

RM-CESU Project Progress Report, FY07

Project Title:

Excavate and Research Fossil Plants from the Antero Formation

Park: FLFO

Funding Source: Rocky Mountains CESU Research Funding; FLFO funds (in kind)

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University Partner: University of Colorado at Boulder, Dena Smith

Student Participant: Melissa Barton

Project Description:

Collections of leaves and pollen from the Eocene-Oligocene Antero Formation, Colorado, are being analyzed to determine the taxonomic composition of this fossil flora and make inferences about paleoclimate. Comparison with the fossil flora from Florissant will provide new information about the effects of the major global climate change during the Eocene-Oligocene transition and the dynamics of plant community evolution in the Rocky Mountains during the Eocene-Oligocene climate change, as well as data about the magnitude and timing of the climate change.

Methods:

New excavations will provide collections from the Antero Formation. Besides the megafossil specimens, samples will be prepared for pollen analysis. Research on these collections will involve 1) taxonomic identifications of leaves and fruits, 2) pollen analysis to provide a broader understanding of the taxonomic composition, 3) paleoclimate analysis using established methodologies such as plant physiognomy (e.g., CLAMP) and nearest living relatives (NLR), 4) reconstruction of the ancient forest community, and 5) comparison to the Florissant flora and climate.

Project Progress:

Land-ownership complications required considerable effort to obtain permission to begin excavations, but this was finally achieved at a meeting with the Park County Board of Commissioners in July 2007. This delayed the start of the summer field season and limited the extent of the excavations for 2007. The locality that was excavated was not as abundant in fossil leaves as had been hoped, although this in part may be due to the limited timeframe for the field work. A pollen sample was prepared and initial analyses indicate that fossil pollen is very well preserved, diverse, and abundant. It may be necessary to focus more on the pollen than on the megafossils, although this focus is consistent with the goals of the original stated project and should provide much of the new data that are needed. Melissa Barton is currently defining the scope of her Master's thesis, which will involve an analysis of the fossil leaves, pollen, and insects. These will be compared to Florissant, and the scope of the comparison may be expanded to include

other regional floras of similar age. Pre-existing fossil leaf collections from Antero have also been obtained by loan, and another collection has recently been located. These provide new locality clues that should be useful for possible excavations in 2008, although the success of having already obtained a good pollen sample assures that many of the project goals will be achieved. Very preliminary results suggest that the Antero flora represents a cooler climate than Florissant, although there are many plant genera that are shared between the two. Members of the pine family appear to be more abundant in the Antero pollen assemblage than at Florissant. Among the small leaf sample, half of the taxa are conifers, which is much higher than at Florissant. These observations may indicate cooler climatic conditions for Antero than Florissant.

Expected Final Report:
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