

# The European Commission's science and knowledge service

Joint Research Centre

## Mapping and assessment of ecosystem services

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# Contents

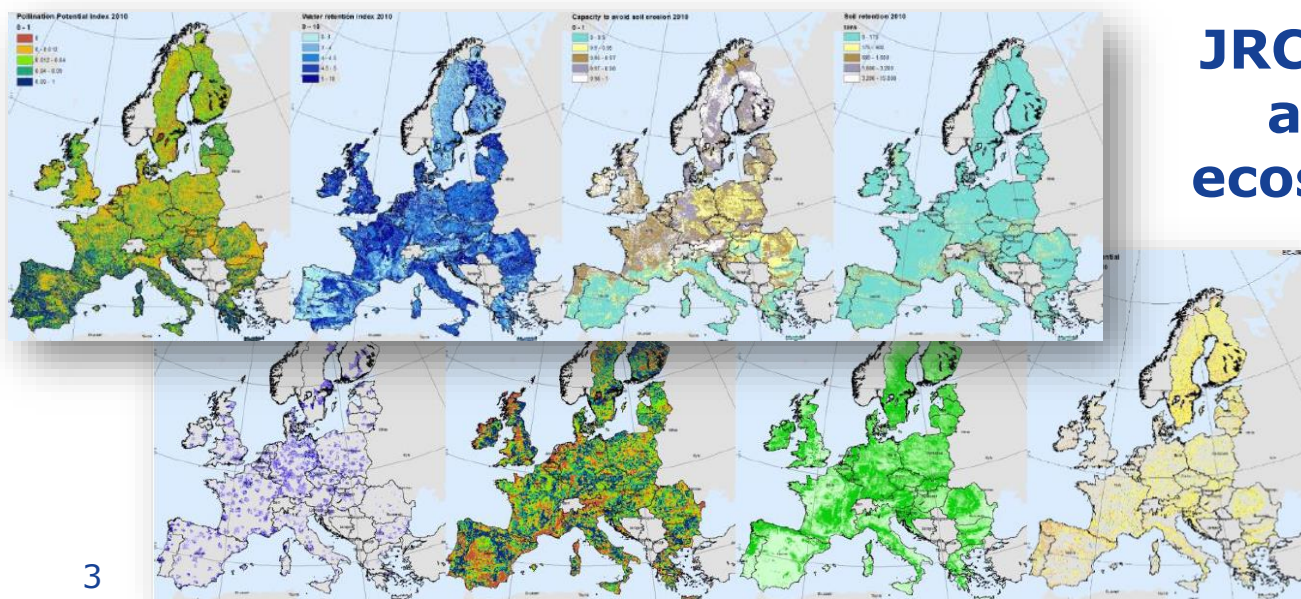
1. Mapping and Assessment of ES: **MAES**
2. Ecosystem services accounting: **INCA**
3. JRC products derived from EO data

# 1. Mapping and Assessment of ES

## EU Biodiversity Strategy

**Action 5.** Improve the knowledge of ecosystems and their services in the EU (MAES)

1. Mapping and assessment of ecosystems and services
2. Economic valuation and integration into accounting and reporting systems (INCA)

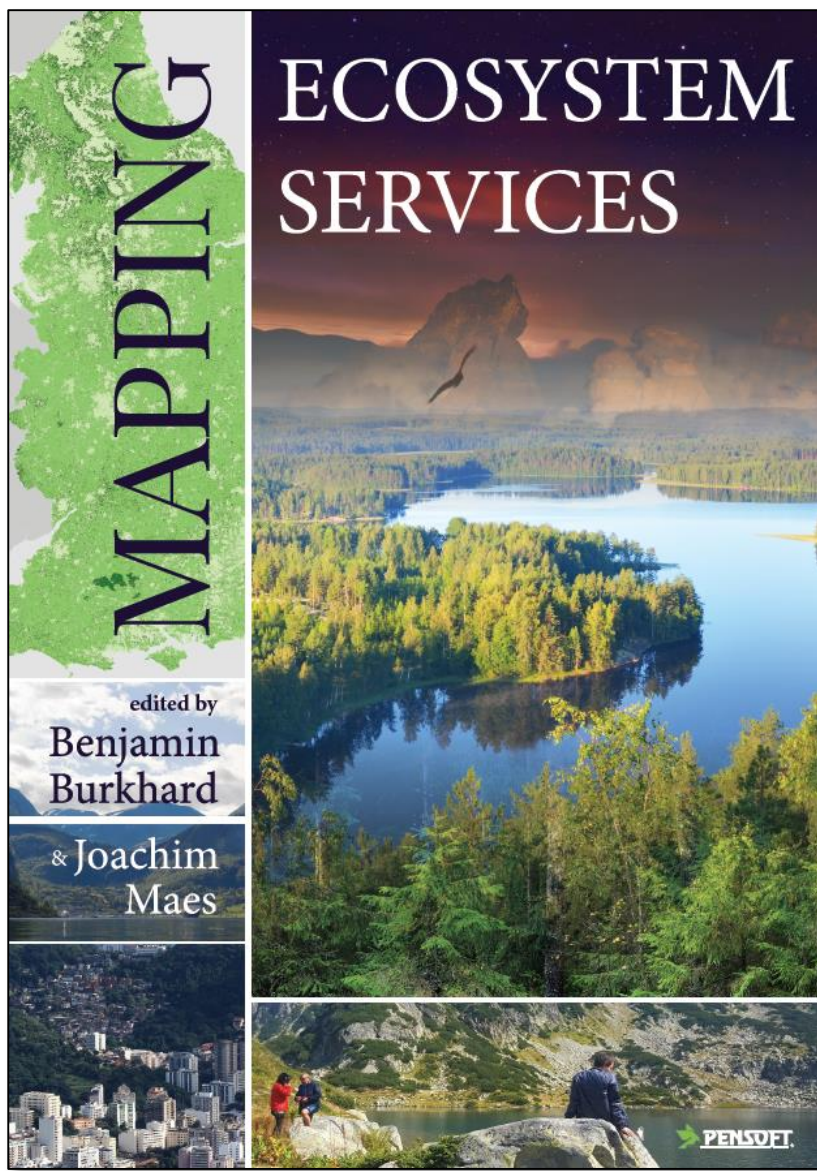


**JRC-European based  
assessment of  
ecosystem services**

# 1. MAES

**ESTIMAP** Collection of spatially explicit and dynamic models of ecosystem services

Section	Service
Regulation and maintenance	Air purification
	Soil erosion control
	Coastal protection
	Water retention
	Crop pollination potential
	Habitat maintenance for common birds
	Potential of pest-control
Cultural	Outdoor recreation



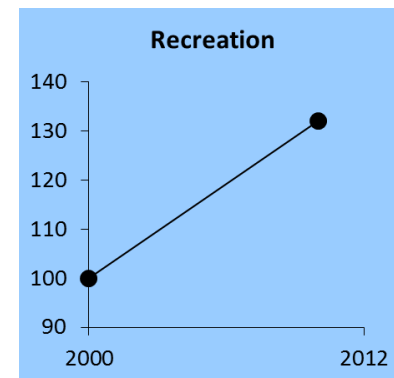
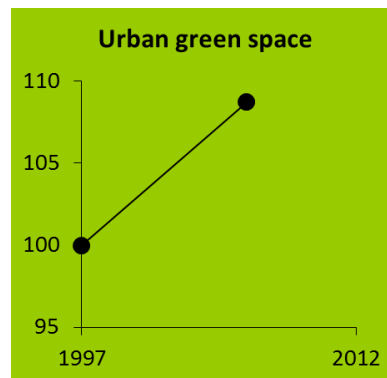
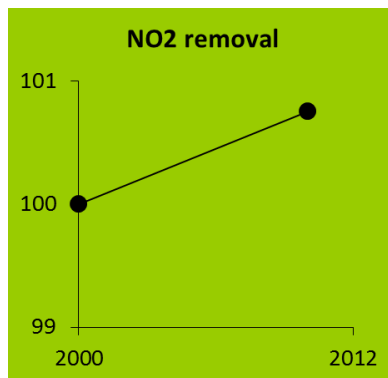
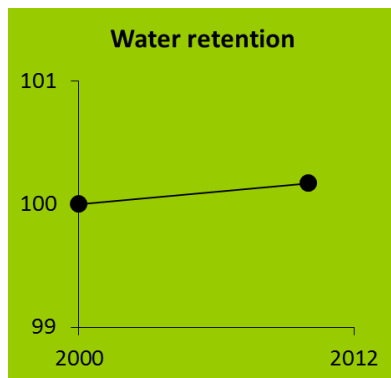
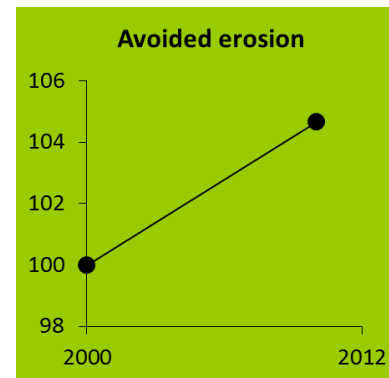
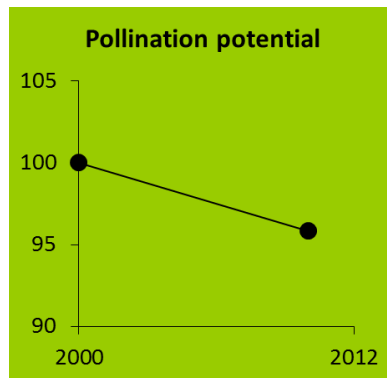
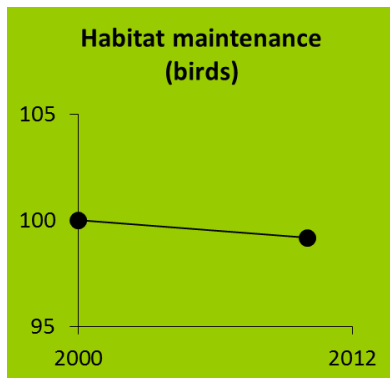
## New book: **Mapping Ecosystem Services**

State-of-the-art of ecosystem services mapping, related theory and methods, different ecosystem service quantification and modelling approaches as well as practical applications.

Hard copies can be ordered with the publisher: Pensoft, Sofia

**Open Access version ready soon.**

# 1. MAES



**Source:** Maes et al. (2015) Mapping and Assessment of Ecosystems and their Services: Trends in ecosystems and ecosystem services in the European Union between 2000 and 2010. Report EU 27143 EN.  
<http://publications.jrc.ec.europa.eu/repository/bitstream/JRC94889/lbna27143enn.pdf>



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1. Mapping and Assessment of ES: **MAES**

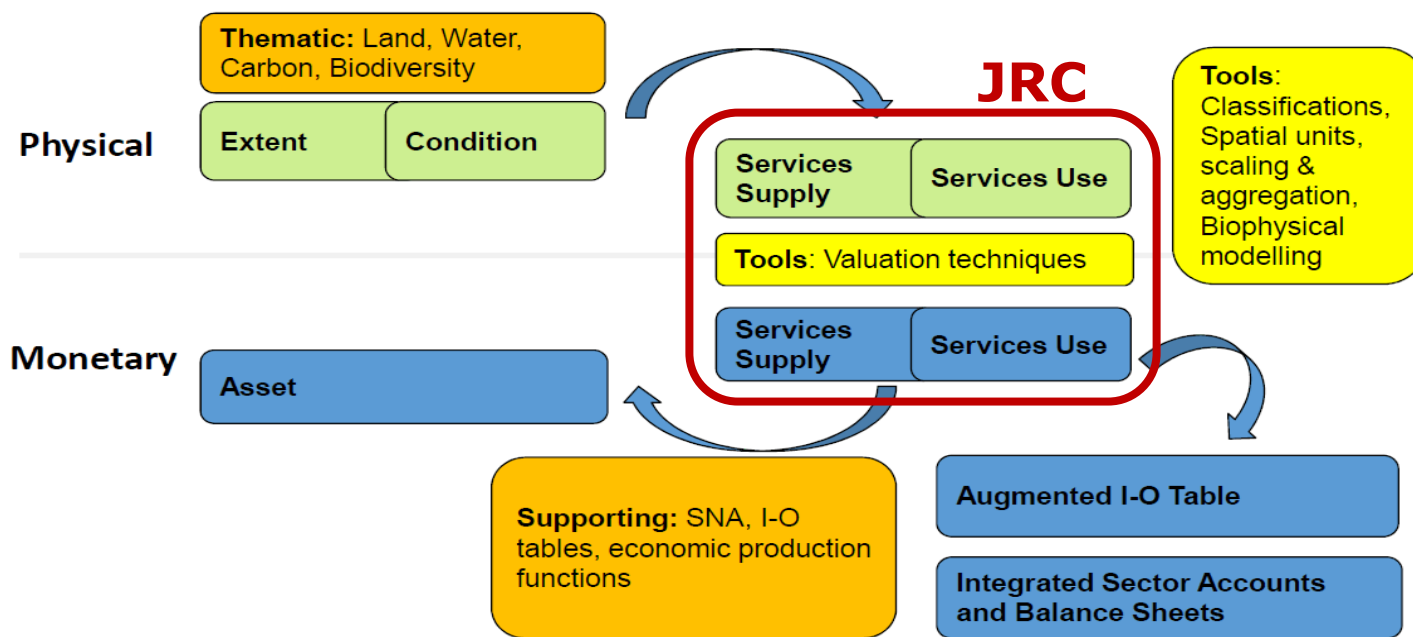
2. Ecosystem services accounting: **INCA**

- Uncertainty in land cover data
- Next steps in the use of EO4EA

3. JRC products derived from EO data

## 2. INCA

### Knowledge Innovation Project on the Integrated system for Natural Capital and ecosystem services Accounting (**KIP-INCA**)

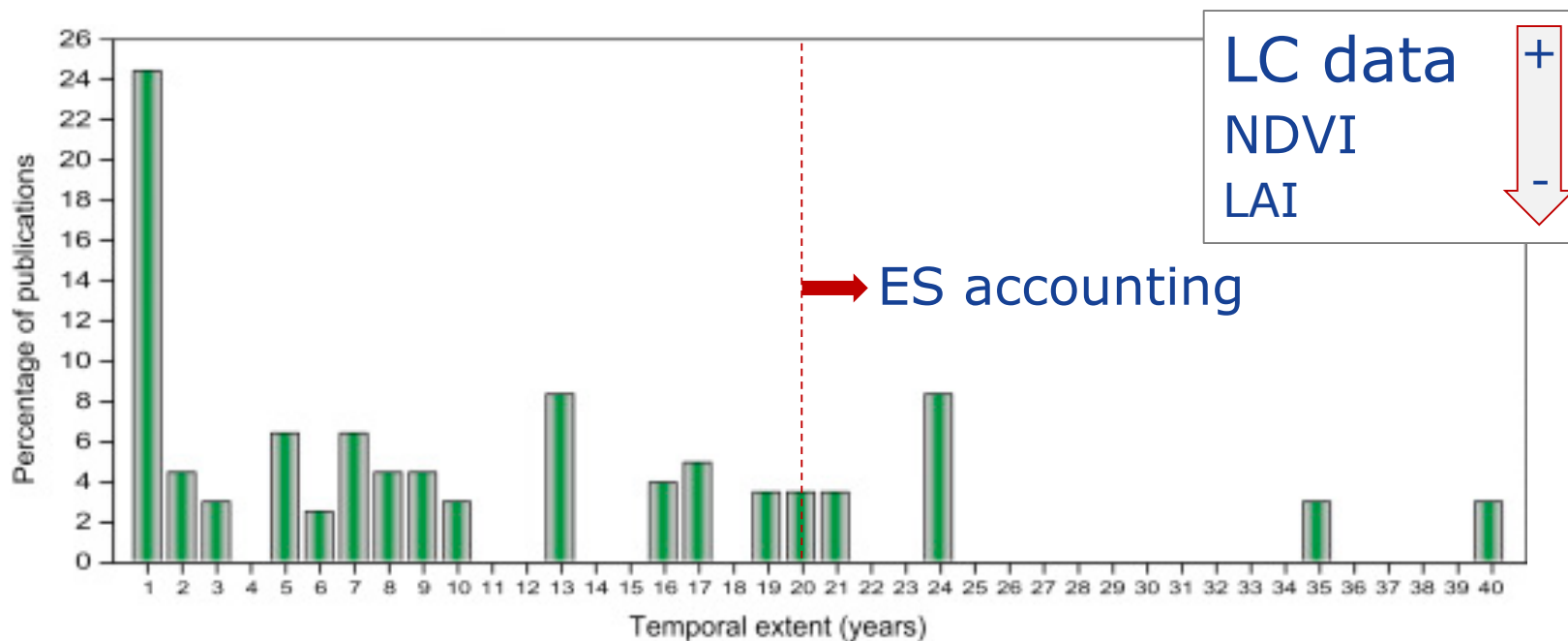




## 2. INCA: choices for modelling

Compromise between:

- Spatial resolution
  - Spatial extent → EU level
  - Temporal coverage → Time series
  - Model complexity
- Fit for purpose



de Araujo Barbosa, C.C., Atkinson, P.M. & Dearing, J.A. (2015) **Remote sensing of ecosystem services: A systematic review**. *Ecological Indicators*, 52, 430-443

## 2. INCA: challenges with LC time series

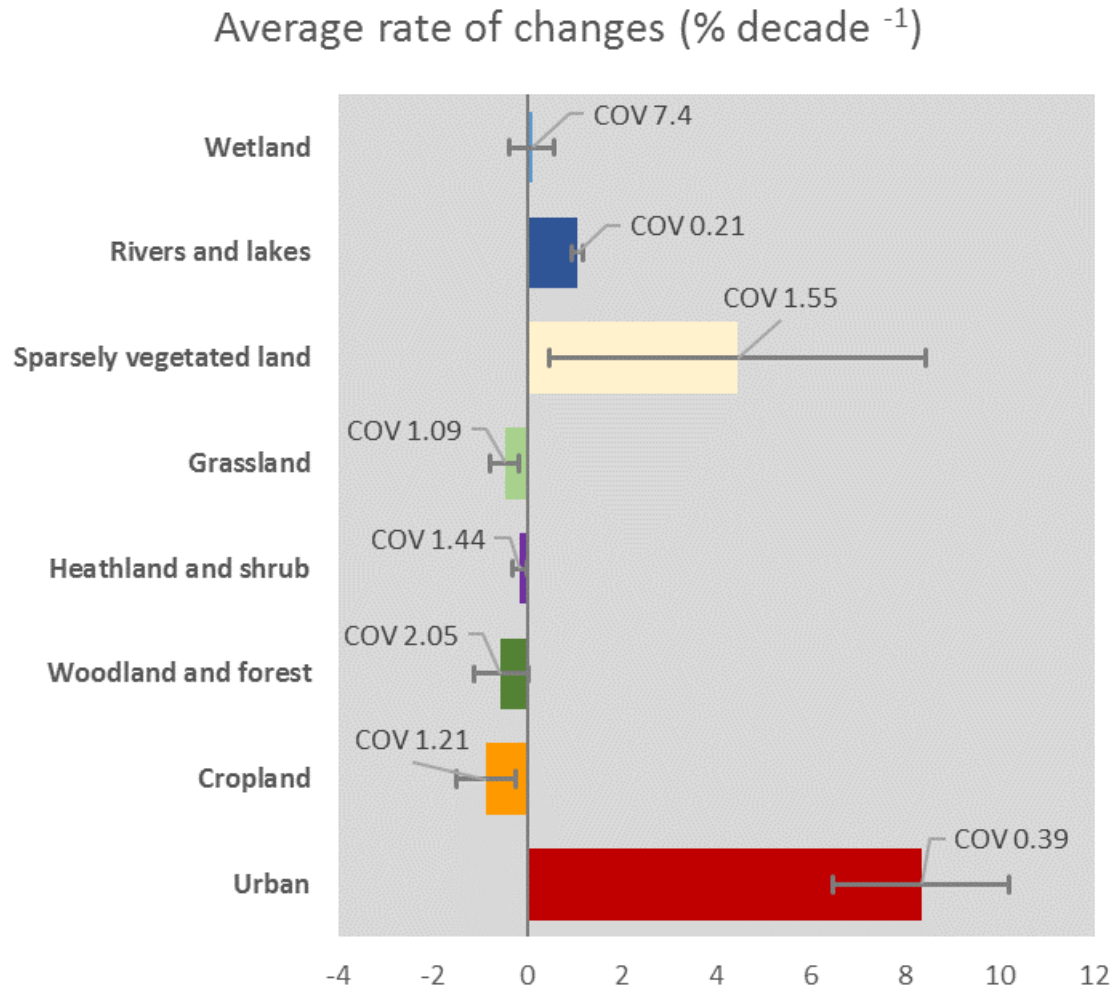
### Comparison of open land-cover data with EU coverage

Land Cover data (EO)	Temporal coverage
CORINE Land Cover	1990, 2000, 2006, 2012
CCI Global land cover	~2000, ~2005, ~2010
<del>GlobCover</del>	<del>2005 and 2009</del>
<del>Modis</del>	<del>Yearly for 2001-2012</del>
Global Surface Water Explorer	1984-2015
Global Human Settlement Layer	1975, 1990, 2000, 2014
Global Forest Watch	Yearly 2001-2014

Other type of LC data	Temporal coverage
LUCAS data	2006, 2009, 2012, 2015 Extent: 2009 and 2012
Hilda dataset	1900-2010 (every 10 years)

Disclaimer:  
comparisons over time  
not recommended

## 2. INCA: uncertainty in rates of change



## 2. INCA: next steps in the use of EO4EA

Move from LC models to other EO indicators

**Land surface temperature**



**Microclimate regulation**  
(cooling capacity urban areas)

**Leaf area index**



**Air purification**  
(vegetation capacity to remove pollutants)

**Imperviousness level**  
(Copernicus product)



**Flood control urban areas**

**NDVI**



**Soil erosion control**

# Contents

1. Mapping and Assessment of ES: **MAES**
2. Modelling ES for accounting: **INCA**
  - Uncertainty in land cover data
  - Next steps in the use of EO4EA
3. JRC products derived from EO data

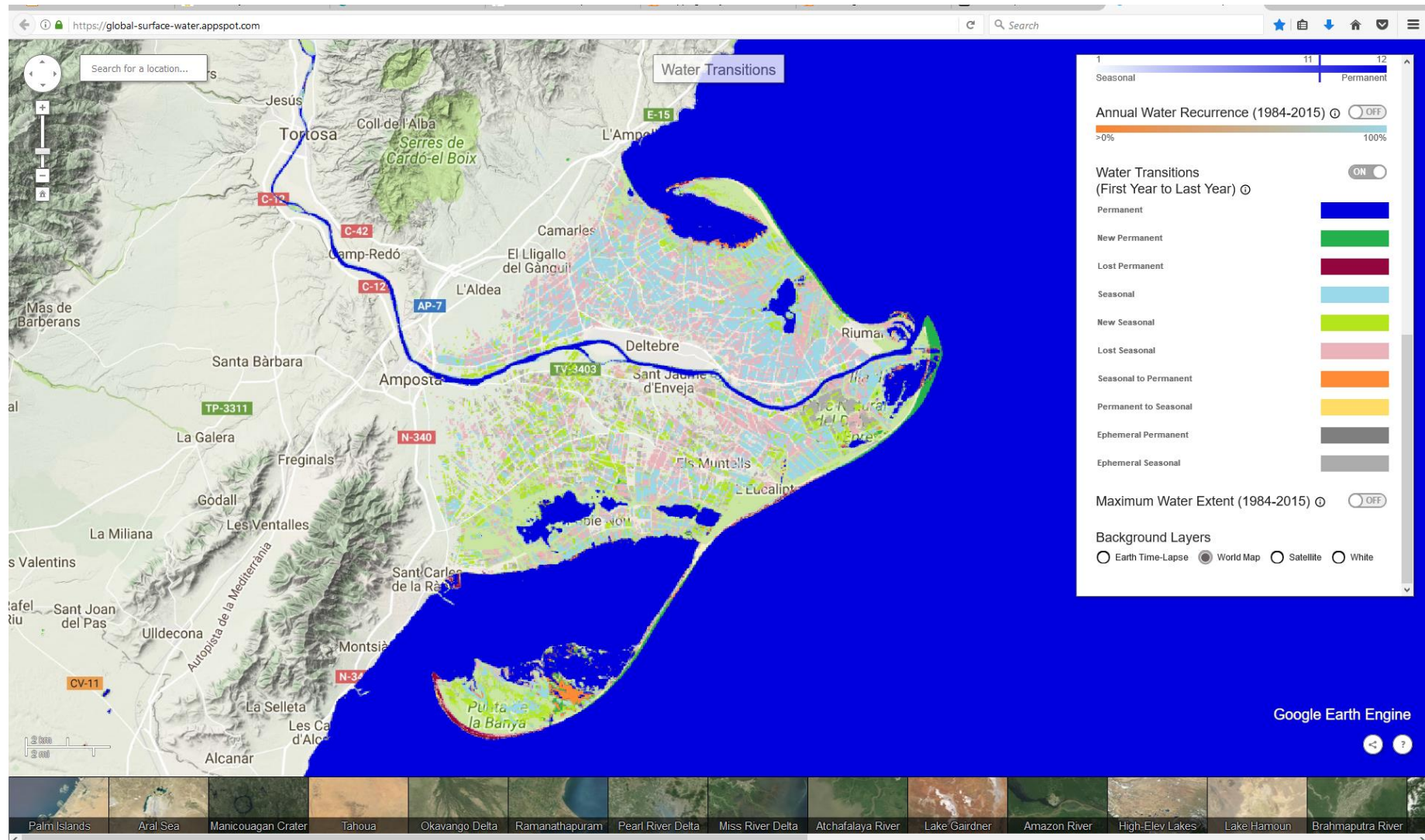
# 3. JRC products:

## Global Surface Water Explorer

(30 x 30 m resolution, time period 1984 and 2015)

- **Water Occurrence** dataset: overall water dynamics
- **Water Occurrence Change Intensity:** increase/decrease/invariant
- **Water Seasonality:** permanent and seasonal water bodies
- **Water Recurrence:** frequency water returns from one year to another
- **Maximum Water Extent:** between 1984 and 2015
- **Water Transitions:** changes in water state between the first year and the last year of observation

# 3. JRC products: Global Surface Water Explorer

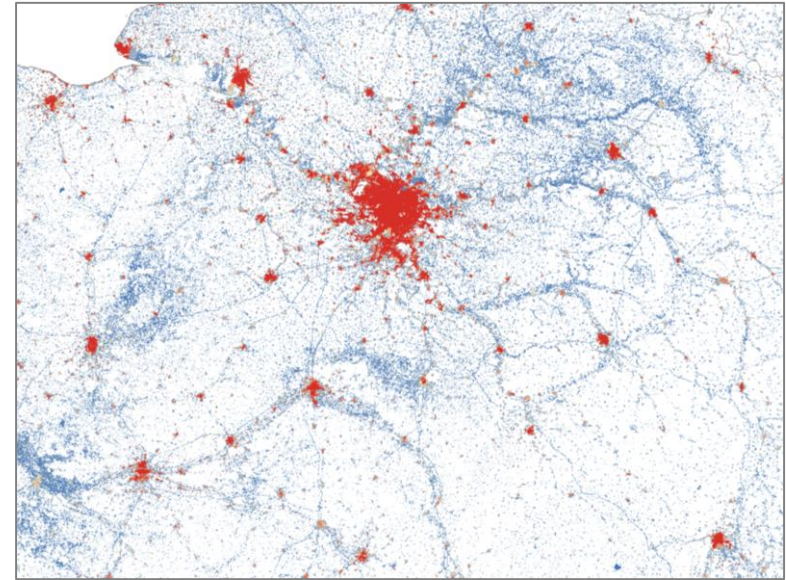




# 3. JRC products:

## Global Human Settlement datasets

- **Built-up presence grid**
  - ~38 x 38 m resolution
  - Years: 1975, 1990, 2000, 2014
  - Confidence map
- **Population density grid**
  - 250 x 250 m
  - Years: 1975, 1990, 2000, 2015



Population density map

# THANK

# YOU!!

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