

# PLATINUM GROUP METALS

## ► Use and markets

The suite of metals known as Platinum Group Metals includes platinum (Pt), palladium (Pd), iridium (Ir), rhodium (Rh), osmium (Os) and ruthenium (Ru). PGM have become critical to industry because of their extraordinary physical and chemical properties. The metals are refractory, are chemically inert even at elevated temperatures and display excellent catalytic activity. These properties are the basis for their principal uses: as catalysts in the automotive, chemical and petroleum refining industries and as corrosion resistant materials in the chemical, electrical, glass and medical and dental industries.

World demand for PGM over the past decade has grown steadily, especially for palladium which has been adopted as the standard for manufacture of autocatalysts. This has had far-reaching effects because in late 1999, with the introduction of stricter pollution controls in USA and Europe, there has been a sharp demand increase for PGM. From 1997 platinum and palladium demand has outstripped supply mainly because Russia, the biggest palladium producer, has been unable to meet demand from new production and has run down its stockpiles. As a result there has been a strong move to substitute other PGM for palladium with a consequent sharp rise in demand and price.

## ► Geology and potential of New Zealand PGM deposits

PGM are common in New Zealand and are usually associated with chromite in basic to ultrabasic complexes, or as alluvial concentrations.

### Orepuki and the southern beaches

The PGM deposits with greatest historic importance and some future potential in New Zealand are the placer deposits of Southland. Although PGM have been produced in New Zealand as a by-product of alluvial gold mining

since the 1870s, PGM were commonly discarded and production was recorded from only one area. At Orepuki, 47 kg of PGM were produced between 1897 and 1907. PGM-bearing gravels extend 30 km around the south of the Longwood Range and PGM-bearing sands extend continuously eastward along the beaches at Orepuki and along the beaches and raised beaches at Waipapa, Twelvemile and Otara, a distance of about 100 km.

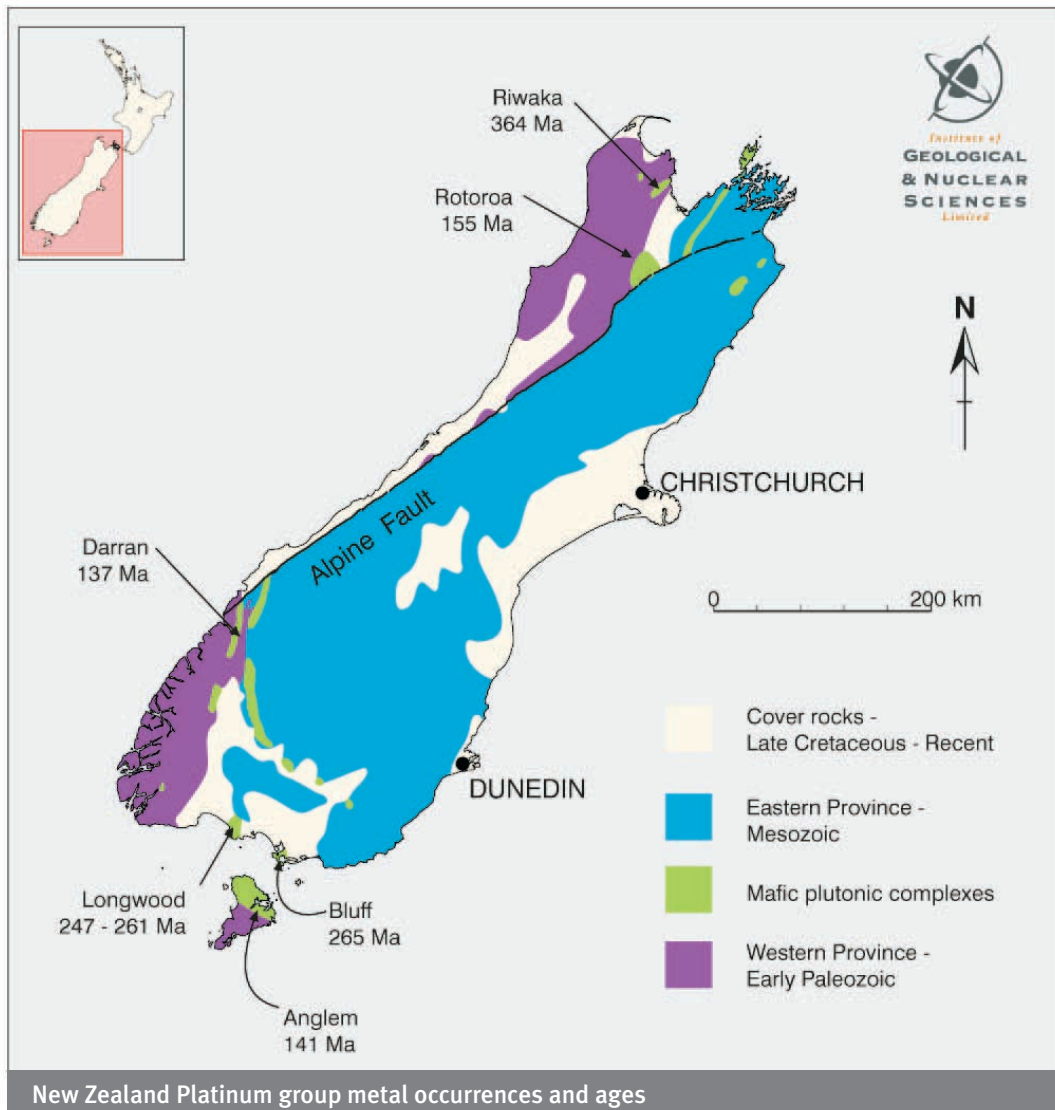
### Longwood Ranges Pahia Point, Bluff and Stewart Island

The source of PGM in the gravels and beach sands of Southland is the basic and ultrabasic rocks in the Longwood Range north of Orepuki, at Pahia Point to the south, and at Bluff. The Longwood Igneous Complex extends over an area of 32 by 12 km and includes an extensive series of layered gabbros, olivine gabbros and troctolitic lithologies of the Pahia layered series. Similar rocks of the Anglem Complex in northern Stewart Island are shedding PGM onto its northern beaches. Numerous publications have included mention of the PGM potential of the Longwood Range, and recent dating, aeromagnetic surveys, field work and drilling have combined to give a new understanding of the geology. Comparisons have been made with highly productive layered igneous complexes overseas.

### Red Hill mineral belt

PGM are being shed into rivers draining the Red Hill mineral belt of northern Fiordland, although little prospecting has been carried out. PGM are apparently associated with chromite concentrations around the flanks of Red Hill. The Red Hill ultramafic belt crops out along a 30 km long northeast-to-southwest trend and is truncated along its northwest flank by the Alpine fault. It is recognised as the southern extension of the Dun Mountain ultramafic belt discussed below.

Pounamu intrusives: PGM have been recorded in quartz veins in schist of the Pounamu region of the Southern Alps in central Westland. The quartz veins are in close proximity to lenses of serpentinite and talc-serpentinite which are



the source of nephrite jade (greenstone). Detritus from erosion of these rocks is shed into several large westward-flowing river systems, particularly the Taramakau, Arahura, Kokatahi and Hokitika rivers, all of which contain detrital PGM. There is potential for the discovery of further vein-hosted and placer deposits of PGM in Westland.

### Riwaka

PGM were identified in samples of sulphide mineralisation in the 30 km-long Riwaka basic to ultrabasic intrusive complex in the Nelson Province. No follow-up prospecting has been carried out.

### Collingwood and Takaka valleys

Gold-bearing gravels form extensive glacially derived high terraces on both sides of the Aorere Valley south of Collingwood and in the Takaka Valley to the east. Quartz conglomerates form isolated but extensive outliers in the same river valleys. The origin of the PGM recovered from these deposits is unknown.

### Dun Mountain mineral belt

Dun Mountain is an ultrabasic mass in a belt of ultrabasic rocks extending 140 km from D'Urville Island in the north to the Wairau Fault in the south. PGM are associated with chromite at Dun Mountain and have been found in streams which drain the western slopes of the mountain. No prospecting has been carried out specifically for PGM.

### Awakino River and Coromandel

Only two minor PGM occurrences are present in the North Island. Small amounts of 'platinum' recorded in stream gravels in a small tributary of the Awakino River were probably derived from a small serpentinite mass near Piopio. PGM were also obtained from a gold mine near Thames.

### Other areas with potential for PGM

Other areas in New Zealand which have potential for hosting PGM mineralisation include Mt Tapuaenuku in Marlborough, Hurunui Peak in central Canterbury, and several poorly mapped basic intrusions in Southland. Potentially more prospective is a massive, 95 km-long layered basic sill and smaller basic and ultrabasic intrusions in Fiordland. In the North Island there is some potential in numerous, small, fault-related ultrabasic intrusions.

### ► Exploration potential

There is considerable potential for PGM production in New Zealand, both from hard rock deposits and alluvial concentrations. The Longwood Range is considered the most prospective area, and recent drilling has shown PGM anomalies. Related rocks at Pahia Point, Bluff and Stewart Island also have considerable PGM potential, and alluvial deposits in Southland, Otago, Westland and Nelson are known to contain PGM. None of the known occurrences has been adequately prospected and there is a real possibility of future discovery of important deposits.



Alluvial platinum from Western Southland