GLOBE Brings Landcover and Remote Sensing Studies to Schools

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Do you remember how and why you became interested in hydrology? For many of us, multiple factors were involved, such as where we grew up, a favorite summer activity, or a pressing issue like pollution or conservation. We were probably encouraged by an adult – a family member, scout leader, or teacher. As school districts around the country limit time spent on science instruction, it is increasingly important for the scientific community to support quality science in our schools. I’d like to share some of my own experiences with schools and suggest ways you can become more involved in this important endeavor.

A number of programs that allow students to explore and expand their scientific and geographic skills are available. Perhaps the most ambitious program is an NSF/NASA-funded effort called GLOBE (www.globe.gov). GLOBE students around the world regularly collect environmental data based on measurements of the atmosphere, soils, water quality, and land cover. GLOBE scientists guide their data collection efforts toward broad scientific questions. Schools submit data to an Internet archive, which is open to the public. Students are encouraged to use the data and associated visualizations for inquiry-based learning. The most common measurement subject is atmosphere (5,800 schools), followed by hydrology (2,300 schools), and land cover (800 schools).

This spring, I conducted a one-day training for GLOBE teachers interested in land cover and remote sensing. The workshop consisted of instruction and activities on how satellites work, finding your GPS location, assessing an area’s general landcover type based on a Modified UNESCO Classification scheme, and how to make a vegetation transect to quantify the fractional cover of soil, grasses, shrubs, and trees and enter these data into the GLOBE data archive. We compared this information with Landsat Thematic Mapper satellite images taken over our field site using a freeware package called Multispec. All this in six hours!

Teachers return to school from a workshop like this with a lot of enthusiasm and some ideas for class projects, but often they need a little mentoring to avoid unproductive speculation, make connections with local scientists, or gain access to a nearby field area. This is where you can help. Perhaps the most
difficult step in the investigation process is to develop an appropriate research question. Students and teachers often lack technical confidence, have limited software choices, and are unfamiliar with the scientific community’s needs. You can help focus their research idea into a simple, achievable, and meaningful class project.

While there are no strict rules on what makes an appropriate land cover investigation, many areas of the Southwest are experiencing considerable changes in land cover – an excellent topic for investigation. Examples of change include urbanization, drought/fire effects, and riparian restoration. At Marana High School in Tucson, students evaluated the effects of rapid urbanization and community connectivity by surveying walking paths and wildlife corridors (undeveloped washes) through a new development. Other examples are available online at www.globe.gov/fsl/investigations/.

To learn more about how to help, look over the National Science Education Standards (bob.nap.edu/html/nesse/html/) and the National Geography Standards (www.ncge.org/publications/tutorial/standards/). Some other Web resources that provide satellite and remote sensing data to the public are NASA’s Earth Observatory (earthobservatory.nasa.gov/) and Visualizing Earth (visualizingearth.ucsd.edu). Then contact a local GLOBE partnership (www.globe.gov/fsl/FRAN/Display.pl?zoom=US) or the science coordinator for your local school or district. They can introduce you to teachers who have expressed an interest in land cover or satellite remote sensing. Take it slowly at first and remember that teachers are skilled professionals but they often are working under stressful and under-resourced conditions. Look for ways to nurture long-term, mutually beneficial collaborations. And have fun!

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Transboundary Waters

More than three-quarters of Colombia’s borders are delimited by water. The country shares river waters with four other nations: Venezuela, Ecuador, Brazil, and Peru. In fact, most Andean rivers that originate in the Colombian Cordillera are part of the international Orinoco and Amazon basins. Consequently, managing these rivers is a complex diplomatic process that creates opportunities for both international cooperation and conflict.

Future Challenges

The challenge for Colombia in years to come will be the development of a robust infrastructure for water supply and power generation that addresses governmental and economic concerns while employing effective environmental legislation, thereby ensuring sustainable economic development.

Colombian society must preserve water resources as an integral part of its biodiversity, recognizing water’s importance by managing it similar to the way that oil resources are currently preserved and managed in many countries worldwide. Such a task will require joint efforts with neighboring countries, based on common regional planning criteria and reliable political agreements.

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Despite improvements in environmental legislation since 1993, it is not easy for the governmental bodies (known as “Regional Autonomous Corporations”) to exert permanent control or regulation over the natural resources. Conflicts between users and uses of water, as well as general internal – and often violent – social conflicts, add complexity to the legal and social treatment and resolution of these issues.