Educational System Data Bases Using Satellite-Based Images

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Lately the accessibility of GPS receivers and services for processing and exchange of geoinformation (GoogleEarth type) have given birth to neogeography, a system of geographic data collection and exchange by unprofessional users. Currently neogeography (though slowly) starts influencing on geographic education. But its possibilities are much bigger.

If you tie-up any scientific parameter with geographic coordinates (for example, bridge it to a map) you will get geoscientific data. Chemical data bridged to coordinates give geochemical data; tied-up botanical data produce geobotanic data, etc. Pupils are the most inquisitive and energetic non-professional users. Collection and processing of corresponding data can be done during classes or after school activities. This way neogeography can be easily incorporated into educational system.

Neogeoscience allows defining and depicting regularity of environmental processes, having outdoor classes, reveal hidden processes in landscaping. Charting the contents of pollutions one can define the mechanism of their expansion. Plotting the soil humidity and comparing it to the vegetation distribution it is possible to understand the influence of humidity on vegetation. Measuring the distribution of temperature over landscape we can find the regularities of heat exchange.

Relevant data base with the command system is needed for exchange and visualization of big volumes of data. There is quite a lot of geoinformation data bases. However, all of them are quite complicated and require professional approach. That is why they are not suitable for neogeoscience.

We created a simple open-access data base of geochemical information (maps.sch192.ru), which can be easily transformed into geoscientific data base. In order to show geoscientific information, a dot painted in accordance with value of a parameter is marked on the GoogleEarth space image. The parameter can be any. The data (together with metadata, when, who and where defined this particular parameter) are loaded in *.csv format. Same format is used for extraction of data after different filterings. This method of data visualization and processing make it accessible for non-professionals. In order to maintain the credibility of data only registered users can enter

data (registration is free) and the main tool verification is the reputation of the user.

Data base uses open data format (*.csv) and widely spread tools: PHP as the program language, MySQL command system and JavaScript for interaction with GoogleMaps. Interface is Russian/English but can in other languages.

Openness and public accessibility of the base as well as visual bridging of data to space images are the main advantage of the data base which makes it convenient for non-professionals in general and for the educational system in particular.

It is worth mentioning that all technical work was performed by one person and took all in all about 100 hours. It means that advanced pupils will be able to create their data bases with bridging to space images.

Potential for satellite and aerial imagery in agricultural land monitoring

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The «Concept development strategy of state monitoring of agricultural land and other categories of land used or leased for agriculture, and formation of state information resources for these lands until 2020», developed by the Ministry of Agriculture of the Russian Federation, assigns the remote sensing methods of agricultural land survey a special mission. At this point, satellite and aerial imagery is primarily used for delineation of land parcels. However, when the imagery meets certain requirements in terms of the season and time of imagery, the band, linear and spectral resolution, and the thematic applications of the imagery in agriculture could be substantially expanded.

At the current stage there are technologies which integrate assessment of land parcel areal specifications with the estimate of the crop yield potential. In a classic approach to the yield assessment, we would estimate the crop at the sample plot, and the calculations would then be extrapolated to the rest of the land plot. Remote sensing data will identify the irregularities in the crop growth and will provide a more differentiated approach to the crop yield estimate giving a more precise value. A set of parameters, such as the crop yield, land plot tillage rate, specific area under crops, land development rate, tillage rate based on the satellite imagery is a system of specifications that allows estimating the land use efficiency.