

**REPORT
ON
REGIONAL SURVEY
FOR
MINERAL RESOURCES
IN
THE SOUTHERN ANDES AREA
THE ARGENTINE REPUBLIC**

PHASE I

MARCH 2000

**JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN**

PREFACE

In responding to the request of the Government of the Argentine Republic, the Government of Japan decided to conduct a regional survey for mineral resources in the Southern Andes area, Argentine republic, and entrusted the survey works to the Japan International Cooperation Agency (JICA). JICA, considering the technical nature of geology and mineral resources, entrusted the survey works to the Metal Mining Agency of Japan (MMAJ).

JICA and MMAJ agreed on the Scope of Work (S/W) with the Subsecretaria de Minería, Secretaria de Industria, Comercio y Minería, Ministerio de Economía y Obras y Servicios Públicos of the Government of the Argentine Republic after discussing the survey program, on December 2, 1999. The survey works will be carried out within a period of two years commencing from 1999.

MMAJ dispatched a survey team consisting of five members to the Argentine from January 12 to February 21, 2000. The survey works in the Argentine was carried out successfully with close cooperation of the Argentine government authorities.

This report summarizes the results of the survey works carried out in the initial year, and it constitutes a part of the final report which will be submitted after completion of the survey works of second year.

We would like to express our sincere appreciation to the officials concerned of the Argentine government, and we also grateful to the officials concerned of the Ministry of Foreign Affairs of Japan, the Ministry of International Trade and Industry of Japan, and the Japanese Embassy in Argentine for their helpful supports to conduct the survey works.

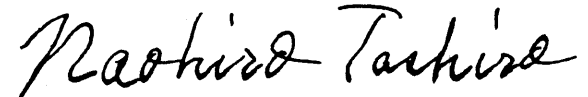
March, 2000



Kimio Fujita

President

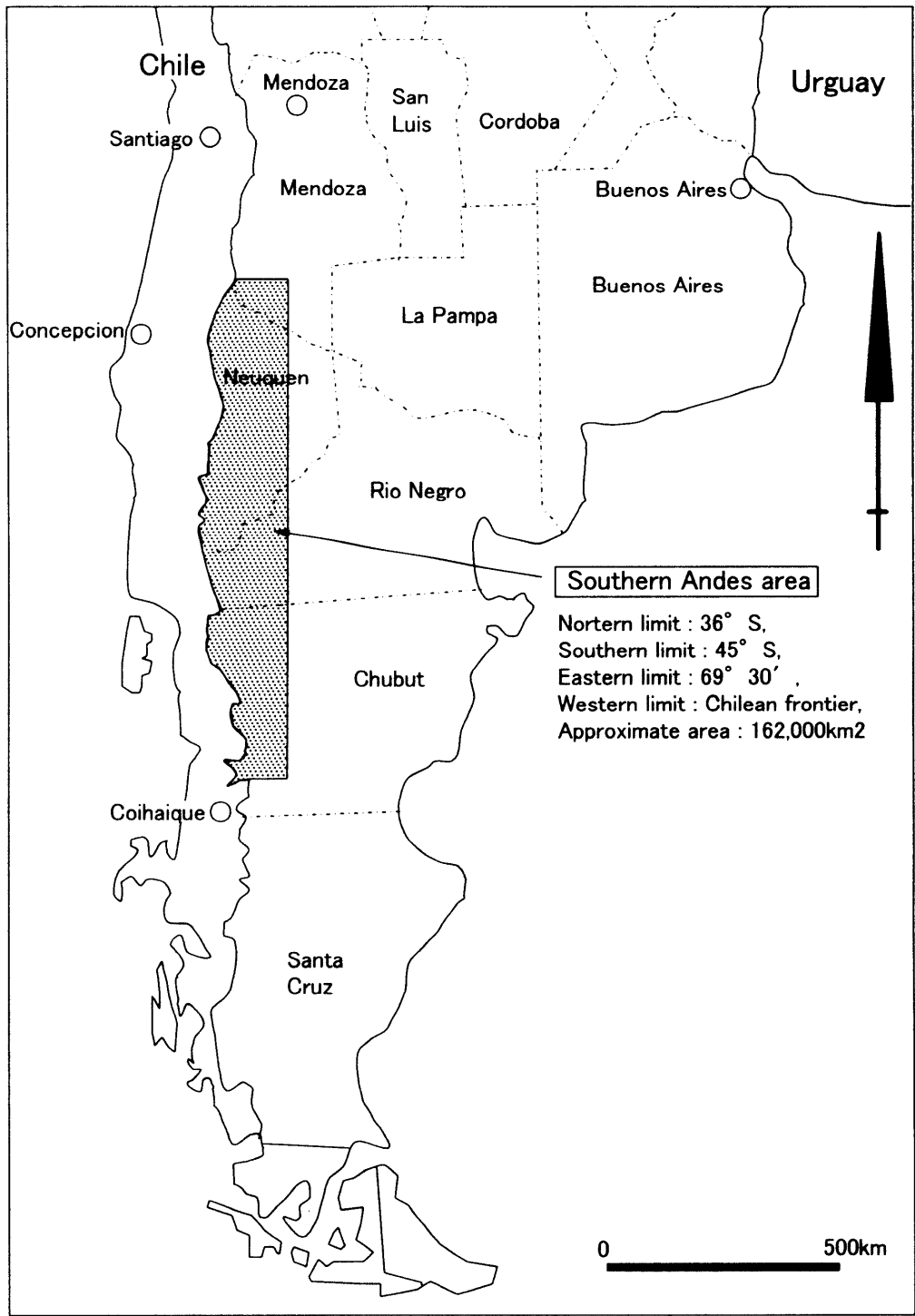
Japan International Cooperation Agency



Naohiro Tashiro

President

Metal Mining Agency of Japan



Location map of the Southern Andes area, the Argentine Republic.

SUMMARY

The southern Andes area covers 162,000 km² of lat. 36° S to 45° S and long. 69° 30' W until the border with Chile. The purpose of this survey is evaluation the potential of non-ferrous metallic mineral resources within a period of two years, and selection of promising areas, and also provision of information for the further exploration. In the course of the Phase-1 survey in first year, 1999 fiscal year of 1999 to 2000, the existing data analysis, satellite image analysis on LANDSAT TM and ground truth survey were conducted.

In the existing data analysis, the distributions and characteristics of magmatic arcs of each period, known mineral deposits, and hydrothermal alteration zones extracted by the satellite image analysis were examined mainly based on the report of Zappettini (1998) and Zanettine et al. (1999). As the results, porphyry Cu-Au deposits, high- and low-sulfidation epithermal Au deposits and auriferous polymetallic vein deposits are considered to be important from the viewpoints of geology and metallogeny, and economical viability for mine development. In the southern Andean region including the survey area, magmatic arcs were created by the collision of allochthonous blocks and the subduction of oceanic plates from the Pacific side since the Carboniferous. The above mentioned deposits were generated by these magmatic activities. Especially, it is supposed that the porphyry Cu-Au deposits have a high potential in the upper Cretaceous to Paleogene magmatic arcs. Meanwhile, the epithermal Au deposits have a higher potential than porphyry Cu-Au deposits in the Neogene magmatic arcs because the erosion has not been advanced.

In the satellite image analysis on LANDSAT TM, the photogeologic interpretation, lineament analysis and extraction of alteration zones were conducted by utilizing of false color images and ratio images. As the results, 244 alteration zones were extracted.

In the ground truth survey, 31 districts were surveyed. These were selected based on the results of existing data analysis, satellite image analysis, and consultation with SEGEMAR. The known deposits and hydrothermal alteration zones extracted by the satellite image analysis are distributed in the survey districts. It is designed to understand the outline of whole geology of the survey area and to recognize the characteristics of many typical mineral deposits as much as possible. Moreover, remote regions were excepted to conduct the survey for many districts as much as possible in a short period.

Based on the survey results of Phase-1, 7 districts were selected for objectives of Phase-2 survey. These are Varvarco, Campana Mahuida, Nireco, Rio Quillen, Rio Foyel, Epuyen, Cerro Gonzalo districts.

In Varvarco district, Permian to Triassic magmatic arcs and Neogene magmatic arcs are distributed. In the former, high-sulfidation epithermal Au deposits and porphyry Cu-Au deposits are expected, while in the latter, high- and low- sulfidation epithermal gold deposits

are expected. In Campana Mahuida district, upper Cretaceous to Paleogene magmatic arcs are distributed, and porphyry Cu-Au deposits are expected. In Nireco area, Permian to Triassic magmatic arcs and Neogene magmatic arcs are distributed, and porphyry Cu-Au deposits are expected in the former, while epithermal Au deposits are expected in the latter. In Rio Quillen district, Permian to Triassic magmatic arcs are distributed, and gold deposits are expected as sources of the placer gold. In Rio Foyel district, Paleogene magmatic arcs are distributed, and gold deposits are expected as sources of placer gold. In Epuyen district, upper Cretaceous to Paleogene magmatic arcs are distributed, and porphyry Cu-Au deposits and high-sulfidation epithermal Au deposits are expected. In Cerro Gonzalo area, upper Cretaceous to Paleogene magmatic arcs are distributed, and porphyry Cu-Au deposits are expected.

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