CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)

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Project Number

S0803

Project Title

Using Fossils from the Mojave Desert to Reconstruct a Miocene Period Ecosystem

Abstract

Objectives/Goals

The purpose of this investigation was to determine if horse bones and other fossils found in the Barstow Formation from the Miocene period could be used to reconstruct the type of environment from that period. We compared Merychippus bones we found to other horse bones from the same period as well as looking at other fossils found in the immediate area such as Pseudolauris (an ancient cat), camel, wood, and root casts. If recovered fossils share characteristics with holotype fossils from the same era, then it is possible to identify the species and reconstruct the ancient California ecosystem that existed approximately 14.8 million years ago. This investigation is important since by revealing the environment of that particular area, we can determine climate, habitat, environmental history, and the animals present during this lush time in southern California's pre-history and get insight into how climate change impacts ecosystems.

Methods/Materials

On separate occasions, with permission from the BLM, we recovered fossils of various ancient animals, algae, and plants from the Barstow Formation in southern California. Following established procedures for fossil recovery and preservation, we removed diagnostic fossils for further investigation. GPS was utilized to precisely determine the location of our fossils. Recovered fossils were then measured and compared to published measurements.

Results

Recovered fossils were found to be similar to documented fossils, thus allowing for identification of the species from which the bones came. Bones recovered were determined to be that of Merychippus, an Miocene era three-toed horse. Other fossils found at the site were determined to be that of Pseudolauris, (an ancient cat), as well as an ancient camel, root casts, and algae. Merychippus hoof print impressions were also found in the general area, further substantiating our hypothesis that this area was a Miocene era grassland ecosystem.

Conclusions/Discussion

Based on our fossil discoveries, we determined that the area in and around Barstow was a lush grassland during the Miocene era. This was supported by our identification of fossils of three different animal species that were indigenous to grassland areas. It is likely that the area that we studied was a place that animals visited for water. Climate change over time led to these areas drying up and transitioning into the desert environment that currently exists.

Summary Statement

This project surveys the fossil record in the Barstow Formation in order to reconstruct the ecosystem found in this region during the Miocene Period.

Help Received

This project was assisted by members of the Inland Empire Geological Society who provided guidance during fossil recovery and identification.