

Swedish GMES collaboration

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Introduction

Earth observation (EO) is of central importance to monitor status and changes of different Earth system components and to enable sustainable development. Many of the threats to environment and security are not confined to national administrative boundaries. Taking climate change as an example of a paramount global challenge, systematic observations of the Earth are essential prerequisites to advance our understanding of the physical science basis of climate change and variability, to develop our capacity to make climate predictions, and, to allow for an effective response to climate change through mitigation and adaptation, underpinning the work of the Global Climate Observing System (GCOS) and the UNFCCC. EO is also at the heart of any services for environment and security such as the GMES initiative, the Global Earth Observation System of Systems (GEOSS) or the Global Framework for Climate Services (GFCSS) proposed in the final declaration of the World Climate Conference-3 (WCC3).

Problems due to overexploitation of environmental resources, climate change and natural and man-made disasters are increasing. In order to strengthen society's ability to respond, operational EO and EO-based services for environment and security are essential assets with GMES as a major European catalyst. In addition to many efforts and close cooperation at the international level, implementing GMES and utilising its benefits requires a close collaboration also at the national level. This presentation provides examples of activities within the Swedish GMES community. It includes the example of an end-to-end air quality pilot service, examples on cooperation on remote sensing, GMES and GEOSS as well as on spatial data infrastructure, standards and interoperability and, finally, a Swedish success story along the road towards full and open access to environmental data.

GASLINK – An end-to-end air quality service example

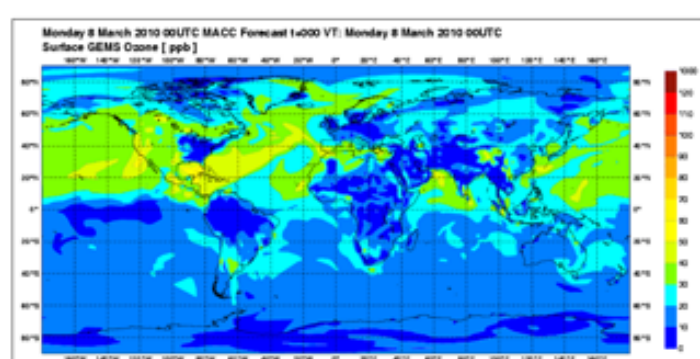
The Global Monitoring for Environment and Security (GMES) programme is specifically committed to bring data, information and services based on remote sensing and in-situ observation capacities to the citizens of Europe. In the atmospheric domain, the FP7 project MACC (Monitoring Atmospheric Composition and Climate), taking stock of its precursors GEMS and PROMOTE, is implementing the GMES Atmosphere Core Service, bringing operational online air quality data and forecasts to the European community. In the MACC regional air quality cluster, a selection of state-of-the-art air quality models is used to deliver ensemble air quality forecasts and atmospheric composition information at the European geographical scale. Sweden contributes to the MACC regional cluster with the SMHI MATCH (Multiple-scale Atmospheric Transport and CHemistry) model. ECMWF meteorological forecasts and GMES satellite observations are used as input for the downscaled air quality forecasts for Europe.

The Stockholm-Uppsala Air quality Management Association manages the effects of air pollutants in the Stockholm-Uppsala Metropolitan area. The association contracts Stockholm Air Quality and Noise Analysis (SLB), part of Stockholm municipality, to do the operational air quality work of which air quality forecasts is one of the tasks.

Funded by the Swedish National Space Board, the project GASLINK will build an end-to-end service chain, linking the GMES Atmosphere Core Service (GAS) to the Stockholm Air Quality Service and a downstream facility for the production of air-quality forecasts at the urban scale.

Expected results: Operational 2-days air quality forecasts on the European scale, simulated by the MATCH photochemistry model with data assimilation of in-situ and satellite data and later downscaled over Stockholm-Uppsala region to a horizontal resolution of 1 or 2 km, using official emission databases of the Stockholm-Uppsala air quality community (SULFV). The project will also set up a mechanism for on demand re-analysis with the nested model system and allow for the use of alternative emission scenarios.

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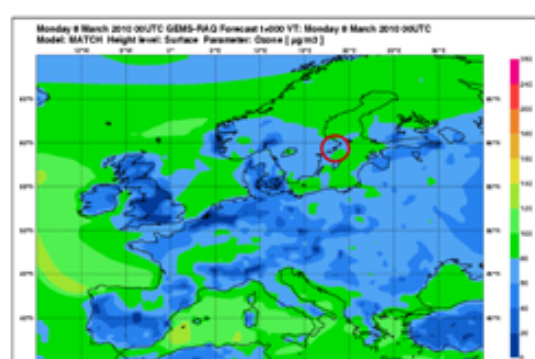


GMES
Atmosphere Core Service

Scientific questions:

Is the added value of remote sensing data traceable down to the local scale?

Performance of ensemble vs individual member?



GASLINK
Downstream Service



Earth observation, GMES, GEOSS and INSPIRE

GMES and GEOSS, including its climate component GCOS, show many interesting communalities. By nature, these initiatives are dependant on sustainable EO infrastructure and sustainable exchange, processing and dissemination capacities. In addition, they also depend on spatial data infrastructure, standards and interoperability, allowing for the cross-border, cross-system and cross-domain integration of EO to deliver consistent and interoperable data and information services. The latter is especially important in the light of the multitude of scattered stakeholders and often fragmented assets, which need to be successfully integrated to achieve the initiatives' ambitious objectives. Full and open access to data, i.e. GEOSS data sharing principles, is a key facilitator of progress along that path.

Thus, cooperation at the global, European and national level is an important prerequisite. In that context, nine Swedish governmental agencies together with other stakeholders are currently investigating future forms for an intensified Swedish cooperation on remote sensing, including initiatives such as GMES and GEOSS. The project is led by the Swedish National Space Board on behalf of the Swedish government and will also take into account requirements arising from a coherent climate change and energy policy proposed by the Swedish government.



Regarding geodata, spatial data infrastructure and interoperability, Swedish governmental agencies cooperate through the Geodata Advisory Board, consisting of 11 members from public authorities and organisations. Chaired by the Swedish mapping, cadastral and land registration authority ("Lantmäteriet"), the Geodata Advisory Board works on the formulation and implementation of the Swedish National Geodata Strategy, which in turn aims at increasing co-operation within the geodata sector, contributing to the development of Swedish e-governance, supporting the development of the private sector, allowing for fast adaptation to new pre-requisites and representing a cornerstone for the implementation of the INSPIRE directive. Read more: <http://www.geodata.se/en/>

SACCESS – A success-story along the winding road towards full and open access



The Swedish national satellite database SACCESS helps to study changes in the Swedish landscape and environment over the past three decades. While Lantmäteriet's running costs are normally covered by user fees, for SACCESS a consortium is meeting them instead. The consortium currently consists of the Environmental Protection Agency, Swedish National Space Board, Swedish Forest Agency, Swedish University of Agricultural Sciences and the companies Holm Skog, Vattenfall and Svea Skog. This means that data can be provided free of charge to all SACCESS users.

Read more: <http://saccess.lantmateriet.se/>

Conclusions

Ultimately, the success of GMES depends on the uptake of its services by a broad spectrum of users. Complementing the core service suite with downstream services tailored to specific user communities' needs is crucial. The Swedish project GASLINK sketched in this presentation is an example of an end-to-end service in the domain of air quality, building a downstream capacity on top of the GMES Atmosphere Service.

Cooperation at different levels is a prerequisite for the successful implementation of GMES and the full exploitation of its benefits as well as for realizing the GEOSS. Spatial data infrastructure, standards and interoperability are key pillars for flexible and scalable services in the domain of environment and security, underlining in turn the importance of the INSPIRE initiative. In complementation to the work of the Swedish geodata community, there is a growing cooperation in the fields of EO, GMES and GEOSS with a view to strengthen society's ability to respond to environmental problems such as climate change and natural and man-made disasters.

References

GMES: <http://www.gmes.info/>
GMES Atmosphere Core Service: <http://www.gmes-atmosphere.eu/>
GEOSS: <http://www.earthobservations.org/>
GCOS: <http://www.wmo.int/gcos/>
INSPIRE: <http://inspire.jrc.ec.europa.eu/>