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REGIONAL SETTING OF CRETACEOUS-PALEOGENE PALYNOFLORAS OF SEYMOUR ISLAND, ANTARCTICA

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Major environmental changes occurred during the Late Cretaceous and Paleogene that affected the Antarctic Peninsula area. These included tectonic episodes (such as the separation of Antarctica from South America), climatic changes (particularly temperature and rainfall), and environmental changes associated with the Cretaceous-Tertiary (K-T) event. The Antarctic Peninsula fossil palynofloras provide a sensitive record of environmental change, reflecting trends in land vegetation and marine micro-phytoplankton.

Outcrops on Seymour Island, northeastern Antarctic Peninsula, comprise shallow marine to marginal marine (and rare nonmarine) siliciclastic sediments that contain abundant, well-preserved marine and nonmarine palynomorphs [1]. These organic-walled microfossils include spores and pollen of land plants, marine dinoflagellate cysts (dinocysts) and acritarchs, other marine and freshwater algae, and fungal spores and fruiting bodies. Organic debris such as woody and cuticular fragments are also preserved in the sediments.

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The Seymour Island succession [2,3], deposited in the James Ross Basin [2,4] in a back-arc setting, includes Campanian to Eocene strata:

Unit	Age
La Meseta Fm	Late Eocene to late Early Eocene
Cross Valley Fm	Thanetian?
"Wiman Fm"	Thanetian?
Sobral Fm	Danian
López de Bertodano Fm	early Danian to Maastrichtian to Campanian

These formations are separated by erosional episodes, some of which include major valley cutting, though at the López-Sobral contact erosion is relatively minor.

Palynofloras preserved on Seymour Island are moderately to highly provincial [5,6]. Degree of endemism changes through the Late Cretaceous and Paleogene in both marine and nonmarine palynomorph assemblages, reflecting times of greater separation by geographic, climatic or biotic barriers. For example, in the Late Paleocene (during deposition of the Wiman Formation) a relatively high degree of separation for Seymour marine floras is apparent from the high proportion of endemic (including new) dinocyst species. This provincial flora may be related to changing water masses associated with changing Gondwana paleogeography [7]. Other environmental changes including relative sea-level in the shallow Weddellian seas also had an impact on the dinocyst floras.

The Seymour palynofloras include a significant proportion of Weddellian Province species. This Late Cretaceous-Paleogene southern high latitude province [8] extended across Antarctica and into southern South America and southern Australasia. In the northern Chubut region, terrestrial spore and pollen assemblages reflect vegetation at the margin of the Weddellian Province [9]. Some Weddellian taxa are present but the vegetation is not closely similar to the "typically Weddellian" type growing on the paleo-Antarctic Peninsula. The predominant arboreal component of the Weddellian mainly cool wet open forest [10] was the conifer *Lagarostrobus* which produced *Phyllocladidites mawsonii* pollen. In South America during the Maastrichtian the northern limit of this conifer may have been near Quiriquina [11] in Chile and the Chubut/Río Negro area [9] of Argentina.

Changing paleogeography and climates affected the Seymour land vegetation, the most striking change being from conifer-dominated to *Nothofagus*-dominated forests in the Eocene [12]. Paleogeographic and climatic effects also influenced evolutionary trends in the floras and dispersal pathways [6,13]. For terrestrial species, the South America-Antarctic Peninsula corridor was lost in the Eocene.

Although paleolatitudinal position of Seymour Island (~63°S) barely changed from near the end of the Cretaceous through the Paleogene [7], the paleo-geographic changes associated with the later phases of Gondwana breakup, and resulting changes in climate, biotic stress, etc., had major regional effects recorded on Seymour Island by both marine and nonmarine palynomorphs.

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