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The relevance and use of atmospheric data access for the geospatial user community (ADAGUC)

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Abstract: The atmospheric and geospatial communities are still separate worlds with their own tools and data formats. It is extremely difficult to easily share data among scientists representing these communities without performing some cumbersome conversions. ADAGUC aims to reduce the need for scientists to invent their own converter tools. Selected space borne atmospheric datasets will be made accessible to a GIS system in order to be submitted to data comparison, resampling, selection, manipulation and visualization. The user community will be intensively involved in the project to obtain a high fitness for use. The first ADAGUC workshop (Oct 2006) was attended by a large group of users from both the atmospheric and GIS community and resulted in a better understanding of user needs that are currently translated into specifications for the user requirements document of ADAGUC. The deliverables of this project are: Open Source conversion tools, selected atmospheric datasets in a GIS-friendly format and a web service to demonstrate the usability of the above to the geospatial and atmospheric community.

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The Relevance and Use of Atmospheric Data Access for the Geospatial User Community (ADAGUC)

Michael E. Schaepman, Marc Hoogerwerf; John van de Vegte; Frans van der Wel; Wim Som de Cerff; Richard van Hees; Pepijn Veeffkind; Ronald van der A; Richard de Jeu; Ben Domenico; Stefano Nativi; Olga Wilhelmi

Introduction

Having the advent of increasing data dissemination potential through Spatial Data Infrastructures (SDI), clearinghouses, and related web-portals, the atmospheric and geospatial communities currently remain separate worlds in terms of data accessibility.

We develop Open Source conversion tools for atmospheric data, selected atmospheric datasets in a exchangeable format and provide a standardized web service to demonstrate the usability of the above to the geospatial and atmospheric communities.

Method

In a user consultancy workshop, we have defined 4 relevant user communities needing flexible and reliable access to atmospheric data:

Policy Makers – are interested in Level 3/4 products, maps, archived for easy access. Many national and international stakeholders provide atmospheric data to their governments that deal with social and political impact of climate change.

Earth System Scientists and Atmospheric Scientists – are interested in Level 2/3 data, both archived and real-time. The atmospheric users are particularly interested in fast tracers like aerosols, and trace gases like NO₂ and SO₂.

GIS Users – are interested in Level 2/3 data, including archived access. GIS users are characterized as being non-experts in the field of atmospheric research, their focus is more on earthbound features and earth-atmosphere interactions.

Risk assessment community – is interested in mapped Level 2/3 data, preferably in (near)-real time. These users are interested in products at an urban scale that are focused on industrial calamities, like gas leakage or chemical fires. Combinations with other data sources provides input to crisis information teams.

We provide 5 exemplary use cases for these communities as follows, where two are presented here:

Local daily monitoring of air quality – no example given

NO₂ Map for Europe – In this use case it is described how from the OMI Level 2 NO₂ data a map of the yearly averaged tropospheric NO₂ over Europe is constructed (see Example 1).

Improved Space Estimates of NOx deposition – Develop a methodology that integrates remote-sensing products and atmospheric chemistry models to improve quantification of reactive nitrogen deposition on ecosystems through a prototype data-assimilation system of NOx and dis-aggregation of large scale space measurements to the ecosystem scale. Validate the product against observations in two contrasting settings (see Example 2).

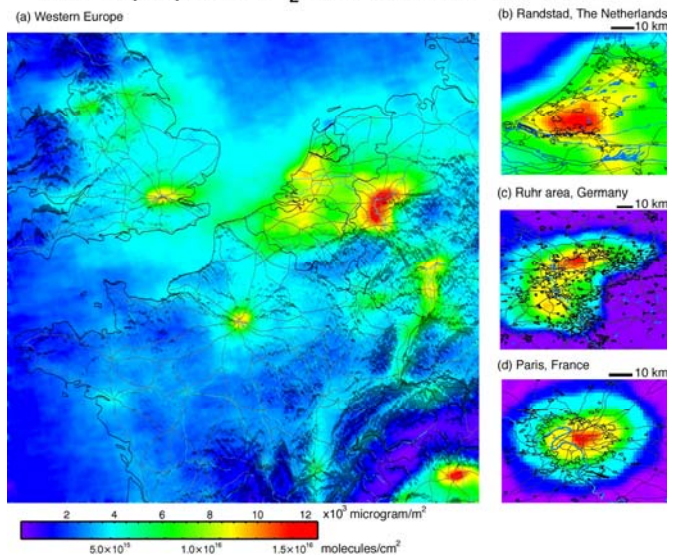
Improving the Performance of River Basin Simulation Models with ADAGUC data – no example given

5) Weather alert: Heavy Snow and Icy rain – no example given

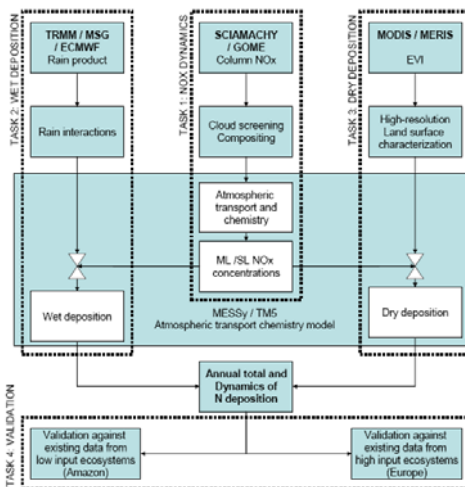
First Results

NO₂ Map for Europe

OMI Tropospheric NO₂, Dec 2004 until Nov 2005



Improved Space Estimates of NOx deposition (Scheme)



Conclusions

First results demonstrate that structured access to atmospheric data significantly increases their use and contributes to the development of advanced applications for various stakeholders. A portal for data dissemination will be set up in a following step for user community wide access.

Abstract for 10th Intl. Symposium on Physical Measurements and Signatures in Remote Sensing

Theme: Data fusion approaches based on multi-platform or multiple sensor techniques

The relevance and use of Atmospheric Data Access for the Geospatial User Community (ADAGUC)

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