

Earth Sciences at the Point Arena Field Station of Mendocino College

The Mendocino College Point Arena Field Station is in a perfect location for students to see geologic features otherwise only talked about in class and read about in their course materials. The field station buildings and adjoining land are situated on a marine terrace underlain by an east-west geologic rock structure known as an anticline. This is an ideal place for students to explore the headland and discover for themselves this well-defined geologic structure. Visualizing 3-dimensional features in the classroom can be quite challenging for many students. Being able to see this kind of structure in person can make all the difference in their learning.

This anticlinal structure in rocks that are millions of years old was scraped flat by waves thousands of years ago before tectonic uplift brought the rocks up from sea level and left the marine terrace deposits on top. This creates an unconformity, and is a very clear example of this kind of marked gap in the geologic record for students to investigate. The headland itself is carved on the sides by inlets of water and sea caves, all created by wave refraction processes introduced to students in their classroom lectures. Just to the north, and clearly evident while viewing from the college property, a large sea stack is dramatic evidence of what this wave refraction will ultimately do to the college headland. The rocks exposed along the edges of the cliffs are also weathering at different rates, giving students a first-hand view of this differential weathering. There are also rock falls and landslide features evident. All these are key components of modern coastal erosion processes, and exploring the college property helps make the concepts very real for students in a way pictures in their textbook cannot.

Having the field station facility allows all these geologic learning activities to occur. With the ability to offer boys and girls dorms, as well as a separate space for faculty, students work and live closely together, allowing a learning community to develop. In addition, the college facility is centrally located in a unique and important location geologically, and offers a classroom and a lab room for earth science classes to use as a base of operation for student exploration of all the incredible geologic features of the area. Being so far from the main campus, the overnight accommodations are critical for completing the many and varied learning experiences.

Within a few miles south of the field station, students can take short trips to study more aspects of these same age rocks. They further study differential weathering and cliff/slope stability, as well as have the chance to measure basic sedimentary rock structural characteristics such as the strike (map orientation) and the dip of the bedding planes within the rocks. Views from the pier at Point Arena allow students to see a geologic dome to the south and a large sequence of tilted beds to the north. These beds to the north help students to visualize sea level change via the different types of sedimentary rocks in the sequence. One layer includes dramatic organic material content, seeping oil in the warm afternoon sun.

A fantastic extra feature of the nearby sedimentary rocks further south is the dramatic concretions found at bowling ball beach. This location just a short drive from the college field station offers a fantastic place to bring home the ideas of sedimentary processes and differential weathering as the concretions wear down so much slower than the surrounding rocks that contained them. Nearby Moat Creek and Schooner Gulch allow for further exploration of geologic structures, including folds, faults, unconformities, active sedimentary deposits, and sand dykes through the solid rock. Just a short hike north from the college property, students have the ability to view large sinkholes, where the wave action has carved out sea caves whose roofs have collapsed. In this same area, a fault is evident where millions-of-years-old rocks have been thrust up and over the thousands-of-years-old marine terrace deposits. This is further dramatic evidence of the local, recent tectonic uplift, and is a location studied in the past by the United States Geological Survey. In one study, USGS staff employed the aid of a student from Mendocino College who went on to major in geology at UC Davis.

The rocks of the field station were created in ancient coastal seas many miles to the southeast. It has been tectonic movements that have moved them over time to where we find them today. The San Andreas Fault is just three miles inland, and a global positioning system satellite receiver has been installed on site as part of the National Science Foundation funded Plate Boundary Observatory. Students can take a short trip to the nearby fault zone, make measurements and note features associated with fault movement, then come back to the classroom at the field station where they can integrate their field observations with data from the GPS instrument. They learn about real-time monitoring and earthquake recurrence interval calculation.

Crossing the San Andreas and just a short drive north of the college field station are viewing spots and coastal access sites where students can see rocks with a totally different geologic history. In this area the geology is a remnant of the ancient subduction zone that left behind a jumble of rocks known as the Franciscan Assemblage. These rocks, similar to those inland in Ukiah, have dramatically different minerals and structures than the rocks students have studied in and around the college field station, and the geologic history of these rocks illustrates the tectonic history of California before the San Andreas Fault existed.

The proximity of the college property near Point Arena is perfect for illustrating, via numerous on-site and nearby locations, key learning objectives within our earth science courses. The on-site accommodations allow for multi-day use and thorough exploration of all these geologic wonders making the college property the perfect spot not only for college classes, but also for external organizations that have used them the past. The Mendocino College Point Arena Field Station is a research and teaching facility without equal!