

GEOPHYSICAL SURVEY RESULTS AT THE ANCIENT BURIALS OF THE UGUUMUR SITE (DORNOD AIMAG, KHULUNBUIR SUM)

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ABSTRACT. Underground structure of ancient burials in Takhilgat and Tsuvraa mountains, Khulunbuir sum, Dornod aimag were investigated by geophysical method of magnetometry. The results of the study show that magnetic anomalies caused by different geological formations (mineral structure, rifts and etc.) may demonstrate about the existence of a stone construction under ground at the site of investigation and that geophysical methods can be effective for archaeological investigations of the burials and other underground structures.

INTRODUCTION

Within the framework of the scientific project "Ancient civilization of the Eastern Mongolia", we have done the geophysical survey for the purpose of archeological prospecting at the area, named Uguumur, Khulunbuir sum of the Dornod province, Mongolia.

The survey area is located in south part of the Takhilgat mountain ($47^{\circ}53'06.8''$ NL, $112^{\circ}56'01.2''$ EL), in 5 kilometers from the Khulunbuir sum (Fig. 1).

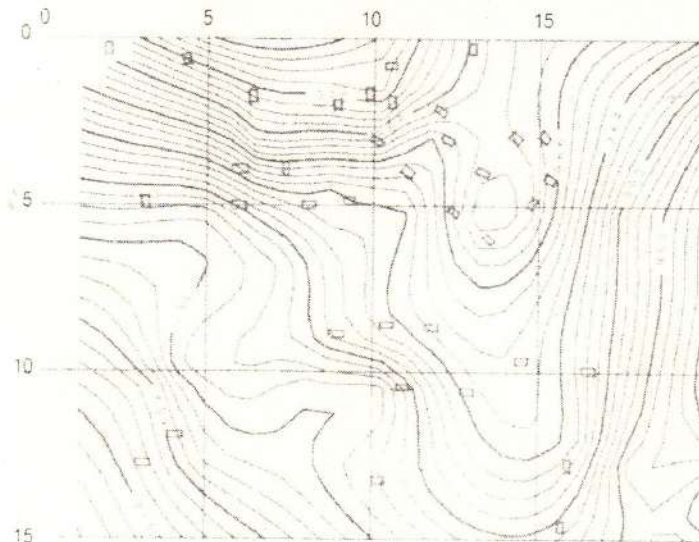


Figure 1. Plan of the Takhilgat mountain and burials location

There are about 130 burials within the region and among these around 50 are in the survey area. The area locates in the southern part of the Kherlen river basin in

low altitude mountain region. Soil in the area consists of Paleozoic era magmatic rocks and minerals (granite, granodiorite, granosierite etc). Takhilgat is a granite mountain and granite rocks are found at the top section of the mountain.

INTERPRETATION

Measurements were taken at about 260 points in the 5000 m² area of the Takhilgat mountain with 5x5 m grid square, using magnetometry and radiometry methods for the geophysical field surveys. In the Fig. 2, we have shown the magnetic and radiometric anomalies measured by quantum magnetometer (M-33) and field radiometer (SPR-68), respectively.

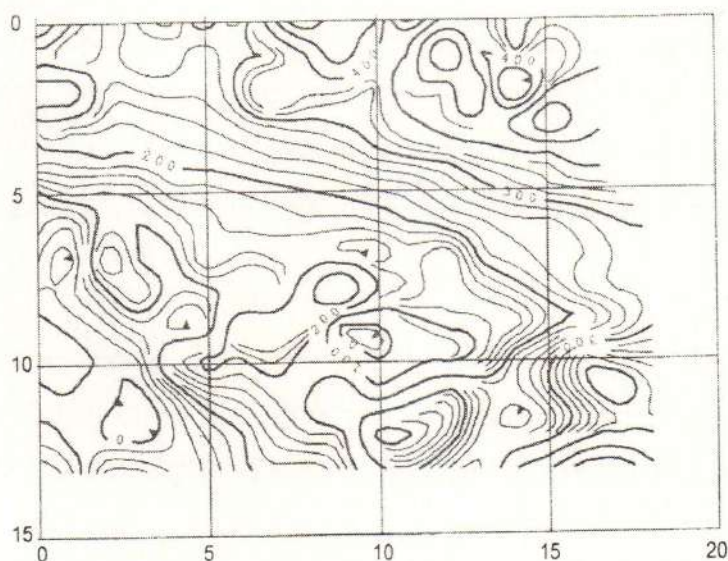


Figure 2. Contour map of magnetic anomalies of the survey area, the Takhilgat mountain

The gradient of magnetic field increases from 0 through 400-500 nTI from the southwest to the northeast and east side of the area. The burial location is coincided with the high gradient section of the area. But there is no local anomaly related to burials.

Magnetic survey results show that different geological formations (mineral structure, rifts etc.) may cause magnetic anomalies at the site of investigation. Based on the measurements of geophysical anomaly we concluded about absence of any artifacts in the graves, which could be source of geophysical anomaly. Subsequent excavation of some burials confirmed our conclusion.

For radioactive field measurements, the intensity of gamma radiation was 17-24 mcr/hour. The measured intensity value was the same with the background radiation (e.g. there is no radioactive anomaly).

The second survey area was a burial with 8x8 m stone railing. The burial is laid at the lower back section of the Tsuvraa mountain, at the east side of the Takhilgat mountain. We have done geophysical investigations using magnetometry, resistivity and radiometry methods in the survey area (224 m²) and used 2x2 m grid square. In the Fig. 3 and 4, we show the contour maps of the magnetometric and resistivity surveys.

The archeological object is revealed by isolated maximum of the electrical resistance (200-500 Om*m) and relative minimum value of the magnetic field.

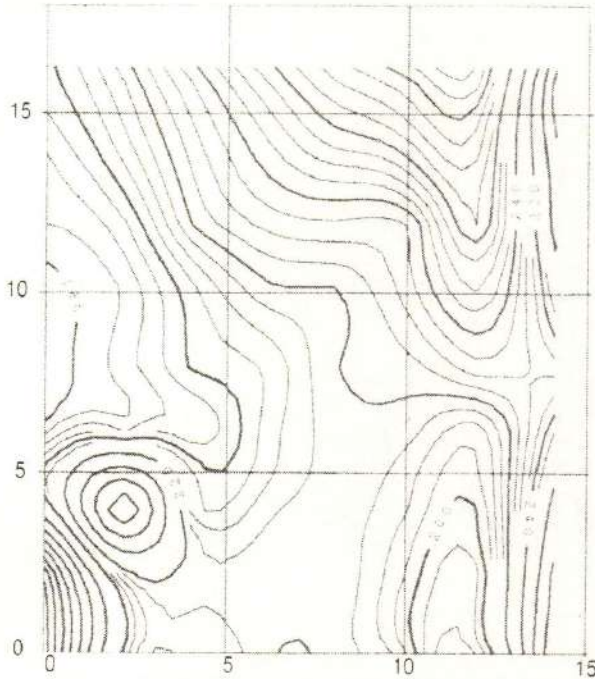


Figure 3. Magnetic anomalies of the burial, the Tsuvraa mountain

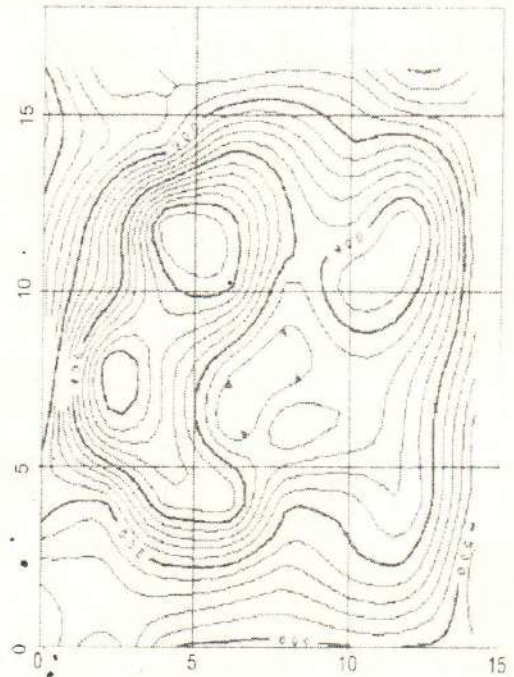


Figure 4. Contour map of electrical resistance of the burial, the Tsuvraa

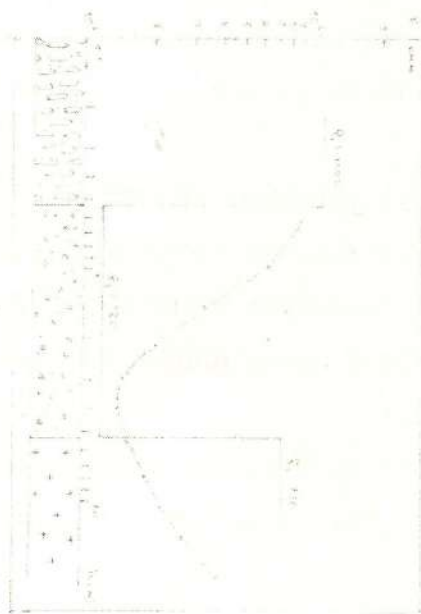


Figure 5. Interpretation of vertical electric probing

The electrical resistance contour map reflects the rectangular shape of the stone railing of the burial and we can notice slight anomalies from magnetometric contour map which are coincided with the shape of the railing. The result increases the probability of the existence of a stone construction under the ground.

Because of the isolated maximum

of magnetic field, the west and east edges of the area were determined by excavating the construction.

In the Fig. 5, we show the result of vertical electric probing, which was measured at the central point of the burial. The result reveals the depth (about 6 meter) of base rocks, which were cumulated geological evidence of erosion and sedimentation, by which we can estimate the depth of the burials.

CONCLUSION

- The ancient burials of the Takhilgat mountain are the stone constructions, located near the ground, which are covered with plate stone. There are no metall belongings inside the burials.
- The structure of the burial, which is located at lower back section of the Tsuvraa mountain, coincided with the geophysical field anomalies. The coincidence shows that using geophysical methods could be effective for the burial, which has similar size and structure with the Tsuvraa mountain burial.

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REFERENCE

Batsaikhan Z., 2002. Ancient nomads of Eastern Mongolia. Scientific Journal of NUM. Series Archaeology, Anthropology and Ethnology. Vol.210 (19) p.40-48

SUMMARY

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ӨГӨӨМӨРИЙН (ДОРНОД, ХӨЛӨНБУЙР) ЭРТНИЙ БУЛШНЫ ГЕОФИЗИКИЙН СУДАЛГАА

Энэхүү өгүүлэлд эрт үеийн булшны дотоод бүтцийг судлах, түүнд агуулагдаж байж болзошгүй эд өлгийн зүйлийг илрүүлэх зорилгоор хийгдсэн геофизикийн судалгааны туршилт арга зүйн асуудлыг тусган зарим үр дүнг өгүүлэв.