The paleoflora of King George Island, Antarctic Peninsula, and its contribution to paleogeography, paleoclimate and the evolution of austral floras

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The paleofloristic record of King George Island (South Shetland Islands) and the Antarctic Peninsula is discussed including its importance in paleogeographic and paleoclimate reconstructions, stratigraphic correlation, and its influence in the evolution of modern austral floras. Tectonically different from East Antarctic environments by its link with the Mesozoic Pacific subduction process, the Antarctic Peninsula has a history closely linked to that of southernmost South America. This connection persisted until the opening of Drake Passage in the late Paleogene. However, its paleofloristic record -especially in northernmost regions- also shows a great similarity with extant floras in what was eastern Gondwanaland. This similarity is a consequence of the continuous Cretaceous land masses along the Antarctic coast. The fossil record in the Antarctic Peninsula attests to a northwards rejuvenation of the deposits and their floras, beginning in the Triassic in Alexander and Livingston islands with Bennettitales and Cycadales as dominant vegetation. The Early Cretaceous witnessed the arrival of the first angiosperms and at the end of this period and during the Neogene, the explosive diversity of a unique mixed paleoflora of ferns, conifers and angiosperms today dispersed in different southern areas and with exclusive climatic appeals. Located at the northern tip of the Antarctic Peninsula, King George Island documents the events occurred since the Late Cretaceous and due to its location in a fore-arc context -as opposed to those of the James Ross sub-basin- contains a nearly complete record of what occurred in the continental environments of the region during the Early Cenozoic. Plant fossil records are mainly exclusive, and were favoured in their preservation by the volcanic environment that generated the island. Although they show different plant compositions through time, their paleobiomes reveal the persistence of some diagnostic taxa, represented by Nothofagus, podocarps, and Cyatheaceae-Dicksoniaceae as dominant ferns in the under-storey. With the post-Oligocene separation of South America-Antarctic Peninsula and the onset of cold climates, the Paleogene floras declined and nearly disappeared from the continent. In spite of certain heterocrony observed in the dispersion of the austral forest elements among the different landmasses of Gondwana, radiometric data and the regional extension of the deposits allowed the establishment of a coherent chronostratigraphic framework. The relationship between climate and flora and its continuous fossil record make King George Island a good laboratory to investigate changes occurring in this critical part of the world. The plant assemblages of King George Island are central to the understanding of this scenery of drastic tectonic and climatic changes that took place between the end of Mesozoic and the beginning of Cenozoic.

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