ENDELEO Newsletter

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Introduction

To our regret, we are distributing the last ENDELEO newsletter. The Belgian funding will end in 2011. Nevertheless, the ENDELEO monitoring website will continue to be operational and updated and the help desk will remain available.

This newsletter starts with a brief report and some pictures from the workshop in Nairobi in May 2010. Once again, we want to thank all organizations for the hospitality and the participants for their high interest in the ENDELEO project.

Following this, we want to announce that a final ENDELEO workshop will be held in Nairobi from the 30th of November until the 2nd of December. An official invitation and the program will be distributed one of these days. On the request of our users, part of the workshop will consist of training. The remaining time will be dedicated to the demonstration of local applications for which the ENDELEO tools have been a valuable source of information. In this section we want to give the floor as much as possible to our users. As such, by means of this newsletter we encourage all users to be engaged in the workshop by presenting a case study for which the ENDELEO data or tools have been used. People who are willing to contribute are very welcome (mail to Flore.Devriendt@UGent.be or Josefien.Delrue@Vito.be). We are hoping for a lot of positive feedback.

In this issue we further present a short case study on the effect of El Niño on the status of the vegetation in Kenya throughout the year 2010. As usual, we also announce some improvements of the ENDELEO monitoring website.

Report of the workshop

The aim of the visit in May 2010 was to create or increase interest in the use of RS for environmental monitoring and to explain how ENDELEO tries to lower the barrier for its use. It was also an opportunity to enhance the ties with users previously involved in ENDELEO. A demonstration workshop was given at the Department of Resource Surveys and Remote Sensing (DRSRS) in which representatives from eight different Kenyan institutions participated. A brief introduction to the project and a demonstration of the web-based tools was given, after which the potential use of low resolution vegetation indicators (e.g. NDVI and DMP from SPOT-VGT) was illustrated. The response from the participants was very positive. Besides, six different organizations were visited: Regional Centre of Mapping of Resources for Development (RCMRD), Kenya Forest Working Group (KFWG), Save the Elephants (STE), Kenya Wildlife Service (KWS), International Livestock Research Institute (ILRI) and the International Union for Conservation of Nature (IUCN). At each organization potential contribution of the ENDELEO tools for their activities was discussed.

*Pictures of the workshop in Nairobi, May 2010*

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Improvements of ENDELEO monitoring website

Since the newsletter of March 2009, a number of refinements have been implemented to the website. A short overview is given.

A new functionality is added to the **graph and table function** of the monitoring website. As from now it is possible to **export** the graph and table information to a **.TXT-file or a .CSV-file** (see figure below). These files can be imported in other software applications, such as Excel. In this way, the derived ENDELEO data can easily be combined with other data and presented in new graphs or tables.

The information displayed in the **graph function** has been changed. In the previous version, the graphs were based on the values directly calculated from the NDVI images. However, fictitious minima may occur e.g. due to undetected clouds. In the new version, the NDVI values are smoothed over time. The smoothed value is calculated as the average value of the two previous decades, the decade itself and the two next decades. In this way, it removes all abrupt local minima (supposedly clouds), as far as they don't persist longer than four decades. As such, three graphs are plotted (see figure below). The **red graph** shows the temporal evolution of the NDVI (vegetation health & density) for the selected year, directly calculated from the images. The **blue graph** is representing the same, but the **dataset has been smoothed over time** to remove possible dips related to bad values. It is better to interpret the change of the blue graph than of the red graph as the overall trend of the values becomes more clear after removing small changes that are not due to the trend. The **black graph** shows the smoothed NDVI for the 'average year'. The 'average year' corresponds to the ten year average (1999-2008) NDVI. Comparing the position of the blue graph with the black graph shows whether the vegetation conditions for the year of interest are better or inferior compared to the average situation. If the blue graph is above the black one, the conditions are better, if it is bellow, the conditions are worse.
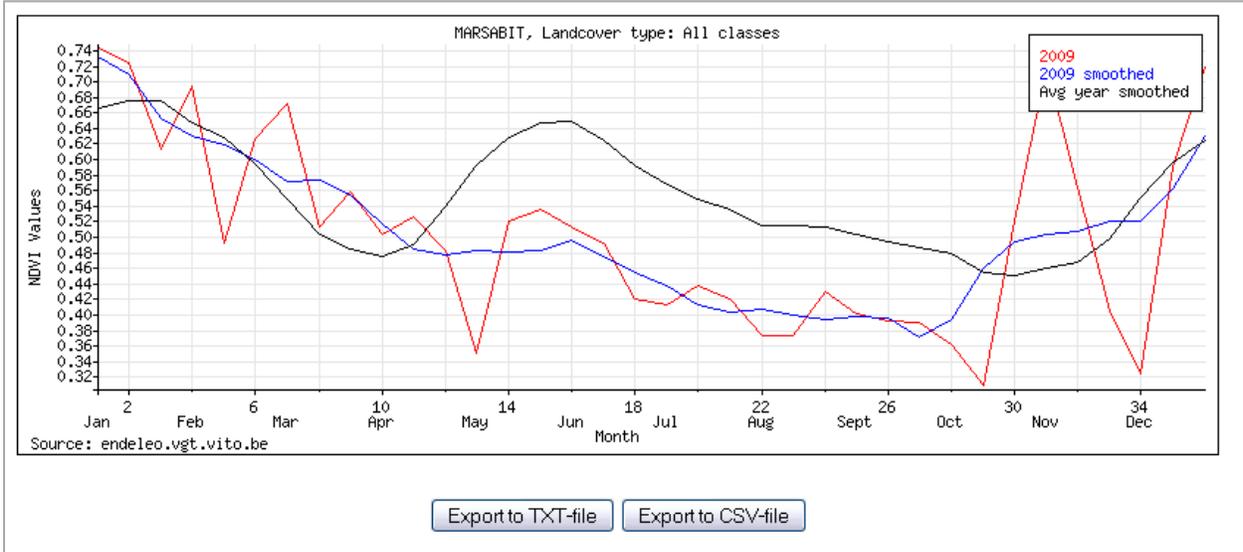
Overview of the graph function with the new export buttons and three graphs displayed.

The **land cover classes** derived from the AfriCover map for which the vegetation status can be calculated in the graph and table function have been **simplified**. AfriCover classes that occur in small patches are merged into a larger class of similar vegetation. As such it is avoided that statistics are calculated from too few pixels, which could give unreliable results. The figure below gives an overview of the new merged classes with the old classes between brackets.
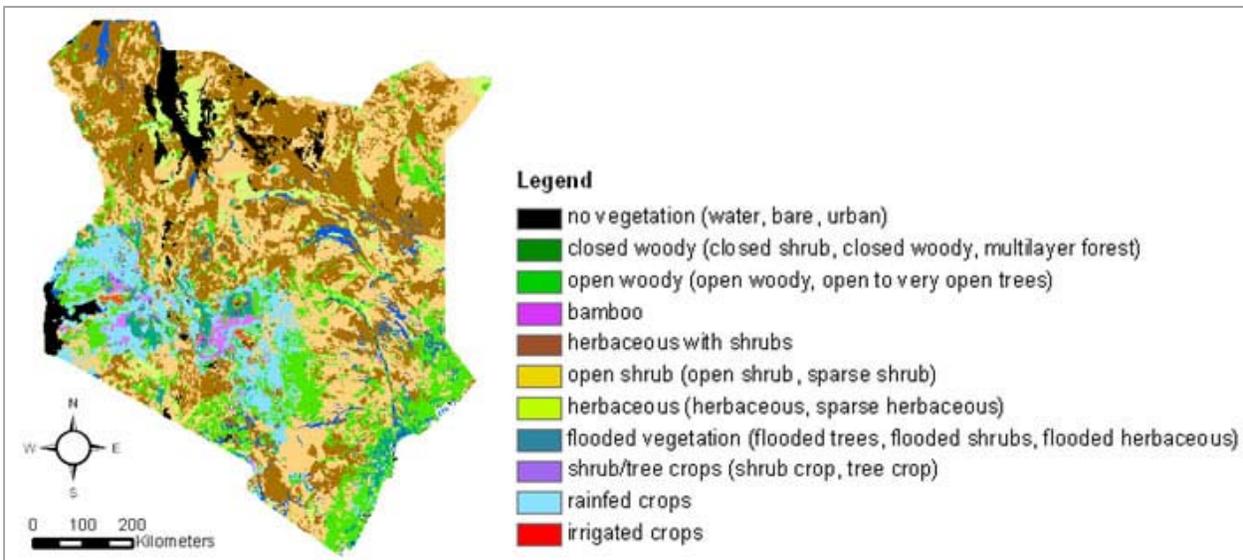
New landcover map used for the calculation of the statistics. Between brackets the original AfriCover classes.

Each data product is now **accompanied by a product specification sheet**. This metadata file contains all information about the data content, used abbreviations, data quality, used attributes, used spatial reference system, etc. of the corresponding data product. These product specification sheets can be downloaded from the ftp-site together with the data and are available on the ENDELEO website under the respective section. Before downloading any data product or before starting analysis based on ENDELEO data, it is advisable to first consult the product specification information.

Two **manuals** are **added to the ftp-site**. A first one is a tutorial explaining how to **define the projection system** when you want to use the ENDELEO data in ArcGIS. The downloaded ENDELEO data is not automatically connected to the Kenyan projection system. A second one is a manual with the **naming conventions** in order to easily retrieve your data of interest.

In the FAQ a column is spend on how to **cite data derived from the ENDELEO monitoring website**. Please cite as follows: ENDELEO. *Description of the data product.* Retrieved MM DD, YY from http://endeleo.vgt.vito.be/.

Case study: Influence of El Niño on the vegetation status

The rainfall intensity at the end of 2009 and the beginning of 2010 (until May) is influenced by the El Niño event. The influence of this event on the vegetation status can easily be studied with the ENDELEO tools.

According to the Kenya meteorological department, most parts of the country received enhanced rainfall that was well distributed both in time and space during March-April-May 2010. This was the case for the northwest, west, central and northeast parts of the country where most meteorological stations recorded rainfall that was well above 100 percent of their seasonal Long-Term Means (LTMs) for March and May.

The heavy and continuous rainfall impacted positively on the agricultural, water resource, live stock, energy and other rainfall dependent sectors. However, there was a negative impact on disaster management since floods and landslides/mudslides that occurred in different parts of the country claimed several human lives, washed away minerals and livestock, destroyed property worth millions of shillings and displaced many people.

The ENDELEO graph tool allows to study the respons of the vegetation to these heavy rainfalls in for example the northwestern districts Marsabit, Isiolo, Samburu and Turkana.
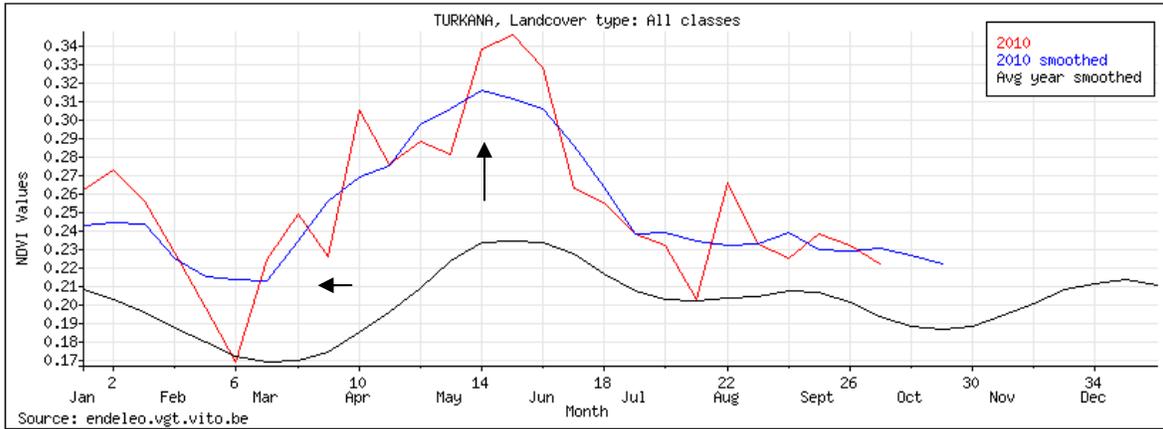
The evolution of the NDVI or 'vegetation health and density' is plotted against the average situation for all land cover types in these four districts.
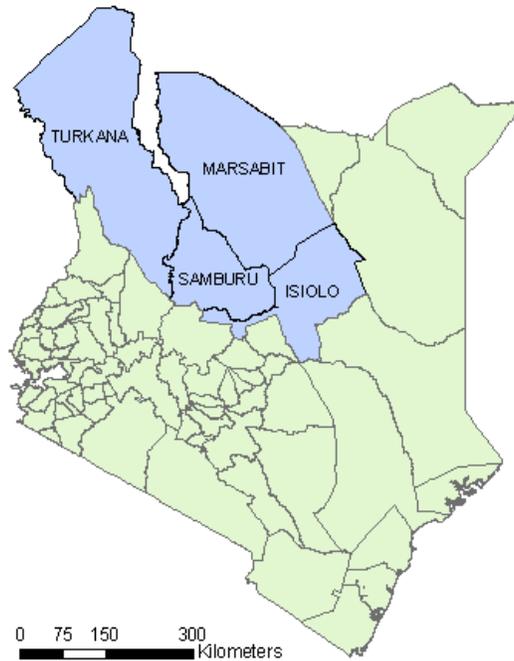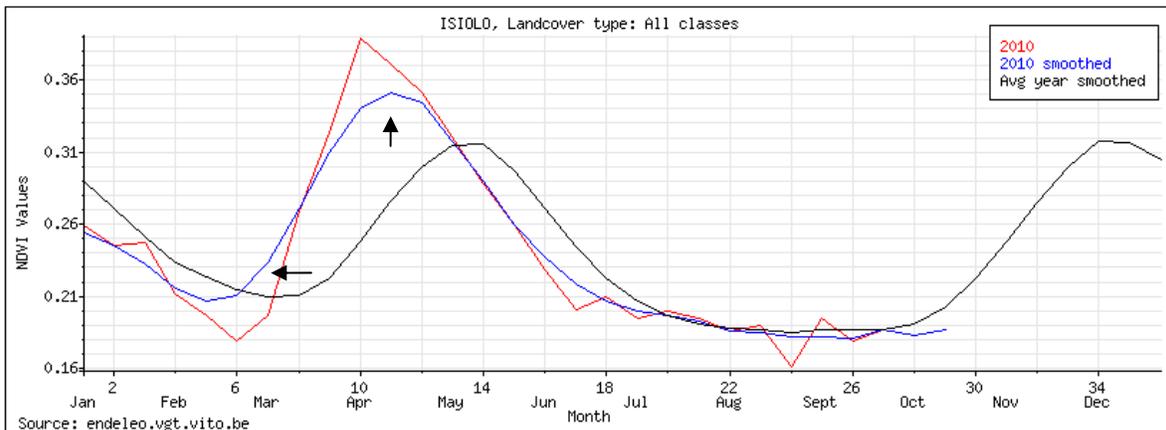

Situation of the northern districts Marsabit, Isiolo, Samburu and Turkana in Kenya.
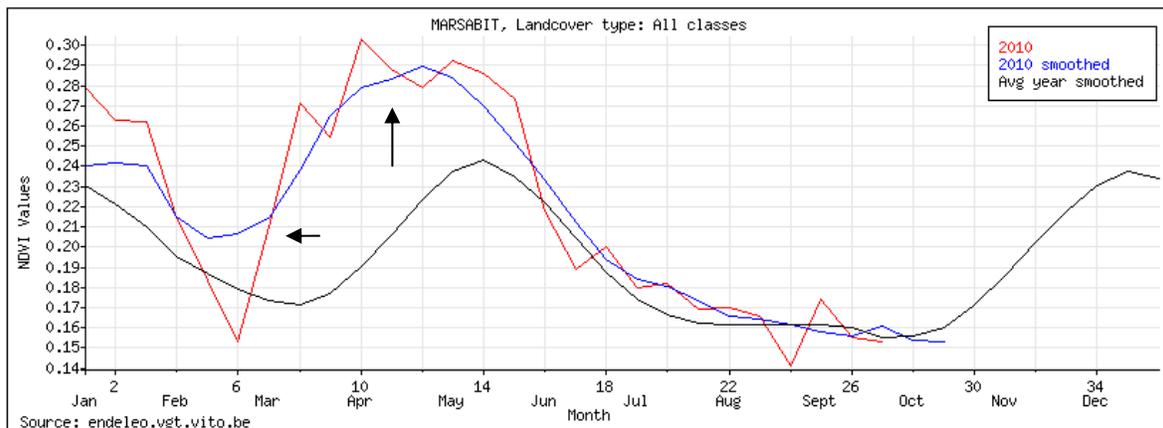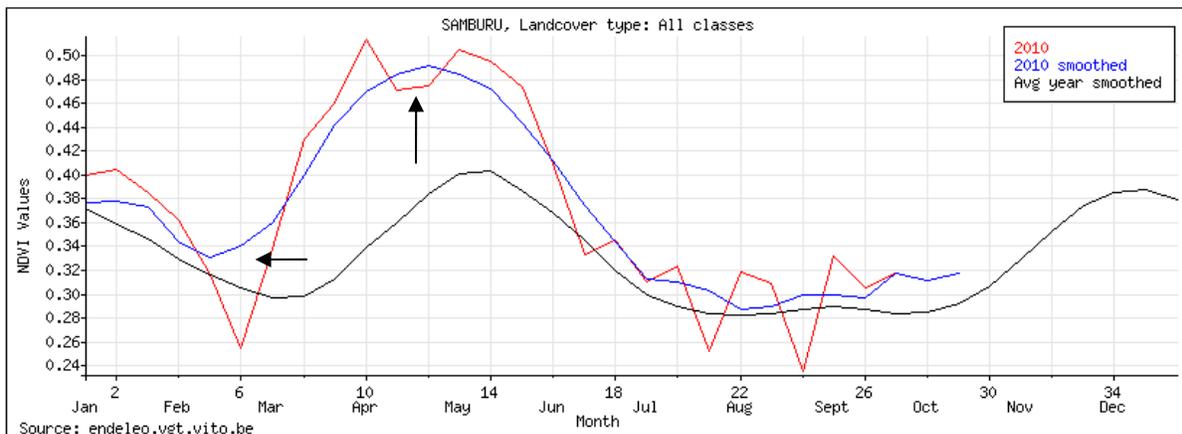

Vegetation health and density for the total area of Marsabit for 2010 smoothed and for the average year smoothed.

Vegetation health and density for the total area of Turkana for 2010 smoothed and for the average year smoothed.

Vegetation health and density for the total area of Isiolo for 2010 smoothed and for the average year smoothed.

Vegetation health and density for the total area of Samburu for 2010 smoothed and for the average year smoothed.

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When reviewing these four graphs, the influence of the weather conditions on the status of the vegetation in the area can be measured. In the four districts, the high amount of rain resulted in an increase of the NVDI values during the months March, April and May. The smoothed blue graph for 2010 is located above the black graph representing the smoothed average NDVI. A higher density of the vegetation is occurring when El Niño is present. The earlier onset of the long rainy season is visible as an earlier increase of the NDVI. The shift between the blue and black graph is clear for all districts. The long rainy season starts this year somewhere half of February, whereas this normally occurs in half March.

The Kenyan meteorological department predicts for the short rainy season (October – November – December) that much of the country is likely to experience generally depressed rainfall. The expected depressed seasonal rains are associated with the presence of an evolving La Nina. You may follow up possible effects on the vegetation with the ENDELEO tools.

Miscellaneous

- The mirror server for the ENDELEO monitoring website is still not installed at DRSRS to assure sustainability of the website in the future. Some technical barriers have to be taken. Within this time, the server remains operational at VITO. Although the Belgian funding ends in 2011, the web services will still be available at VITO. Ultimately the ENDELEO services will be maintained independently by the Kenyan partner.

- A poster with a presentation of the ENDELEO project was presented at the Forestsat 2010 conference in Spain on September 7 – 9, 2010. The ENDELEO project was orally presented at the 2nd EARSeL Joint workshop: Urban, 3D, Radar and Thermal Remote Sensing and Developing Countries in Belgium on September 22 – 24, 2010. The ENDELEO project will be presented in the near future at the AARSE conference in Ethiopia on October 25 – 29, 2010.

Contact:

Flore Devriendt (Flore.Devriendt@UGent.be)
Josefien Delrue (Josefien.Delrue@Vito.be)

Links:

ENDELEO Monitoring website