

(long. 105°–180°) as a cooperative United Kingdom–New Zealand–United States venture, to complete a study of the entire southern rim of the Pacific Ocean basin.

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Southern Rim of Pacific Ocean Basin: Southern Andes to Southern Alps

Between the southern Andes of Tierra del Fuego and the Southern Alps of New Zealand lies the least accessible and geologically least explored part of the Pacific Ocean basin. A joint United Kingdom–United States project was initiated in 1983 to elucidate the geologic history and structure of the Pacific margin of Antarctica from the Antarctic Peninsula to Pine Island Bay at approximately long. 105°W. The first season (1983–1984) of this West Antarctic Tectonics Project was spent in the Ellsworth–Whitmore crustal block, and the second (1984–1985) in the Thurston Island crustal block. The project involves structural and general field geology, petrology, geochemistry, paleomagnetism, and airborne geophysics (magnetics and radar ice echo sounding). A final geologic season will be spent in the Pensacola Mountains of the Transantarctic Range in 1987–1988. Currently, airborne geophysical work will continue near the Byrd Subglacial basin and the Bentley Subglacial Trough.

This display will feature new paleomagnetic data indicating that little relative motion has occurred between the Antarctic Peninsula and the Ellsworth–Whitmore crustal blocks, but movement of both blocks has occurred relative to the East Antarctic craton. The favored reconstruction restores them with a 15°–20° counterclockwise rotation and a northward translation of up to approximately 10° of latitude, to a position on the Pacific side of the Falkland Plateau–Cape Fold Belt–Coats Land junction.

Geochemical data indicate that orthogneisses exposed at Haag Nunataks represent a Proterozoic cratonization event, and aeromagnetic data demonstrate that related rocks occur beneath the ice from the Ellsworth Mountains to the Antarctic Peninsula. Thus, the above reconstruction is geologically acceptable in that it places these rocks close to crystalline Precambrian rocks of similar age in the Falkland Islands and along the coast of Coats Land.

The Ellsworth–Whitmore block consists mainly of folded Paleozoic strata of the Gondwana cover sequence cut by middle Jurassic peraluminous “S-type” granites. These are crustal anatectic (or at least highly contaminated) melts signifying an intracontinental thermal event of substantial proportions that seems to herald the breakup of the Gondwanaland supercontinent.

The subsequent late Mesozoic–Cenozoic history of the Ellsworth–Whitmore block is recorded in geophysical evidence for sub-ice fault-bounded crustal rifts, some of which are probably young features related to Cenozoic alkali magmatism and the recent marked uplift of the Ellsworth Mountains, the highest on the continent (5,000 m).

Finally, plans are to continue the project westward into Marie Byrd Land