

POSITIONS OF THE BRAZILIAN *ARAUCARIA* FOREST DURING THE HOLOCENE AND PALEOCLIMATIC IMPLICATIONS

M.P. LEDRU¹, H. BEHLING, M. FOURNIER¹, L. MARTIN¹ & M. SERVANT¹

Today's *Araucaria angustifolia* forest in Brazil can be found in two different areas: a more extensive area located between 24° and 30°S latitude and 600-1200m elevation, and one composed of several smaller sites more at 22°S latitude and at higher elevations (1200 to 1800m). Restriction is not due to human-caused destruction. Phytogeographers like Aubréville (1961) and Schnell (1961) suggested that the northern *Araucaria* forest is maintained by favorable climatic conditions (less than 10°C winter temperatures and absence of a dry season) and that only different past climates could explain the forest's extension to the North. Such climatic conditions are unusual in tropical areas and are due to the presence of polar advections during the austral winter. To test if in fact past climates are responsible for the distribution of the *Araucaria* forest, two cores were analysed for pollen analysis in Salitre LC91/1 (19°S lat., 1050m alt.) and in Serra da Boa Vista (27°42'S lat., 1160m alt.). Radiocarbon dates date LC91/1 to ca. 4000 yr B.P. at the base and Boa Vista to ca. 14,000 yr B.P. The pollen record realised from a previously analysed core (LC3) from Salitre showed expansion of the *Araucaria* forest between 13,000 and 9500 yr B.P. which was interpreted to reflect cold and moist climate. The Boa Vista pollen analysis on 38 samples showed an initial development of the *campos* vegetation with Poaceae and Cyperaceae which continued until ca. 8000 yr B.P. *Weinmannia* frequencies increased abruptly and the tropical forest expands interpreted as warmer climates. Maximum proportions of *Weinmannia* were recorded until 5000 yr B.P. Between 5000 and 3000 yr B.P. the tropical forest taxa decreased in favour of *Araucaria* forest and *campos* vegetation. 21 samples have been studied from Salitre LC91/1 showing essentially no change in the floristic composition during the last 4000 years. Taxa characteristic for mesophilous forest such as *Celtis*, *Alchornea*, Myrtaceae, *Copaifera* dominate except for short dry period at ca. 1000 yr B.P. Poaceae and Cyperaceae increased. These differences in regional vegetation can be interpreted to reflect regional climate differences. The fact that at 9500 yr B.P. the *Araucaria* forest is well developed at latitude 19°S whereas *campos* vegetation is recorded at latitude 27°42'S suggests that polar advections must have been strong resulting in low temperatures without a dry season. Boa Vista farther to the South then lies behind the polar front creating conditions too dry for forest development and *campos* are predominant. Between 8000 and 6000 yr B.P. the mesophytic forest becomes dominant at Salitre whereas tropical *Weinmannia* forest expanded at Boa Vista. The polar advections in Salitre must have decreased, increasing consequently of temperatures and the length of the dry season. This implies that polar fronts at the latitude of Boa Vista have increased resulting in a decrease in the length of the dry season. From 4000 yr B.P. onward modern conditions became established at Salitre and Boa Vista; the *Araucaria* forest increased until 3000 yr B.P. when it reached its modern distribution. Our results suggest that the influence of the polar advection determines the distribution of *Araucaria* in Brazil during post-glacial times. This would confirm the climate hypothesis by Aubréville and Schnell to explain the presence of *Araucaria angustifolia* forest in the Brazilian Serras.

¹ ORSTOM, Francia