

# StatE0

5-7 May 2026 | ESA-ESRIN | Frascati (Rome), Italy

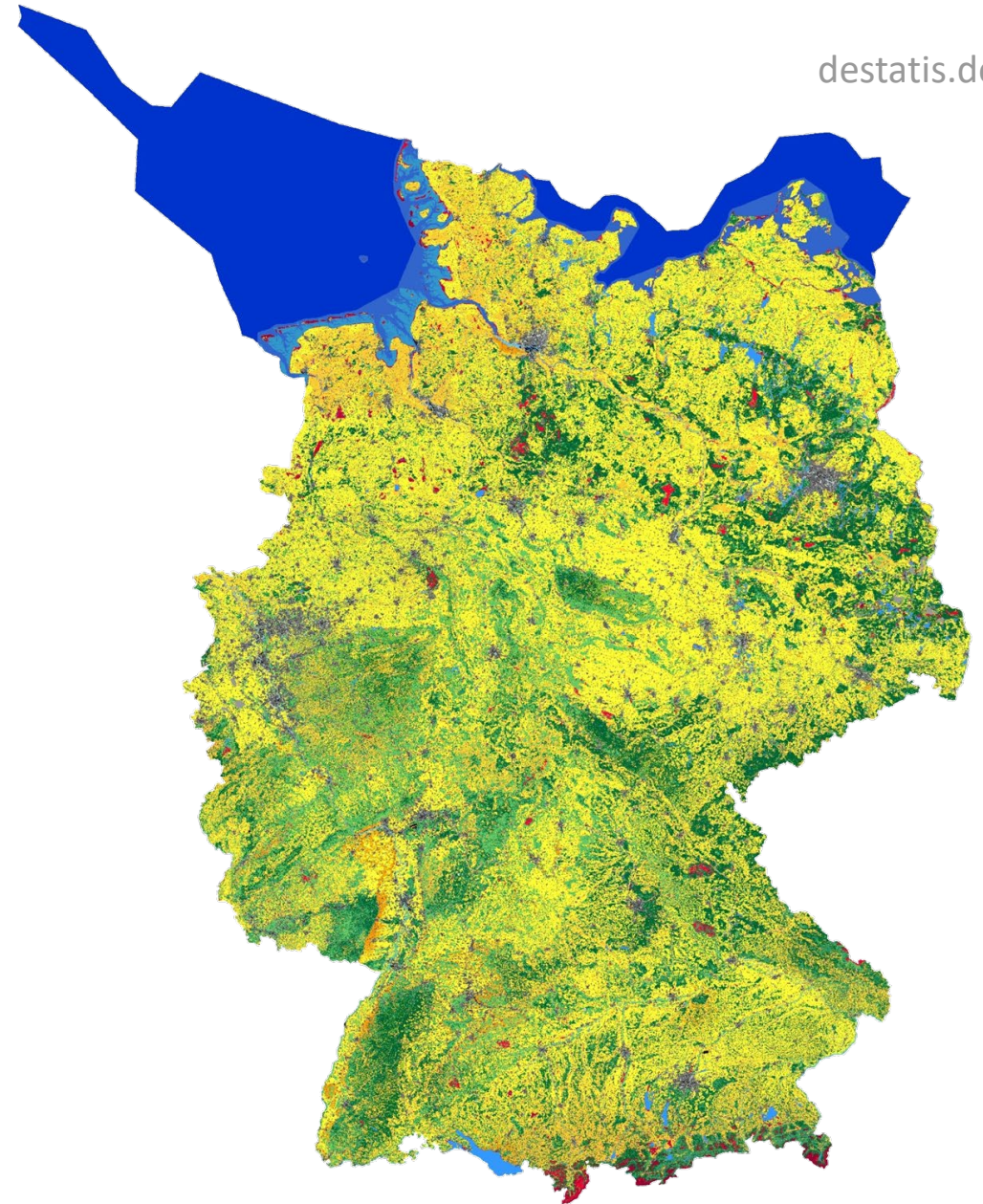
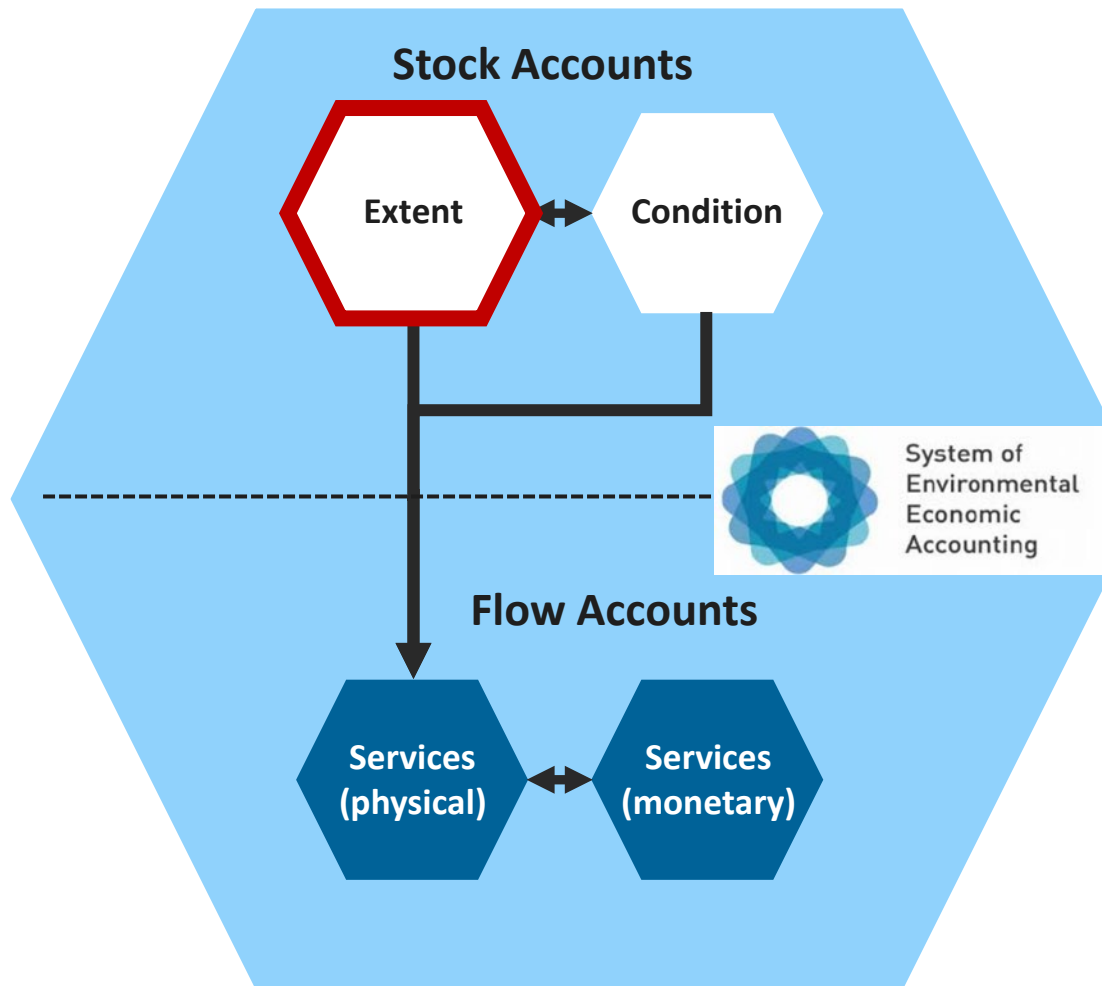
## Integrating Earth Observation into Official Statistics: The German Ecosystem Accounts

**Jonathan Reith, Marius Bellinghen, Simon Felgendreher, Simon Schürz, Johannes Oehrlein, Dan Kanmegne, Nuan Stahl**  
Federal Statistical Office (Destatis)

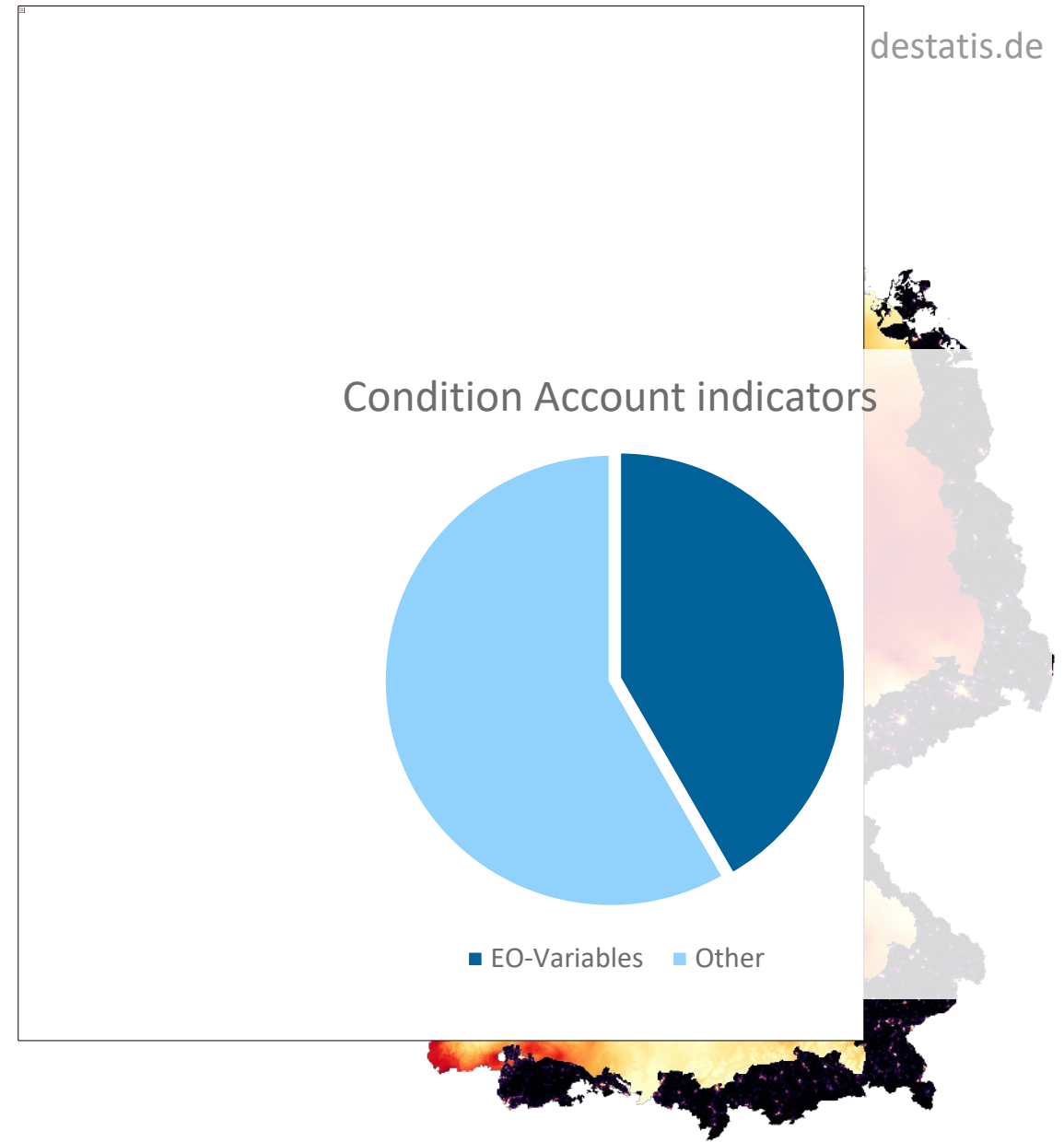
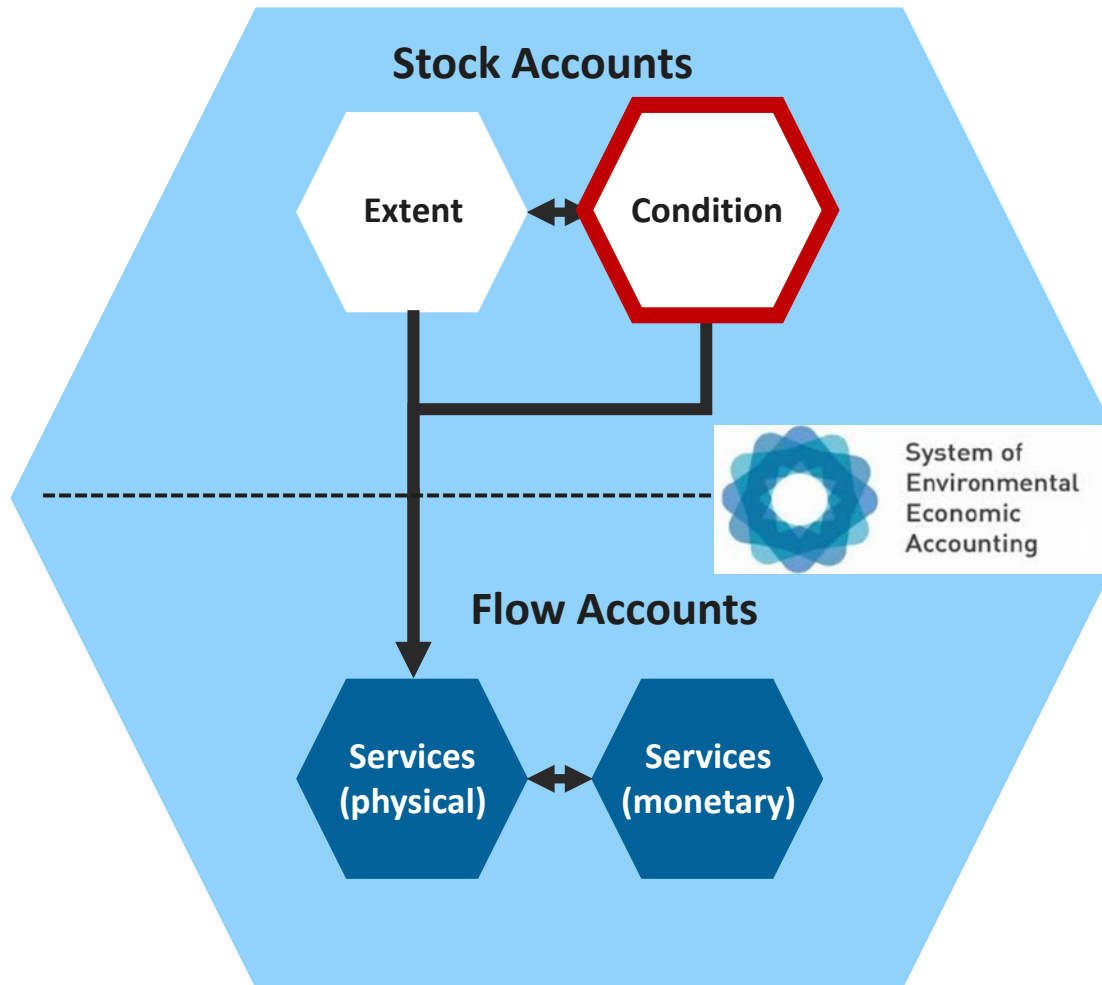
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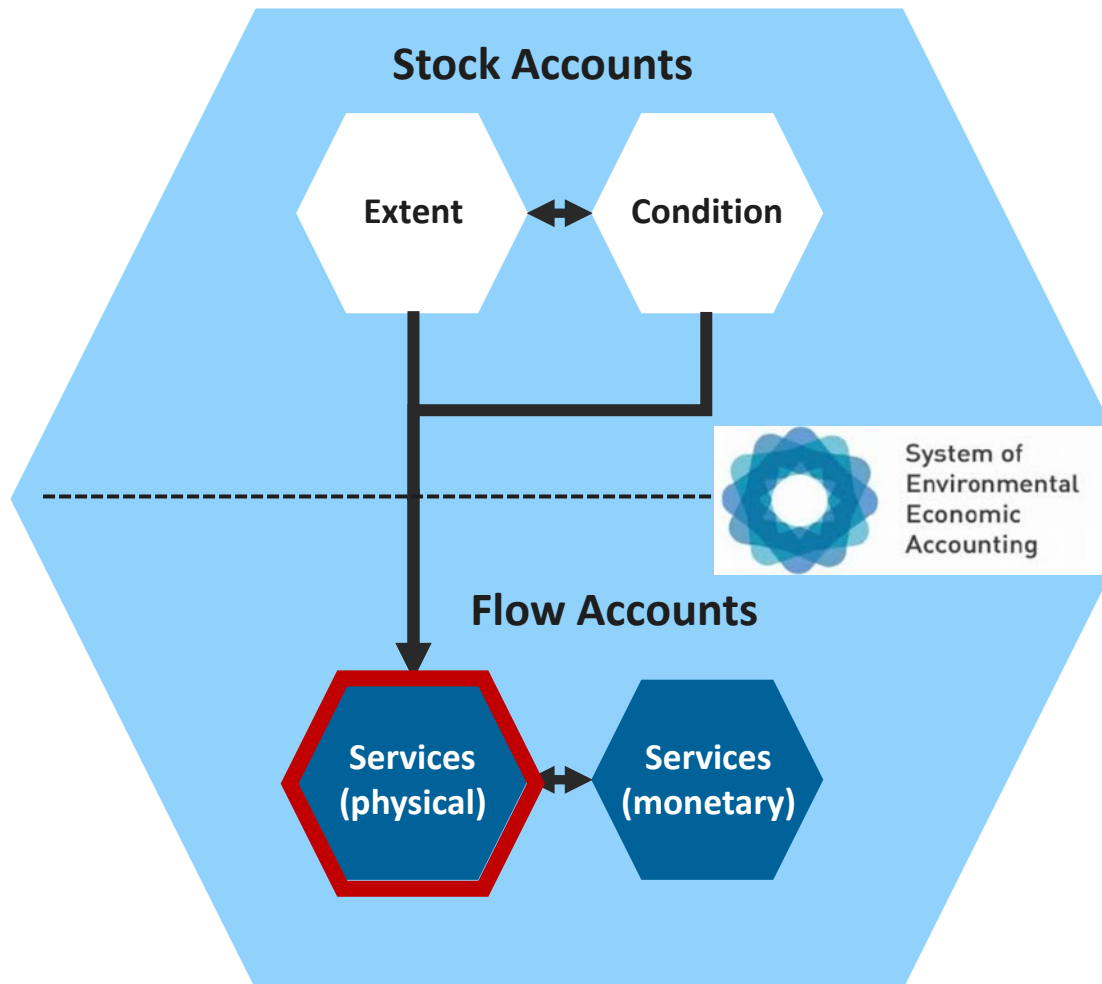
# Extent Account



# Condition Account



# Service Account



## Provision Services:

- ❖ Crop Provision
- ❖ Wood Provision
- ❖ *Pollination*

## Regulating Service:

- ❖ Carbon Stocks & Sequestration
- ❖ *Erosion Control*
- ❖ **Air Filtration**
- ❖ Urban Cooling

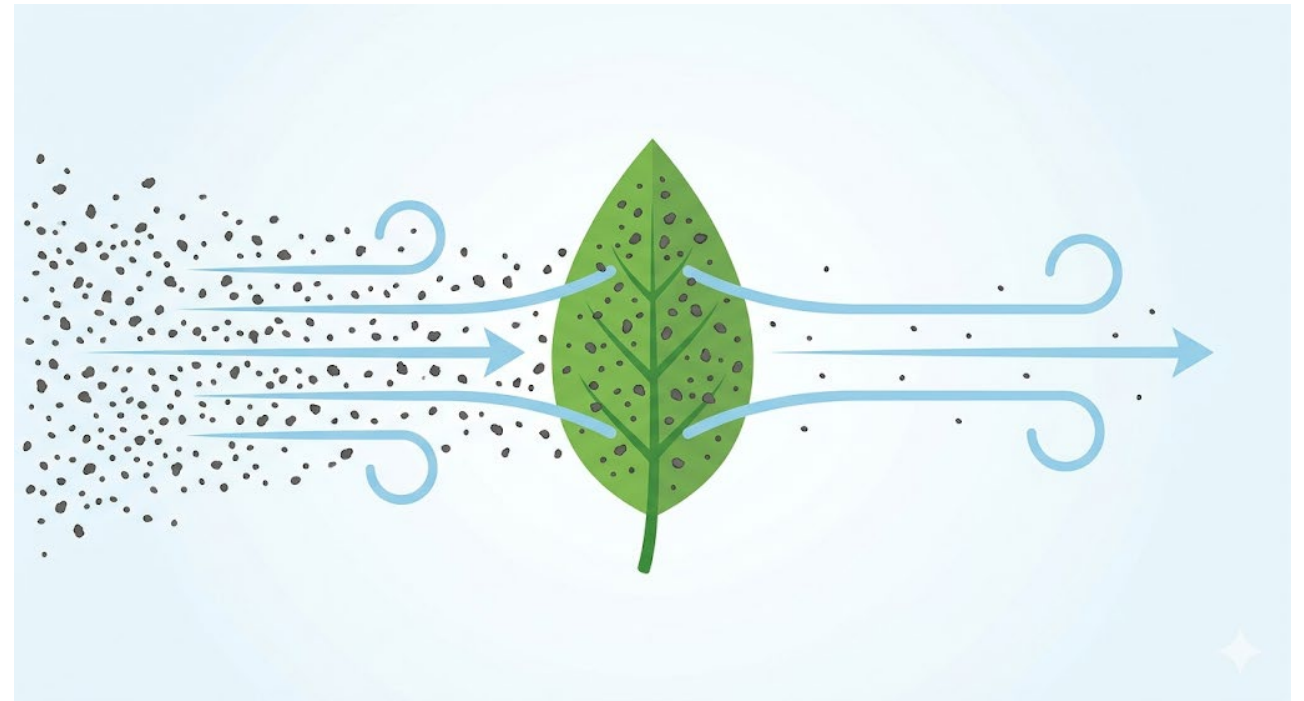
## Cultural Service:

- ❖ Nature-Based Tourism

# Air Filtration

‘...filtering air-borne pollutants through the deposition, uptake, fixing and storage of pollutants...’

$$\text{Air Filtration} = V_d * C_{\text{PM}_{2.5}} * 10^{-10}$$

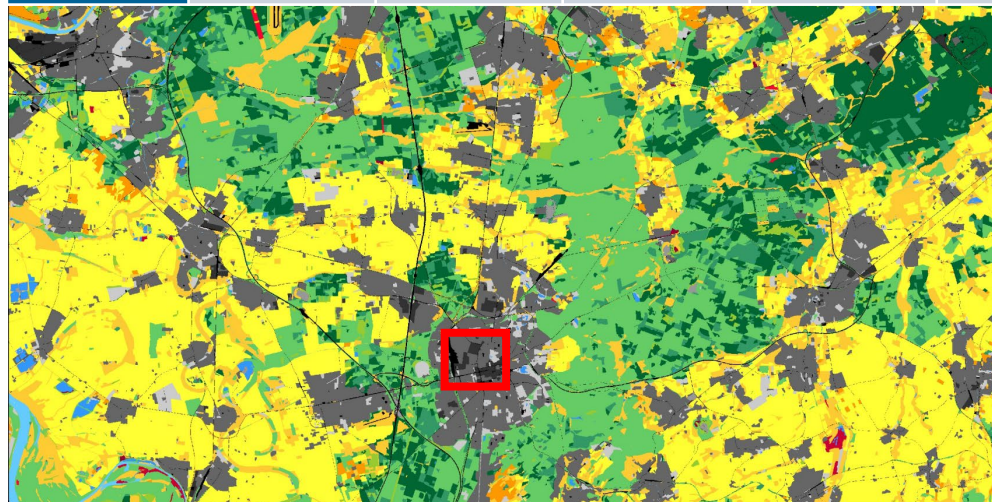


Nanobana Pro

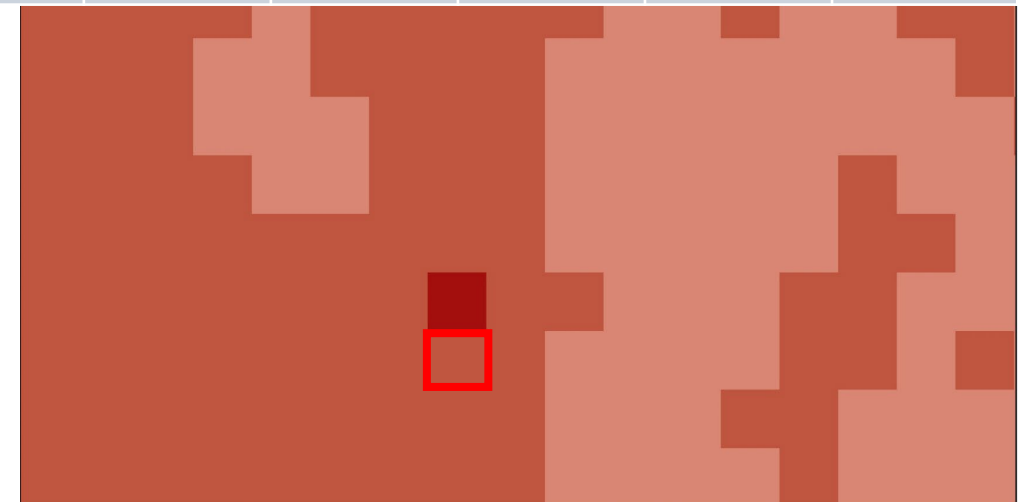
# Air Filtration

Default: Lookup-table

Average Vd for PM <sub>2.5</sub> for 2018 in the EU (m/s)											
GEO	Settlements	Cropland	Grassland	Forest & woodland	Heathland & shrub	Sparsely vegetated ecosystems	Inland wetlands	Rivers & canals	Lakes & reservoirs	Marine inlets	Coastal wetlands
...											
DE	0.00098	0.0011	0.00131	0.0009	0.00087	0.00033	0.00084	0	0	0	0.00072
IT	0.00083	0.00116	0.00114	0.00091	0.00137	0.00044	0.00069				0.0003
...											



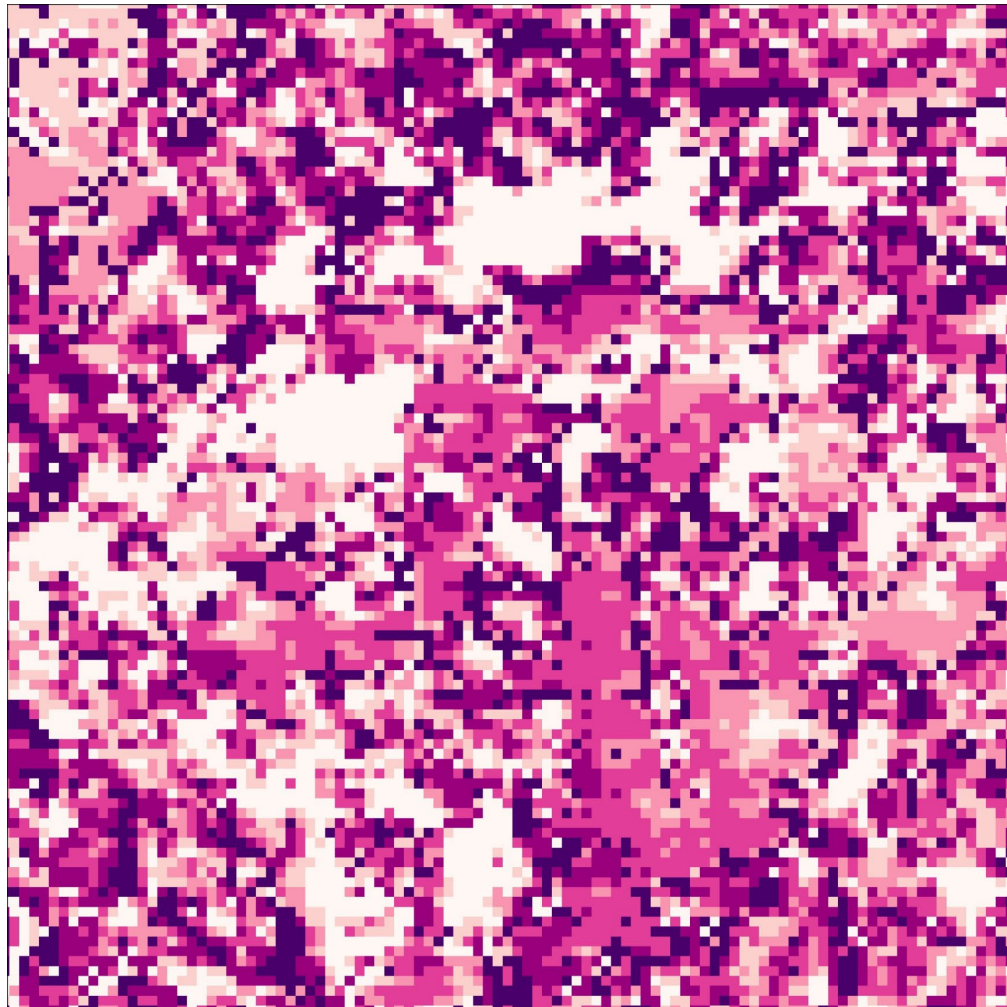
- Ecosystems**
- Settlement Areas
  - Settlement Areas
  - Transport Infrastructure
  - Urban green spaces
  - Arable Land
  - Permanent Cropland
  - Pastures
  - Broadleaf Forests
  - Coniferous Forests
  - Mixed Forests
  - Shrubland
  - Natural grasslands
  - Wetlands
  - Sparsely vegetated
  - Rivers
  - Lakes



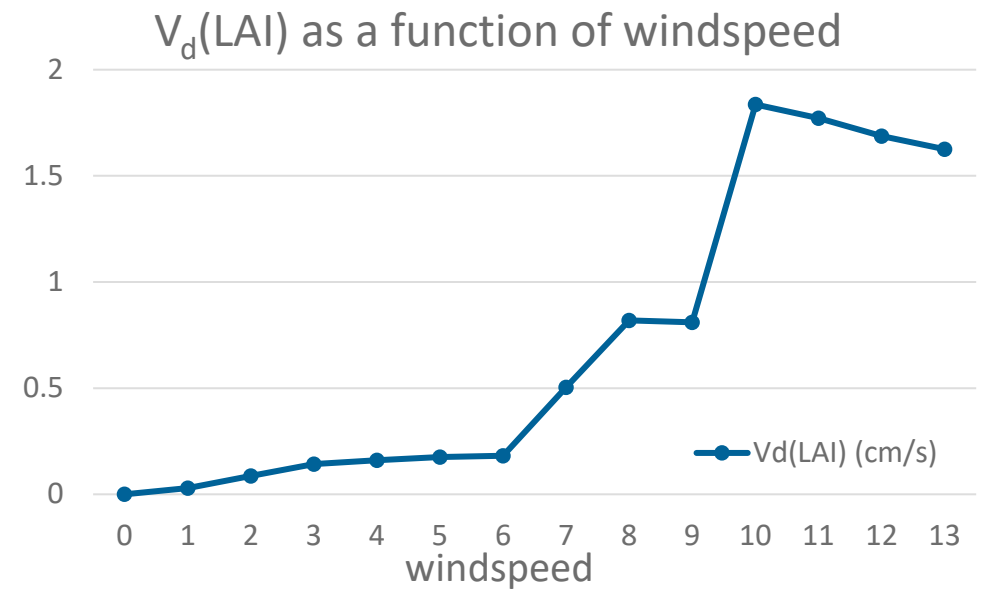
- PM 2.5**
- 0,001 - 5
  - 5,001 - 6,5
  - 6,501 - 8
  - 8,001 - 10,566

# Air Filtration

## Advanced: LAI & Wind



$$V_d = V_{d(LAI)} \times LAI$$



# Air Filtration

National Approach:



**JAMES** | Journal of Advances in Modeling Earth Systems®

RESEARCH ARTICLE  
10.1029/2022MS003050

## A New Aerosol Dry Deposition Model for Air Quality and Climate Modeling

Jonathan E. Pleim<sup>1</sup>, Limei Ran<sup>2</sup>, Rick D. Saylor<sup>3</sup>, Jeff Willison<sup>1</sup>, and Francis S. Binkowski<sup>4</sup>

**Key Points:**

- New aerosol deposition velocity model agrees better with observations than current models
- Impaction on microscale obstacles such as leaf hairs is key process
- New aerosol deposition velocity model increases dry deposition

<sup>1</sup>U.S. Environmental Protection Agency, Research Triangle Park, NC, USA, <sup>2</sup>U.S. Department of Agriculture, Natural Resources Conservation Service, Greensboro, NC, USA, <sup>3</sup>Air Resources Laboratory, National Oceanic and Atmospheric Administration, Oak Ridge, TN, USA, <sup>4</sup>Institute for the Environment, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

$$V_d = \frac{V_g}{1 - \exp(-V_g(R_a + R_b))}$$

$V_g$  = gravitational acceleration

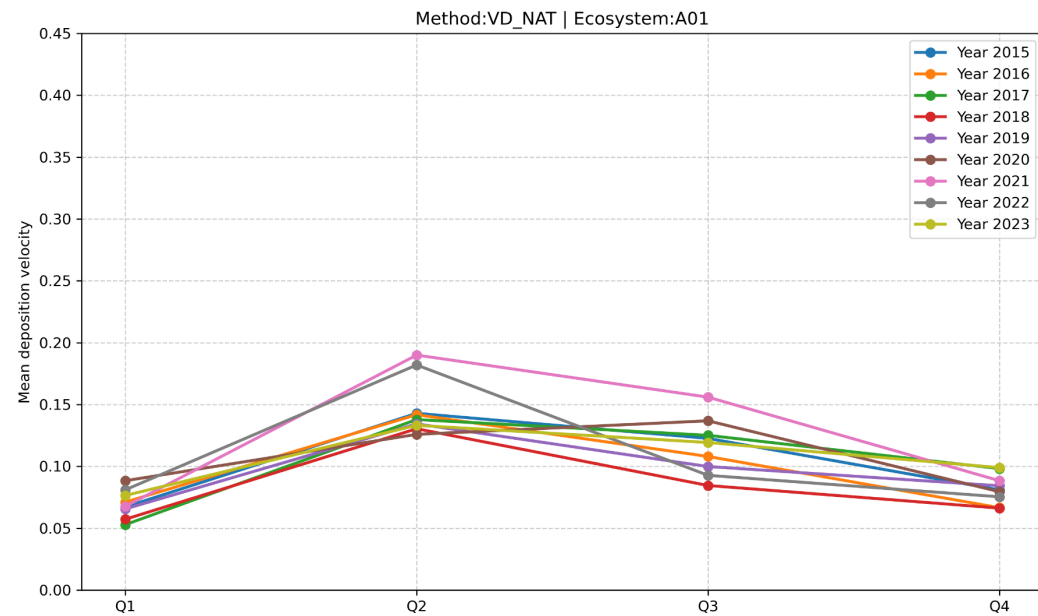
$R_a$  = aerodynamic resistance

$R_b$  = quasi-laminar boundary layer resistance

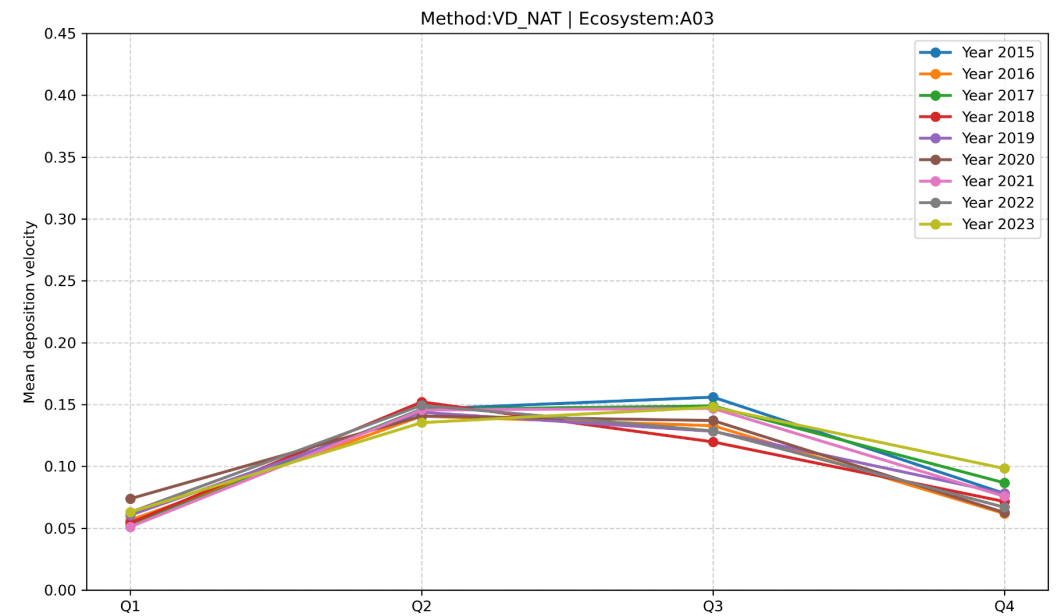
# Air Filtration

## National Accounts Results

### Urban

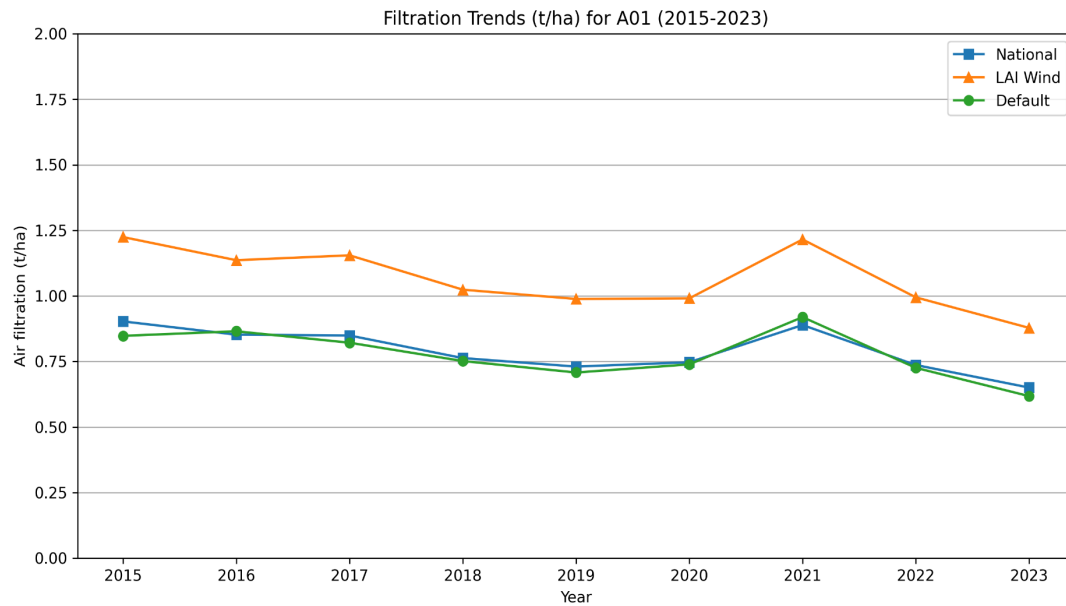


### Forests

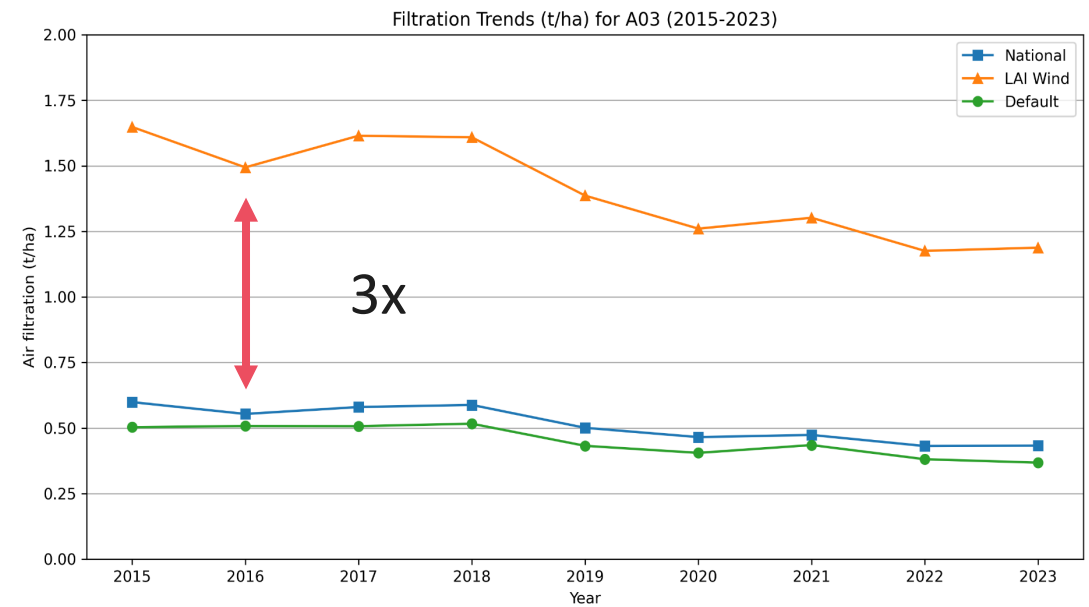


# Air Filtration

## Urban



## Forests



## Take away

- Ready-to-use EO-data
- Timely EO-products
- Long time series
  - Methodological consistency

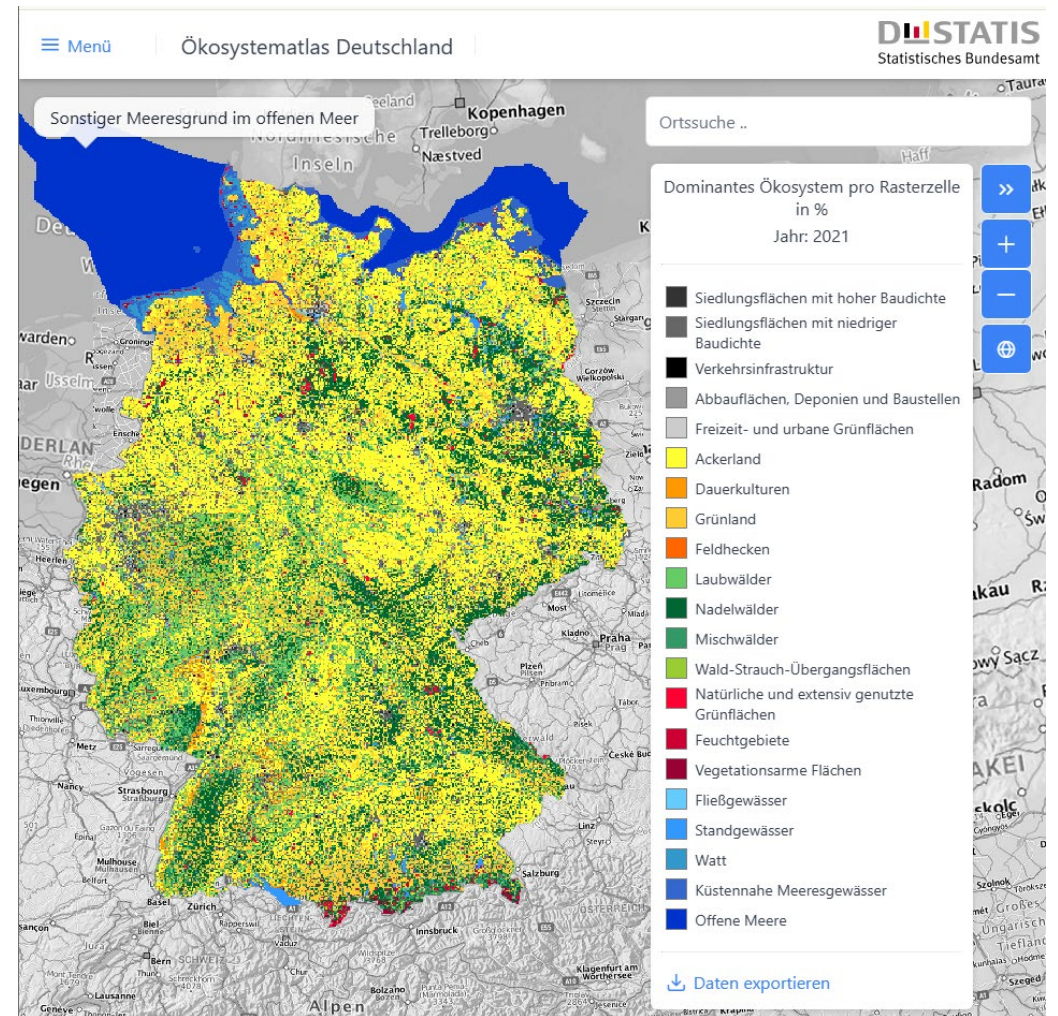
# Publication

- Ecosystem Accounting
- Extent, Condition and physical Service Accounts available as statistical report
- Methodological report including fact sheets

## Ecosystem Accounting



## Ecosystem Atlas



# Contact

Statistisches Bundesamt  
53117 Bonn  
Germany  
[www.destatis.de](http://www.destatis.de)

Jonathan Reith  
[jonathan.reith@destatis.de](mailto:jonathan.reith@destatis.de)

[ugr-oesl@destatis.de](mailto:ugr-oesl@destatis.de)

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