

StatEO

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



Analysis of Earth Observation Data for Economic Statistics

Maren Köhlmann, Stefan Irrgang & Melanie Brauchler
Institute for Research and Development in Federal Statistics
Federal Statistical Office Germany (Destatis)

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Integrating Earth Observation into Official Statistics

Thematic sessions – Environmental Accounting

Big Hall 12:35pm – 12:45pm

German Ecosystem Accounts

Integrating Earth Observation into Official Statistics: The German Ecosystem Accounts

Jonathan Reith

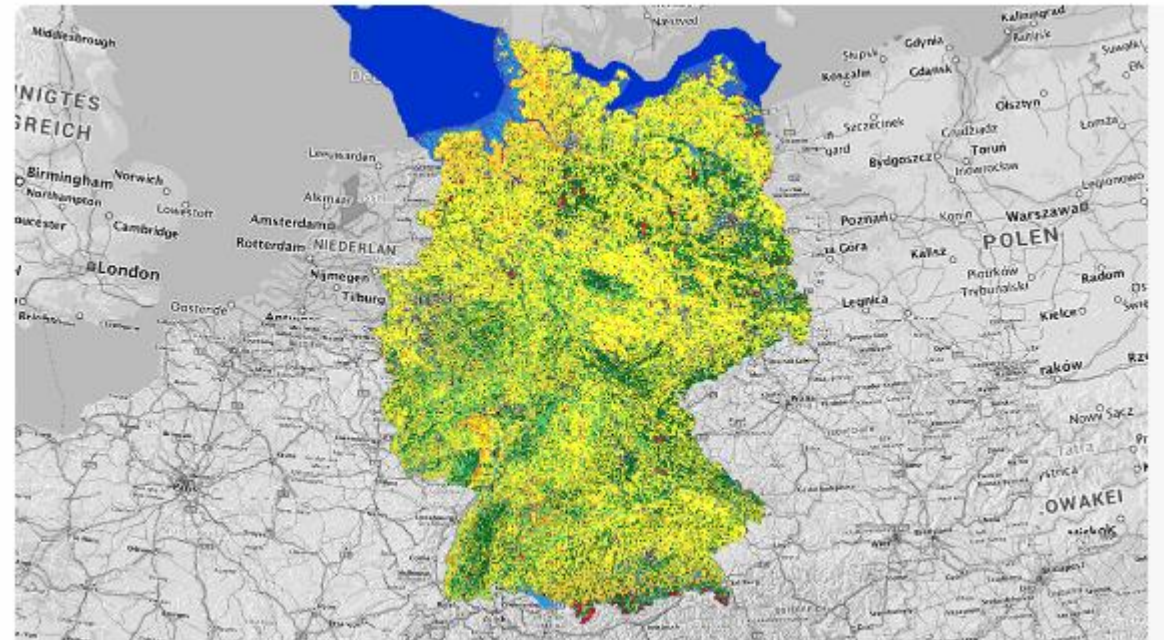
Federal Statistical Office Germany

Session Details:

Thematic sessions - Environmental Accounting

Time: 06/May/2026: 11:45am-1:30pm · Location: Big Hall

<https://oekosystematlas-ugr.destatis.de/>
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Completed and Current Feasibility Studies



Sat4GWR – Satellite and other remote sensing data for the register of buildings and dwellings



Funded by
the European Union

Sat4EC – Satellite-based economic flash estimation



Construction Activity
Automobile Production



Funded by
the European Union

EO4ConStat – Earth Observation data and AI for Construction Statistics

Earth Observation and AI for Construction Statistics (EO4ConStat): Developing an EO-based Approach for Quality Assessment in Building Statistics

Frederik Stellmach¹, Stefan Irrgang², Carola Stolle¹, Maren Köhlmann², Dorothee Stiller³, Michael Wurm³, Thorsten Dahms¹, Michael Hovenbitzer¹

¹Federal Agency for Cartography and Geodesy Germany; ²Federal Statistical Office Germany; ³German Aerospace Center

Sat4GWR - Housing and dwelling register

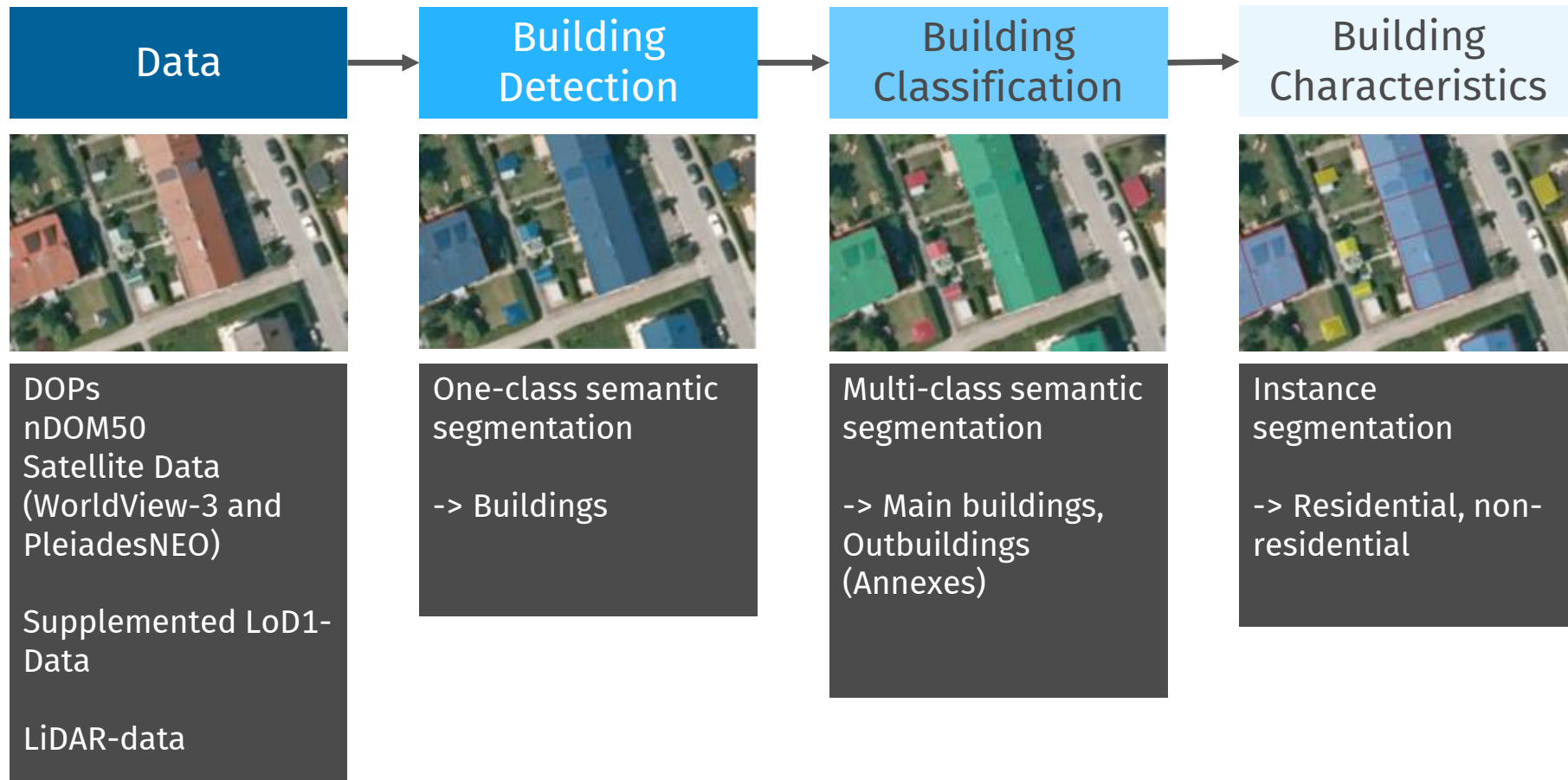



Image Source: Geobasis NRW

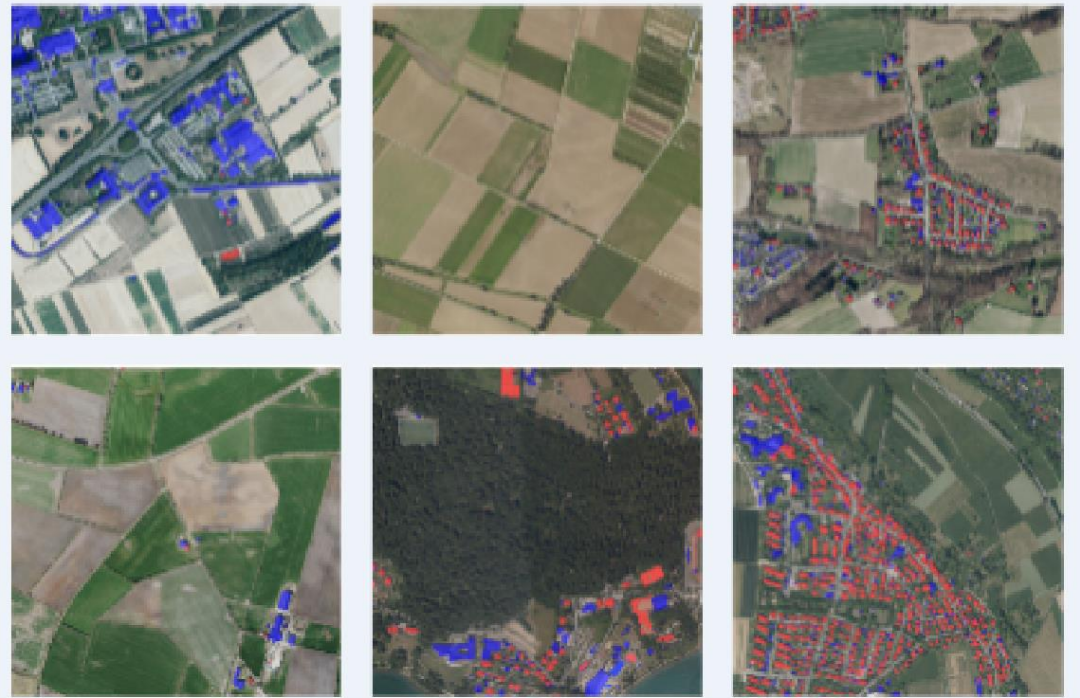
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 Federal Agency for
Cartography and Geodesy

 **DLR**
Deutsches Zentrum
für Luft- und Raumfahrt
German Aerospace Center

Building detection & characteristics

Result of building detection (OA 96%)



 Residential buildings
 Non-residential buildings



Background Map:
© OpenStreetMap Contributors

 Federal Statistical Office Germany

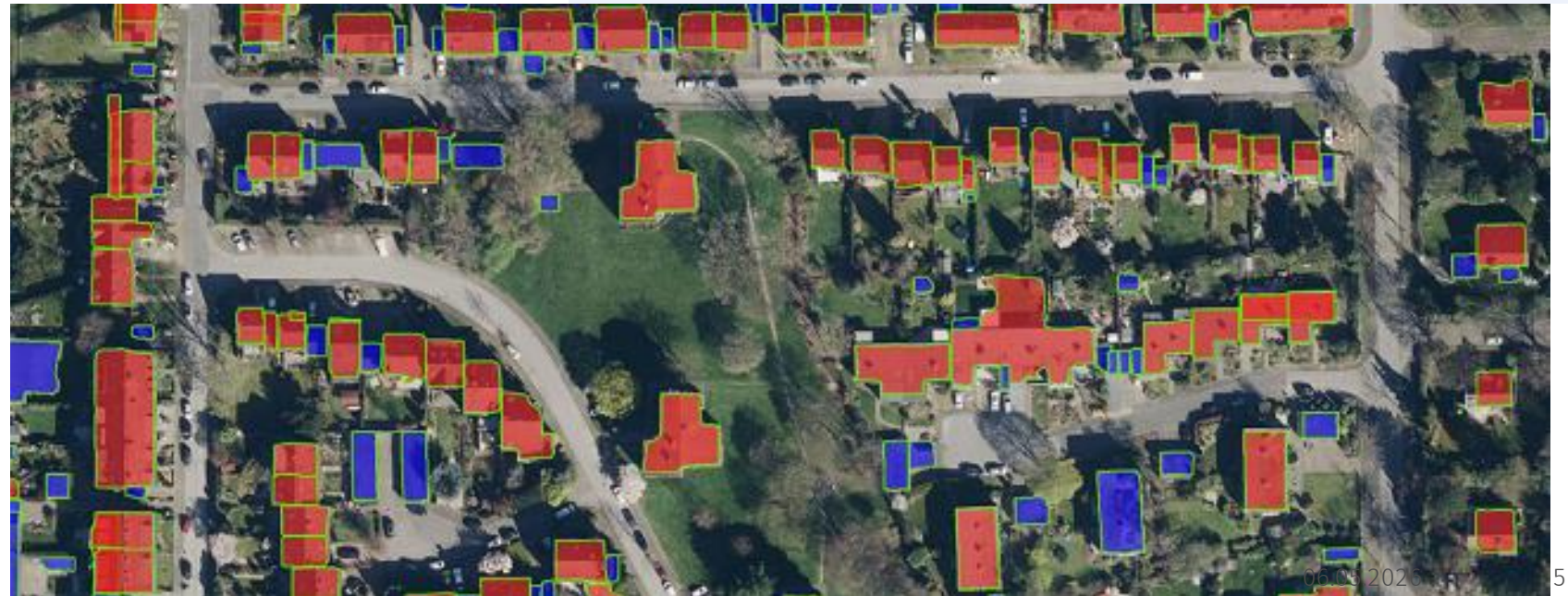
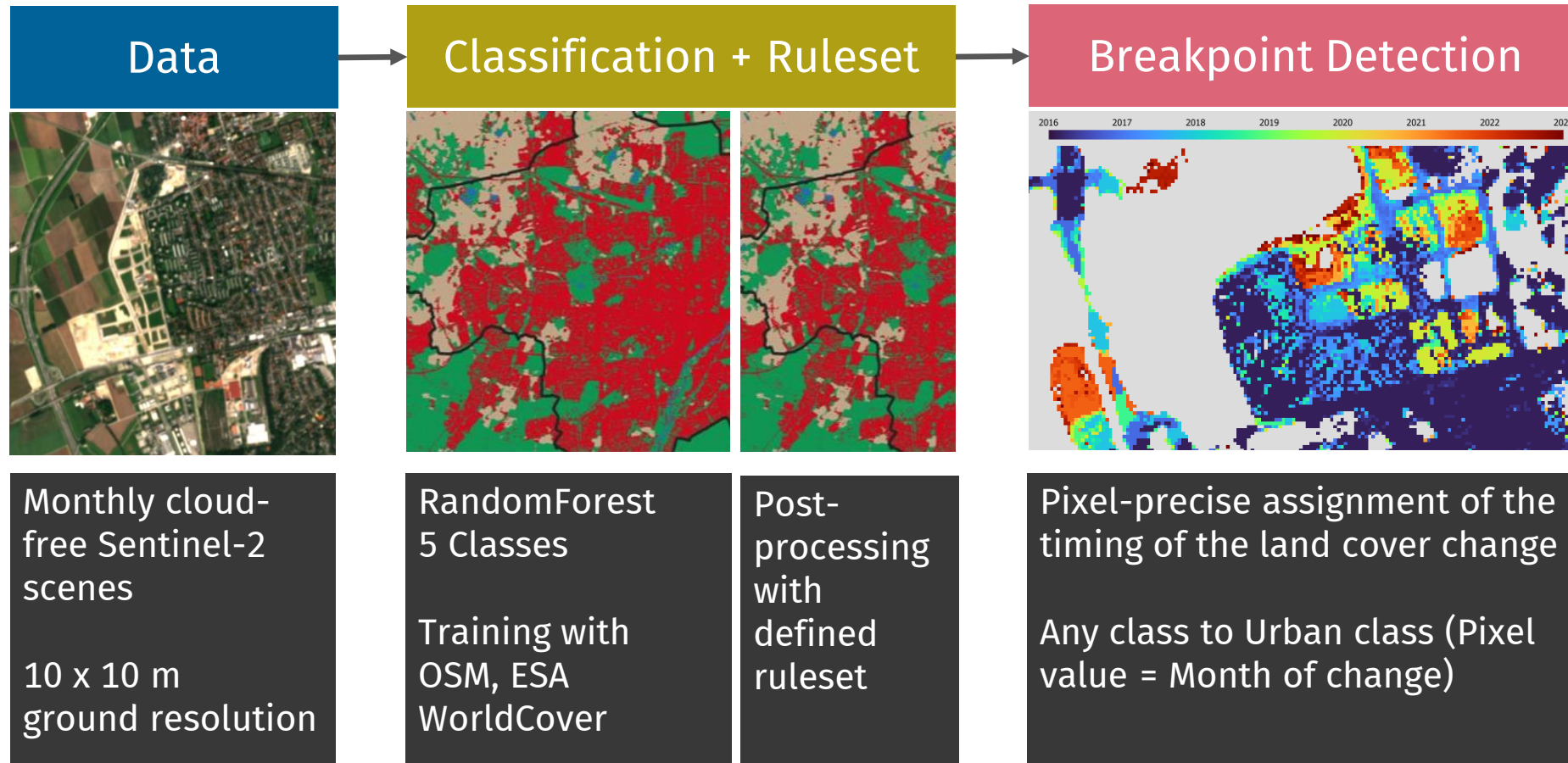


Image Source: Geobasis NRW

Results

- » Comparison to data of *Building and Housing Census*: Accuracy of 82%
- » Establishing the housing and dwelling register has been deprioritized politically
- » Analysis of construction activity (experiment conducted as part of this project)

Construction Activity Indicator



Sources: <https://geoservice.dlr.de/web/maps/sentinel2:l3a:wasp>, Copernicus Sentinel data [2015-2023]


Wurm et al. "Satellite-based fine-grained spatio-temporal monitoring of urban building activities as an indicator of economic development", 2025 Joint Urban Remote Sensing Event (JURSE), Tunis, Tunisia, 2025


EO4ConStat





EO4ConStat – Earth Observation Data and AI for Construction Statistics

Project Members
EO4ConStat


 **BKG**
Wir geben Orientierung.

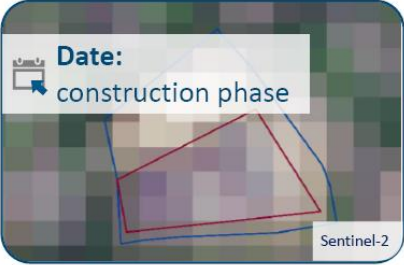
 **STATIS**
Statistisches Bundesamt


 **DLR**


 **Funded by the European Union**

Goal: Develop a methodology for quality assuring German construction statistics


Detect:
Construction sites
 DOPs

Date:
construction phase
 Sentinel-2

Validate:
Location & Time
 Statistics

 Federal Agency for Cartography and Geodesy

Vortragende(r): Titel, 28.04.2026 | Page 4

 **BKG**
Wir geben Orientierung.

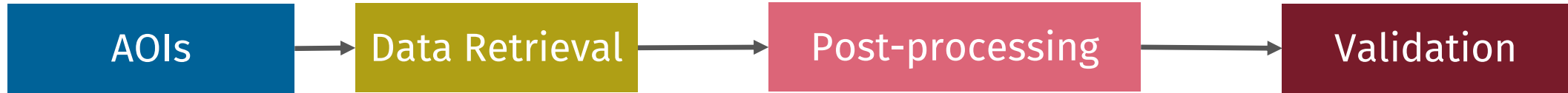


Earth Observation and AI for Construction Statistics (EO4ConStat): Developing an EO-based Approach for Quality Assessment in Building Statistics

Frederik Stellmach¹, Stefan Irrgang², Carola Stolle¹, Maren Köhlmann², Dorothee Stiller³, Michael Wurm³, Thorsten Dahms¹, Michael Hovenbitzer¹

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Automobile Production Indicator



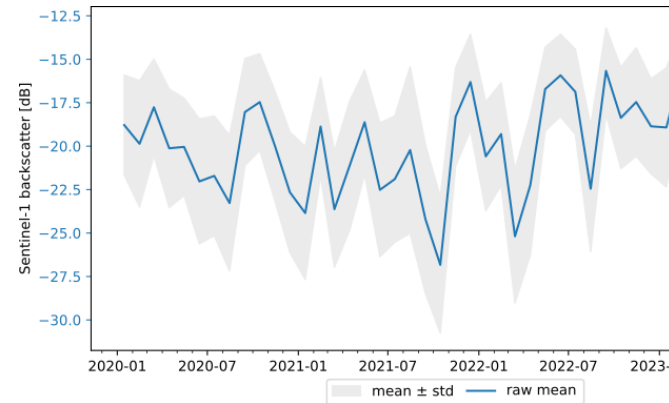
esa Rapid Action for Citizens with EO



Eisenach Location
23.09.2015

AOIs for car production facilities' parking lots

Zonal Statistics via SentinelHub API
Only retrieve the newest data



Monthly mean of Sentinel-1 backscatter
Anomaly detection
Smoothing

Comparison of the backscatter signal with reported car production

Source: Copernicus Sentinel data [2015-2023]

Automobile Production Indicator

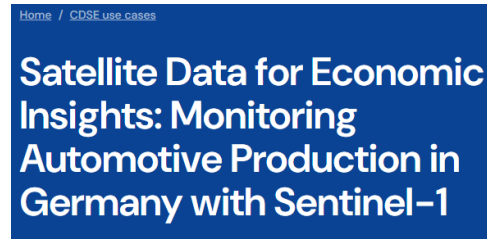
Poster Session 2

Enhancing Macroeconomic Statistics with Sentinel-1: Monitoring Automotive Production in Germany for Timely Economic Indicators

José Manuel Delgado Blasco², Franziska Kraft¹, Sandro Martinis¹, Simon Plank¹

¹German Aerospace Center (DLR), German Remote Sensing Data Center (DFD), Oberpfaffenhofen, Germany; ²European Space Agency (ESA), Φ-lab, Earth Observation Climate Action, Sustainability and Science Department (EOP-S), Frascati, Italy

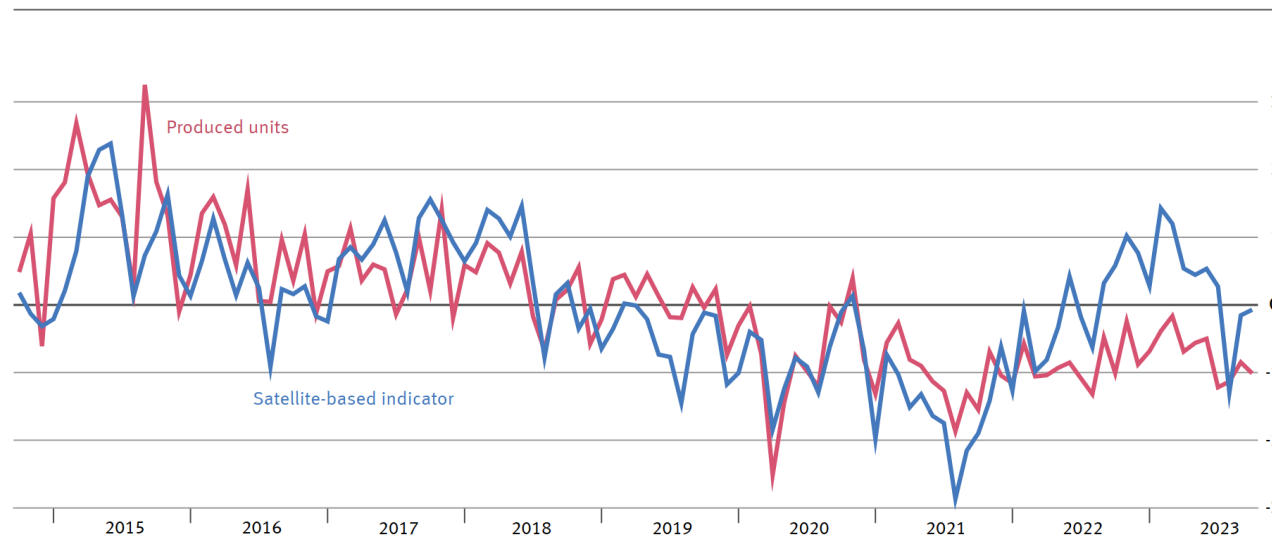
CDSE Use Case



<https://dataspace.copernicus.eu/cases/satellite-data-economic-insights-monitoring-automotive-production-germany-sentinel-1>

Automobile Production Indicator

Monthly time series of satellite-based indicator and produced units (reported) ¹ z-transformed values



[1 Subclasses 29.10.1 Production of passenger cars and passenger car engines, 29.10.2 Production of utility vehicles and utility vehicle engines. Classification of Economic Activities, 2008 edition (WZ 2008).

- » Ready to be published as experimental statistics?
 - » Timely
 - » Low cost production
- » GDP-flash estimate test concluded
 - » No clear positive or negative relationship
 - » Low impact on estimate on selected sites (left)
 - » No impact on estimate using all sites
 - » Other data available

Melanie Brauchler, Maren Köhlmann, Franziska Kraft, Manuel Köberl (2026): Entwicklung von statistischen Wirtschaftsindikatoren unter Verwendung der Copernicus-Sentinel-Satelliten. In "WISTA - Wirtschaft und Statistik", 1/2026

Resources

Sat4GWR

Hennig F., Köhlmann M., Weißmann J., Schepers, M. (2025). **Erforschung von Satelliten- und weiteren Fernerkundungsdaten zur Ermittlung von Gebäudeangaben.** In: WISTA Wirtschaft und Statistik. Edition 4/2025, page 70 ff. URL: <https://www.destatis.de/DE/Methoden/WISTA-Wirtschaft-und-Statistik/2025/04/erforschung-satelliten-fernerkundungsdaten-042025.pdf>

Sat4EC

Brauchler, M., Köhlmann, M., Kraft, F., Köberl, M. (2026). **Entwicklung von statistischen Wirtschaftsindikatoren unter Verwendung der Copernicus-Sentinel-Satelliten.** In: WISTA Wirtschaft und Statistik. Edition 1/2026, page 100 ff. URL: <https://www.destatis.de/DE/Methoden/WISTA-Wirtschaft-und-Statistik/2026/01/entwicklung-wirtschaftsindikatoren-copernicus-sentinel-satelliten-012026.pdf>

Kraft, F., Martinis, S., Krullikowski, C., Plank, S., Anghilea, A., Delgado Blasco, J. M., Schönenberger, K., Köhlmann, M. & Brauchler, M. (2025). **Satellite Data for Economic Insights: Towards Tracking Automotive Production in Germany With Sentinel-1 for Economic Nowcasting.** In: IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing. Edition 18/2025. <https://doi.org/10.1109/JSTARS.2025.3601351>

Wurm, M., Köberl, M., Cevallos, M., Köhlmann, M., Brauchler, M., Schumann, C. & Taubenböck, H. (2025). **"Satellite-based fine-grained spatio-temporal monitoring of urban building activities as an indicator of economic development"**, 2025 Joint Urban Remote Sensing Event (JURSE), Tunis, Tunisia, 2025

Construction Statistics

Schumann, C., Schepers, M., Weigert, A. (2025). **Digitalisierungspotenzial in der Bautätigkeitsstatistik.** In: WISTA Wirtschaft und Statistik. Ausgabe 3/2025, Seite 74 ff. URL: <https://www.destatis.de/DE/Methoden/WISTA-Wirtschaft-und-Statistik/2025/03/digitalisierungspotential-bautaeigkeitsstatistik-032025.html>

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