

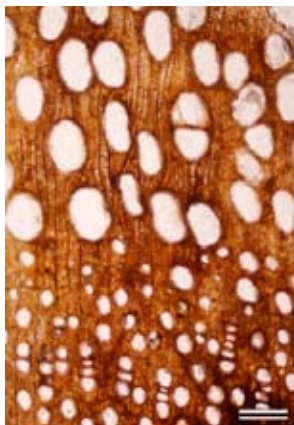
# Ancient Climate & Environment

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Because it is impossible to study ancient climates (“paleoclimates”) directly, scientists often look to fossils for information about climatic conditions earlier in geologic time. In the case of The Petrified Forest Piedra Chamana, aspects of Sexi’s Eocene climate have been interpreted from careful analysis of fossilized plant material. Plant species are not only indicative of specific climates, but these fossils are particularly useful as both woods and leaves are present; therefore, scientists can double-check climate estimates inferred from the woods with those obtained from leaves and vice versa. Reconstructing Sexi’s paleoclimate ultimately helps scientists reconstruct what the earth was like 39 million years ago during the Eocene.

## Fossil Woods

Analysis of the fossil woods involved careful study of anatomical characteristics relating to the vessels, including their size, distribution, and arrangement, and comparison to woods from forests growing in different climates. Many aspects of the fossils establish the fossil flora as a tropical forest. Wood characteristics also provide information about the type of tropical forest that is represented. One example is illustrated below. It was possible to estimate precipitation amounts based on the characteristics of the woods.



Larger vessels

alternating with

Smaller vessels

This specimen has large vessels produced at the beginning of growth that contrast with the smaller vessels produced later. This type of wood is only found in trees that lose their leaves seasonally and thus shows that there were deciduous trees in the ancient forest.

## Eocene Climate & Environment

The fossil forest grew in an environment significantly warmer than that of Sexi today. Conditions were probably much like modern dry tropical forest with precipitation that was seasonal and in relatively low amounts. The forest was also growing at a much lower elevation. Because the fossil forest grew near sea level, it shows that the rocks near Sexi were uplifted as much as 2500 m in conjunction with the rise of the Andes.

Continue reading for a visual reconstruction of geologic events at Sexi from the Eocene to the present.



Leaves may or may not have teeth. Leaves with teeth are associated with cooler climates, whereas leaves without teeth are more prevalent in warmer climates. All of the fossil leaves found in Sexi lack teeth.

## Fossil Leaves

Fossil leaves are often used in paleoclimatic studies. Analysis of the edges, or “margins,” of leaves provides evidence regarding average annual temperature. Margins with serrated appearances are typical of cooler climates; smooth, or “entire,” margins are more common in warmer environments. Additionally, leaf size relates to average annual precipitation trends, with small leaves associated with drier environments than larger leaves.