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Lessons Learned from Multiple Citizen Science Projects: Organizer, Participant, and Accidental Success

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ABSTRACT

During the previous 15 years, we have been involved with multiple distinct efforts to engage the public in citizen science participation. The previous projects include reporting of middle atmospheric lightning visual observations through the web, interactive reporting and contribution of information about a glaciated watershed in southeast Alaska through a geowiki platform, and involvement as contributors to an all-sky camera meteor observation network. We present lessons learned from these three experiences.

INTRODUCTION

Three distinct scientific projects are described below. Each project had a component of engaging citizen scientists. The first two projects are described from the principal-investigator-scientists' perspective. In contrast, the third project is described from the citizen-scientists' perspective. Project one (sprites) had a minor citizen-scientist reporting mechanism which provided surprisingly successful engagement. Project two (SEAMONSTER) had a specific engagement aspect which only succeeded after targeted partnership with visitor center interpreters. Project three (All Sky Camera Network) is reliant upon individuals hosting equipment to make measurements. After a brief project description, the results of the citizen-science engagement are briefly described.

CONCLUSIONS

Reflecting upon the experiences of public engagement and attempts at citizen science in the projects described and others, we conclude:

The initial enlistment of citizen scientist participants requires sufficient technology and appropriate engagement. Citizen scientists lose interest and stop participating if their observations 'disappear.' When volunteer participants can view their contributions and the impact of those contributions, the contributions are much more likely to continue.

Acknowledgments

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References

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[2] Heavner MJ, DR Fatland, E Hood, C Connor, (2010), SEAMONSTER: A Demonstration Sensor Web Operating in Virtual Globes, Computers & Geosciences, 10.1016/j.cageo.2010.05.011, arXiv:0906.2611v2 [physics.geo-ph]

[3] Heavner M, L Ferguson Craig, M Hekkers, CL Connor, EW Hood (2010), Engaging Citizens through Partnership with Interpreters, abstract ED11A-0494 presented at 2010 Fall Meeting, AGU, San Francisco, CA, 13-17 Dec.

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Project One: Sprites 1994 - present

The University of Alaska Fairbanks sprites research effort attempted to understand the middle atmospheric energy implications associated with sprites, jets, elves ("middle atmosphere lightning"). In addition to disseminating results through publicly available web pages, the group setup a "sprite reporting" web page with basic forms. After several years of operation, even the simplistic web-forms broke. The "reporting page" was changed to an extremely primitive web page requesting information via email, as shown below.

The image at right shows one of the more dramatic images of a sprite event captured during the University of Alaska research efforts.

Report Sprites Here

Until Matt repairs this web form, please email him with the following information:

Report your Sprite Sightings here. Please fill in as much information as possible:

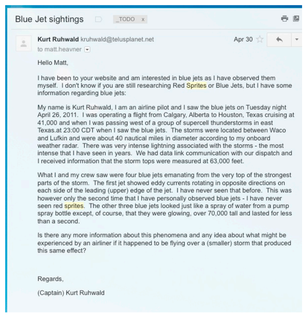
Your Name:

Your Location: (Lat, Long, or nearest city)

Time of Sighting (and Time Zone)

Please Describe what you saw:

Return to the Sprites and Jets Page

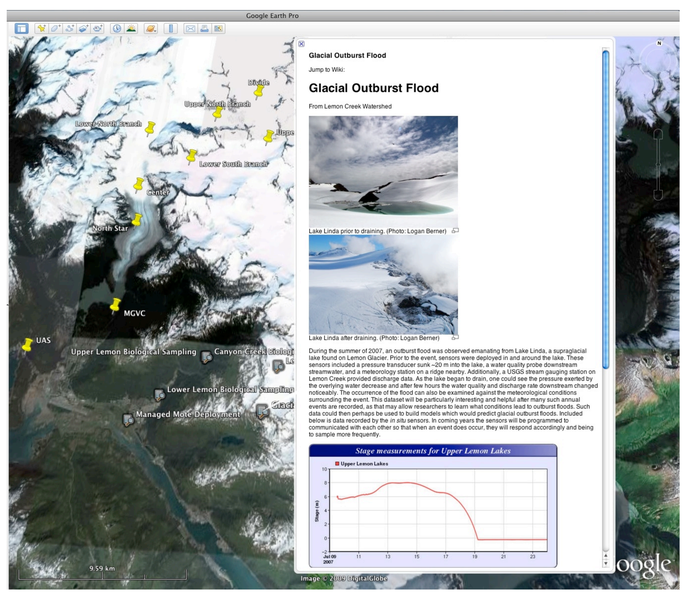


The primary focus of the sprites research was on the scientific discovery and inquiry aspects of the project. However, the inclusion of the option for "citizen science" reports of individuals observations of sprites and jets remains an important aspect of the project. The 'citizen' reports were included as an appendix to a 2000 PhD dissertation [4]. Reports of sprite and jet observations continue to be submitted (approximately 3-4 per year), and two recent submissions are presented above. The interest in self-reporting observations, especially among pilots, illustrates that tapping into a somewhat rare, but quite notable, phenomenon triggers public participation despite poor technological implementation.

Project Two: SEAMONSTER 2005 - present

The South East Alaska MOnitoring Network for Science, Telecommunications, Education, and Research (SEAMONSTER) is a collaborative environmental research program centered at the University of Alaska Southeast in Juneau [2]. The emphasis in SEAMONSTER during its three-year initial run was terrestrial hydrology in glacier-covered watersheds, and in particular on near-real-time data recovery from sensors by means of radio telemetry and related sensor network technology.

The SEAMONSTER sensor web tested new technology development for NASA, documenting impacts of climate change and glacier control of watersheds, and providing views and information about a popular tourist destination (approximately one million tourists visit Juneau every year). Education and public outreach are a major component of the SEAMONSTER project [1]. As part of the efforts for education and public outreach as well as facilitating data discovery and sharing by other scientists, a public wiki was conceived of as a two-way conduit for general information about the sensor web. The wiki is intended to have a larger scope: a hypothetical example is a biologist interested in wind and temperature data in the Juneau area for a migratory bird study. The SEAMONSTER meteorologic data could be discovered and the migratory bird information could be easily added by the biologist to the public wiki. The mediawiki engine is used to implement the public wiki, requiring a SQL database back-end. Typically, mediawiki is configured to use mySQL. However, the SEAMONSTER mediawiki installation makes use of the PostGIS database already containing the SEAMONSTER data.

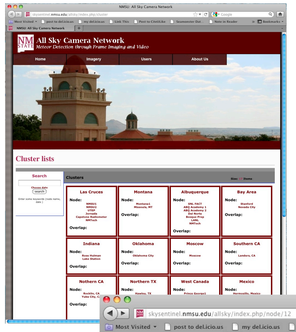


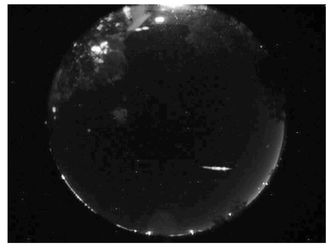
The SEAMONSTER effort to engage citizen science through the option to edit directly our project wiki was a failure. Another SEAMONSTER effort to engage tourists and helicopter pilots to access reports and photos of glacial lake releases was also a failure. A SEAMONSTER citizen science success was made by partnering with interpreters at the US Forest Service Mendenhall Glacier Visitor Center [3]. Although the subject of glaciers and outburst floods was assumed to be interesting, the most successful aspect of citizen engagement in this project indicated the need for specific targeting.

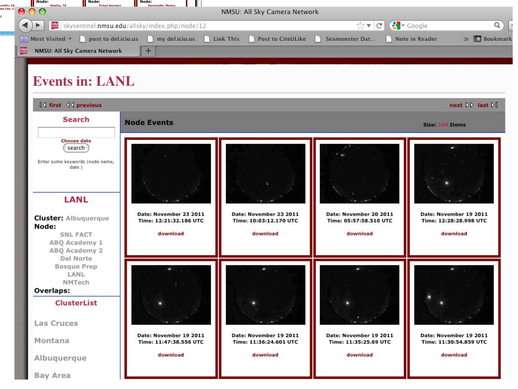
Project Three: All-Sky Meteor Camera 2010 - present

The Klipsch School of Electrical and Computer Engineering at New Mexico State University is developing an all sky camera system intended to monitor, track, and analyze atmospheric meteor events to provide a database for assisting satellite operators in separating natural and man-made events and for instrument calibration tasks.

The program objectives include: 1) field a network of uplooking, wide-angle view cameras at a number of sites throughout the continental United States, 2) develop the network to access/archive data and make the data available for processing and analysis by interested parties, 3) develop software tools for calibration, removal of detector effects and anomalies, automatic event detection and correlation among stations, and automatic trajectory computation, and 4) develop a companion multi-band detector for the all-sky sensors to improve the diagnostic capability of the camera network.







One all sky camera is hosted at the Heavner household for the NMSU all-sky meteor camera network. There are sporadic communications from the NMSU and SNL personnel. A good web interface to data collected is illustrated above. Many of the cameras are situated at institutional hosts so minimizing host intrusion may be important. However, reflecting on my experience hosting the camera, a monthly email newsletter with network updates and links to recent interesting observations would provide additional motivation and positive feedback for contributors.