# Informing Species Distribution Models and Essential Biodiversity Variables using Remote Sensing

*Workshop organized by ESA's GlobDiversity and Future Earth's Global Mountain Biodiversity Assessment, bioDISCOVERY and Global Land Programme*

*5-9 Feb. 2018, University of Zurich, Switzerland*

The ESA GlobDiversity consortium and Future Earth's Global Mountain Biodiversity Assessment GMBA jointly organize a workshop on the **use of remote sensing for biodiversity assessments with foci on**
- Species Distribution Modeling (Part I, 5-7 Feb, GMBA) and
- Essential Biodiversity Variables (Part II, 7-9 Feb, GlobDiversity).

Species Distribution Models (SDM) have become a powerful tool in relating species observational data to land cover, land use, climate and other environmental conditions. Applications include projections of future species distribution, habitat fragmentation and range shifts under the drivers of global change. Remote sensing contributes, for instance, to the detection of invasive species, functional trait diversity, mapping of ecosystem extent, ecosystem functions and services and to mapping land change. The goals pursued by the SDM and EBV communities are highly synergetic and both benefit from recent developments in Earth observation, which provides the basis for the workshop.

Understanding patterns of biodiversity, predicting potential changes in response to drivers of global changes, and developing sustainable biodiversity management and conservation strategies are urgent necessities in line with the Convention for Biological Diversity Aichi targets and the United Nations' Agenda 2030. Monitoring biodiversity has therefore made a leap forward and recent efforts resulted in suggestions for measurable variables that are deemed essential for studying, reporting, and management of changes in global biological diversity (Pereira et al. 2013). It is the goal of ESA's GlobDiversity project to short-list and prioritize EBVs that can be informed by remote sensing (Skidmore et al. 2015) and to test methodological approaches for a selection of variables.

The first part of the workshop aims at **identification of remote sensing data and products that inform species distribution models**, including assessment of uncertainties and future steps. The second part focuses on **observation requirements for selected remotely sensed EBV**s that are informed by satellites. Specific observational approaches will be discussed for three EBVs (i.e., fragmentation, land-surface phenology and canopy chlorophyll content). This discussion includes links between ecological processes and functional diversity, as well as required indicators and properties.

The workshop is hosted at the University of Zurich.

For further questions, please contact
 info@globdiversity.net

## *Program Workshop Part II*
## *"Essential Biodiversity Variables using Remote Sensing "*

### *Wednesday February 7, 2018*

### *Closing session Species Distribution Modelling*
### *(room Y25-H-92):*

08:30-10:30     Discussion & next steps
                *All (chair: TBD)*
10:30-11:00     *Coffee break*


### *Public talks (room Y03-G-85):*

11:00-11:45     **Keynote talk by Jeannine Cavender-Bares** (Univ. of Minnesota)**:**
                *Outlook: Informing species distribution models and essential biodiversity variables using remote sensing*

*11:45-12:00*     *Closing words of Workshop Part I*
                *Davnah Payne*

12:00-13:30     *Lunch (Dozenten Foyer)*

13:30-14:15     **Welcome & Introduction to GlobDiversity**
                *M. Schaepman, R. de Jong, C. Röösli*

14:15-15:00     **Keynote lecture David Schimel** (JPL, NASA)
                *"New remote sensing missions for observing biodiversity change: filling gaps in the global program"*

15:00-15:30     *Coffee break*

*15:30-16:15*     **Keynote lecture Paul Moorcroft** (Harvard University)
                *"Remote Sensing-Constrained Predictions of Terrestrial Ecosystem Function"*

16:15-17:00     **Keynote lecture Nestor Fernandez** (GEO BON)
                *"Monitoring biodiversity change through effective global coordination"*

17:00-18:00     **Panel Discussion**
                *Topic: How can RS-enabled EBVs inform about global biodiversity?*
                **Panel:     Nicolas Coops, Walter Jetz,
                             David Coomes, Michael Schaepman**

*19:00*           *Workshop dinner "Il Postino"*

## Thursday February 8, 2018
## (closed, Break-out sessions, room Y25-H-92)

| | |
|---|---|
| 08:30-09:00 | Introduction to the objectives of the break-out sessions<br>(C. Röösli, UZH; M. Paganini, ESA; T. Wang U. of Twente ITC) |
| 09:00-11:30 | Break-out sessions (including coffee break) Part I:<br>***Topic: User requirements for observation of RS-enabled EBVs***<br>Fragmentation, Canopy Chlorophyll Content, Land Surface<br>Phenology, Vegetation Height |
| 11:30-13:00 | **Reporting and Plenary Discussion on Part I** |
| 13:00-14:15 | *Lunch (Mensa)* |
| 14:15-14:30 | Introduction to the objectives of break-out session part II<br>(A. Ali, U. of Twente ITC) |
| 14:30-16:30 | Break-out sessions (including coffee break) Part II:<br>***Topic: Documenting observation requirements***<br>***Verification and validation strategies for RS-enabled EBV***<br>***products.***<br>Fragmentation, Canopy Chlorophyll Content, Land Surface<br>Phenology, Vegetation Height |
| 16:30-18:00 | **Reporting and Plenary Discussion on Part II** |

## Friday February 9, 2018
## (closed, Plenary sessions, room Y25-H-92)

| | |
|---|---|
| 08:30-10:30 | **Discussion*:***<br>*Topic: Contribution of RS-enabled EBVs to inform on biodiversity*<br>Fragmentation, Canopy Chlorophyll Content, Land Surface<br>Phenology |
| 10:30-10:00 | Coffee break |
| 11:00-12:00 | **Plenary discussion:**<br>Wrap up and Conclusion |
| 12:00-12:30 | Outlook and Closing words |
| 12:30 | *Lunch (Y25-H-92)* |

## Confirmed participants (Status 01 Feb. 2018)

|    | Last Name         | First Name | Affiliation                                                                 |
|----|-------------------|------------|-----------------------------------------------------------------------------|
| 1  | Ali               | Abebe      | University of Twente ITC, NL                                                |
| 2  | Aplin             | Paul       | Edge Hill University, UK                                                    |
| 3  | Billing           | Maik       | University of Potsdam, GER                                                  |
| 4  | Böttcher          | Kristin    | Finnish Environment Institute (SYKE), FI                                    |
| 5  | Cavender-Bares    | Jeannine   | University of Minnesota, USA                                                |
| 6  | Coomes            | David      | University of Cambridge, UK                                                 |
| 7  | Coops             | Nicolas    | The University of British Columbia, Vancouver CA                            |
| 8  | de Jong           | Rogier     | University of Zurich, CH                                                    |
| 9  | Fernandez         | Nestor     | GEO BON Valencia, ESP                                                       |
| 10 | Guelmami          | Anis       | Tour du Valat, FRA                                                          |
| 11 | Heiden            | Uta        | DLR, GER                                                                    |
| 12 | Jetz              | Walter     | Yale University, USA                                                        |
| 13 | Kattge            | Jens       | Max Planck Institute for Biogeochemistry, GER                              |
| 14 | Le Clech'         | Solen      | ETH Zurich                                                                  |
| 15 | Litsios           | Glenn      | BAFU/FOEN, CH                                                               |
| 16 | Luoto             | Miska      | University of Helsinki, FI                                                  |
| 17 | Moorcroft         | Paul       | Harvard University, USA                                                     |
| 18 | Morsdorf          | Felix      | University of Zurich, CH                                                    |
| 19 | O'Connor          | Brian      | WCMC, UK                                                                    |
| 20 | Paganini          | Marc       | European Space Agency, ESRIN, ITA                                          |
| 21 | Price             | Bronwyn    | Swiss Federal Institute of Forest, Snow and Landscape Research, WSL CH     |
| 22 | Reme              | Jochen     | Wageningen University and Research, NL                                      |
| 23 | Röösli            | Claudia    | University of Zurich, CH                                                    |
| 24 | Schaepman-Strub   | Gabriela   | University of Zurich, CH                                                    |
| 25 | Schaepman         | Michael    | University of Zurich, CH                                                    |
| 26 | Schimel           | David      | NASA, USA                                                                   |
| 27 | Thonicke          | Kirsten    | Potsdam Institute for Climate Impact Research, GER                         |
| 28 | Valbuena          | Ruben      | WCMC, UK                                                                    |
| 29 | Van de Kerchove   | Ruben      | Vito, BE                                                                    |
| 30 | Van Eupen         | Michiel    | Wageningen University and Research, NL                                      |
| 31 | Verburg           | Peter      | Vrije Universiteit Amsterdam, NL                                            |
| 32 | Wang              | Tiejun     | University of Twente ITC, NL                                                |
| 33 | Wilson            | Adam       | University at Buffalo, USA                                                  |
| 34 | Woodcock          | Paul       | Joint Nature Conservation Committee, UK                                     |
| 35 | Ziel              | Valentin   | DLR, GER                                                                    |

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