Project Summary
Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Visualization of the Mammoth Hydrothermal System, Yellowstone National Park Headquarters, and the Controlled Groundwater Area of the Montana Compact

Discipline: Natural Resources
Type of Project: Research
Funding Agency: National Park Service
Other Partners/Cooperators: Utah State University
Effective Dates: September 15, 2010 – December 31, 2011
Funding Amount: $20,000

Investigators and Agency Representative:

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Abstract: USU and the National Park Service have established a positive research and technical support relationship over the last 5 years under a RM-CESU cooperative agreement (Cooperative Agreement Number: H1200040001, USURM-13, J1580050608). This proposal outlines a new collaboration of a hydrothermal monitoring program. This new collaboration integrates night-time thermal infrared imagery with LiDAR imagery and establishes well-rectified baseline data for change detection of hydrothermal areas. We will apply the techniques for calibration and correction of the thermal infrared imagery developed through the previous collaborative work and will generate well-rectified maps of estimated heat flow for hydrothermal areas near Mammoth.

Outcomes with Completion Dates: September 30, 2011

1. Calibrated 3-band multispectral mosaics of the new areas (Mammoth area and controlled groundwater area north of Mammoth) flown at 1-meter resolution, calibrated in terms of surface reflectance.
2. Calibrated thermal infrared mosaics of the areas flown at 1-meter pixel resolution, corrected for atmospheric effects and surface emissivity (Mammoth area and controlled groundwater area north of Mammoth).
3. LiDAR point cloud data of the areas to be covered (Mammoth area and controlled groundwater area north of Mammoth) and 1-meter resolution DEM's of the same areas.
4. Journal articles and conference papers describing the methodology and results in the energy balance study and the heat flow calculations.
5. A final report integrating technical papers and describing the acquisition, data processing, methodology and results of the study.

Keywords: Utah State University, Yellowstone National Park, remote sensing, thermal springs