# To Observe the Earth and Visualize the Future

John Moore

United States (jdmoore@nsf.gov)

The advantage of using remotely sensed data and imagery is that much can be learned about geographic locations, many which cannot be easily accessed, if at all. For the first time in human history, the entire surface of Planet Earth can be viewed, analyzed and interpreted. Scientists, educators, and students have therefore, the capability of looking at the planet as a total global system, a sum of integrated systems, physically interacting in a constantly changing fluid and dynamic state. Students can begin to observe Planet Earth from both outside and inside the classroom, and from the earth (ground) and from a space perspective. An educational model can therefore be used, i.e. SPACE to EARTH: EARTH to SPACE (SEES Model). Furthermore, using a geospatial reference point the ground and space observations and measurements can be aligned through the use of a Global Positioning System (GPS), which in turn can be applied to a Geographic Information Systems (GIS) which becomes the language and basis for geospatial thinking. Appling these concepts to Google Earth applications allow teachers and students to observe data sets, many at or near real time.

Studying these datasets from an Earth Systems perspective, i.e. looking at interrelationships or cause and effects, allow students to conduct true inquiry-based investigations. Science education programs such as the GLOBE Program an international environmental/science education project, allows students to conduct ground based observations and measurements that are used by the scientific community.