

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

MARCH 2004

**JAPAN INTERNATIONAL COOPERATION AGENCY
JAPAN OIL, GAS AND METALS NATIONAL CORPORATION**

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PREFACE

The Government of Japan, in response to the request of the Government of Republic Turkey, conducted mineral exploration, composed of geological survey and drilling survey, in Hopa, Turkey. The Japanese Government entrusted the survey works to the Japan International Cooperation Agency (JICA), and JICA in turn sought the cooperation of the Metal Mining Agency of Japan (MMAJ, recently, Japan Oil, Gas and Metals National Corporation) 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 4 members to Turkey from July to December 2003.

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 2003, and also forms a part of the final consolidated report that will be submitted to the Government of Republic of Turkey after completion of the survey work.

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

March 2004

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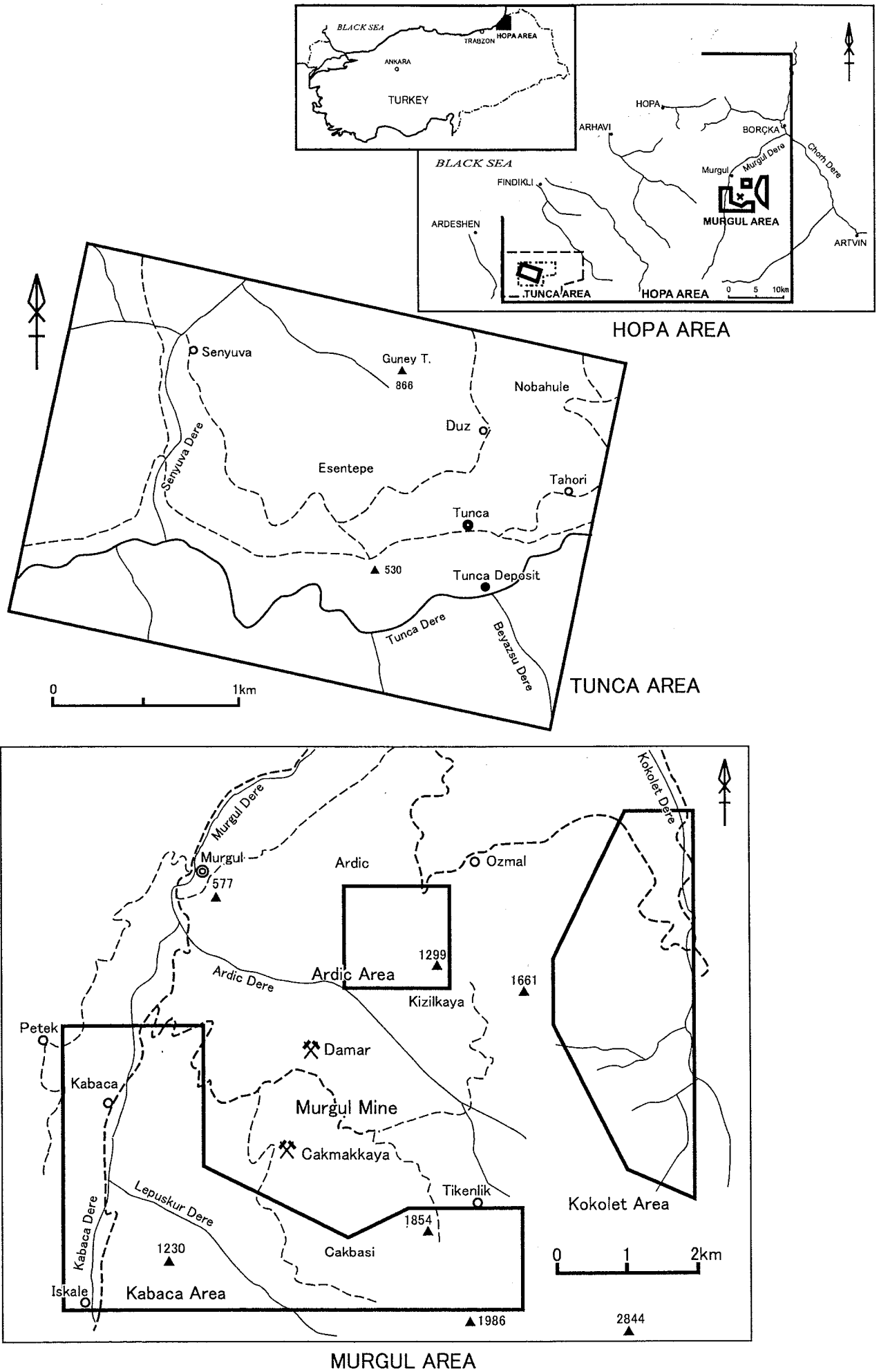


Fig.1 Location Map of the Survey Area

Summary

This survey has been conducted to extract potential areas of ore deposits for gold, silver, copper, lead, zinc etc., represented by the volcanogenic massive sulphide type, through various surveys and interpretation of the geology and state of mineralization, in the Hopa area of the Republic of Turkey. The transfer of technology related to this field to the counterpart is also important object of this program.

In this year's program, a detailed geological survey and structural drilling in the Tunca area, which has been extracted by the first year's survey, and a geological survey in the Murgul area have been performed.

1. Tunca Area

The Tunca area is underlain by the Cretaceous Alemağaç Formation consisting of dacitic rocks, the Çağlayan Formation being dominated by basic volcanic rocks, and Sivrikaya Formation consisting of sedimentary rocks, and the Tertiary Hamidiya Formation of sedimentary rocks.

The volcanogenic massive sulphide deposits in the area have been formed by a hydrothermal activity being accompanied by phreatic explosion occurred on the slope of dacite lava dome of the Alemağaç Formation. Right after the activity, the purple dacite body has intruded, and undergone sulphide dissemination of late stage mineralization at the green dacitic pyroclastic rocks. These facts indicate that the ore horizon ranges from the uppermost of the lower dacitic volcanic pyroclastic rocks of the Alemağaç Formation (Atf) to the lowermost of the Çağlayan Formation.

In the drilling survey, mineral occurrences relating to the volcanogenic massive sulphide mineralization have been caught from the all holes. Pyrite dissemination in the purple dacite has been confirmed in the MJTH-1 hole, and minor chalcopyrite and sphalerite dissemination in the footwall dacitic pyroclastic rocks has been caught in the MJTH-2 hole. As the result of the drilling survey, it has been presumed that the main body of the Tunca Ore Deposit is in between the northern slope of the Tunca River and MJTH-2 hole in a small-scale. MJTH-3 has captured the horizon of the volcanogenic massive sulphide ore and the underlying mineralized and altered zone. The state of the mineralized and altered zone suggests that the mineralization center is to the east of this area.

2. Murgul area

The Murgul area is underlain by the Kabaca Formation consisting of basic volcanic rocks, Murgul Formation consisting of dacitic rocks, Ardiç Formation being dominated by basic volcanic rocks, and Küre Formation being composed of sedimentary rocks. The Murgul Formation is divided into two members, the lower member having undergone the volcanogenic massive sulphide mineralization and the upper member overlying the former. The dacitic rocks in the area are of the Murgul Formation, except the Karatepe Dacite, and most of the dacitic rocks are of the lower member having undergone the mineralization.

The central parts of the alteration mineral zoning and distribution of strong alteration zones are on the Murgul Deposit Swarm, extending NE to SW. The volcanogenic massive sulphide mineralization occurred along this belt. In the Murgul Deposit swarm, the ore horizon in the southwestern part of the deposit has already eroded out, but that in the northeastern part is overlain by the Ardiç Formation, and extends to the subsurface of the mountains in between the Ardiç area and Kokolet area.

Based on the survey result up to now, following survey programs are recommended for the third year.

1. Tunca area

- (1) Drilling survey in the east of the Beyazsu area.
- (2) Geological and drilling surveys around the Manganez area.

2. Murgul area

- (1) Drilling survey in
- (2) the area between the Ardiç area and Kokolet area

3. Another area

- (1) Geological and drilling surveys around Peronit, Kutunit and Syvrikaya.

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