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esa

GAUSS

GENERATING ADVANCED USAGE OF EARTH OBSERVATION FOR SMART STATISTICS

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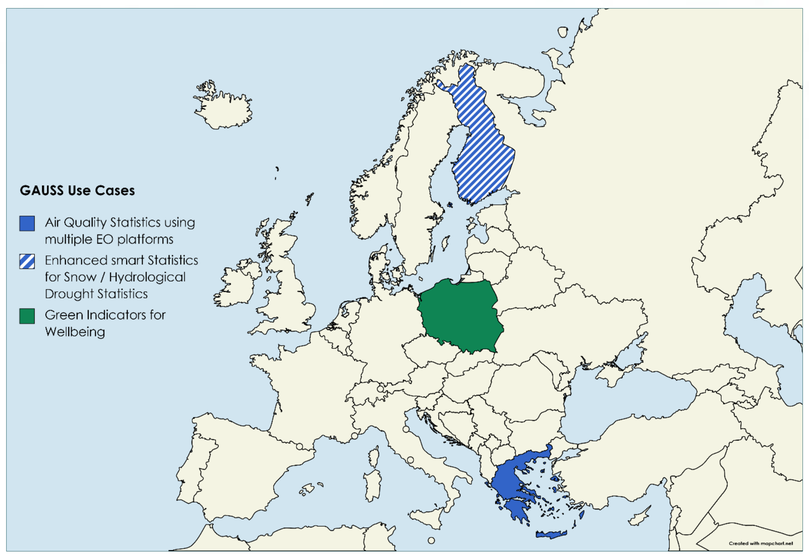
eo4smartstats.com

GAUSS project, bringing EO and Statistics closer

In recent years the concept of "Smart Statistics", which can be viewed as the future extended role of official statistics, has received heightened focus. Traditional data sources (survey and administrative data) are complemented by information from sensors (such as satellite imaging and a host of environmental sensors), smartphones (including GPS), behavioral data (e.g. data from online searches, online activity, financial or otherwise) or even social applications data (comments on social media, etc.). These data, cumulative acknowledged as Big Data, can provide entirely new insights into social and economic trends to drive public policy making.

Earth Observation (EO) can constitute an important component of smart statistics, being a subset of Big Data. Organisations such as the United Nations Statistical office (UNSTAT), the European Statistical Office (Eurostat, e.g. through the ESSNet Big Data II project with explicit EO activities) as well as many national statistical institutes/offices (NSIs/NSOs) and supporting organisations are currently seeking to incorporate satellite imagery and other EO data sources (such as models and in situ platforms) into their operational workflows. The SDG framework is of particular interest providing a common ground for exemplifying such interactions as the SDG Goals and indicators are pursued both from the Statistics and EO communities.



Oct. 2021: Answering ESA's ITT on "EO for Smart Statistics", GAUSS kicks-off. For the next 18 months, 4 Use Cases will be implemented in the domains of Air Quality, Snow, Drought and Green Indicators for Natural Capital. The project is led by the National Observatory of Athens (NOA) working together with FMI (Finnish Meteorological Institute), IGiK (Institute of Geodesy and Cartography of Poland) and Evenflow (a Brussels SME).

Main objectives

demonstrate how EO can help meet key reporting needs of National Statistical Organizations (ELSTAT, SYKE/Statistics Finland, Statistics Poland)

showcase the added value EO brings in current or new workflows

support SDG Indicators 11.6.2, 6.5.1, 6.6.1, 11.7.1

elaborate a future roadmap with recommendations for further integration of EO into Smart Statistics addressing technical, operational and regulatory barriers to increased adoption of such products in official statistic

pursue the EO and Statistics convergence further through an Advisory Board comprised of key statistical agencies and align with relative international initiatives such as the EO4SDG

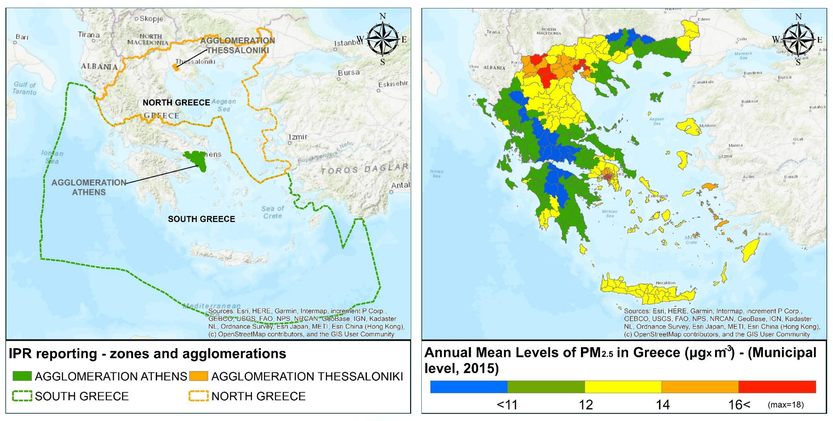
Stakeholder Ecosystem

Statistics Poland
Statistics Finland
SYKE
eurostat

continuous engagement through Advisory Board, dedicated stakeholder workshops on user needs, use case implementation as well as communication/networking events (e.g. DGINS 2021 Conference on the topic of "Earth observation (EO) for official statistics"

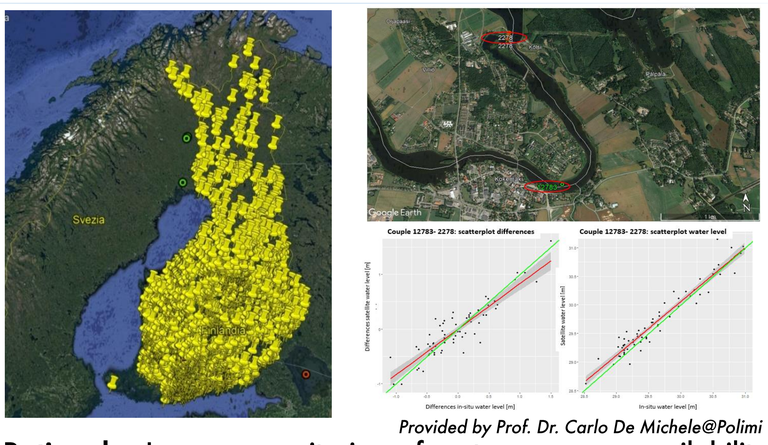
Use Cases, rationale, added value and SDG link

Air Quality Statistics using multiple EO platforms



Rationale: Utilize a variety of EO platforms (CAMS Regional Ensemble Reanalysis, in-situ low cost PM2.5 sensors, columnar NO_2 from Sentinel-5p) on top of the current regulatory AQ network to produce the IPR reports of the Air Quality Directive.
Added value: Increased spatial resolution compared to the current bulk levels, improved characterization of under-monitored areas, identification of AQ hot-spots.
SDG: Improved estimation of SDG Indicator 11.6.2 "Annual mean levels of fine particulate matter (e.g. PM2.5) in cities (population weighted)" especially within urban areas.
Contact: E. Gerasopoulos – egera@noa.gr

Enhanced Smart Statistics for Drought

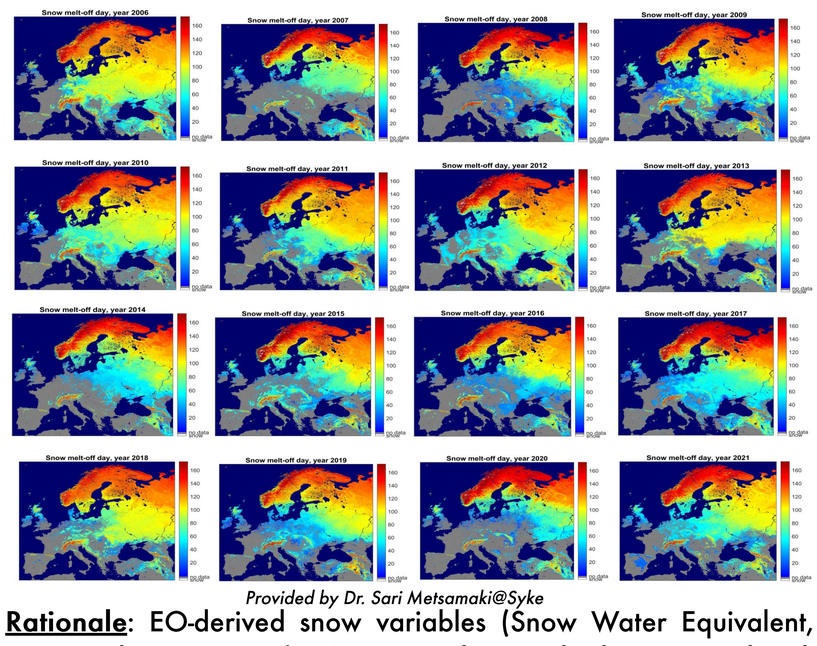


Provided by Prof. Dr. Carlo De Michele@Polimi

Rationale: Improve monitoring of water resource availability by defining a drought index regarding water level variation in time using Satellite Altimetric data (Sentinel 3A& 3B, Jason 2/3) and comparing with national in-situ stations.
Added value: Improved capacity of quantifying rivers or lakes status and managing surface water resources at country scale.
SDG: Contributions to Goal 6 on Indicators 6.5.1 "Degree of integrated water resources management implementation" and 6.6.1 "Change in the extent of water-related ecosystems over time". *Contact: AN Arslan - ali.nadir.arslan@fmi.fi*

Enhanced Smart Statistics for Snow

Snow melt-off day maps between 2006-2021



Provided by Dr. Sari Metsamaki@Syke

Rationale: EO-derived snow variables (Snow Water Equivalent, Fractional Snow Cover), ERA5 reanalysis and other snow related-climate indices are compared to in-situ measurements and in-situ-based modelling to bring forward the value of Earth Observation in producing snow statistics.
Added value: Accuracy assessment and improvement of the current snow-related statistics and generation of new statistics better serving a wide user base (e.g. energy, tourism, building damage). Better forecasts for the water state at a nationwide level.
SDG: Contributes to Goal 2 as snow and snow melt are critical for agriculture, SDG Indicators 6.5.1and 6.6.1, Goal 7- regarding hydropower, Goal 11 with more accurate weather and road weather forecasts. *Contact: AN Arslan - ali.nadir.arslan@fmi.fi*

Green Indicators for Natural Capital

Rationale: EO data utilization to assess the extent and quality of green areas for information on natural capital statistics and human well-being. Transferability assessment of the other Use Cases.
Added value: Improved quality and timeliness of regional wellbeing statistics at commune level, homogenized across Poland.
SDG: Provision of more accurate and accessible data of green spaces for SDG Indicator 11.7.1 "Open spaces in cities (the average share of the built-up area of cities that is open space for public use for all, by sex and persons with disabilities".
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The way forward

Oct. 2021, adoption of "**Warsaw Memorandum**":
...make extensive use of EO data in official statistics
...relevance of EO for monitoring and reporting of SDG indicators
...European strategy for using EO in different statistical domains
...cooperation between the European Statistical System and the EO community

The **GAUSS project** will help drive the discussion partly through the Use Cases, using these to reach out to further stakeholders. Feedback from all stakeholders will be used to define a **roadmap** for future adoption to EO by statistical agencies, including pathways to address identified **technical, legal and structural** barriers. Please **contact us** if you would like to support the development of this roadmap.

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