

**REPORT ON THE MINERAL EXPLORATION
IN
THE HOPA AREA,
THE REPUBLIC OF TURKEY
PHASE I**

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METAL MINING AGENCY OF JAPAN
JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

The Government of Japan, in response to the request of the Government of Republic Turkey, conducted mineral exploration, composed analyzing existing data and geological and geophysical surveys, in Hopa, Turkey. The Japanese Government entrusted the survey works to Japan International Cooperation Agency (JICA), and JICA in turn sought the cooperation of the Metal Mining Agency of Japan (MMAJ) to accomplish the survey work, considering the importance and technical nature of the work.

The survey work in the survey area will be carried out within a period of three years commencing from 2002. MMAJ dispatched the survey mission of 5 members to Turkey from October 15th, 2002. to December 7th 2002.

The survey work in Turkey was carried out successfully with cooperation of the Turkish Government authorities, and General Directorate of Mineral Research and Exploration. This report summarizes the results of the survey work carried out in 2002, and also forms a part of the final consolidated report which will be submitted to the Government of Republic of Turkey after completion of the survey work.

We wish to express our deep appreciate to the officials of the the Government of Republic of Turkey and to the Embassy of Japan in Turkey concerned for their close cooperation extended to the survey mission.

February, 2003

Takao Kawakami
President
Japan International Cooperation Agency

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President
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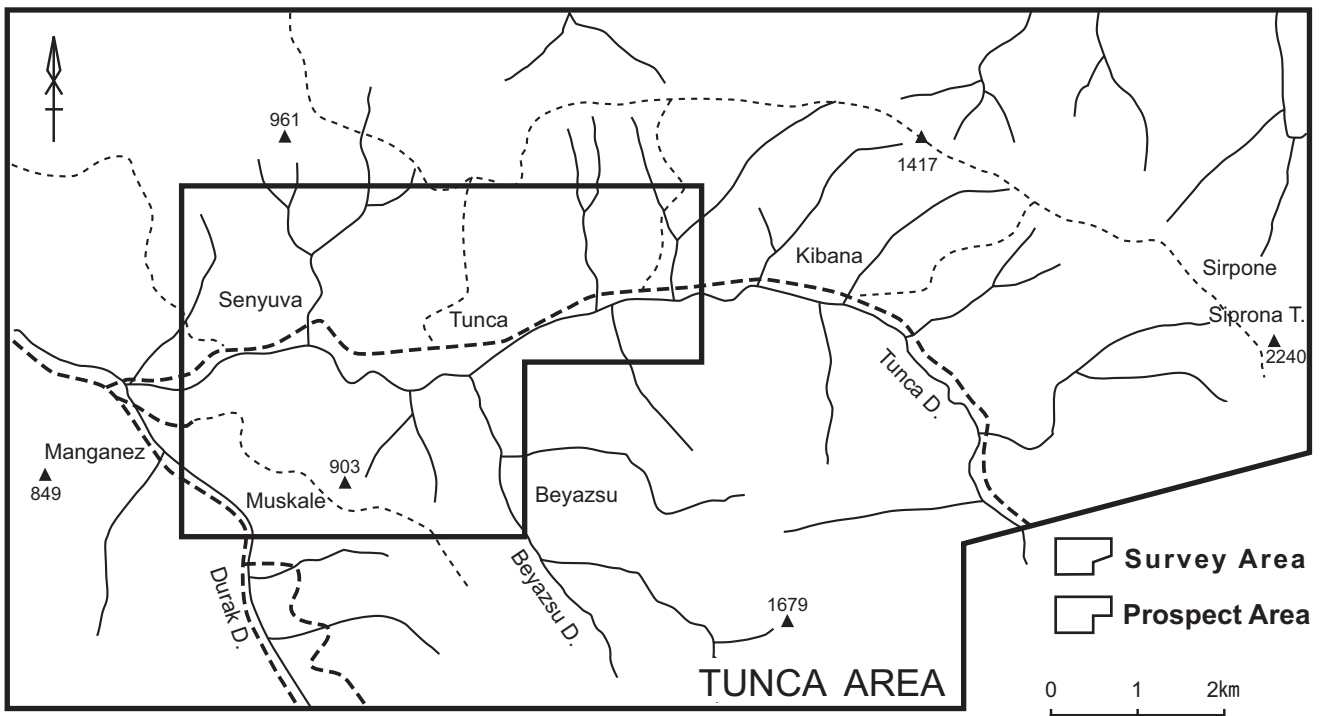
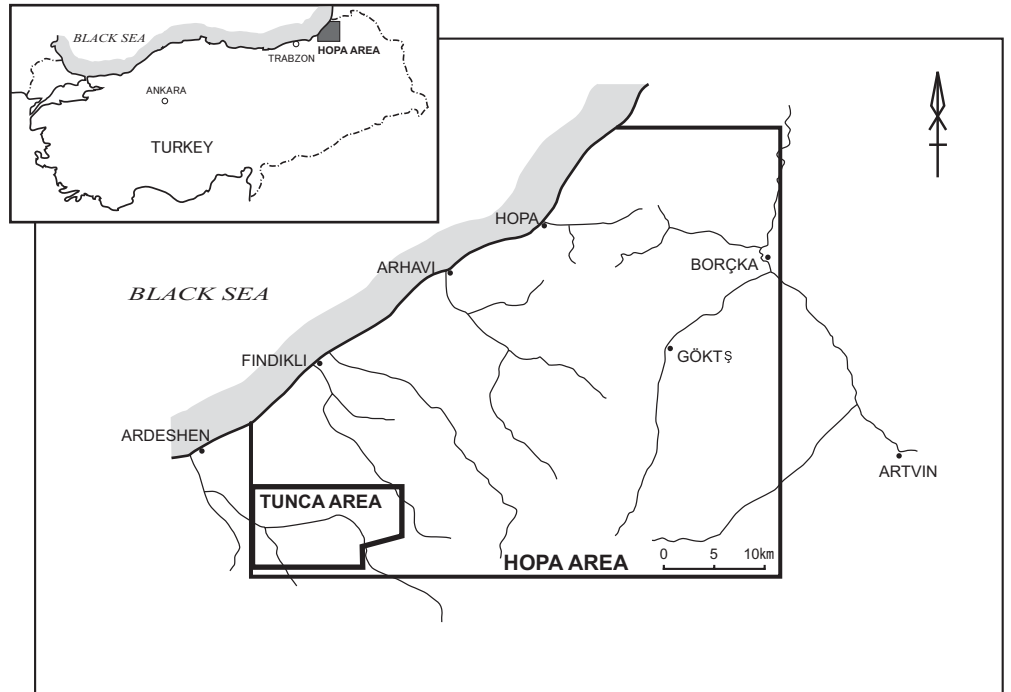


Fig.1 Location Map of the Survey Area

Summary

The purpose of this survey is to estimate the mineral potential for volcanogenic massive sulphide ore deposits and other type deposits in the Hopa area through an interpretation of results of geological survey and mineral occurrence surveys, on the basis of the work agreement concluded between the Japanese government and the Republic of Turkey on August 28, 2002.

In fiscal 2002, the first year of this survey, existing data was analyzed and a geological survey and a geochemical survey were also conducted in Tunca, the southwestern part of the Hopa area. The survey results are shown below.

The Alemağaç, Cağlayan and Sivrikaya formation of the Upper Cretaceous, and the Hamidiya formation of the Tertiary are underlain from bottom to top. Kackar granites of the Eocene, dacites and other rocks are intruded.

The Alemağaç formation is composed of dacite lava at the bottom and dacitic pyroclastic rocks at the top. The dacite lava erupted along the rim of the circular structure to form a lava dome. The dacitic pyroclastic rocks at the top was formed by a phreatic explosion that occurred on the side of the lava dome. The Cağlayan formation is mainly composed of thick basalt lava and is divided into several strata by calcareous mudstone and acidic tuff. The Sivrikaya formation is made up of acidic tuff, mudstone, sandstone, etc. and the Hamidiya formation is made up of pyroclastic rocks.

Volcanogenic massive sulfide mineralization and other mineralization are found in the survey area. The former is more important. As for the volcanogenic massive sulfide mineralization, hydrothermal activities caused by the phreatic explosion that occurred on the lava dome formed an ore deposit and occurrences, with dacite of the Alemağaç formation as host rock.

The Tunca Deposit, Tunca southern Occurrence, Muskale Occurrence, Isina Occurrence, Senyuva Occurrence, Garimani Occurrence, etc. are distributed in the survey area. These deposit and occurrences, except the Garimani Occurrence, occur at the above-mentioned lava dome. Many of the mineral occurrences have pyritic dissemination and network veins. The Garimani Occurrence occurs on another rock mass of dacite lava and has the mineralization of Pb and Zn. The Tunca Deposit consists of a massive sulfide block located on the slope of the Tunca River and a silicified footwall rock stretching along the river. The massive deposit was part of the main deposit, which might have existed in the north, separated and carried by a landslide. Therefore, it is an allochthonous deposit. It consists of pyrite with a small amount of chalcopyrite and barite. In the present survey, the Cu grade of the massive ore was as low as 0.1 to 0.3%.

In the past drilling survey conducted by MTA, however, a 7.65-meter-thick massive sulfide ore with an average Cu grade of 1.43% was discovered, and a high grade of Pb and Zn mineralization was also found in boulders. Consequently, there is a strong possibility that a high grade and large-scale ore deposit may be discovered in a future exploration.

Rocks near the Tunca Deposit and the Muskale Occurrence are strongly altered and belong to the quartz-sericite-chlorite-(sericite/smectite mixed layer minerals) alteration zone and high alteration index distribution zone. The alteration zone and high alteration index distribution zone near the Tunca Deposit continue to the area covered with the Cağlayan formation on the north.

The Muskale Occurrence is mineralized and altered over the wide range and pyritic dissemination and network are found. The existence of high-grade polymetallic sulfide ore gravel in the talus near the Isina Occurrence, situated south of the Muskale Occurrence, was reported (Todroviç et.al., 1973).

The geochemical survey revealed that a geochemical anomaly zone exists from the Muskale Occurrence to the Tunca Deposit and to the Senyuva Occurrence.

On the basis of the above-mentioned survey results, we propose the following surveys in Phase II.

1. Geological detailed survey in order to clarify the continuity of the ore horizon
2. Structure drilling in the hanging wall area in order to determine the depth of the ore horizon and alteration condition
3. IP survey in order to extract concealed deposits

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