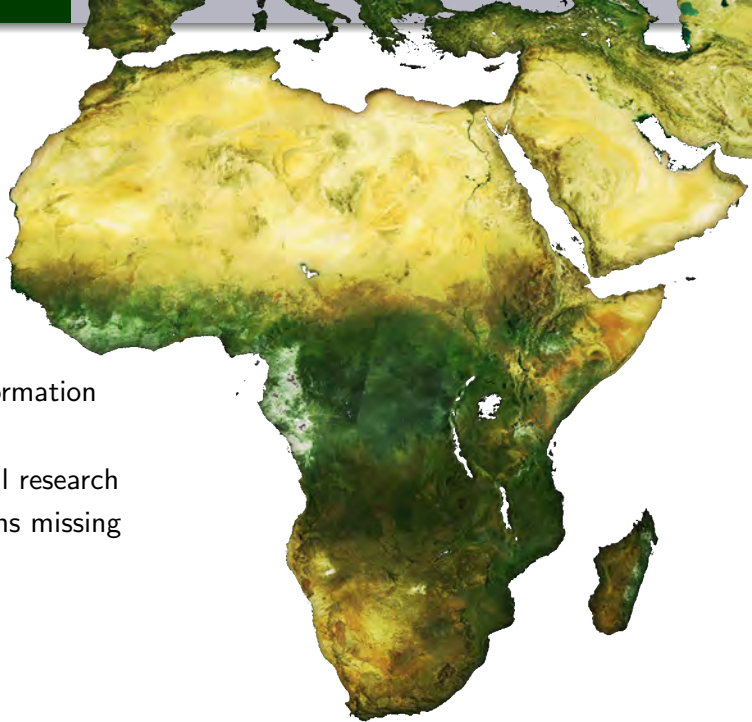
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- compiled for specific tasks/requirements
- partly useful for biodiversity and ecological research



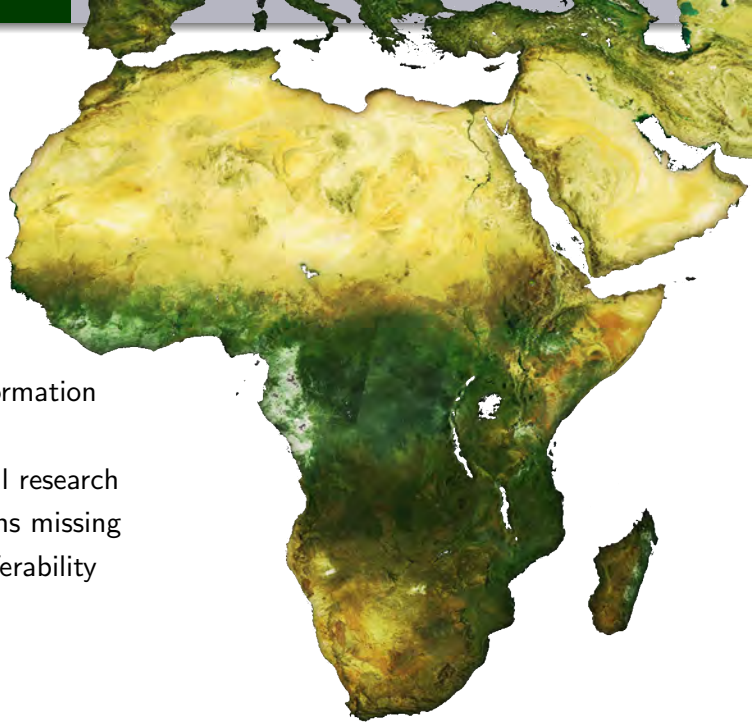
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- compiled for specific tasks/requirements
- partly useful for biodiversity and ecological research
- standardized and homogenised observations missing



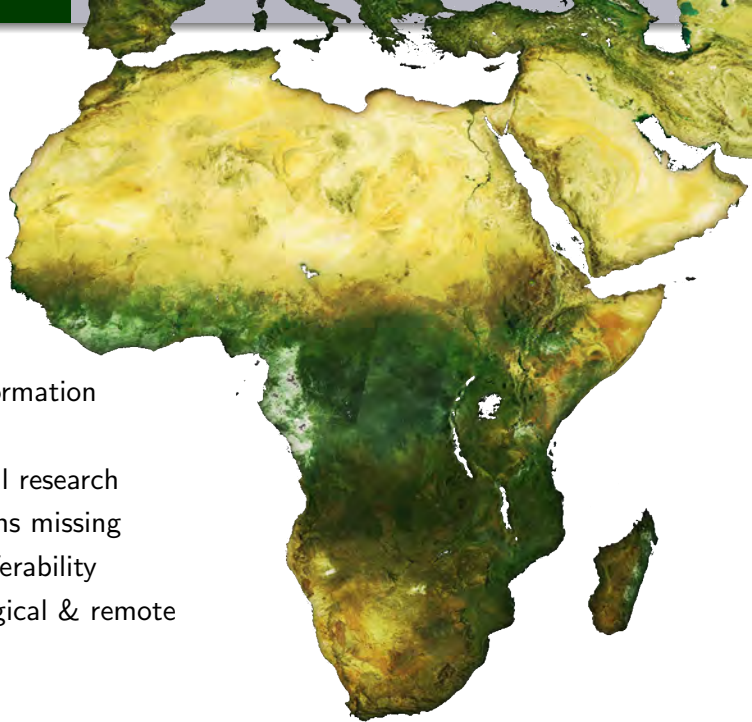
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a lot of data

- but not yet a lot of (interdisciplinary) information
- compiled for specific tasks/requirements
- partly useful for biodiversity and ecological research
- standardized and homogenised observations missing
- shortcomings in data adequacy and transferability
- esp. combination high potential for ecological & remote sensing research



Essential Biodiversity Variables

H. M. Pereira,^{1†} S. Ferrier,² M. Walters,³ G. N. Geller,⁴ R. H. G. Jongman,⁵ R. J. Scholes,⁶ M. W. Bruford,⁸ N. Brummitt,⁷ S. H. M. Butchart,⁶ A. C. Cardoso,⁹ N. C. Coops,¹⁰ E. Dulloo,¹¹ D. P. Faith,¹² J. Freyhof,¹³ R. D. Gregory,¹⁴ C. Heip,¹⁵ R. Höft,¹⁶ G. Hurtt,¹⁷ W. Jetz,¹⁸ D. Karp,¹⁹ M. A. McGeoch,²⁰ D. Obura,²¹ Y. Onoda,²² N. Pettorelli,²³ B. Reyers,²⁴ R. Sayre,²⁵ J. P. W. Scharlemann,^{26,27} S. N. Stuart,²⁸ E. Turak,²⁹ M. Walpole,³⁰ M. Wegmann³⁰

Reducing the rate of biodiversity loss and averting dangerous biodiversity change are international goals, reasserted by the Aichi Targets for 2020 by Parties to the United Nations (UN) Convention on Biological Diversity (CBD) after failure to meet the 2010 target (1, 2). However, there is no global, harmonized observation system for delivering regular, timely data on biodiversity change (3). With the first plenary meeting of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) soon under way, partners from the Group on Earth Observations Biodiversity Observation Network (GEO BON) (4) are developing—and seeking consensus

Change (UNFCCC) (8). EBVs, whose development by GEO BON has been endorsed by the CBD (Decision XI/3), are relevant to derivation of biodiversity indicators for the Aichi Targets (9). Although CBD biodiversity indicators are designed to convey messages to policy-makers from existing biodiversity data (1), EBVs aim to help observation communities harmonize monitoring, by identifying how variables should be sampled and measured.

Given the complexity of biodiversity change (3), the challenge of developing a global observation system can appear insurmountable. Nearly 100 indicators have been proposed for the 2020 CBD targets (ongoing work seeks to identify a more limited subset

potentially fit this definition. We developed and tested a process, still ongoing, to identify the most essential (11). Dozens of biodiversity variables were screened to identify those that fulfill criteria on scalability, temporal sensitivity, feasibility, and relevance. These variables were scored for importance, checked for redundancy, and organized into six classes on the basis of commonalities, general enough for use across taxa and terrestrial, freshwater, and marine realms (see the table).

Often, it is not possible to generalize observations from point locations to regional scale. Variables selected as EBVs harness remote sensing (RS) to measure continuously across space (e.g., habitat structure),

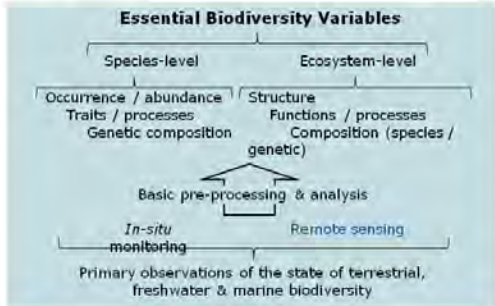
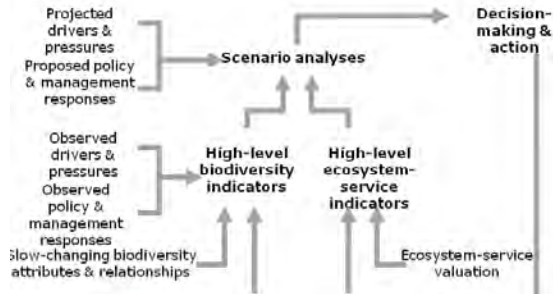
A global system of harmonized observations is needed to inform scientists and policy-makers.

- GEO BON initiative
- definition of globally needed variables
- important contribution by remote sensing



SCIENCE 2013, vol. 339, 277-278

Essential Biodiversity Variables (EBVs)



EBV characteristics:

- able to detect change
- repeatable and quantifiable
- representing the state
- biological information (comparable to ECVs)

Global Earth Observation initiatives

- *GEO/GEOSS* - coordination of global earth observations
- *GEO BON* is focusing within *GEO* on Biodiversity Observation Networks



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- *CEOS* is the focal point for international coordination of space related Earth Observation activities



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- *CEOS* is a *GEO* participating organization
- *CEOS* is the focal point for international coordination of space related Earth Observation activities
- *CEOS Biodiversity* is the focal point for biodiversity related remote sensing within *CEOS*



- the “Biodiversity Observation Network” (BON) in GEO
- aims to coordinate Biodiversity Observations



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- development of EBVs
- filling gaps in data and its organization on a regional basis
- providing frameworks (e.g “BON in a BOX”)
- OpenAccess and fitness of use of data



GEO Home



GEO BON: Biodiversity Observation Network

About
Contribution
Working Groups
Meetings
Essential Biodiversity Variables
Documents
Outreach
Observations
Links
Contact



Highlights

Adequacy of Biodiversity Observation Systems

In response to a decision taken last November at the Nagoya conference of the Convention on Biological Diversity, GEO BON has produced and submitted to the CEO a report entitled "Adequacy of Biodiversity Observation Systems to support the CBD 2020 Targets". The report can be read [here](#).

EC JRC launches DOPA, a Digital Observatory for Protected Areas

The Joint Research Centre of the European Commission has launched the Digital Observatory for Protected Areas (DOPA). A GEO BON contribution to the monitoring of Biodiversity, the DOPA is designed as set of distributed web services to assess the state of, and pressure on, Protected Areas and to prioritize them accordingly in order to support decision making and fund allocation processes. It is also conceived as a monitoring and ecological forecasting service.

DOPA is supported by the European projects EuroGEOSS and UncoverWEB and developed in collaboration with GBIF, UNEP-WCMC, BirdLife International, RSPB and others. Read [here](#) a description of the use of DOPA for Africa presented at MapAfrica, 23-25 November 2019, Cape Town, South Africa.

More information about DOPA can be found at <http://dopa.jrc.ec.europa.eu/>.

[Native sites GEO BON value for biodiversity assessment](#)

GEO BON

Biodiversity Observation Network

The Group on Earth Observations Biodiversity Observation Network – GEO BON – coordinates activities relating to the Societal Benefit Area (SBA) on Biodiversity of the Global Earth Observation System of Systems (GEOSS). Some 100 governmental, inter-governmental and non-governmental organizations are collaborating through GEO BON to organize and improve terrestrial, freshwater and marine biodiversity observations globally and make their biodiversity data, information and forecasts more readily accessible to policymakers, managers, experts and other users. Moreover, GEO BON has been recognized by the Parties to the Convention on Biological Diversity.

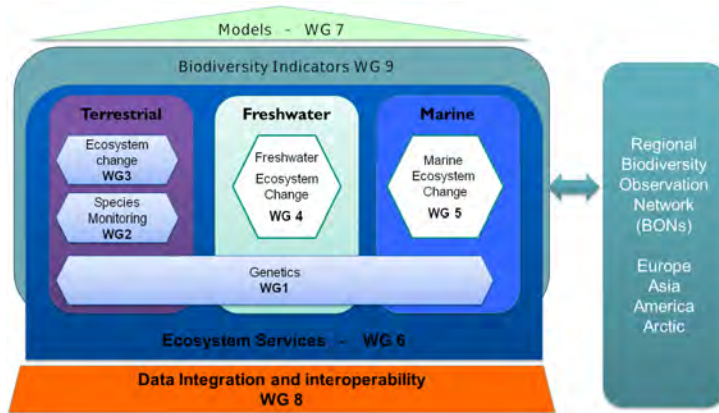
The Biodiversity Observation Network is both a Community of Practice and a Task in the GEO Work Plan. It is a voluntary partnership that is guided by a steering committee comprising the key stakeholders, including DIVERSITAS, GBIF, IUCN, NASA, UNEP-WCMC and others. GEO BON draws on GEO's work on data-sharing principles to promote full and open exchange of data, and on the GEOSS Common Infrastructure to enable interoperability through adoption of consistent standards.

To assist both holders and users of biodiversity information to engage with GEO BON, this website contains links to information resources, activities and GEO BON documents, meetings and other resources.

- network of people to improve Biodiversity Observations
- coordination of global activities
- linking regional BONs



- chair: Henrique Pereira, Mike Gill (HQ: iDIV, J. Freyhof)
- Implementation Committee: CSIRO, UNEP, ESA, NASA, CEOS/DLR, ...



- assessing different kinds of biodiversity
- monitoring schemes
- scientific as well as political activities
- remote sensing is an essential component

CEOS & CEOS Biodiversity

- Committee on Earth Observation Satellites (established in 1984)
- coordinates civil space-borne observations (www.ceos.org) - space arm of GEO since 2005
- comprises of 31 space agencies and 24 international organizations



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- **CEOS Biodiversity:** coordination of Remote Sensing for Biodiversity and Conservation
- gaps, future developments, adequacy reports, defining relevant products
- recommendations to space agencies

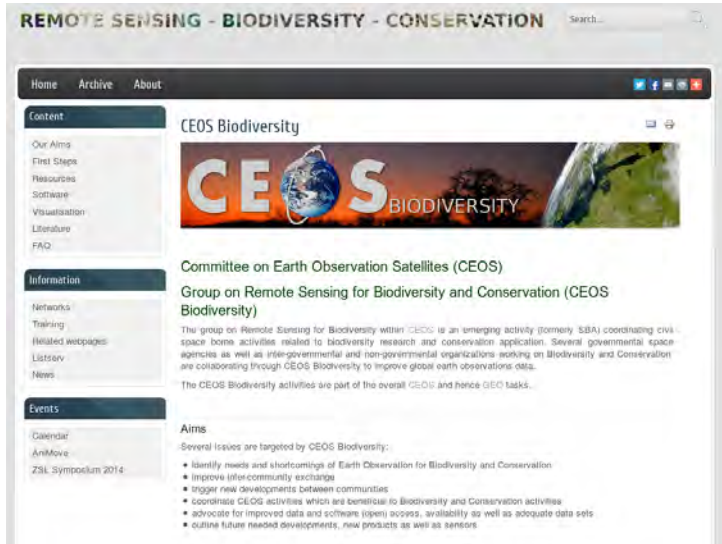
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- **CEOS Biodiversity:** coordination of Remote Sensing for Biodiversity and Conservation
- gaps, future developments, adequacy reports, defining relevant products
- recommendations to space agencies
- interdisciplinary developments, network for collaborations

CEOS Biodiversity



- network of people interested in combining remote sensing, biodiversity and conservation
- general news about remote sensing for biodiversity related topics
- links to remote sensing and GIS data resources

www.remote-sensing-biodiversity.org/ceos

CEOS Biodiversity



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CEOS Biodiversity Workshop (Oct. 2012 at DLR, Munich)

- collaborative workshop approach
- focused on terrestrial species biodiversity
- status, gaps and future perspectives
- developing innovative joint approaches
- Sponsored by DLR and German GEO
- jointly organised with NASA, SCBI and ZSL
- participants from MPI, ETH, JRC, IUCN, GOFC-GOLD, EU BON, GEO, NASA, DLR



Result of this workshop

One outcome Special issue in Phil. Trans.

- only articles focusing on collaborative approaches
- terrestrial species biodiversity
- a wide range of topics:
- biodiversity patterns,
- movement analysis etc.
- linked with remote sensing data
- <http://rstb.royalsocietypublishing.org/site/2014/satellite.xhtml>



Workshop organised by WCS

- top 10 conservation challenges
- workshops organised by WCS with NASA funding
- participants from US (WHRC, CI, JGI, SI, CEOS BD, ...)

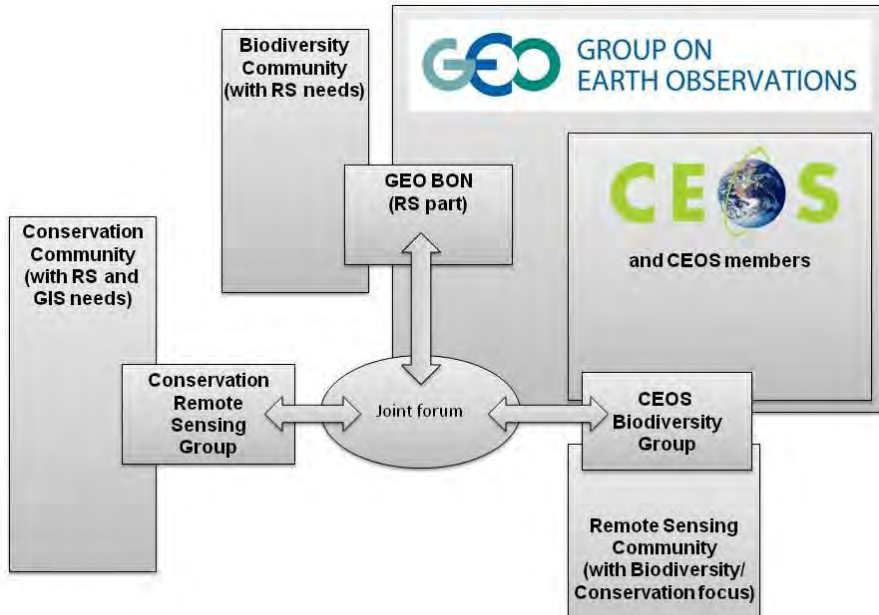


Workshop organised by WCS

- top 10 conservation challenges
- workshops organised by WCS with NASA funding
- participants from US (WHRC, CI, JGI, SI, CEOS BD, ...)
- article submitted covering the top 10 questions

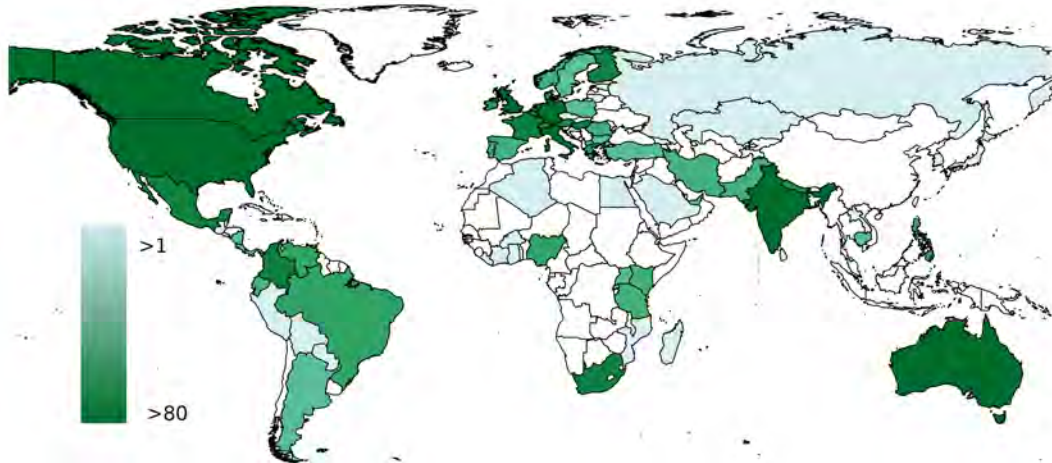


initiatives addressing different communities



Remote Sensing for Biodiversity survey

- more than 500 replies
- global coverage
- covering different organisations





Main Challenges

- Data Continuity
- Data Access & Availability
- Data Adequacy
- Access to Methods/codes & Software
- Training
- Communication/Collaboration

Satellites: make data freely accessible

The cost of accessing satellite data is hampering the widespread application of satellite monitoring, a vital tool for controlling deforestation (Jim Lynch *et al. Nature* **496**, 293–294; 2013) and for biodiversity assessments. We urge government agencies that produce taxpayer-funded satellite images to make these available free of charge and in user-friendly formats.

Lynch and colleagues' call for daily satellite observations of forests worldwide would mean aggregating information from numerous satellites that are operated by many countries. Assembling the large data sets needed for global monitoring would be prohibitively expensive, however, because national governments do not

Satellites: make data freely accessible *Woody Turner, Graeme*

Buchanan, Carlo Rondinini, John Dwyer, Martin Herold, Lian Pin Koh, Allison Leidner, Peter Leimgruber, Brice Mora, Nathalie Pettorelli, Zoltan Szantoi, Hannes Taubenboeck, Martin Wegmann, Martin Wikelski **Nature** 2013, 6, 498

- better data availability and accessibility
- for conservation and biodiversity research



Increasing interdisciplinary interests and collaboration



MAX PLANCK GESELLSCHAFT



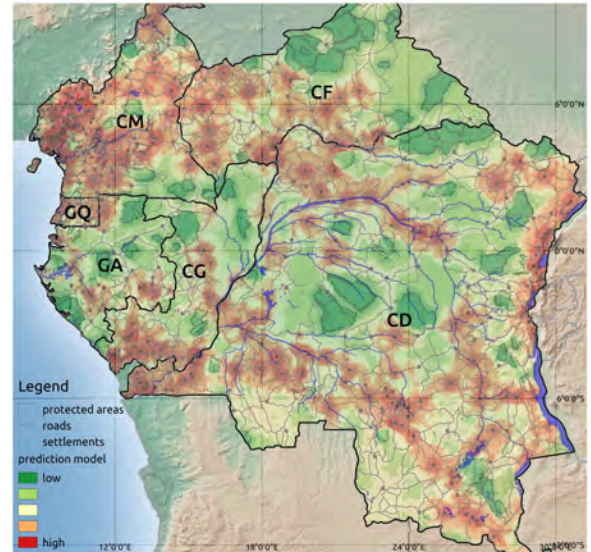
Smithsonian

any many more such as CSIRO, iDIV, ESA, NASA, DLR, University Wuerzburg, UMd, KIT, CI, JGF, CSIR ...

- interdisciplinary discussions
- definition of various needed approaches
- among others aims:
 - development of new interdisciplinary analysis
 - new remote sensing products
 - comparable biodiversity observations
 - long-term essential measurements (EBVs)
- discussions and development of new products
- challenging and time-consuming to develop new joint approaches

“bush meat offtake” in Centralafrica

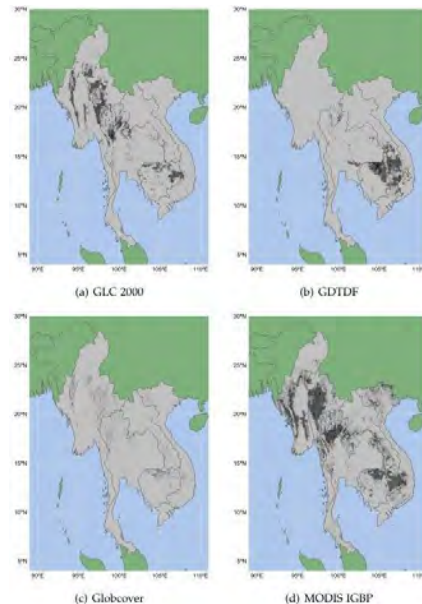
- Can the bushmeat offtake pattern be explained by environmental factors?
- Using forest cover, road network etc. information



Ziegler, Fa.. Wegmann (submitted)

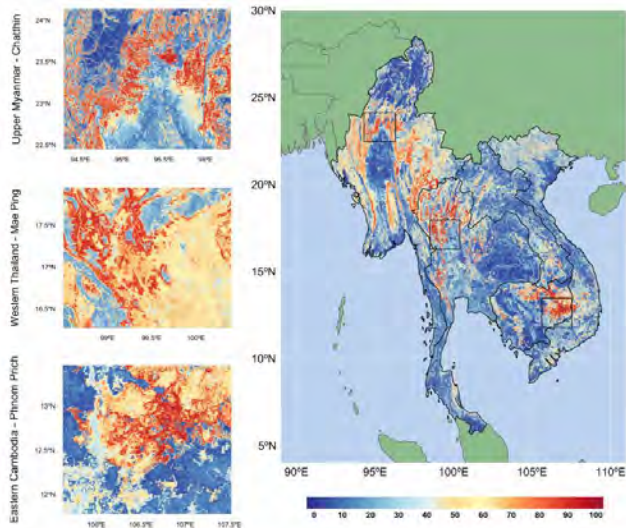
Mapping Tropical Dry Forests

- example from South East Asia
- tropical dry forests are underrepresented
- high differences between landcover classifications



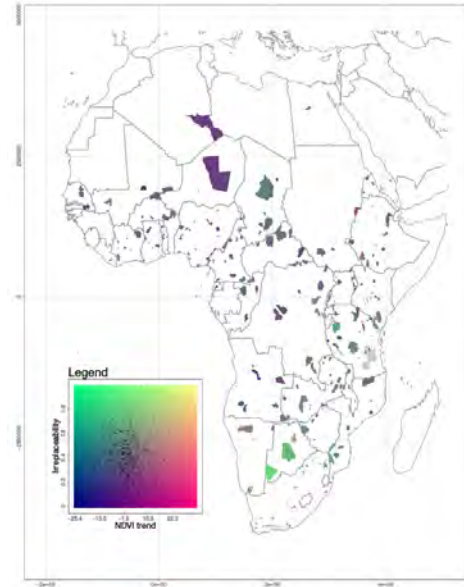
Mapping Tropical Dry Forests

- interdisciplinary approach
- remote sensing with an ecological perspective
- relevant Environmental information for specific questions



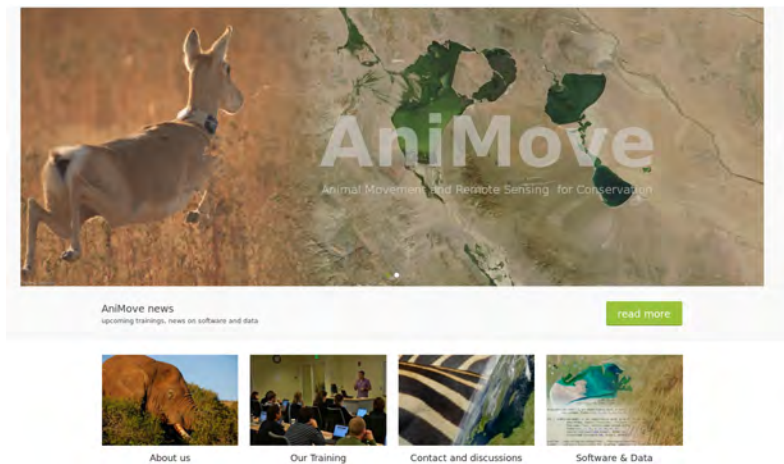
Mapping irreplaceable and threatened areas for mammals

- interdisciplinary approach
- GIMMS time-series related to animal dispersal
- irreplaceable and threatened areas for African PAs



Wegmann et al. (2014)

Implementation of activities

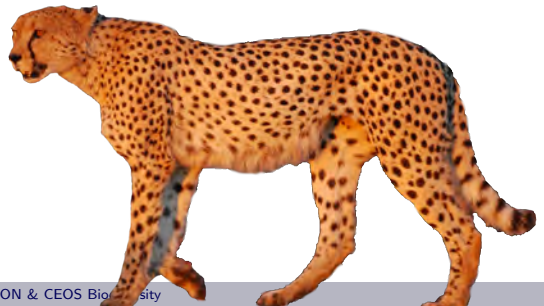


- linking remote sensing and animal movement data
- extracting relevant information for both disciplines

www.animove.org

Upcoming activities

- RS4EBV workshops
(lead by: Skidmore, Pettoirelli, Mucher and Wegmann, funded by GEO BON)
- further development on remote sensing parameters for biodiversity
- interdisciplinary hands-on workshops
- recommendations and addressing shortcomings
- local case studies





www.earthobservation.org/geobon.html
www.remote-sensing-biodiversity.org/ceos

