



## El Bosque Petrificado de Piedra Chamana: Preliminary paleoecological interpretations of a late Middle Eocene fossil assemblage

Deborah W. Woodcock<sup>1</sup>, Herbert W. Meyer<sup>2</sup>, Isabel Prado<sup>3</sup>, Pedro Navaro<sup>4</sup>, y Diana Pajuelo<sup>4</sup>

<sup>1</sup> Clark University, Worcester, Massachusetts, Estados Unidos

<sup>2</sup> Florissant Fossil Beds National Monument, Florissant, Colorado, Estados Unidos

<sup>3</sup> Museo de Historia Natural, Lima, Perú

<sup>4</sup> INGEMMET, Lima, Perú

The Piedra Chamana Fossil Forest in northern Peru, which is associated with Calipuy volcanics dated at 39 Ma, includes a large amount of fossil wood occurring across an 8-km-long area. In one part of the site, woods are weathering out of a volcanic mudflow (lahar) deposit and in growth position in an underlying ashfall that also contains fossil leaves. The general geologic context and inferred taphonomy of the fossils has been described in Woodcock et al, 2009. Recent fieldwork, and ongoing studies of the fossil material, has added to our understanding of the assemblage and also shown that fossil sites are more extensive than had been thought.

Analysis of the fossils and their spatial occurrence indicates that three plant associations are represented at the sites we have studied most intensively (Fig. 1):

- 1) Lowland tropical forest with a diversity of monocots and dicots. Preliminary study of the fossil woods indicates that a diversity of typically tropical taxa are represented.

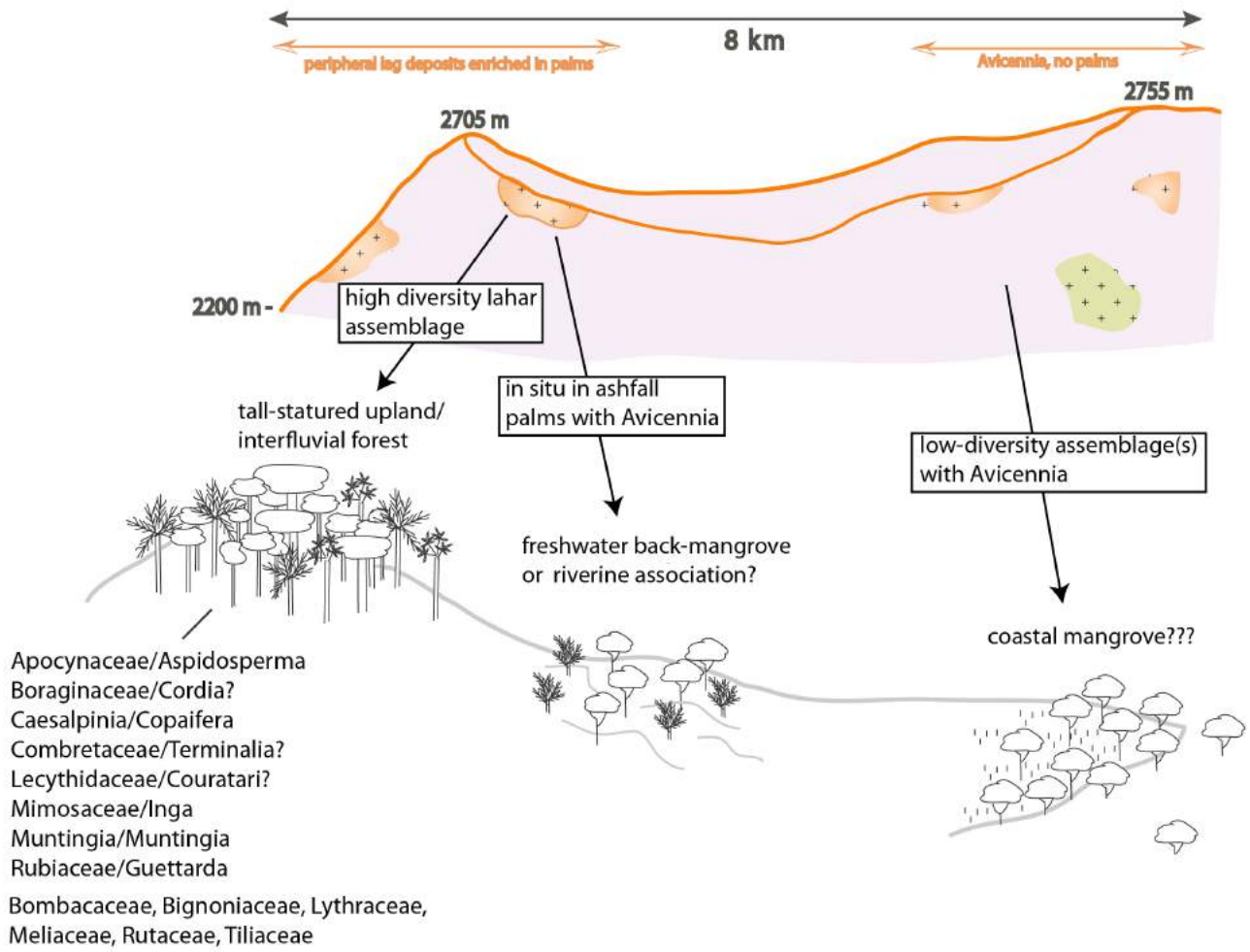
- 2) A back-mangrove or seasonally flooded association with the mangrove genus *Avicennia* and other taxa including palms. *Avicennia* is one of the commonest woods at the site and leaves of this genus are also found in the ashfall deposit.

- 3) Low diversity coastal/strand vegetation with *Avicennia*.

Presence of *Avicennia* among both woods and leaves and morphological/anatomical analyses of the leaves and woods are consistent with dry conditions along the shore of the ocean embayment that extended into the continental interior during this period. Estimated specific gravity of the woods averages .50-.55, lower than the average for wet tropical forest, but the range of values (.33-.77) approaches that of lowland tropical forests generally. The fossils document uplift of ~2600 m since the late middle Eocene and include a type of ecosystem (coastal mangrove) that is rarely preserved in the rock record.

### References

Woodcock, D., Meyer, H., Dunbar, N., McIntosh, W., Prado, I. 2009. Geologic and taphonomic context of El Bosque Petrificado Piedra Chamana (Cajamarca, Peru). Geological Society of America Bulletin, v. 121, p. 1171-1178.



**Figure 1.** Inferred vegetational associations based on the fossil material studied thus far (main part of the site). Identifications are preliminary pending more complete analysis of the woods.