The purpose of this study was to examine the pollen and spores in a stratigraphic sequence from the late Eocene to the early Oligocene Epochs (33-32 Ma) specifically collected from the White River Formation in Wyoming, and identify ecologically significant plants that were living in this area during the time when worldwide climates were changing from temperate-moist to cool-arid. Hypothesis: If climatic conditions were changing, then the pollen and spores should also be changing to reflect the new plant groups that were moving into this locality and emerging as dominant flora.

Results

- Sediment samples were collected from the White River Formation near Douglas, WY
- Sediments were sent to Global GeoLabs Ltd. in Canada and were prepared using standard palynological techniques
- Palynomorphs and cuticular material were imaged using Jenoptik Gypixax camera in conjunction with a Motec BA410E microscope
- Images were compared to various palynological publications for identification of pollen and spores
- Pollen counts were conducted to calculate distributions and relative abundance

Conclusions

- The identified pollen and spore data indicate an environment that was warm with moderate rainfall
- This is supported by the presence of mesic streamside elements, such as Ulmus, Betula, and Saxif
- This data coincides with the Antero locality in Colorado (Leopold et al. 2019) based on the relative abundance of key pollen taxa (Figure 3)
- Worldwide climate shift towards cooler, drier conditions is not supported with the palynomorphs identified in this locality, but may support an east-to-west progression of dryland deposition (Evanoff et al., 1992)

Background

- Major global climate changes that occurred during the Eocene and Oligocene epochs were marked by increased aridity and a abrupt decrease in temperature
- Eocene-Oligocene Transition (EOT) cooling in nearby locality (Colorado) was correlated with O1-1 Antarctic glaciation and global cooling trend of −5 °C
- This climatic cooling caused vegetational and faunal changes, seen in regional extinctions of vertebrates and invertebrates
- The loss of exotic woody taxa and the increased appearance of xeric shrubland, grasses, and herbaceous taxa suggested a floristic turnover of taxa better adapted to the cooler climate

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