

# Data4SDG: challenges and opportunities

Dr. Gregory Giuliani, Dr. Nicolas Ray, Prof.  
Anthony Lehmann

University of Geneva/enviroSPACE

# Global Sustainability Challenges

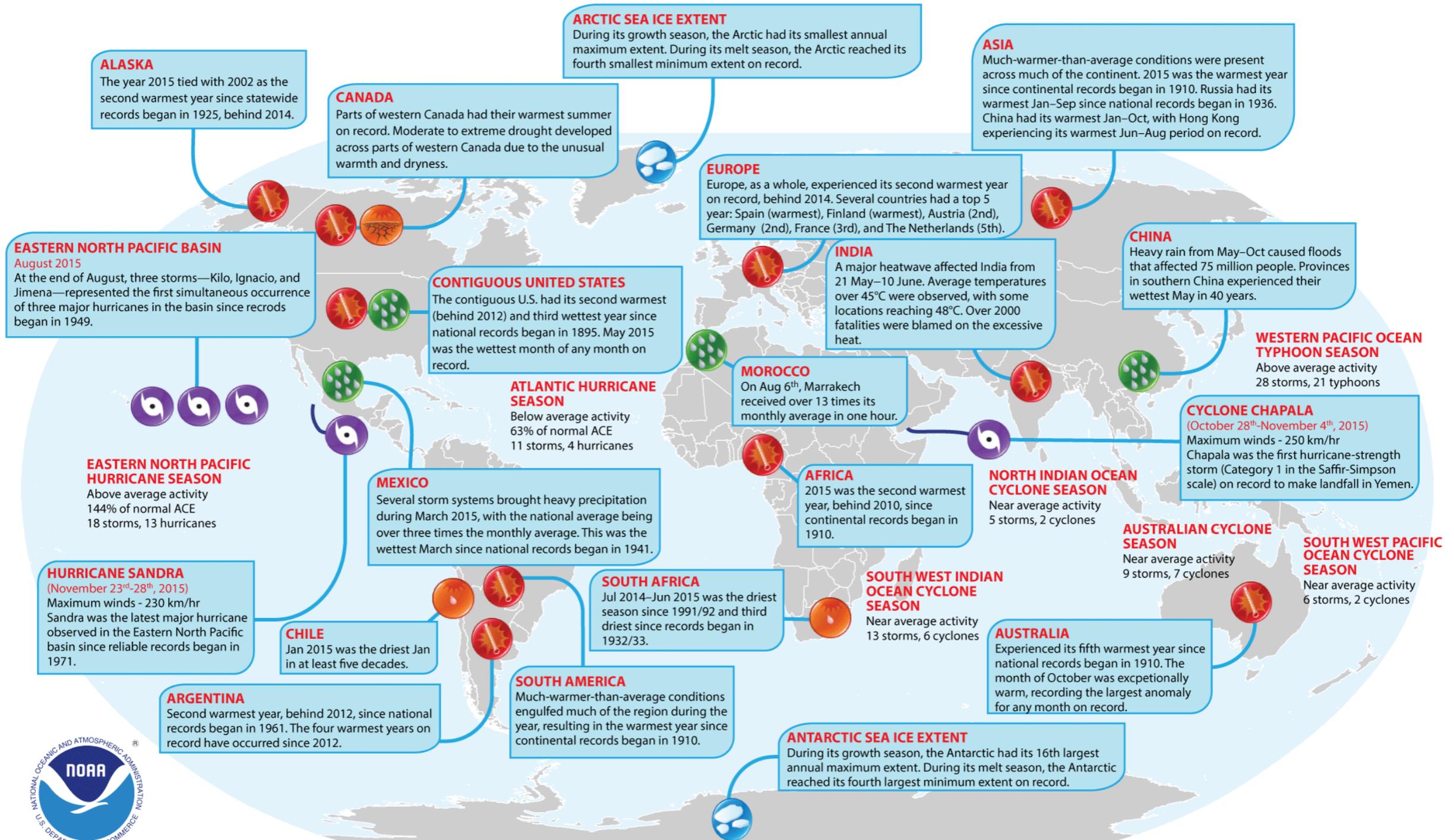
Sept 2015 - 2030 Agenda for Sustainable Development



# Global Sustainability Challenges

## Dec 2015 - COP21 Paris Declaration

### Selected Significant Climate Anomalies and Events in 2015



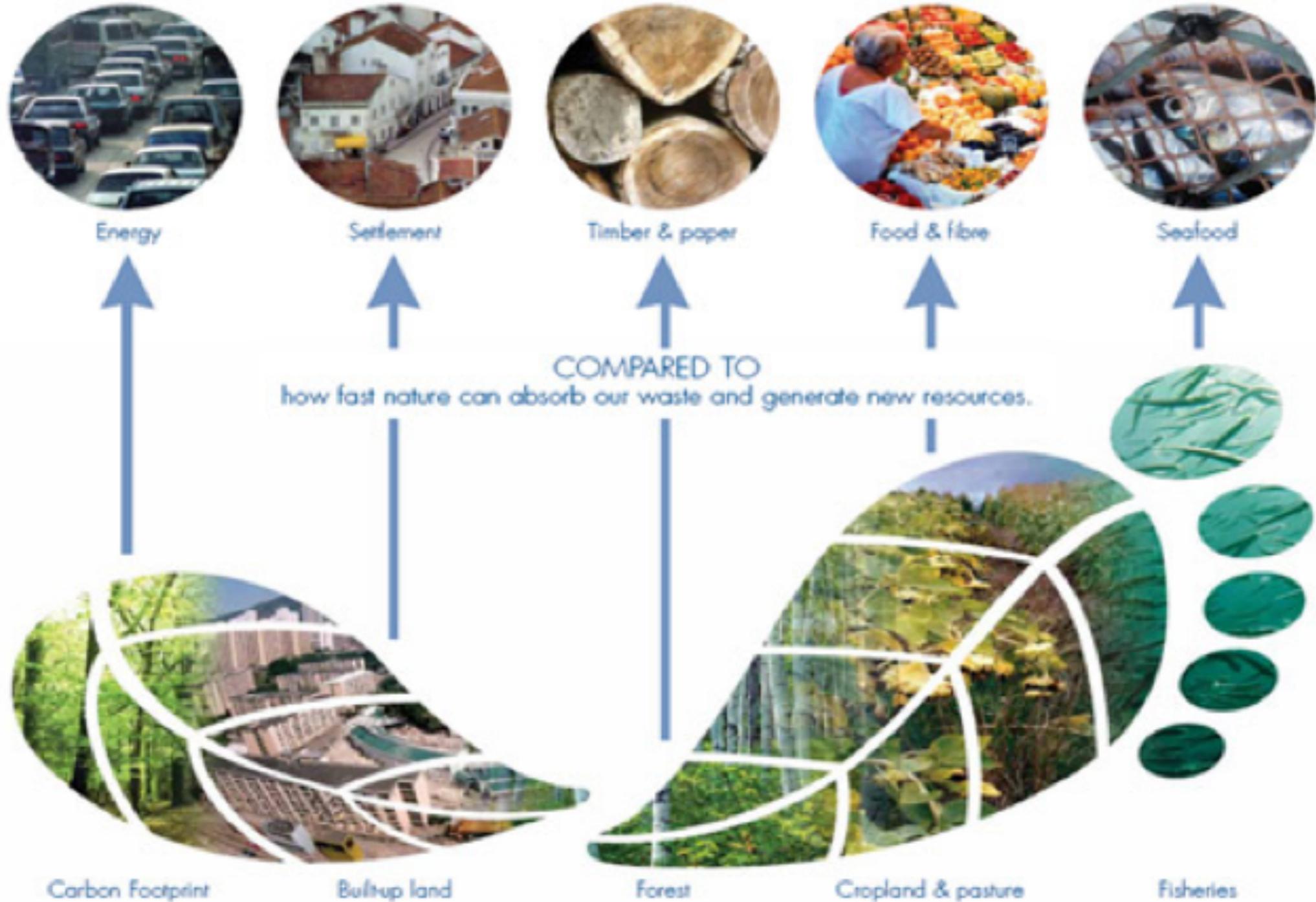
Please Note: Material provided in this map was compiled from NOAA's NCEI State of the Climate Reports and the WMO Provisional Status of the Climate in 2015. For more information please visit: <http://www.ncdc.noaa.gov/sotc>

# Global Sustainability Challenges

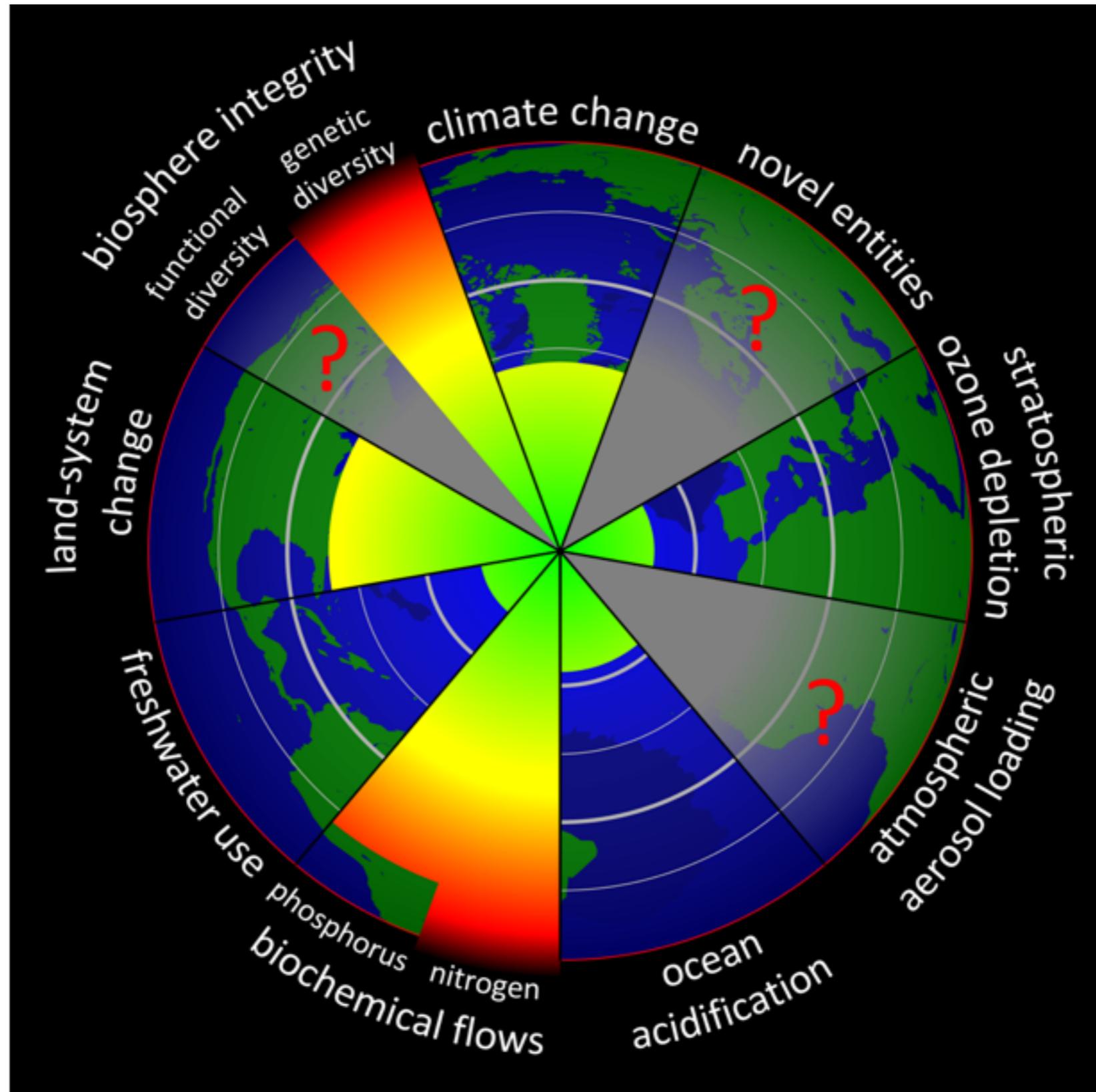
## The Ecological Footprint

MEASURES

how fast we consume resources and generate waste



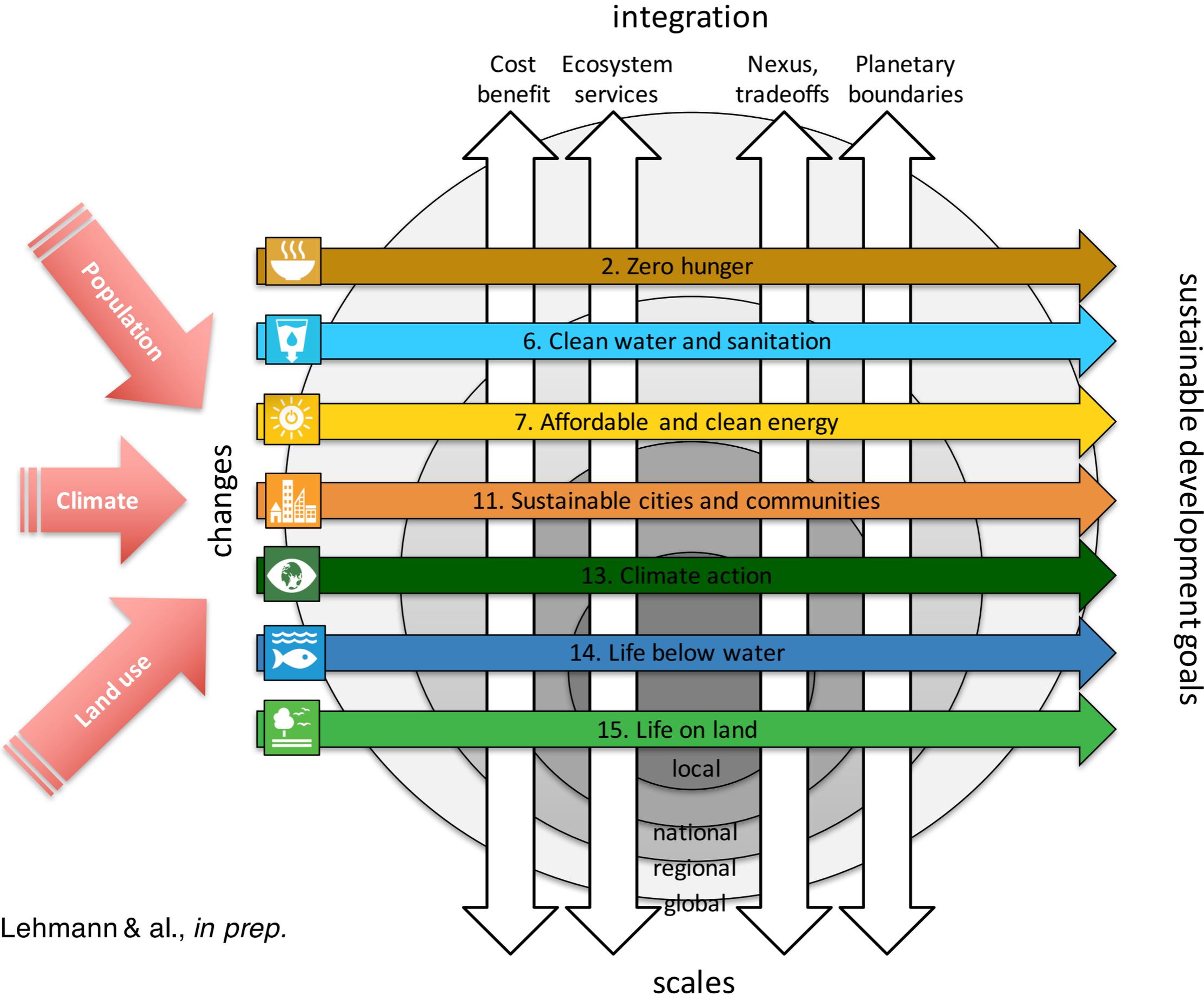
# Global Sustainability Challenges



Rockstrom *et al.* (2009). A safe operating space for humanity." *Nature* 461(7263): 472-475.

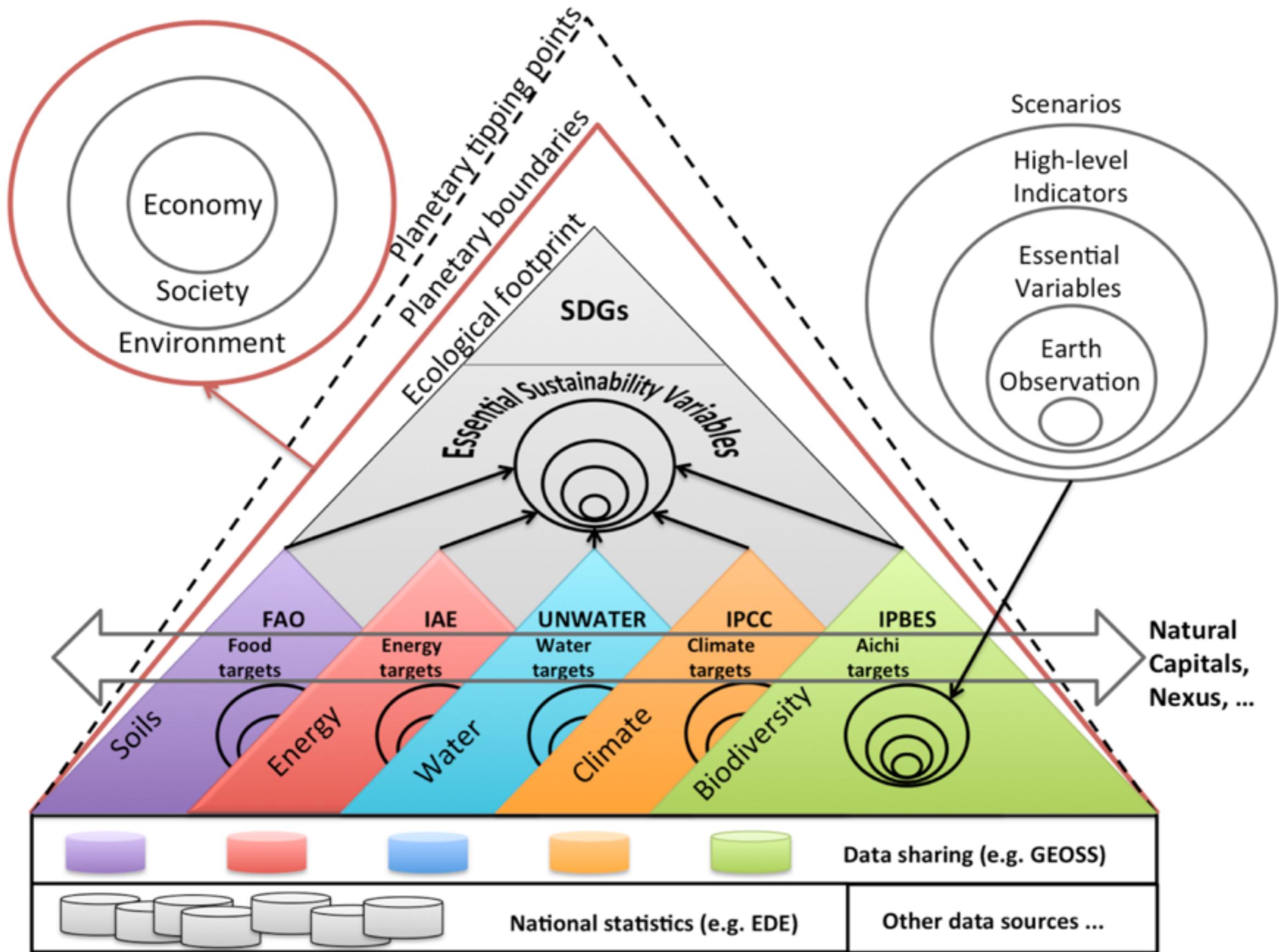
Steffen *et al.* (2015). Planetary boundaries: Guiding human development on a changing planet." *Science*.

# Issues and challenges related to SDGs

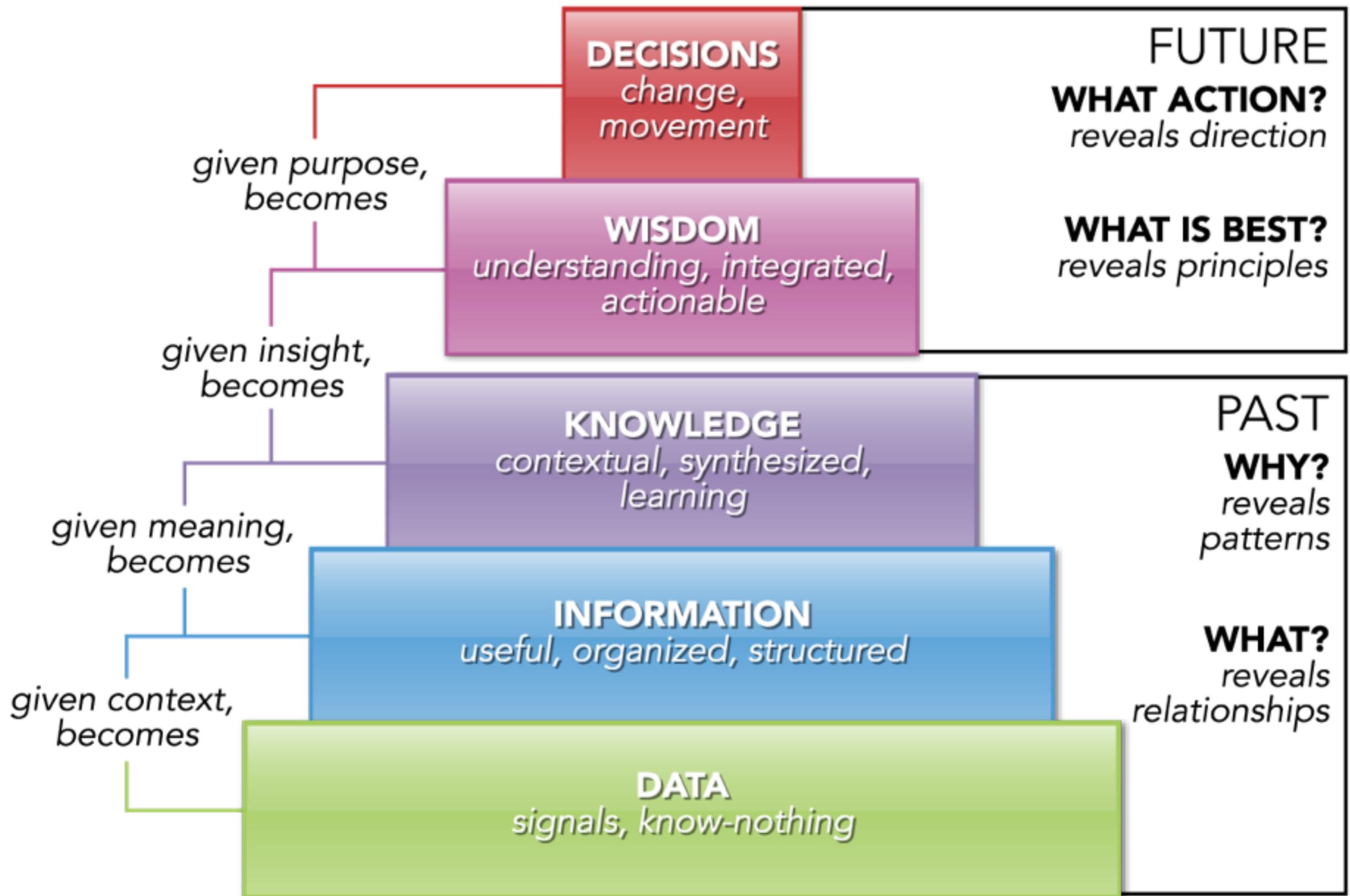


Lehmann & al., *in prep.*

# Issues and challenges related to SDGs



# Data to knowledge



# What EnviroSPACE is doing?

**UNIVERSITÉ DE GENÈVE**  
**ENVIROSPACE LAB. - SPATIAL PREDICTIONS AND ANALYSES IN COMPLEX ENVIRONMENTS**

University of Geneva > Environmental Sciences > enviroSPACE

**enviroSPACE**  
 Spatial Predictions and Analyses in Complex Environments

The **enviroSPACE** laboratory is dedicated to **spatial analyses** within the **Institute for Environmental Sciences** at the University of Geneva, as part of the **Forel Institute**, and in close collaboration with the **Climatic Change and Climate Impacts** group, the **Ecology** group, as well as the **InfoGEO** at the Geography department. These groups collaborate at the University of Geneva to promote **GIS** through a common web platform. We also work under a unique and long lasting agreement with **UNEP/GRID-Geneva** and the **Federal Office for the Environment**.

We have coordinated the FP7 **enviroGRIDS** project in the Black Sea catchment, and are presently coordinating the FP7 **EOPOWER** project. We are also participating to the **IASON**, **ACQWA**, **PEGASO**, **AfroMaison** and **EcoArm2ERA** FP7 projects. We are also coordinating the **SNSF SCOPES ARPEGEO** project, and the **CRUS/SCIEX enviroPAD** project.

We also contribute to the **TIGERS** academic activities to promote **Technology and Information for Geographic and Environmental Research and Services** and to the **enviroMATICS** hub at ISE.

- Our aim is to promote **interdisciplinary research based on spatially explicit information and indicators** on the past, present and future **state of changing and complex environment**. We are building several **Spatial Data Infrastructures (SDI)** to improve data sharing and processing.
- Our challenge is clearly **to fill the gap between scientific information on one hand and decision making on the other hand**, in order to improve the sustainable management of our unique and fragile environment.
- Our toolbox is composed of traditional **GIS, remote sensing, relational data bases and statistical analyses**, as well as **dedicated modeling tools** in Ecology, Hydrology, Demography, Climate, Risks or Land Cover analyses.

**TIGERS RSS**

**TIGERS-TALKS**  
 September 5th  
 TIGERS-TALKS starting on C 2015. First Mondays of each noon....

**TIGERS-TALK 8: 22.06.16 - Antonia Brovelli - Politecnico Milano**  
 June 22nd  
 Building a Global Earth Observation System of Systems (GEOSS) Importance of Broad, Open E Policies...

**TIGERS-TALK 6: 04.04.16 - Ryan - Director - Group on Observation**  
 April 4th  
 Building a Global Earth Observation System of Systems (GEOSS) Importance of Broad, Open E Policies...

**TIGERS-TALK 5: 07.03.16 - Adrienne Grêt-Regamey, E**  
 March 7th  
 Towards implementing the ec services concept ...

**TIGERS-TALK 7: 02.05.16 - Stefano Nativi - CNR - Italy**

**People collaborating in enviroSPACE**

Names	Position
Prof Anthony Lehmann	Associate professor
Dr Nicolas Ray	Senior Lecturer
Dr Grégory Giuliani	Lecturer
Dr Martin Schlaepfer	Senior Lecturer
Dr Pierre Lacroix	Lecturer
Dr Yaniss Guigoz	PhD candidate 2011-16
Ana Gago da Silva	PhD candidate 2010>
Dr Denisa Rodila	PhD candidate 2014-16
Marc Fasel	Assistant 2014>
Stéphanie Favre	PhD candidate 2015>
Martin Lacayo	PhD candidate 2015>
Veronica Ruiz Garcia	Master 2013>
Maria Teresa Miranda Espinosa	Master 2013>
Fabian Schneider	Master 2013>
Nathalie Ministeri	Master 2014>
Benjamin Guinaudeau	Master 2014>
Rhêa Garrat	Master 2014>

*Expertise:* Natural Capital, Spatial analysis & modelling, Statistics, Earth Observations, GIS, Remote Sensing, SDI, Geoprocessing, Multi-disciplinary science.

<http://www.unige.ch/enviroSPACE>

# What enviroSPACE is doing?



Lehmann, Schlaepfer,  
PhD Fasel, Masters

Species  
distribution &  
biodiversity

Ray, Masters

Connectivity &  
Movement

Lehmann, Schlaepfer,  
Giuliani, Ray, Lacroix,  
Guigoz, PhD Lacayo,  
PhD Fasel,  
PhD Favre, PhD  
Fornacca, Masters

Ecosystem services  
Natural Capitals

GIS&RS

Modeling

Humanitarian  
solutions

Ray, Lacroix,  
Guigoz,  
Masters

Geoprocessing

SDI

Data flow &  
processing

Data to  
Wisdom

Giuliani, Lacroix, Guigoz, Ray, Lehmann, PhD Lacayo, PhD da Silva, PhD Rodila, Masters

# EnviroSPACE research projects:

## **FNS:**

SWATCH21: ES of Swiss rivers (Sept. 2016)

neCHsus: Nexus approach of Swiss rivers (Sinergia, Dec. 2016)

SDGs agent based with CUI (Sinergia, Jun 2017)

Sustainable Caucasus with Jörg Balsiger (SCOPES)

## **H2020:**

ERA-PLANET: Essential Variables for SDGs (on going)

BLUES: nature-based solutions in Geneva (submitted)

BATEMAN: ES interface for decision making (Mar 2017)

In-situ observatory with Bas Ibelings ? (Mar 2017)

## **Others:**

Map-X: mapping the extractive industry and its impacts

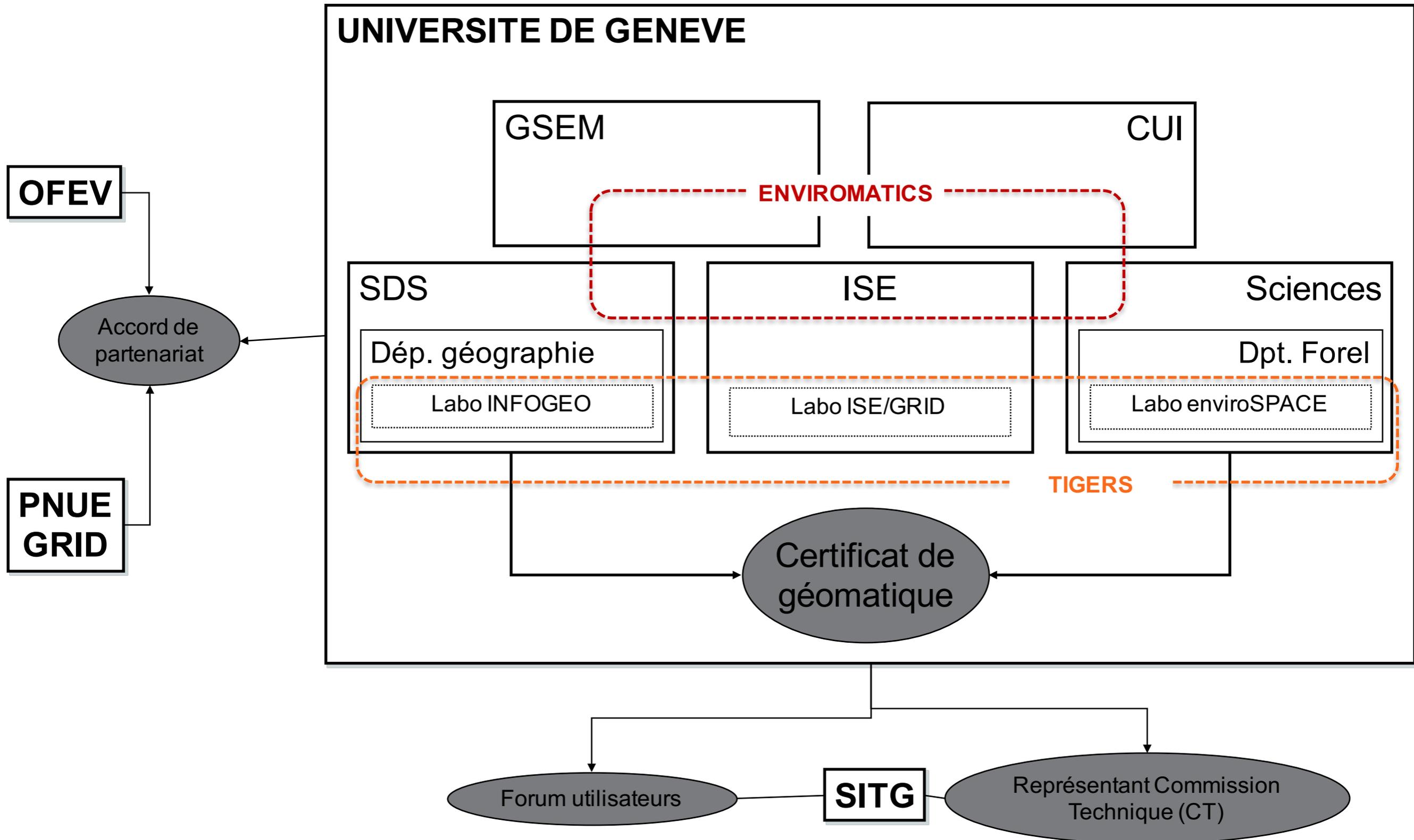
Data4SDGs: Global Partnership

mySDGs: phone application

PhD on Geneva ecosystem services with CJB (Jan 2017)

...

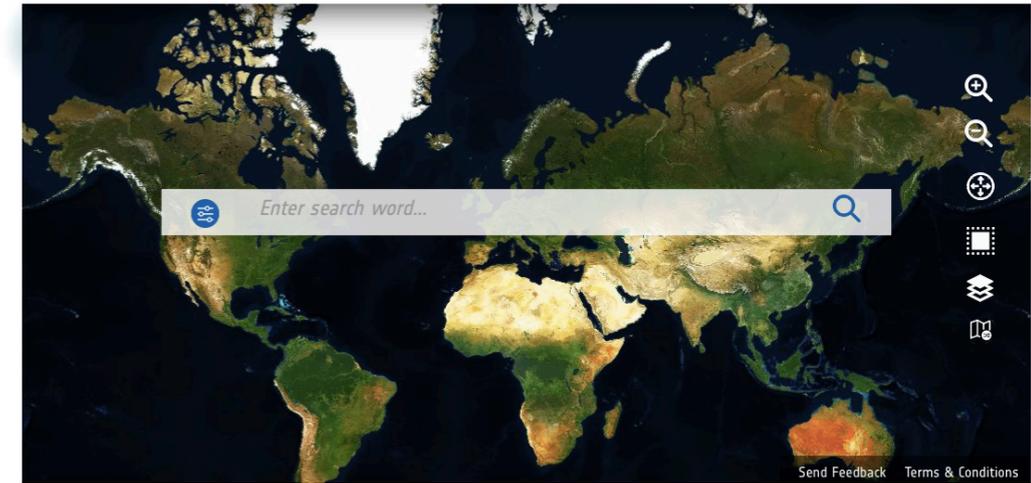
# Collaborations around Geomatics



# Links with GEO/GEOSS and Geneva-based IO



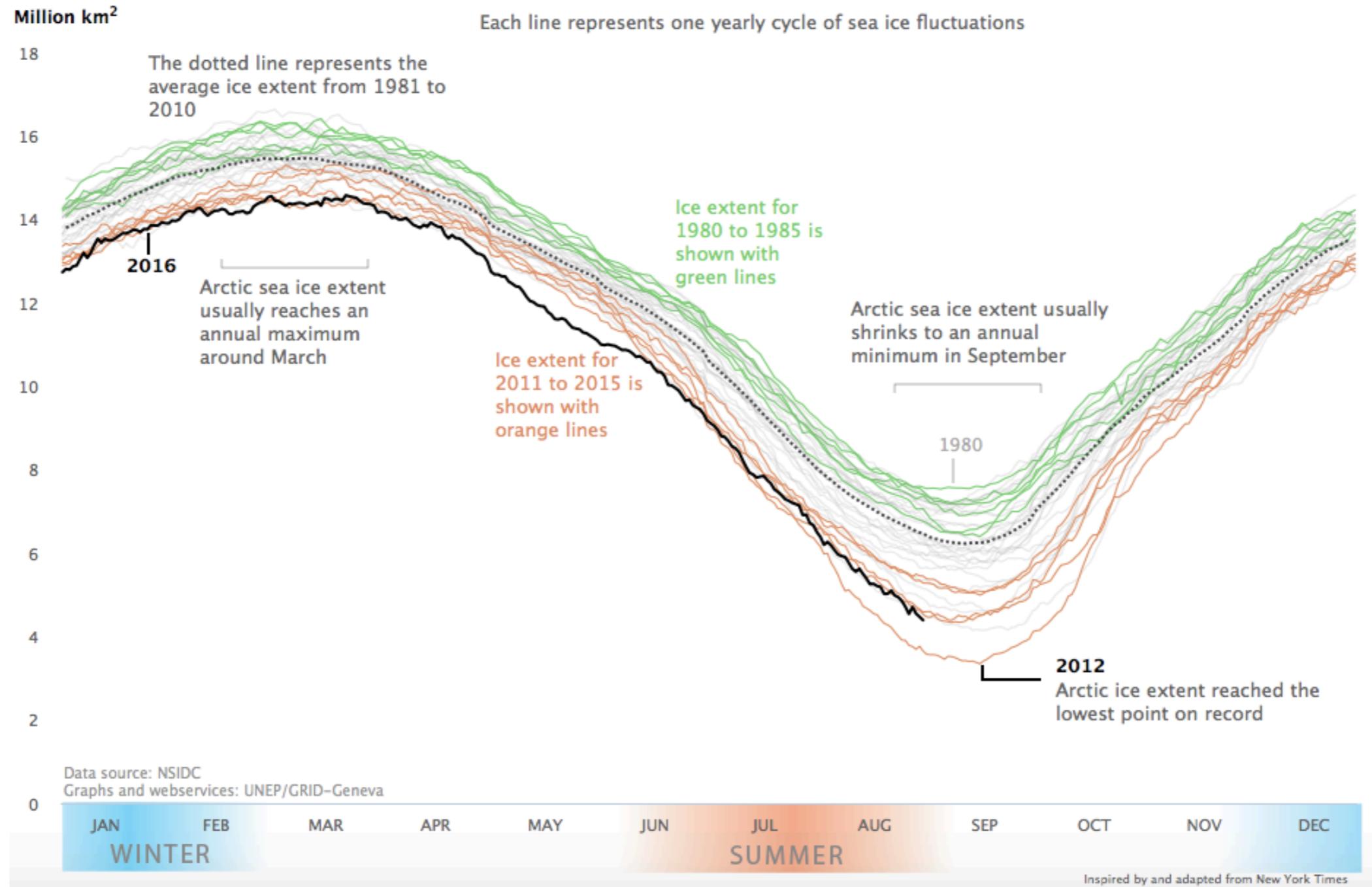
## Societal Benefit Areas



*Collaborations with:* UNEP, UNDP, UNESCO, WHO, PCDDMB

# Links with GEO/GEOSS and Geneva-based IO

## Monitoring of Essential Climate Variables (ECVs) & Essential Biodiversity Variables (EBVs)

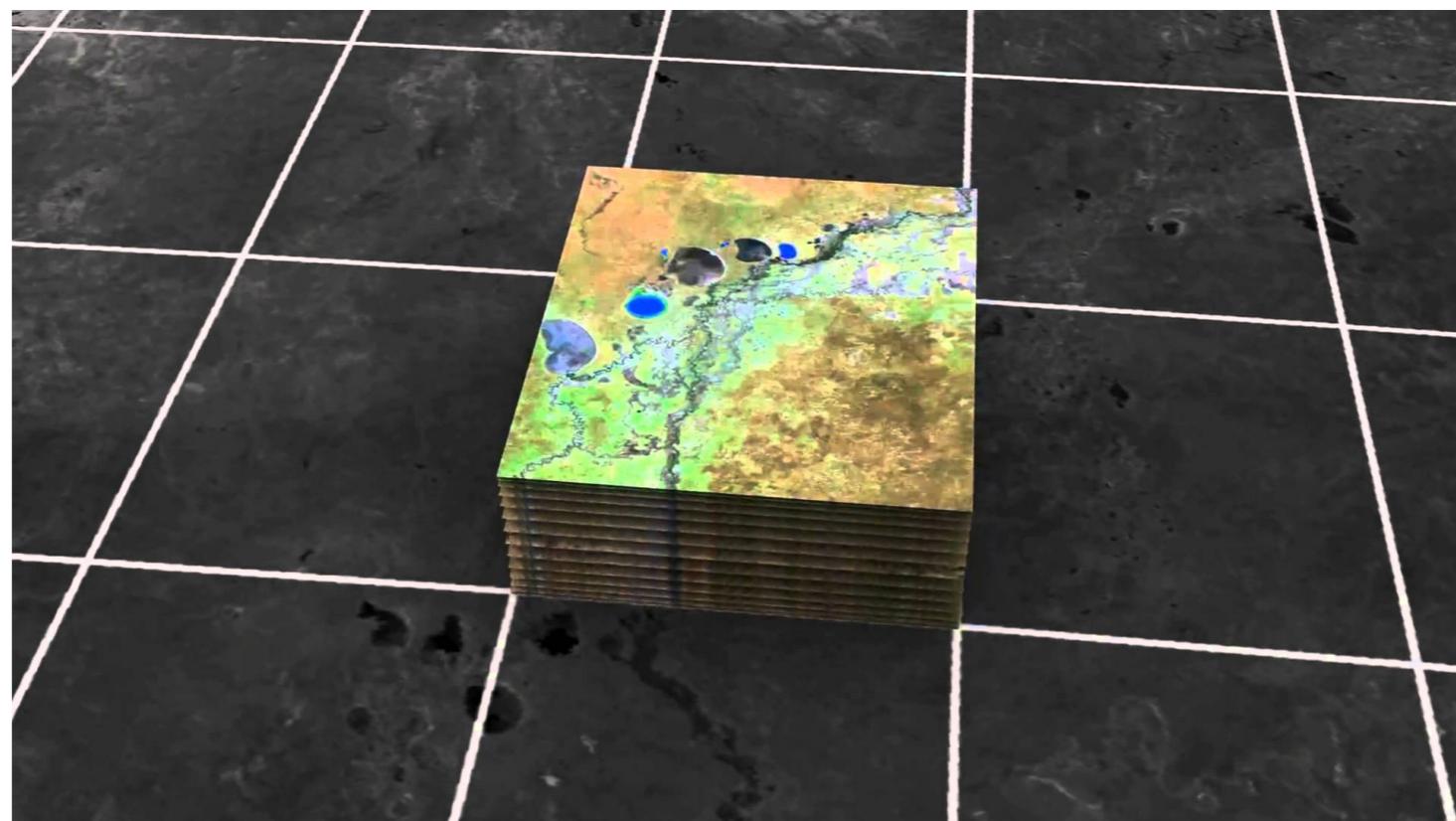
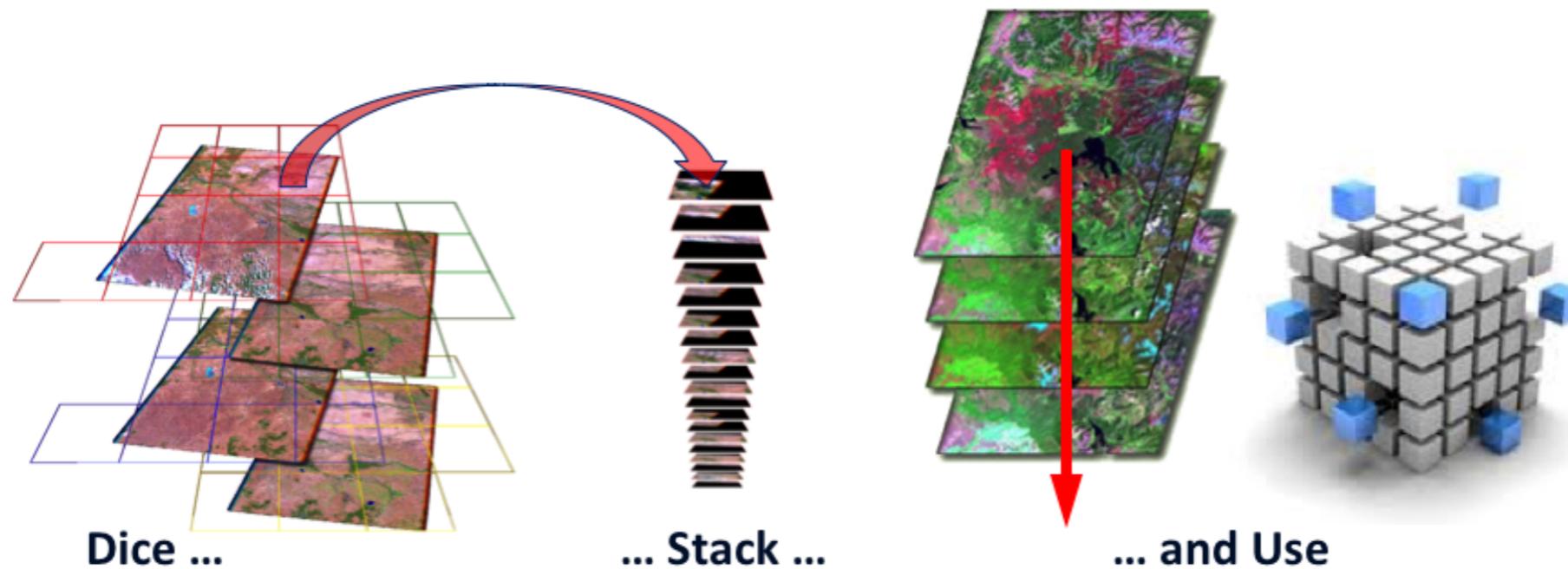


Funded by FOEN

Partners: UNEP/GRID, UNIGE, GEO, CNR

# Links with GEO/GEOSS and Geneva-based IO

Swiss Data Cube: Analyze the environment through space and time



Funded by FOEN

Partners: UNEP/GRID, UNIGE, GEO, CEOS, Geoscience Australia

# Challenges and opportunities for ISE

- Earth Observations and geospatial information are complementary to traditional statistics for measuring progress towards SDGs.
- SDGs as a cross-cutting theme within ISE >> working group within ISE to exchange ideas, develop projects.
- enviroSPACE has good capabilities in data discovery, access, handling, and processing >> coordinate data sharing across ISE and UNIGE.
  
- Concerted and coordinated approach in order to get new (big) projects (e.g., Millenium Institute, new Master SDG, ...)

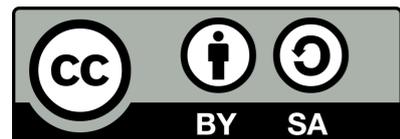
**>> new NCCR on SDGs**



Thank you!

gregory.giuliani@unige.ch  
gregory.giuliani@unepgrid.ch

<http://www.unige.ch/envirospace/people/giuliani/>



This work is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/).