

Use of GEONETCast for Water and Food Security Analysis in Africa

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Ben Maathuis¹

Abstract:

There is a growing availability of earth observation data and derived products for use in water and food security professional practice and research. The GEONETCast data dissemination system, operated by EUMETSAT and international partners, is an example of such a global near real time data dissemination system. This high volume data stream is particularly useful for monitoring the African weather and climate, as well as the conditions and state of the land surface and oceans. The high temporal resolution of Meteosat Second Generation, combined with its open access and easy availability across Africa using a DVB-S based reception mode (without the need for internet connectivity), makes this system and data very appropriate to develop applications for water and food security.

During the last couple of years free and open source software utilities have been developed to utilize environmental data disseminated through GEONETCast. This resulted in the development of the GEONETCast Toolbox as open source software plug-in for ILWIS Open. It enables direct import and management of the GEONETCast data stream and supports their subsequent processing using ILWIS or other geospatial analysis systems. The software design principles of the toolbox were an easy operability, open source freeware software components and an interface, adaptable by the users to their own selected data stream, data analysis, processing needs and information dissemination requirements. These capabilities have been introduced to various collaborating partners in Africa and Latin America.

Given the diverse content of the GEONETCast data stream it was decided to develop more dedicated toolboxes for the more operational focused users, examples are the AMESD-SADC Toolbox and the Water and Food Security – Ethiopia (WFS-E) Toolbox, allowing easy integration of the relevant data, retrieved for the SADC region and Ethiopia respectively, into a GIS for visualization and further analysis. Export routines for further dedicated processing are under development, like for subsequent use of the data in 'Livelihood, Early Assessment and Protection' (LEAP) in the case of Ethiopia or using the 'Software for the Processing and Interpretation of Remotely sensed Image Time Series' (SPIRITS) for further time series analysis. Also routines, through a collaborative effort with the National Meteorological Agency of Ethiopia, have been developed to ingest the Meteorological Data Dissemination (MDD) Service, delivered as a restricted service to the national meteorological agencies, for operational weather forecasting activities. Currently a new toolbox, the CMACast toolbox, is under development allowing users from south-east Asia to utilize the data disseminated over this part of the globe.

¹ Assistant Professor, Department of Water Resources, Faculty ITC, University of Twente, The Netherlands, 52North Earth Observation Community lead (email: maathuis@itc.nl)

Next to these GEONETCast data stream related toolboxes another toolbox has been developed allowing easy ingestion of various environmental (time series) data resources currently freely available from the internet, related to *in situ* climatological observations, gauge and satellite derived rainfall estimates, weather and pressure forecasts, potential evapotranspiration, normalized difference vegetation indices, elevation information, etc. The “*In Situ* and Online Data” (ISOD) Toolbox can be utilized to easily acquire and process archived data to be used in conjunction with near real-time information disseminated by GEONETCast.

Furthermore a Web Processing Server (WPS) and a low cost Network Attached Storage (NAS) has been established to facilitate extraction of (time series of) environmental information based upon user request. For this purpose ILWIS functionality has been upgraded to act both at the server and at the client side. A client based ILWIS processing request can be submitted to the ILWIS based WPS and the resulting output map(s), based on the routine selected or algorithm provided, is subsequently delivered to the client.

Together with collaborating African partners, potential areas for future training and research partnership programs have been identified and possibilities are explored to secure additional support towards strengthening capacity for remote sensing data acquisition, processing, interpretation and application development. Materials already developed are provided online through ITC portals. Software developed is made available by collaboration within the 52North.org community, through the recently established Earth Observation Community.

The presentation elaborates further on the role of the GEONETCast system, the various software utilities developed, how these are used to strengthen the RS-GIS capacity with a focus on Africa and presents the current achievements into more detail as well as the future outlook.