



CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

Name(s) Ellery B. McQuilkin	Project Number 38813
Project Title A Tale of Two Slopes: Aspect Creates Microclimates	
Abstract Objectives/Goals I was curious to see if the different north and south facing aspects in Lundy Canyon create substantially different temperatures and snow depths due to varying amounts of sun exposure. Methods/Materials I placed temperature sensors on the north and south facing slopes of Lundy Canyon in the Sierra Nevada at 100 foot increments ranging from 7400-7900 feet. My project collected data from November to February. I measured snow depth with snow poles and time-lapse cameras on both slopes, recording snow depth at 15 minute intervals. I made a spreadsheet to record snow depth levels from each picture. I measured sun exposure using 27000 time-lapse camera photos. I used Excel to calculate daily slope sunlight from my photos. Results The north facing slope received 0.06% of the solar energy that the south facing received. In December there were 21 days with no sunlight, and when the sun rose high enough in the sky to finally shine on the north facing slope it had low solar energy, because of its low angle in the sky. I found that this caused the north facing slope to have colder temperatures and a longer duration of snow coverage. The south facing slope was up to 14°C warmer than the north facing slope during the day, but cooled down to similar temperatures at night. The south facing slope experienced a large temperature range. Conclusions/Discussion Both slopes create microclimates, places where the topography affects the local climate. The large temperature range of the south facing microclimate stresses rocks, which results in more rock falls. The north facing microclimate can be, at least temporarily, a refuge from climate change for hundreds of plant and animal species that need colder temperatures and deep snow coverage to survive.	
Summary Statement Due to different aspects, Lundy Canyon slopes have different sun exposures, creating microclimates with different temperatures and snow coverage.	
Help Received A big thanks to all the great people who helped me with my project: Dr. Connie Millar was my science advisor and loaned me iButtons. Dr. Greg Stock helped me with Lundy Canyon and geology background. My dad (Geoff) helped me with my experiment in the field. My mom (Sarah) helped me with display	