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Bridging the Gap between the Atmospheric and Geospatial Communities using Web Services and GIS

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Many tools and data formats exist for atmospherical data. To disseminate this wealth of information to the geospatial communities is very cumbersome: in general the geospatial communities use other data formats and they use GIS for their analyses. Therefore, time-consuming and inefficient conversions are needed to use atmospherical data. Within the ADAGUC project (Atmospheric Data Access for the Geospatial User Community) we provide selected space borne atmospheric and land datasets using web services that can be used for data comparison, resampling, selection, manipulation and visualization in GIS. The user community is intensively involved in the project and the project has strong links with the INSPIRE directive of the EU. In this paper we focus on the GIS aspects of the project.

GIS is used throughout the project during preprocessing of the data from lower to higher level products and after provision of the data: the ADAGUC infrastructure enables the geospatial community to directly access atmospheric datasets for use in their GIS Tools. On the conference we will present the use of GIS in several use cases. 1) The preprocessing and analysis of NO_2 (air quality) maps for both Europe and South Africa, where in the past especially the South African users experienced problems because the datasets were in “exotic” data formats. 2) Analysis of global methane patterns where GIS is used to correlate the observed patterns to environmental factors on global scale. 3) The provision of meteorological information during calamities to the general public by dynamic maps on Internet and to the professional users like police, fire departments and traffic information centers as GIS compatible data.

In the project we use ESA's PSS-05 Lite standard for software development. During phase 1 (use case definition) and 2 (user requirements definition) we consulted the user communities (policy makers, atmospheric scientists, GIS users and the risk assessment community) about their needs. Several atmospheric data products from GOME, SCIAMACHY and OMI (NO_2, CH_4, cloud fraction) and weather model products (precipitation, wind, boundary layer height) were identified. These data products should be delivered on a high processing level: gridded and reanalyzed data (level 3/4) as HDF-5, GeoTIFF, ESRI Grid, ESRI Shapefile and GML. The user communities also indicated that they need an easy to use online viewing tool including access by Google Earth (KML). The platforms they use for further processing of the data range from ESRI ArcGIS to IDL-iTools, QGIS, IDL-Envi, Matlab and IDRISI.

To provide the atmospheric datasets we developed an infrastructure based on OGC compliant web services: Web Mapping Services (WMS) for online visualization, Web Feature Services (WFS) for downloading vector data and Web Coverage Services (WCS) for downloading raster data.