

# UNIVERSITY OF OTTAWA DEATH VALLEY TRIP

## Report

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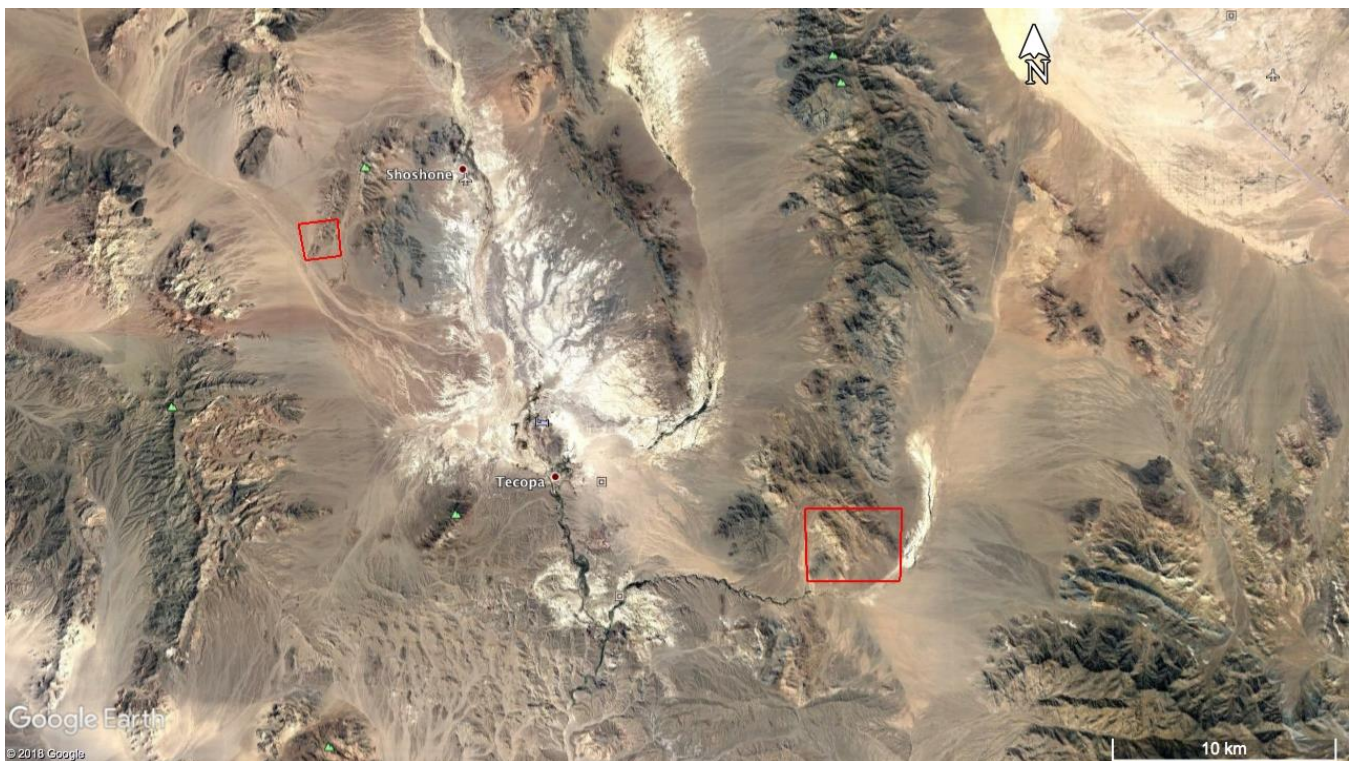
## Summary of the Death Valley Field Trip

The Death Valley trip is an advanced field study geology course that is offered through the University of Ottawa, where students are required to complete specialized projects as well as written research report, based on a total of 10 days of fieldwork investigations.

The course takes place in eastern California and western Nevada, near the world-famous Death Valley National Park, from February 13th – 23rd 2019. The course focuses on advanced bedrock mapping within the tectonically extended Basin & Range province.

The field trip was a positive experience for all students. The almost complete bedrock exposure in the area provided an excellent learning environment where the students put into practice their skills.

We thank the Prospectors and Developers Association of Canada for financially supporting the Uottawa students attending the field course.



**Figure 1: First mapping area (red square upper left) and second mapping area (red square lower right).**

### *February 13th: Arrival*

All of the students arrived in Las Vegas, Nevada, and met with the professor and teaching assistants (TAs) at McCarran International Airport. The students were driven to the township of Shoshone, California, located in the Amargosa Valley, East of Death Valley National Park. The students stayed in the Shoshone Education and Research (SHEAR) Centre, which includes 2 main buildings and 2 bunkhouses with bunk beds.

### *February 14th–16th: 1<sup>st</sup> Mapping Project*

The first project focused on the study and mapping of a Miocene volcanic terrane affected by regional extension associated with the Basin & Range province. The area is characterized by a repetition of volcanic sequences composed of rhyolite flows and volcanic tuffs. In teams of two, students walked several traverses across the area to produce a bedrock map, with occasional assistance from the professor and TAs. The main challenge associated with the area was to identify each volcanic sequence and to find their place in the stratigraphy, which has been shifted due to the presence of several faults. At the end of the last mapping day, the students handed over their completed geological map of the area, along with an idealized cross-section of a single volcanic flow.

### *February 17th: Introduction to the Second Mapping Area*

The second project focused on the study and mapping of a sedimentary rock sequence representative of one of the “Snowball Earth” events that occurred during the Neoproterozoic – Cambrian transition. The professor gave the students an introduction to each different sedimentary units constituting the sequence during a day's walk from the metamorphic basement to the top of the sedimentary sequence. This helped familiarize the students with the rocks they would encounter during the mapping exercise, which includes a diamictite unit, three carbonate units and four siliciclastic units.

### *February 18th: Death Valley Tour*

The students visited various attractions around Death Valley National Park, including Dante's Peak, the Mesquite Flat Sand Dunes, and Badwater Basin (~230 m below sea level), and an ancient borax exploitation. The students also learned about how Death Valley formed, as well as the ongoing tectonism of the area. This tour was scheduled to occur on the day before, but as a result of poor weather conditions the tour was pushed back a day to ensure better views of the area, and the overall geology to be expected in the second field mapping area was introduced the day before.

### *February 19th–21st: 2<sup>nd</sup> Mapping Project*

After the day off, the students went back to the area they were introduced to on Feb 17th. Again, students in teams of two walked several traverses across the area to produce a bedrock map, with occasional assistance



from the professor and TAs. The large size of the area (4 times larger than the first one) as well as the presence of high hills and ridges made the terrain particularly difficult to explore. This required well-thought planning from the students in order to cover as much terrain as possible in the 3 allotted days. The main challenge associated with mapping the area was to distinguish several similar-looking sedimentary units, as well as recognizing the presence of faults based on several indicators such as incoherence in the stratigraphy (repeating, shortened or extended lithologies) and the presence of alteration associated with the passage of hydrothermal fluids.

*February 22nd–23rd: Clean up of SHEAR Centre and course wrap up*

The students handed over their completed geological map and a geological cross section of the 2<sup>nd</sup> mapping area at noon. The rest of the day was spent celebrating the end of the field course and cleaning the SHEAR Centre. On Feb 23rd the students were driven back to the Las Vegas McCarran International Airport to fly back to Canada.



**Figure 2: Class Photo with Professor and TAs**

## Contact

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