



**Detecting changes in essential ecosystem and biodiversity properties- towards a  
Biosphere Atmosphere Change Index: BACI**

**Deliverable 9.3: Press release 3**



<b>Project title:</b>	Detecting changes in essential ecosystem and biodiversity properties- towards a Biosphere Atmosphere Change Index
<b>Project Acronym:</b>	BACI
<b>Grant Agreement number:</b>	640176
<b>Main pillar:</b>	Industrial Leadership
<b>Topic:</b>	EO- 1- 2014: New ideas for Earth-relevant space applications
<b>Start date of the project:</b>	1 <sup>st</sup> April 2015
<b>Duration of the project:</b>	48 months
<b>Dissemination level:</b>	Public
<b>Responsible of the deliverable</b>	Miguel Mahecha (MPG) Phone: +49 3641 576265 Email: <a href="mailto:mmahecha@bgc-jena.mpg.de">mmahecha@bgc-jena.mpg.de</a>
<b>Date of submission:</b>	29.09.2017

## 1. Introduction

On January 2017 an important BACI study was published in "Nature Ecology and Evolution" accompanied with a press releases titled "Older and more diverse forests are more stable in taking up carbon dioxide" (English version) and "Alte und artenreiche Wälder nehmen bei Klimaschwankungen stabiler Kohlendioxid auf" (German version). The press releases were sent to the media and published in the following websites:

### a. Max Plank Institute

- English: <https://www.bgc-jena.mpg.de/www/index.php/PublicRelations/PReleasesSingle?userlang=en&jahr=2017&id=1485514629&disc=>
- German: <https://www.bgc-jena.mpg.de/www/index.php/PublicRelations/PReleasesSingle?userlang=de&jahr=2017&id=1485514629&disc=>

### b. BACI project website

- English and German: <http://baci-h2020.eu/index.php/Outreach/PressReleases>

Different German televisions also presented the relevant study at national level, such as:

- 3sat-nano: The German title is *Alte Wälder atmen besser wee done!* To watch it follow this [link](#)



- MDR: unfortunately this contribution is not available online anymore.

The next press release of the project will be published on November 2017 to inform the public about the progress in the BACI consortium and main outcomes of the BACI progress meeting (21&22 November, 2017)

## 2. Annex- Press releases



## Older and more diverse forests are more stable in taking up carbon dioxide

**Plants take up carbon dioxide (CO<sub>2</sub>) from the atmosphere through photosynthesis. Part of it is later released again by respiration. Overall, forests tend to take up more CO<sub>2</sub> than they release. However, their strength to act as such carbon sink fundamentally depends on the forests' potential to take up CO<sub>2</sub> through photosynthesis. This property, called photosynthetic capacity, is highly variable between years and influenced by climate variability. Writing in *Nature Ecology and Evolution*, researchers now report that in old forests with high species richness the effect of climate variability on photosynthetic capacity is dampened.**

The total uptake of carbon dioxide by ecosystems via photosynthesis is the largest flux in the global carbon cycle. The intensity of this “natural CO<sub>2</sub> pump” shapes the atmospheric concentrations of the greenhouse gas. However, this key process is influenced by climate variability, which translates into year-to-year variations of CO<sub>2</sub> taken up by forests. “Understanding the causes of the year-to-year variations in photosynthetic CO<sub>2</sub> uptake improves our understanding of the global carbon cycle and its sensitivity to climate”, says Markus Reichstein, co-author and Director at Max Planck Institute for Biogeochemistry in Jena, Germany.

In a search for environmental factors that determine the amplitude of the year-to-year variability in the photosynthetic capacity of forests, an international research team led by Talie Musavi of the same institute compiled data from 50 globally distributed forests across different climatic regions. The scientists combined a variety of different data sources including ecosystem-atmosphere CO<sub>2</sub> fluxes from a global network of measurement sites, climate data, biodiversity information, nutrient availability, forest age, and other properties derived from satellite data, such as forest height and tree cover. The scientists then tried to identify the main factors that buffer the annual variations of photosynthetic capacity.

“The year to year variability is driven by climate but the magnitude of the year to year variability decreases in older and more diverse forests. We conclude that the stability of photosynthetic capacity is mostly controlled by forest age and species richness”, says Talie Musavi. This finding can be read as a scientific call to preserving old forests and their diversity in order to stabilize their functionality.

The study belongs to a series of activities emerging from the European project BACI “Biosphere-Atmosphere Change Index”, an international project funded in the context of EU’s Horizon2020 program. “Our project in particular aims at integrating remote sensing data archives, but also a wide range of biodiversity data, and long-term observations of ecosystem functioning.” explains Miguel Mahecha who coordinates the project at the Max Planck Institute for Biogeochemistry. BACI is

P.B. 10 01 64  
07701 Jena, Germany

Hans-Knöll-Straße 10  
07745 Jena, Germany

Phone.: +49 (0)3641 57-60  
Fax: +49 (0)3641 57-70  
[www.bgc-jena.mpg.de](http://www.bgc-jena.mpg.de)

### Directors

Prof Susan Trumbore, PhD (Managing Dir.)  
Phone: +49 (0)3641 57-6110  
[susan.trumbore@bgc-jena.mpg.de](mailto:susan.trumbore@bgc-jena.mpg.de)

Prof. Dr. Martin Heimann  
Phone: +49 (0)3641 57-6350  
[martin.heimann@bgc-jena.mpg.de](mailto:martin.heimann@bgc-jena.mpg.de)

Prof. Dr. Markus Reichstein  
Phone: +49 (0)3641 57-6273  
[mreichstein@bgc-jena.mpg.de](mailto:mreichstein@bgc-jena.mpg.de)

### Research Coordination & Press

Dr. Eberhard Fritz  
Phone: +49 (0)3641 57-6800  
[efritz@bgc-jena.mpg.de](mailto:efritz@bgc-jena.mpg.de)

### Public Relations

Susanne Héjja  
Phone: +49 (0)3641 57 6801  
[shejja@bgc-jena.mpg.de](mailto:shejja@bgc-jena.mpg.de)

developing methods and seeks to foster research into better understanding how our ecosystems interact with the atmosphere.

### **Original publication**

Talie Musavi, Mirco Migliavacca, Markus Reichstein, Jens Kattge, Christian Wirth, T. Andrew Black, Ivan Janssens, Alexander Knohl, Denis Loustau, Olivier Roupsard, Andrej Varlagin, Serge Rambal, Alessandro Cescatti, Damiano Gianelle, Hiroaki Kondo, Rijan Tamrakar and Miguel D. Mahecha. (2017). Stand age and species richness dampen interannual variation of ecosystem-level photosynthetic capacity. *Nature Ecology & Evolution*.  
<http://dx.doi.org/10.1038/s41559-016-0048>

BACI project reference:  
<http://baci-h2020.eu/index.php/>

### **Contact**

Talie Musavi  
Email: [tmusavi@bgc-jena.mpg.de](mailto:tmusavi@bgc-jena.mpg.de)

Mirco Migliavacca  
Phone: +49 (0)3641 57 6281  
Email: [mmiglia@bgc-jena.mpg.de](mailto:mmiglia@bgc-jena.mpg.de)

Miguel Mahecha  
Phone: +49 (0)3641 57 6265  
Email: [mmahecha@bgc-jena.mpg.de](mailto:mmahecha@bgc-jena.mpg.de)

### **Institutions that participated in the study**

German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig, Leipzig, Germany

Institute of Special Botany and Functional Biodiversity, University of Leipzig, 04103 Leipzig, Germany

Biometeorology and Soil Physics Group, Faculty of Land and Food Systems, University of British Columbia, 2329 West Mall, Vancouver, British Columbia, Canada

University of Antwerpen, Department of Biology, 2610 Wilrijk, Belgium

Bioclimatology, Georg-August University of Göttingen, 37077 Göttingen, Germany

INRA, ISPA, Centre de Bordeaux Aquitaine, 71 Avenue Edouard Bourlaux, 33140 Villenave-d'Ornon, France.

UMR Ecologie Fonctionnelle and Biogéochimie des Sols et Agroécosystèmes, SupAgro-CIRAD-INRA-IRD, Montpellier, France

A.N. Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences, Moscow, 119071, Russia

Centre d'Ecologie Fonctionnelle et Evolutive, CEFE, UMR 5175, CNRS, Montpellier, France

Universidade Federal de Lavras, Lavras, MG, 37200-000, Brazil

European Commission, Joint Research Centre, Directorate for Sustainable Resources, 21027, Ispra, Italy

Department of Sustainable Agro-Ecosystems and Bioresources, Research and Innovation Center, Fondazione Edmund Mach, 38010 San Michele all' Adige Trento, Italy

Foxlab Joint CNR-FEM Initiative, Via E. Mach 1, 38010 San Michele all'Adige, Italy

National Institute of Advanced Industrial Science and Technology (AIST), Onogawa, Tsukuba, Ibaraki, 305-8561, Japan



Old forest in Hessen, Germany (Picture by Achim Lueckemeyer / pixelio.de)