Informing Species Distribution Models and Essential Biodiversity Variables using Remote Sensing

University of Zurich, Switzerland, 5-9.02.2018

A joint workshop of the European Space Agency *GlobDiversity* consortium and the Future Earth *Global Mountain Biodiversity Assessment* (GMBA), *Global Land Programme* (GLP), and *BioDISCOVERY* Global Research Projects

The international community recognizes biodiversity as a key aspect of global environmental reporting and a cornerstone of sustainable development. Understanding patterns of biodiversity, predicting potential changes in response to drivers of global changes, and developing sustainable management and conservation strategies in line with the Aichi targets of the Convention for Biological Diversity and with the United Nations' Agenda 2030 are therefore imperatives. Accordingly, biodiversity monitoring and assessment sciences have made tremendous progress, notably with the development of a set of biodiversity variables deemed essential for the study, reporting, and management of changes in global biological diversity (Essential Biodiversity Variables, EBVs), and the development of increasingly powerful Species Distribution Models (SDMs) for the description of species distribution under current climatic and environmental conditions and the prediction of future distributions and range shifts.

In that scientific context, recent developments in remote sensing (RS) mark the beginning of a new area in biodiversity monitoring and assessment by enabling not only the collection of spatial data but also that of biodiversity data. Yet although promising, the combined use of RS and *in situ* data brings along conceptual and methodological challenges, not the least because of the different sources and forms of measurement errors associated with different kinds of data and the associated uncertainties. Accordingly, much work remains to be performed to fully understand whether, when, and how RS can truly inform Species Distribution Models and Essential Biodiversity Variables.

- ❖ The **first part of the workshop** focuses on the use of Remote Sensing data for informing Species Distribution Models (Part I, 5-7 February 2018, organizer: GMBA, davnah.payne@ips.unibe.ch)
- ❖ The **second part of the workshop** focuses on observation requirements for selected remotely sensed Essential Biodiversity Variables that are informed by satellites (Part II, 7-9 February 2018, organizer: GlobDiversity, info@globdiversity.net)

Objectives & Program Workshop Part I

The first part of the workshop will address three objectives:

1. Review how the RS and SDM communities currently benefit from each other
2. Explore the methodological and conceptual challenges of using RS data in SDMs, in particular those associated with measurement errors and error propagation, using mountain-specific case studies
3. Evaluate how high spatial resolution remotely sensed EBVs can contribute to large scale biodiversity monitoring and simultaneously inform local SDMs

Agenda Day 1 - Monday, February 5 (Room Y03-G85)

12:00 – 12:15	Welcome[1] *M. Schaepman & D. Payne*
12:15 – 12:55	Species distribution models: state-of-the-art and challenges *N. Zimmermann (main), S. Dullinger & N. Yoccoz (respondents)*
13:00 – 13:40	Challenges of using land use dynamics in biodiversity modelling: spatial, temporal and thematic resolution *P. Verburg (main), J. Bolliger & C. Randin (respondents)*
13:45 – 14:25	Remote sensing for biodiversity prediction and monitoring *W. Jetz (main), M. Luoto & A. Guisan (respondents)*
14:25 – 14:45	Break
14:45 – 15:00	Contribution of Long-Term Ecological Research and the Ecopotential project to advancing Essential Biodiversity Variables and Remote Sensing *T. Dirnböck*
15:05 – 15:20	Mechanistic species distribution and forest diversity-functioning models: using remote sensing data to reach better predictions? *X. Morin*
15:25 – 15:40	Microclimates as a link between remote sensing and species distribution models *M. Ashcroft*
15:45 – 16:00	Species distribution models and remote sensing in the Anthropocene *E. Ellis*
16:05 – 16:20	Sampling errors and error propagation: what is the problem? *N. Yoccoz*
16:20 – 16:45	Break
16:45 – 18:45	Discussion and outline *All (workshop participants only, Chair: TBD)*
19:00	Dinner

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[1] The Monday afternoon program is open to the public until 16:45. Bred and cheese will be served at noon.

Agenda Day 2 - Tuesday, February 6 (Room Y25-H-79)

08:30 – 09:00	Introduction to working groups (Central Alps, Scandinavia, Argentina, invasive species) *N. Yoccoz & C. Randin*
09:00 – 11:15	Working groups (individual breaks) *All*
11:15 – 11:30	Break
11:30 – 12:30	Progress report (15mns per group) *All (chair: C. Randin)*
12:30 – 13:30	Lunch break
13:30 – 17:00	Working groups (individual breaks) *All*
17:00 – 17:15	Break
17:15 – 19:00	Progress report (15mns per group) *All (chair: N. Yoccoz)*
19:30	Dinner

Agenda Day 3 - Wednesday, February 7 (Room Y25-H-79)

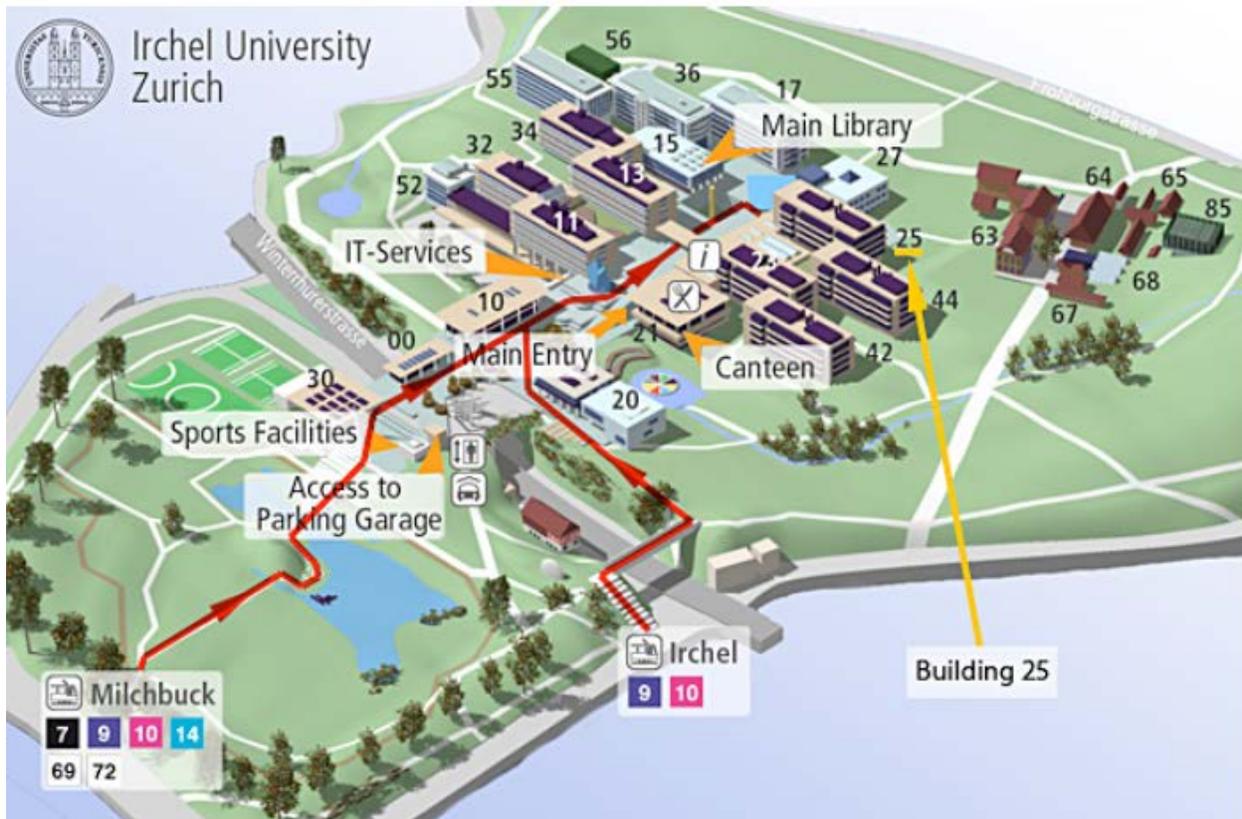|	
08:30 – 10:30	Discussion & next steps *All (chair: TBD)*
10:30 – 11:00	Break
11:00 – 11:45	Outlook: Informing species distribution models and essential biodiversity variables using remote sensing *J. Cavender-Bares*
11:45 – 12:00	Summary & Closure *D. Payne*

Participants Workshop Part I (status 22.01.2018)

First Name	Last Name	Affiliation
Michael	Ashcroft	Wollongong University
Janine	Bolliger	Swiss Federal Institute for Forest, Snow, Landscape Research
Kari Anne	Bråthen	University of Tromsø
Brad	Carlson	Centre de Recherche sur les Ecosystèmes d'Altitude
Jeannine	Cavender-Bares	University of Minnesota
Nicolas	Coops	University of British Columbia
Ariane	De Bremont	Global Land Programme
Rogier	De Jong	University of Zurich
Thomas	Dirnböck	Environmental Agency Austria
Stefan	Dullinger	University of Vienna
Sandra	Eckert	Center for Development and Environment, University of Bern
Albrecht	Ehrensperger	Center for Development and Environment, University of Bern
Erle	Ellis	University of Baltimore
Nestor	Fernandez	GeoBon Valencia
Javier	Foguet	University of Tucuman
Antoine	Guisan	University of Lausanne
Andrea	Izquierdo	University of Tucuman
Walter	Jetz	Yale University
Dirk	Karger	Swiss Federal Institute for Forest, Snow, Landscape Research
Jens	Kattge	Max Planck Institute Jena
Cornelia	Krug	BioDISCOVERY
Solen	Le Clech'	University of Zurich
Jonas	Lembrechts	University of Antwerp
Jonathan	Lenoir	University of Picardie
Miska	Luoto	University of Helsinki
Xavier	Morin	University of Montpellier
Jean-Nicolas	Pradervant	Swiss Ornithological Institute (Vogelwarte)
Bronwyn	Price	Swiss Federal Institute for Forest, Snow, Landscape Research
Christophe	Randin	University of Lausanne
Claudia	Röösli	University of Zurich
Michael	Schaepman	University of Zurich
Wilfried	Thuiller	University of Grenoble
Peter	Verburg	University of Amsterdam
Nigel	Yoccoz	University of Tromsø
Adam	Wilson	University of Buffalo
Paul	Woodcock	Joint Nature Conservation Committee
Niklaus	Zimmermann	Swiss Federal Institute for Forest, Snow, Landscape Research

Venue: University of Zurich, Campus Irchel, Department of Geography

From the airport, the campus can be reached directly (without transfer) using tram #10 (direction Bahnhofplatz/Hauptbahnhof). Please exit at tram stop "Milchbuck" or "Irchel". Both tram stops are 5 minutes away from the department of geography (see map below).

All podium presentations are open to the public and will take place in Room Y03-G91. Workshop activities for participants only will take place in room Y25-H-79.

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