Last week, Google Labs released Google Earth Engine, an online platform for viewing and analyzing satellite imagery and data. The platform's strengths are ease of use for viewing images, collaboration tools, and use of Google's computing infrastructure to analyze the satellite data. Google intends to use the platform to, among other things, help developing countries track their forests in preparation for REDD (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries), and will donate 10 million CPU-hours per year to assist those countries.

California Air Resources Board's (CARB's) proposed cap-and-trade regulation under AB 32 has an offset protocol for forest projects. All offsets must be "real, permanent, quantifiable, verifiable, enforceable, and additional." Google Earth Engine could become a valuable asset in meeting those goals for CARB's forestry offset program.

At this time, Google Earth Engine provides access to image data from two families of satellites: Landsat and MODIS. Landsat repeats scans of a specific ground area at 16-day intervals, with a moderate spatial resolution of 15 to 120 m (depending on sensor type). MODIS covers the earth at approximately 1-day intervals, with a spatial resolution of 100 to 1000 m. You can see Landsat 7 global coverage in Google Earth Engine (click on "Landsat 7 L1T Coverage"). Google's Data Catalog includes links to some MODIS image sets.

There are two (partially) functioning Landsat satellites in orbit today: Landsat 5 and 7. NASA intends to launch a new Landsat satellite (coined the Landsat Data Continuity Mission, or LDCM) in December 2012 to provide continuity with the 38-year Landsat data set. (For climate change modeling and other environmental studies, this may be one of the most important NASA missions over the next few years.) Two MODIS satellites are in orbit today: Aqua and Terra.

Why should CARB care about satellite data and Google Earth Engine? Because satellite data can be used for verification and historical analysis of forest cover, and because Google Earth Engine promises to make this analysis simpler and faster. See Google's example of forest coverage in Mexico (click on "Mexico percent tree cover").

CARB's forest offset protocol covers Reforestation projects, which means the land has been out of forest cover for at least 10 years (or has had recent significant

disturbance.) That is what CARB means by “additional.” Analysis of historical satellite data can determine the extent of forest cover for a project area over an extended period. Improved Forest Management and Avoided Conversion Projects (other ways to provide “additional” carbon storage) could also benefit from satellite analysis to determine extent, density and type of forest cover.

CARB intends to verify that all forest offset projects are “permanent,” which is defined as maintaining the project for 100 years after issuance of offset credits. To make permanence “enforceable” means, for CARB, having third-party verification through site visits every six years. But, in addition to site visits, periodic examination of satellite data for a project could provide verification on much shorter timelines, with much larger coverage than can be expected through site visits.

CARB could also use historical satellite data on forest coverage to determine what areas are experiencing increased or decreased forestation. Projects in areas experiencing higher rates of deforestation may be preferable, if CARB’s goal of “additional” offsets is to be realized.

I am sure that some third-party development of forest offset projects includes the use of satellite data. A simpler, faster method of accessing this data could be a real breakthrough for better enforcement and management of forest offset programs as California looks to implement cap-and-trade.