

## 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 requires isotopes that undergo radioactive decay. This is constant and can be measured in the labs. Two key techniques are set out below. Argon-Argon dating and Carbon dating.

### 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  $^{39}\text{K}$  (present as a known fraction of the total K in the rock) is converted to  $^{39}\text{Ar}$ . The half-life of  $^{40}\text{K}$  is  $1.248 \times 10^9$  ②

### Carbon Dating

$^{14}\text{C}$  is accumulated during an organisms lifetime. On death the  $^{14}\text{C}$  decays to  $^{14}\text{N}$  by emitting a beta particle. The half-life of  $^{14}\text{C}$  is 5000 years. This can be used to date extremely old things and events. ②

### The age of the Park Volcanics.

The Park Volcanic rocks have been dated using the two techniques above and are 200ma old.