EnviMon – data acquisition and processing application for Environment monitoring

eGee
Enabling Grids for E-sciencE

by **Veaceslav SIDORENCO, Peter BOGATENCOV, Alexandr GOLUBEV**: RENAM - Moldova,
Dorian GORGAN: Technical University of Cluj-Napoca, Romania
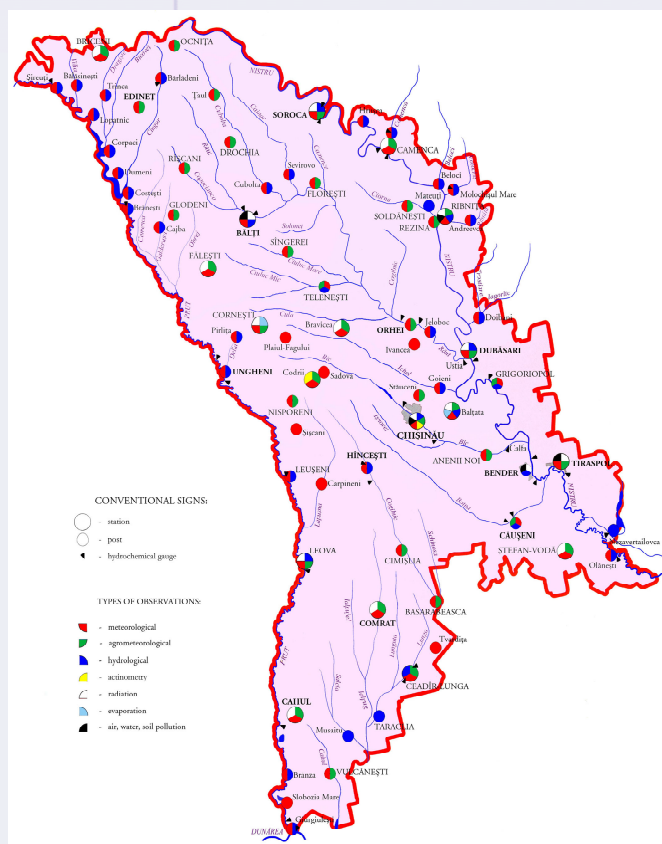**Irina BORTA**: State Hydrometeo Service of Moldova

Abstract

The aim of EnviMon is to organize data acquisition and processing for Environment state monitoring. A nation-wide distributed set of sensors are polled from central station placed at main station of the State Hydrometeo Service of Moldova (SHMS). The application provides data collection, filtering, storage and processing in order to produce synthetic reports and data that can be used as table data or put on geoinformation systems maps.
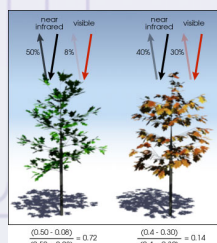
The application is developing by MD-Grid NGI specialists from Moldova in collaboration with specialists from Romania and Hungary participating in SEE-GRID-SCI project and using SEE-GRID infrastructure. The application can be used both autonomously and as part of GreenView grid application, that also is developing in frame of SEE-GRID-SCI project.

The aim of the GreenView application is a refinement of surface- and vegetation parameters in SEE region based on satellite images. Construction, usage and comparison of diverse satellite datasets will be performed. High resolution satellite measurements can be used for numerous environmental studies (climate-related or air pollution modeling). Using the sophisticated environmental data the change of the vegetation distribution in the Carpathian Basin and its climate-related causes will be investigated. It may also be used to extend the urban climate related research. The dataset may also contribute to the development of air pollution models, which describe the dispersion of tracers or their exchange between the surface and the atmosphere. These transport and deposition/exchange models require detailed input fields about surface and vegetation (for example vegetation types, leaf- area index, albedo). Satellite data could be an appropriate source to create these input datasets for the regional models combined together with terrestrial data acquired via EnviMon applications.

Map of Moldova. Environment monitoring stations

CONVENTIONAL SIGNS:
- ○ station
- ○ post
- ◖ hydrochemical gauge

TYPES OF OBSERVATIONS:
- meteorological
- agrometeorological
- hydrological
- actinometry
- radiation
- evaporation
- air, water, soil pollution

Normalized Difference Vegetation Index (NDVI)

$$\frac{(0.50 - 0.08)}{(0.50 + 0.08)} = 0.72 \qquad \frac{(0.4 - 0.30)}{(0.4 + 0.30)} = 0.14$$

NDVI is calculated from the visible and near-infrared light reflected by vegetation. Healthy vegetation (left) absorbs most of the visible light that hits it, and reflects a large portion of the near-infrared light. Unhealthy or sparse vegetation (right) reflects more visible light and less near-infrared light. The numbers on the figure above are representative of actual values, but real vegetation is much more varied.
Nearly all satellite Vegetation Indices employ this difference formula to quantify the density of plant growth on the Earth — near-infrared radiation minus visible radiation divided by near-infrared radiation plus visible radiation. The result of this formula is called the Normalized Difference Vegetation Index (NDVI).
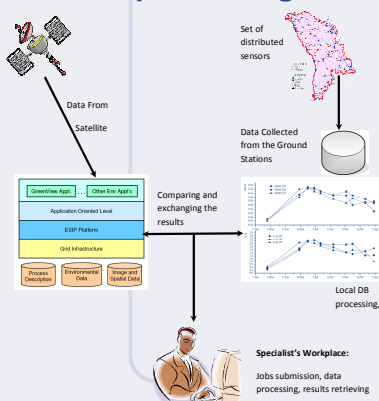
Written mathematically, the formula is:

$$NDVI = (NIR - VIS)/(NIR + VIS)$$

Calculations of NDVI for a given pixel always result in a number that ranges from minus one (-1) to plus one (+1); however, no green leaves gives a value close to zero. A zero means no vegetation and close to +1 (0.8 - 0.9) indicates the highest possible density of green leaves.

EnviMon – information collection and processing flows

Links

www.grid.md, www.renam.md
www.utcluj.ro
www.meteo.md

Contacts

V.SIDORENCO – svv@renam.md
P.BOGATENCOV - bogatenc@renam.md
A.GOLUBEV – galex@renam.md
D.GORGAN – Dorian.Gorgan@cs.utcluj.ro
I.BORTA - iborta@meteo.md

www.eu-egee.org