



## TOWARDS GEO-GOVERNANCE

GEONETCast, the open source, low cost  
global environmental information delivery system

GEONETCast is a global network of satellite based data dissemination systems providing environmental data world-wide.

The current partners within the GEONETCast initiative are NOAA, WMO, EUMETSAT and CMA. Data provided by FengYunCast that utilises the AsiaSat 4 satellite beam to broadcast data and products to the Asia Pacific region is expected to be on-line at the time of the meeting.

### Geo-Governance: Data for sound decision making

GeonetCast provides global environmental data that can be used as a basis for sound decision-making in areas as

- public health
- agriculture
- water
- natural disasters
- energy
- weather
- climate
- ecosystems.

### Low cost

GeonetCast is user-driven and user-friendly.

It is independent from ground-based telecommunication infrastructures. It is low cost because it only requires a standard C-band parabolic satellite receiver (used for television) and standard PC's.

Short Course UT-ITC on

### GEONETCast – Toolbox, Open Source utility for online geo-observation with satellites

**Date : Monday 28 June – Tuesday 29 June 2010**

**Place: LabMath-Indonesia, Lawangwangi Bandung**

(Jl. Dago Giri 99, Warung Caringin, Mekarwangi)

**GeonetCast-Toolbox** is developed as a plug-in of ILWIS version 3.7 (open source). The toolbox offers utilities to make it easy to import various satellite and environmental data / products that are disseminated via GEONETCast, into a common GIS environment.

See for more information:

<http://www.itc.nl/GEONETCast-General-information>

In this Short Course the developers of the toolbox, experienced staff of ITC, will discuss the required hardware, the installation process and will illustrate the way how to retrieve online data such as precipitation, evapotranspiration, etc., and how to handle stored data for various applications. If already available, on-line data of the FengYun satellites for the Indonesian region will be retrieved.

### Lecturers

Dr. Chris Mannaerts, Dr. Tom Rientjes,  
University of Twente - ITC

### Participation

The Short Course is intended for people who are interested in earth-observation with satellites, either with the aim for scientific research as well as for staff from decision making institutions, such as ministries, governmental institutions and local government who are involved in:

- weather data for agricultural purposes
- operational flood forecasting
- observation of land-use, fires and coastal waters
- regional planning
- disaster assessment.

The number of participants is restricted to 75, including 30 participants who will be selected for the consecutive 5-day Training and Research WorkShop. Selection for participation in this Short Course is based on previous education and relevance for study or employment tasks and motivation.

Fee: 2.000.000 Rp to be paid at on-site registration. For qualified applicants who will be selected for the consecutive TRWS, and who cannot get financial support for their participation, (part of) the fee may be waived.

### Registration, organization and further information

Registration should be done on-line at [www.labmath-indonesia.org/Events](http://www.labmath-indonesia.org/Events) before 1 June 2010.

Further information can be obtained from the organizing institute

LabMath-Indonesia, [www.labmath-indonesia.org](http://www.labmath-indonesia.org)

phone: +62 22 250 4065

email: [international@labmath-indonesia.org](mailto:international@labmath-indonesia.org) or to Meli Fitriani [mei\\_melyfs@yahoo.com](mailto:mei_melyfs@yahoo.com)

### Supporting organizations:

UNIVERSITY OF TWENTE.



UNIVERSITY OF TWENTE.



## Training and Research Workshop

### Satellite based Water Balance Computation and Modelling

**Date : Wednesday 30 June – Sunday 4 July 2010**

**Place: LabMath-Indonesia, Lawangwangi Bandung**

(Jl. Dago Giri 99, Warung Caringin, Mekarwangi)

Following the 2-day Short Course on the GeonetCast-Toolbox, this 5-day workshop is aimed to give practical training and to give a glimpse of the modelling that is behind the translation of satellite data into useful information about precipitation, evapotranspiration and prediction of floods and droughts.

The format of the workshop will be to stimulate the use of satellite data in a critical and reliable way. The workshop requires active participation in projects that will be prepared and supervised by the lecturers. Each project will be executed by a group of 4 to 5 people; required background knowledge will be given intertwined with the execution during the evolution of the project.

To emphasize the applicability and to stimulate a critical attitude, some projects will concentrate on applications while some projects will focus on research aspects. The applications will use the GeonetCast software to obtain precipitation and evapotranspiration data for specific regions. The research projects will investigate critically the modelling that is behind the satellite data. Related questions are about the validity by comparison with in-situ data and the use of satellite data in hydrological modelling.

For each of the following topics there will be an application and/or a research project:

- Evapotranspiration
- Precipitation
- Hydrological modelling
- Drying of peatland

The projects are described in more detail at the right.

### Participation:

The workshop is intended for people who are interested in earth-observation with satellites, either with the aim for scientific research as well as for staff from ministries, governmental institutions and local government who are responsible for decision making on:

weather prediction for agricultural purposes,  
prediction of floods and droughts.

The number of participants is limited to 30, and the participants should have attended the preceding Short Course.

Participation for this workshop is highly selective and based on educational performance and motivation; S1, S2 and S3 students with good performance are most welcome to apply, despite different level of knowledge.

Fee: 3.000.000 Rp.

For qualified applicants who cannot get financial support for their participation, (part of) the fee may be waived.

### Lecturers

Prof. Hidayat Pawitan, Dr. S.K. Saptomo

*Institut Pertanian Bogor*

Dr. Martijn Booij, Dr. Chris Mannaerts, Dr. Tom Rientjes, Prof. E. (Brenny) van Groesen

*University of Twente – ITC*

### Registration, organization and further information

Registration should be done electronically at the website mentioned below. Include a CV, letter of motivation and academic record (students). Registration and further information can be found at the website of the organizing institute:

LabMath-Indonesia, [www.labmath-indonesia.org](http://www.labmath-indonesia.org)

phone: +62 22 250 4065

email: [international@labmath-indonesia.org](mailto:international@labmath-indonesia.org) or to

Meli Fitriani [mei\\_melyfs@yahoo.com](mailto:mei_melyfs@yahoo.com)

Deadline for registration: 1 June 2010; information about acceptance 15 June 2010.

### Supporting organizations:

KNAW (Royal Netherlands Academy of Arts and Sciences) Mobility Project 08-MP-04

Participating Institutes: IPB, BMKG, and UT-ITC

## Project Descriptions

### Project 1+2: Satellite based Rainfall estimation

**(Dody Saptomo, Chris Mannaerts, Tom Rientjes)**

Rainfall and atmospheric weather variables represent important data and information driving most hydrological processes on the land surface. Several methods exist to estimate rainfall using thermal and microwave satellite sensors.

Remote sensing permits to improve on the analysis of spatial and temporal variation of the rainfall process.

In this project, remote sensing methods to estimate rainfall rates and related atmospheric variables (cloud physical properties, etc.) will be reviewed, with focus on the use of Geonetcast real time data streams (Fengyun-2E, MTSat-1R, etc.), covering the Southeast Asian region.

Satellite precipitation fields derived for West-Java will be critically evaluated, compared to *in situ* observations, and prepared for use with hydrological models. Specific aspects addressed in the project are observation accuracy and scale issues, satellite retrieval procedures and principles of ground truth comparison.

### Project 3+4: Satellite based Evapotranspiration estimation

**(Dody Saptomo, Chris Mannaerts, Tom Rientjes)**

Amongst the most crucial information in water balance assessment, is the evapotranspiration (ET) of the plants, especially field crops. Traditionally, evapotranspiration is estimated by approaches such as Penman-Monteith and/or Hargreaves. Alternative to these station based approaches are the satellite based approaches where the surface energy balance is solved. Methods make use of satellite datasets (e.g. thermal spectral bands) to estimate earth surface temperatures together with heat and mass transfer processes. In this project, the station based approaches and the surface energy balance approached will be reviewed and compared. Focus will be on the use of Geonetcast available data streams and the Ilwis Open Toolbox for evaluating the ET-component. Satellite estimates will be compared to *in situ* observations and causes of mismatch and constrains of both approaches will be discussed. ET as estimated in this project will be for West Java, Indonesia.

### Project 5: Hydrological modelling using station and satellite-based precipitation

**(Martijn Booij & Hidayat Pawitan)**

Changes in climate and land use may have serious implications for the hydrological regime of a river basin and related flooding events and the duration of dry spells. Hydrological models are useful tools to assess impacts of these changes on hydrological regimes and hence may guide water resources planners and managers to deal with these issues. In this project, an hydrological model (HBV) will be analyzed, developed and applied for the Upper Citarum river basin (1600 km<sup>2</sup>). This includes drawing a system diagram for the model, formulation and implementation of model equations in e.g. Matlab, Excel or Fortran, calibration of the model by choosing appropriate objective functions and validation of the calibrated model. This will be done using ground-based rainfall data as well as satellite-based rainfall estimations as input to the model. Results will be compared and interpreted to assess the feasibility of including satellite-based rainfall in hydrological modelling, which might be a promising alternative in data-sparse areas.

### Project 6: Hydrological model calibration using discharge and satellite data

**(Martijn Booij & Hidayat Pawitan)**

Hydrological models usually are calibrated by using discharge time series observed at one or several locations in the river basin. This does not guarantee the satisfactory simulation of other variables such as evapotranspiration. Also, observed discharge data often are incomplete or unavailable. Furthermore, it is crucial to consider the effects of human activities (e.g. abstractions) on the observed discharge, but this is often not feasible due to different technical, legislative and administrative constraints. Satellite-based actual evapotranspiration could be a useful alternative. In this project, an hydrological model (HBV) will be developed and applied for the Upper Citarum river basin (1600 km<sup>2</sup>). Calibration of the model will be done using both discharge data and satellite-based actual evapotranspiration. In this way, a more robust calibration and the indirect incorporation of the effects of human activities can be achieved.

### Project 7: PUB modelling of drying peat land

**(Brenny van Groesen, Martijn Booij, Andonowati)**

PUB - Prediction Ungauged Basins- modelling means that the water household is modelled for an area with insufficient data. For instance a catchment, when weather data are available but information about discharges of rivers is lacking. We will approach the drying of peatland, in the presence of drainage, from this point of view, using mathematical modelling.

We will be interested to see how changes in the canal depths, or distances between canals, influence the drying. Such information is useful when thinking about solutions for a serious environmental problem causing huge carbon emission. As a specific case we will consider part of the MRP area in South-Kalimantan with rough information about precipitation and evapotranspiration.