

The Age of the Park Volcanics Group SE Southland.

The Event:

Shallow intrusive rocks with some extrusive rocks make up the Park Volcanic Group in SE Southland. They exist in rocks of the Triassic-Jurassic age. They include andesites, dacites and some ignimbrite. The rocks are primarily andesites and suggest emplacement in a back arc setting near an island arc system to the east. The prominent hill near Pomahaka suggests a sill, a shallow intrusive event, but the top of the layer is never exposed. These rocks make up the only volcanic rocks exposed in the Southland Syncline which formed off the east coast of Australia when New Zealand was still part of Australia. These volcanic rocks have been dated as they give the youngest age of the Southland syncline. (1)

Dating techniques for older rocks:

Dating of older rocks (about 200ma) requires techniques with a half-life of greater than 1 million years. This is to get the accuracy required.

Argon-Argon Dating

Argon-argon (or $^{40}\text{Ar}/^{39}\text{Ar}$) dating is a radiometric dating method invented to supersede potassium-argon (K-Ar) dating in accuracy. This technique differs from the K-Ar technique in that prior to measurement in a mass spectrometer, the sample is irradiated with neutrons in a nuclear reactor and some of the ^{39}K (present as a known fraction of the total K in the rock) is converted to ^{39}Ar . The half-life of ^{40}K is 1.248×10^9 (2)

Potassium-Argon Dating

K-Ar dating is based on measurement of the product of the radioactive decay of an isotope of potassium (K) into argon (Ar). The argon collects in crystals and the more Argon present the older the age. The Ratio of ^{40}K to ^{40}Ar changes with time. This gives an old age for the Park Volcanics. (2)

Rubidium-Strontium Dating

The rubidium-strontium dating method is a radiometric dating technique to determine the age of rocks. ^{87}Rb decays to ^{87}Sr . (2)

The final age of the Park Volcanics.

The Park Volcanic rocks have been dated using the three techniques from above and is about 200ma old.