Near Real-time Monitoring and Forecasting Systems for Climate Change Resilience

John Musinsky (Battelle, Boulder, CO)
Karyn Tabor (Conservation International, Arlington, VA)

Background/Objectives. Wildfires, floods, droughts, toxic algal blooms, and other forms of disturbance are natural ecological processes in many regions of the world; however, the more extreme forms of these disturbances that accompany global climate change are beginning to have enormous social, economic, and environmental consequences across the globe. Effective adaptation and resilience measures to climate change require accurate and timely information on the scale of these impacts in a form that is readily usable by decisionmakers and on-the-ground practitioners. This presentation demonstrates a range of near real-time monitoring, alert and forecasting systems based on the latest generation of earth observation satellites that enable pre-event preparation and rapid response to climate-driven disasters. Contributions of these decision-support systems to climate resilience strategies, lessons learned from their development and deployment, and opportunities for further improvement are explored.

Approach/Activities. In 2002, we created one of the first near real-time wildfire monitoring and alert systems, later expanded to include flammability risk forecasts. Combined, these systems supported more than 1300 governmental and non-governmental subscribers from 43 countries. In 2013, with support from NASA's Wildfires program, we merged the fire monitoring components into Firecast, an enhanced monitoring and forecasting system for South America, Indonesia and Madagascar, featuring email alerts, interactive web mapping, a dashboard for analyzing and displaying statistics, and a mobile phone app for field-based data collection and visualization of active fires.

From 2008-2016 we conducted a series of surveys and interviews with existing users of these monitoring systems to better understand the real-world applications and impacts of near real-time satellite data in responding to environmental change, to identify priorities for future system improvements, and to assess the commitment of government institutions to use these data as part of their official business practices.

Results/Lessons Learned. As we explore opportunities for developing new climate resilience monitoring and forecasting systems at Battelle, the following lessons learned may offer valuable insight to this work: the importance of overcoming limited bandwidth for certain remote users; the need to communicate uncertainty in the data; the importance of gaining official trust, buy-in and ownership; the need for capacity building; the value of building systems that enable user-customization; and the value of automated, push-based data delivery.

References

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