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Distribution of Mineral Deposits in Korea and its Significance.

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韓國의 鑛床分布와 그 意義

1. Introduction:

It is a widely known fact that mineral deposits of igneous origin are developed around the granite masses. Dr. Kevin Burke(1960) emphasized on this fact by the study on the distribution of the mineral deposits in southern Korea. It is worthwhile to mention that the mineral deposits are not constantly found around the granite masses. For the formation of mineral deposits, many factors such as structure, nature and form of intrusives must be considered. Here, the writer intends to show the importance of the fracture zones as the passage of ore solution by analyzing the distribution of mineral deposits in Korea.

2. Lineament in distribution of mineral deposits.

Fig.1 shows the distribution of copper deposits in Masan area(Long. 128°34′, Lat. 35°07′). By drawing a stright line which passes through as many points as possible and then the parallel lines on which at least more than three points are present, 16 parallel lines which trend N45°E were obtained. In doing this, 70% of copper deposits are laid upon them. It appears to the writer that there is a lineament in the distribution of mineral deposits in Masan area. These parallel lines are named here as *ore-line*.

The N45°E direction is known as Sinian direction in Eastern Asia, and it is in accordance with the long axis of the Mesozoic granite transversing southern Korea obliquely. This direction is also parallel to the strike of paleozoic formations of the Noryeong folded mountains and the trend of the belt-like Mesozic strata in Gongju area(Long. 127° 07′, Lat. 127°27′). Fig.1 also shows NS-trending ore-lines. NS direction is one of the important tectonic lines in Eastern Asia. Fold axis trending NS is abundantly observed in southern Korea. Gold veins are so closely connected with this NS trending fissures that it is said that one might not expect mineable gold other than NS trending veins. It is also surprising that the distribution of hot springs in the eastern part of Korea has NS trend too (Fig. 11). These facts indicate that the lineament has certain trend which is parallel to the main tectonic lines. It is believed to be that not by accident the ore-lines are parallel to each other and they accord with the tectonic lines.

3. Zonal pattern in the distribution of mineral deposits.

Fig.2 shows distribution of mineral deposits of Korea in 1936. The distinguishable fact is that the deposits are crowded along the certain zones as seen in Fig. 2. This is same with Fig. 3, 4, 5, and 6. Analyzing the lineament of mineral deposits the zonal pattern shows certain trends which have the definite directions, such as N45°E in Fig.2, N 45°W in Fig.3, N80°W in Fig. 4, N30°W in Fig.5 and NS in Fig.6. The writer considers these phenomena as a belted distribution of mineral deposits. Belted distribution trending N45°E is repeated six times, and is parallel to each other as seen in Fig. 2. It is notable that the directions of this belted distribution are in accordance with the directions of linear distribution in Masan area. Belted distribution trending N30°W which accords with the Taebaeg Mountain Range

is also recongnized. The N30°W direction is known as the Korean direction. Belted distribution trending NS is also distinct as much as the cthers. In spite of excellent N45°W and N80°W trending belted distributions the structure of such directions is not definitely known in Korea. The writer's opinion is that the fractures of N45°W and N80°W are related to the folding, the axes of which trend N45°E and N10°E, resepectively. The fold and fault trending N10°E is well known in the folded area and it is believed that the N10°E-trending structure is related with the well known Chugaryeong graben valley in Korea. From these facts it can be said that linear and belted distributions are also concordant with the main structure in Eastern Asia.

4. Intersection of linear distribution

As shown in Fig. 1, the places where copper deposits are crowded in Masan area correspond to the portion where ore-lines are intersected. Assuming that the linear distribution of mineral deposits is caused by filling of ore solution into the fissure among the fracture zone, the above mentioned fact may be interpreted as that mineral depcsits are more or less distributed at the area where fractures are intersected. As the ore shoot is formed at the intersection of fissures, the principle seems to be applicable to the distribution of mineral deposits.

5. Intersection of belted distribution.

Fig. 7 shows that mineral deposits are crowded in the area where zonal patterns of mineral distribution are intersected. More than 80% of mineral deposits are included in these intersected areas. It will not be an accidental coincidence. Assuming that belted distribution of mineral deposits is due to numerous fissure groups of certain direction in particular area, in addition to mineral deposits which are formed at the intersected position of fissures, it can be said that mineral deposits are developed at the area where fracture zones are intersected. Consequently it is inferred that mineral deposits are scarcely found at the area where fracture zones are not intersected. It is also said the intersected portion is structurally a suitable area and other areas are structurally unsuitable ones. In Fig.8, the former is shown in blank and the latter in dots.

6. A review of suitable and unsuitable structures.

Basically it would be expected that the mineral deposits are found abundantly in a suitable area and scarcely in an unsuitable one. In fact, however, as seen in Fig. 8, it is often found scarcely in the suitable area and some in the unfavourable area. From the map (Fig. 8), this fact seems to be disagreeable to the writer's statements, but this is is true that in the former case is due to lack of granite body and the latter case is resulted from suitable structure developed locally. It can be also recongnized from Fig. 8 that the mineral deposits are not developed in the structurally unsuitable district in spite of that the well-developed granite masses are present, and from Fig. 10, that the mineral deposits are highly developed in the structurally suitable district. An excellent example of this is found around the granite mass in which outcrops overlapping the area structurally suitable and unsuitable, where the mineral deposits are abundantly developed in the former and very few in the latter (Fig. 9). These facts indicate that distribution of the mineral deposits in Korea is largely controlled by the zonal fracture parallel to the main tectonic line.

Conclusion

1. Mineral deposits in Korea are accumulated in the intersection districts of fracture zones which trend mostly N45°E, N45°W, NS, N30°W and N80°W.
2. Most of mineral deposits in Korea were emplaced after the above fracture zones were formed.

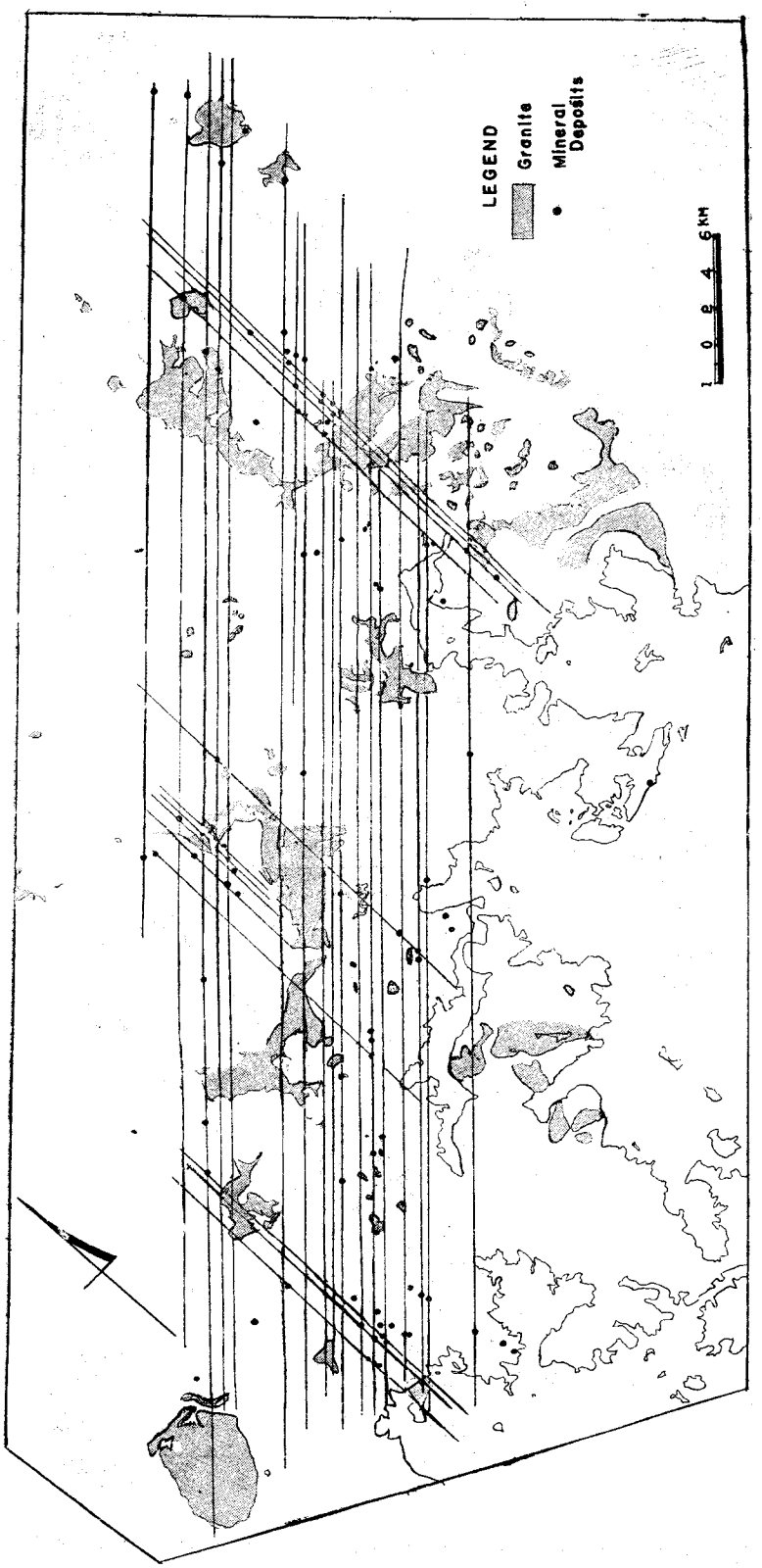

Fig. 1. The map showing linear distribution of mineral deposits in Masan area.

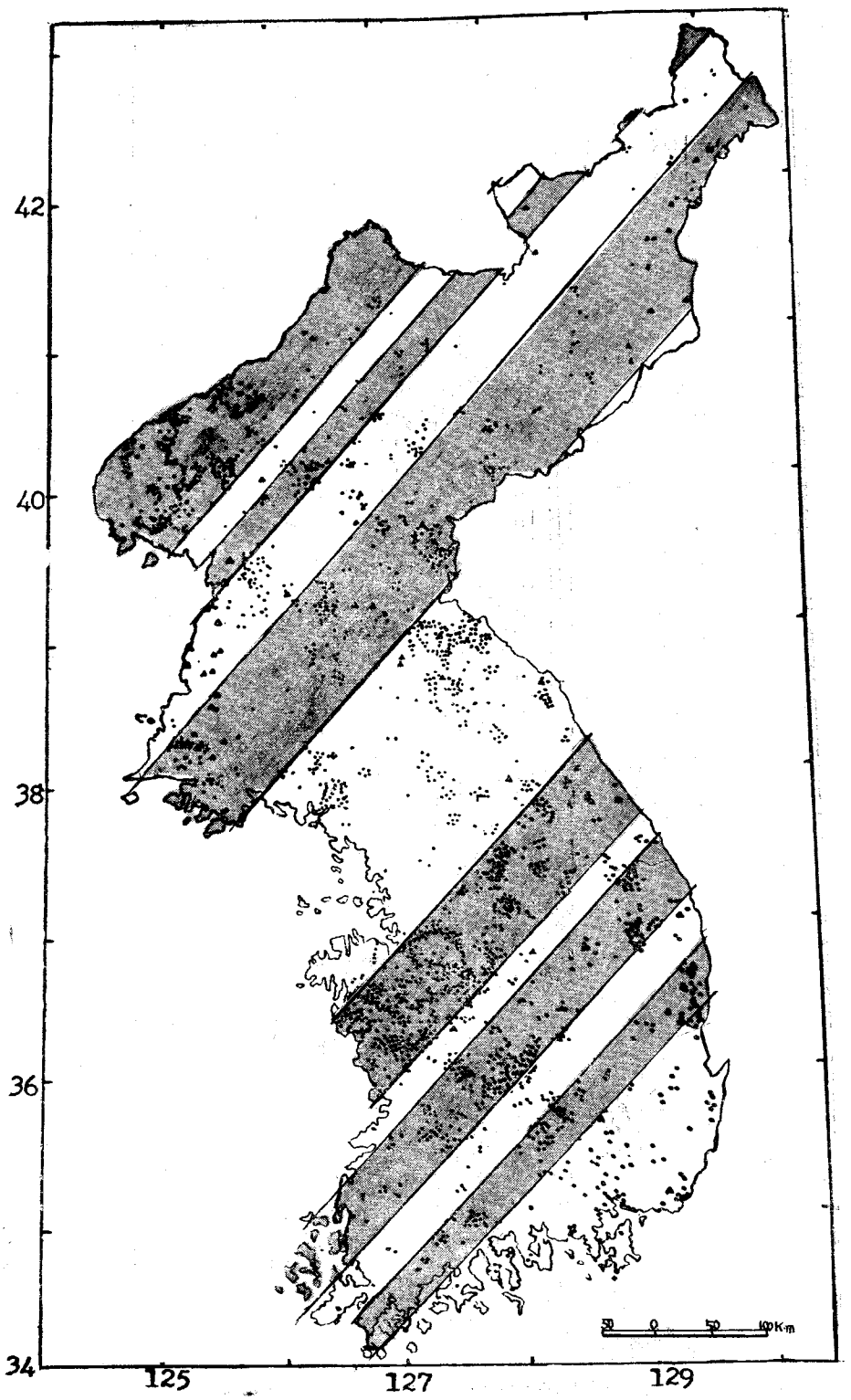

Fig. 2. The map showing belted distribution (shadow part) of N 45°E trend.

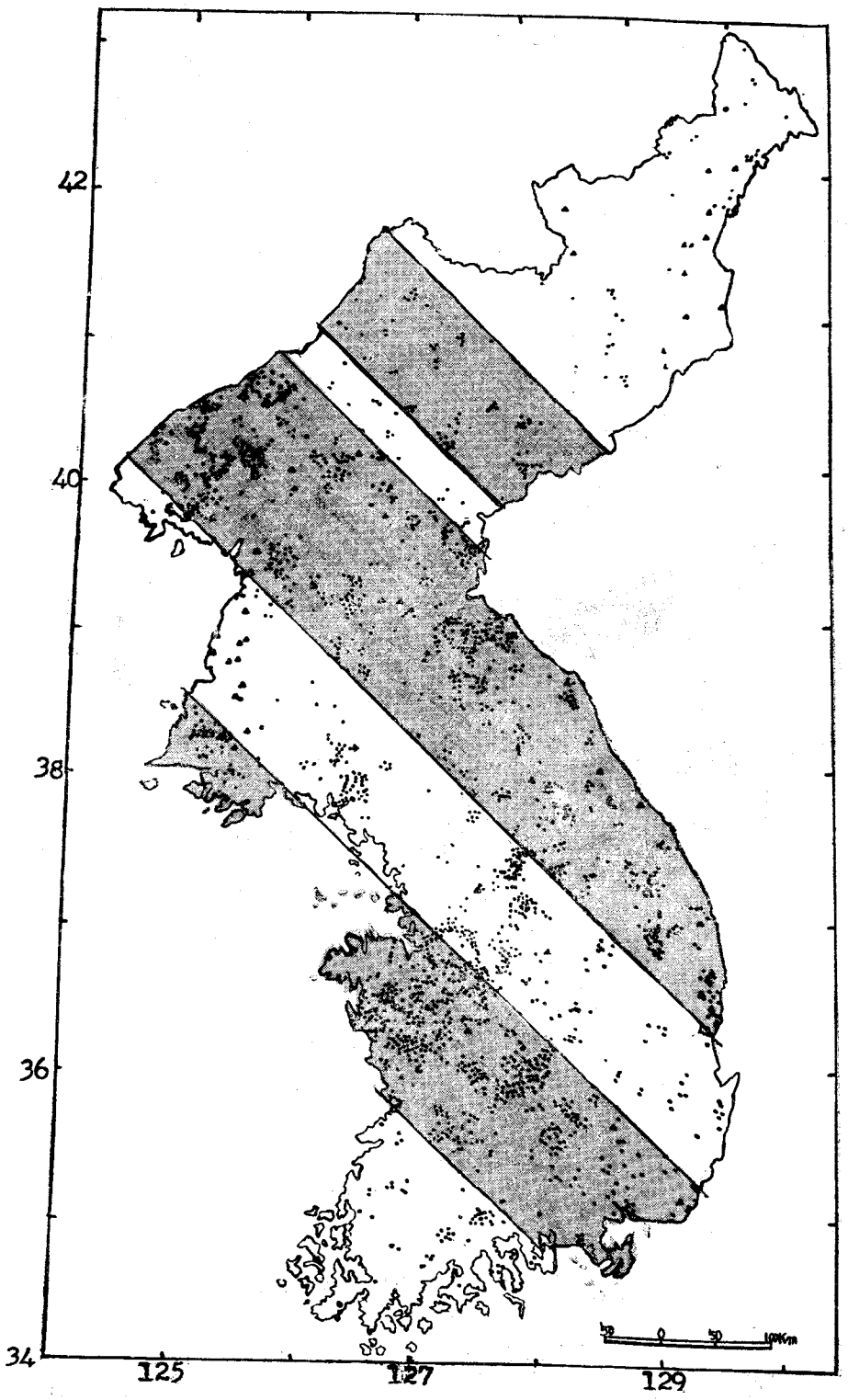

Fig. 3. The map showing belted distribution (shadow part) of N 45°W trend.

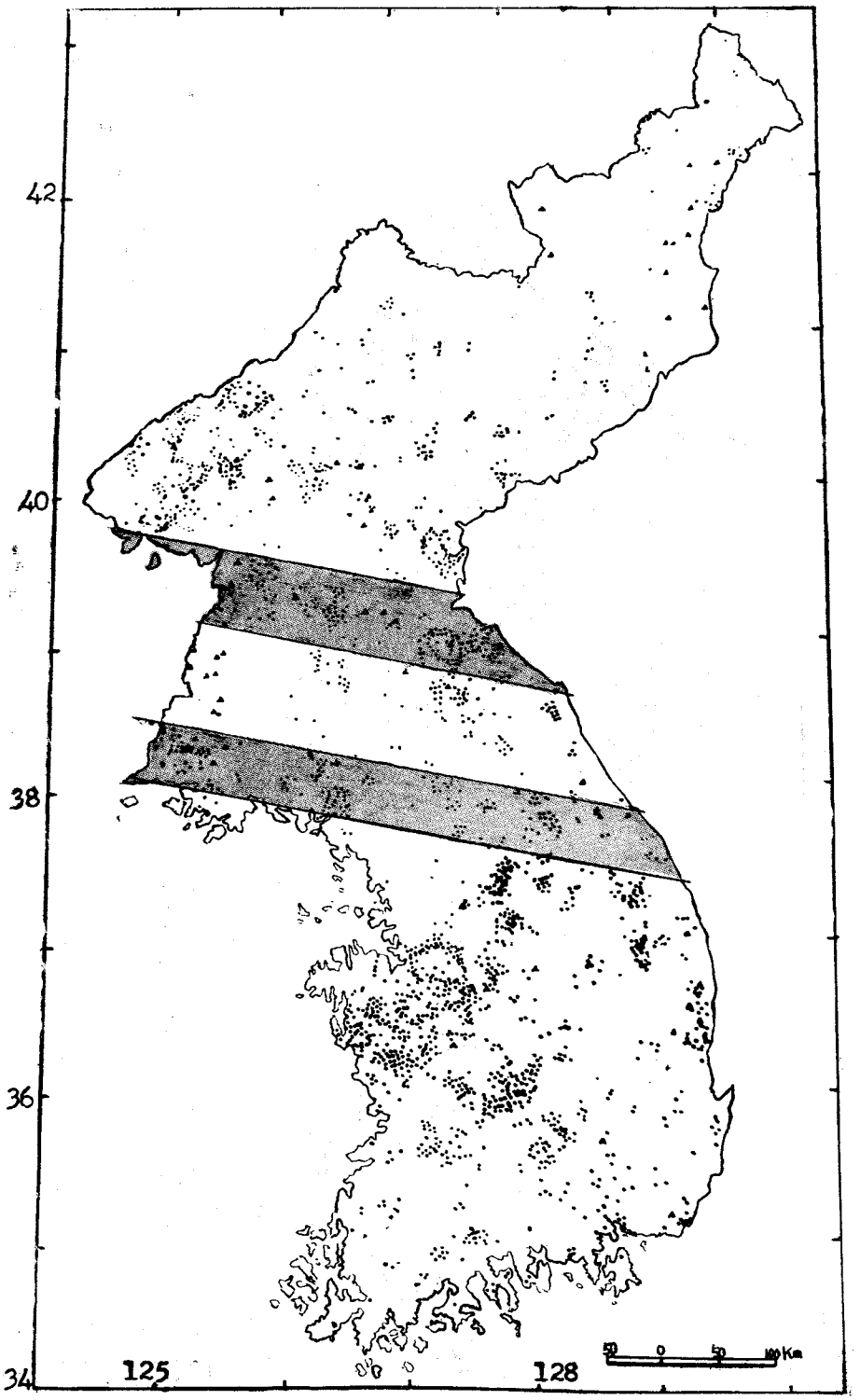

Fig. 4. The map showing belted distribution (shadow part) of N 80°W trend.

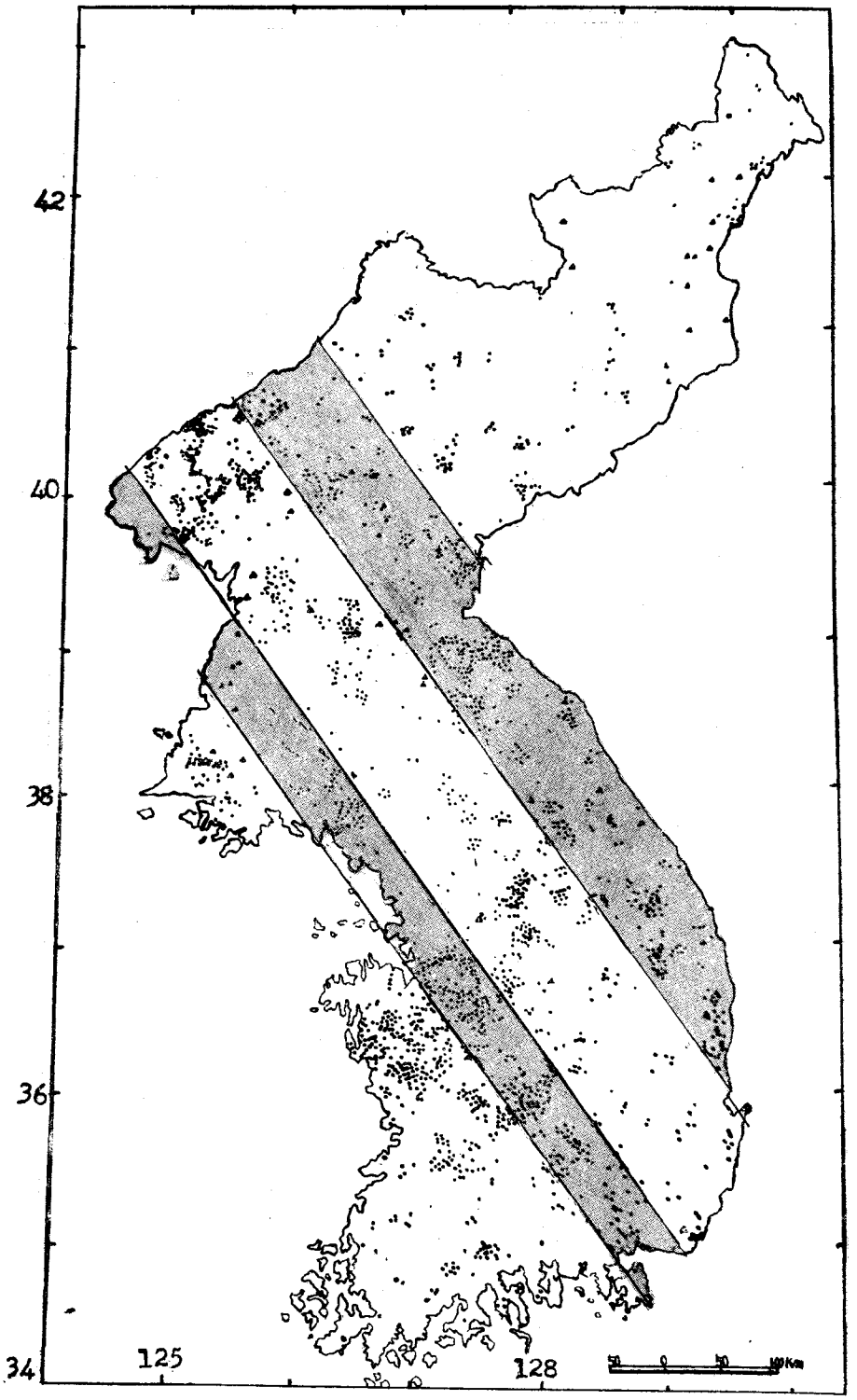

Fig. 5. The map showing belted distribution (shadow part) of N 30°W trend.

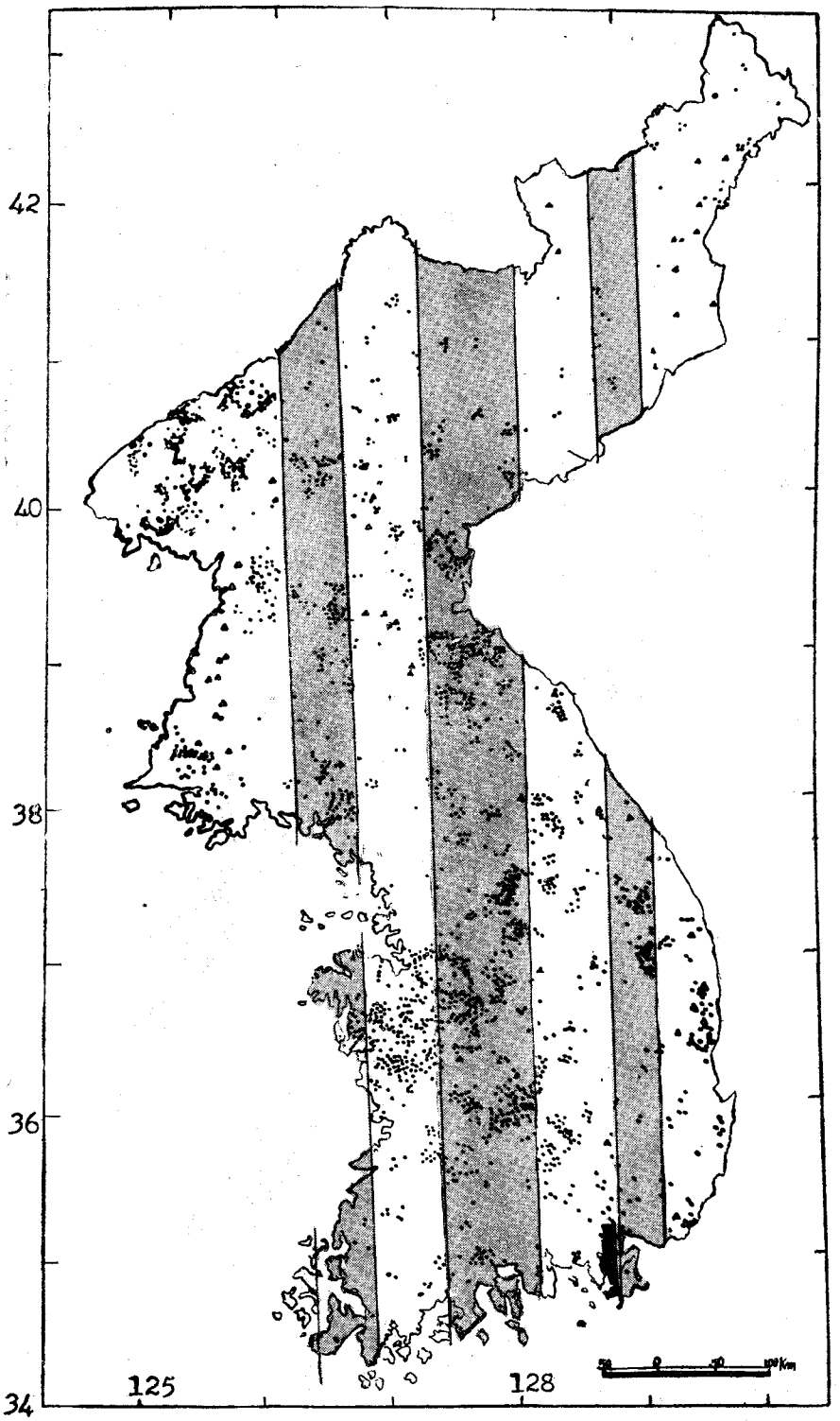

Fig. 6. The map showing belted distribution (shadow part) of NS trend.

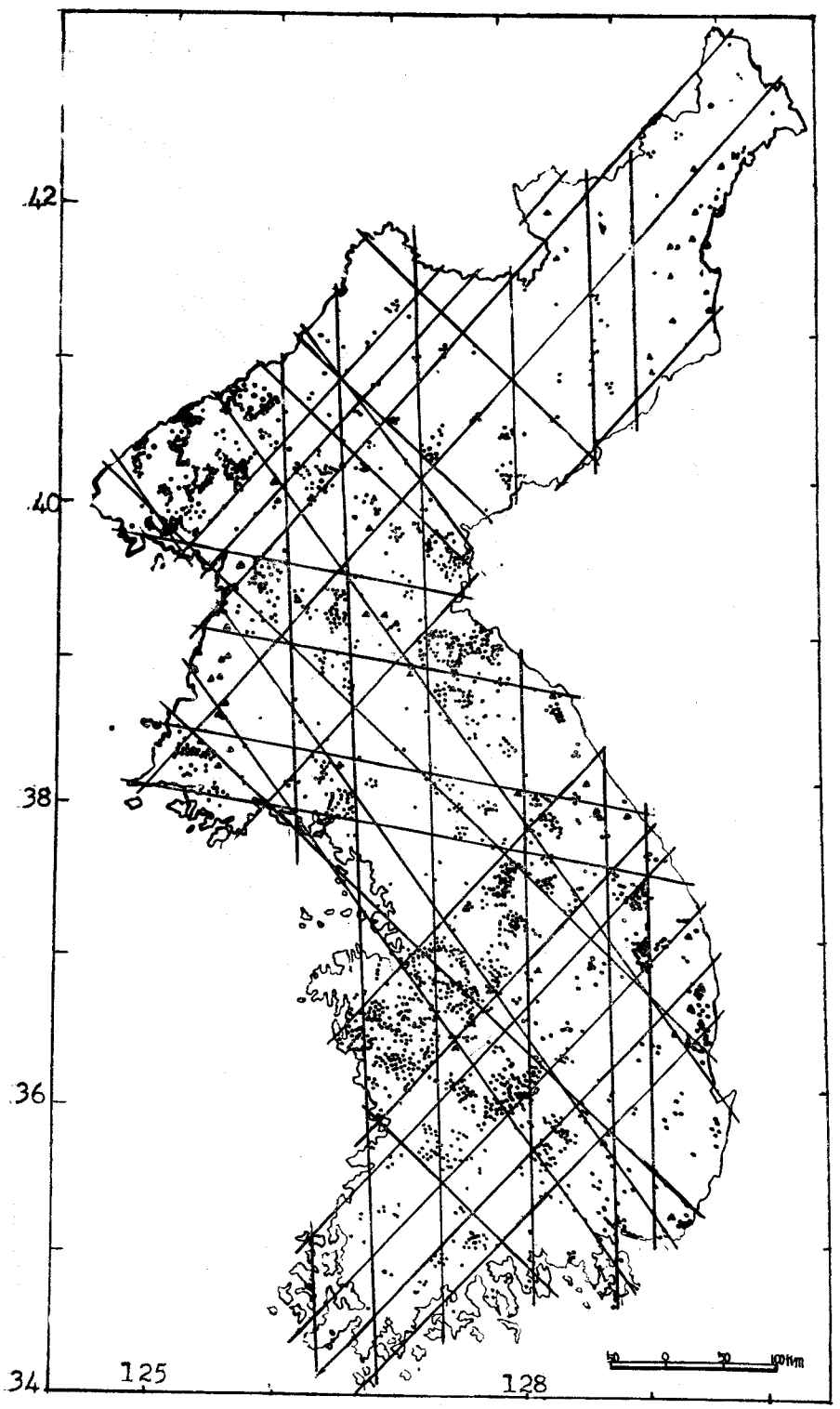

Fig. 7. The map showing belted distribution in the Figs. 2, 3, 4, 5, & 6.

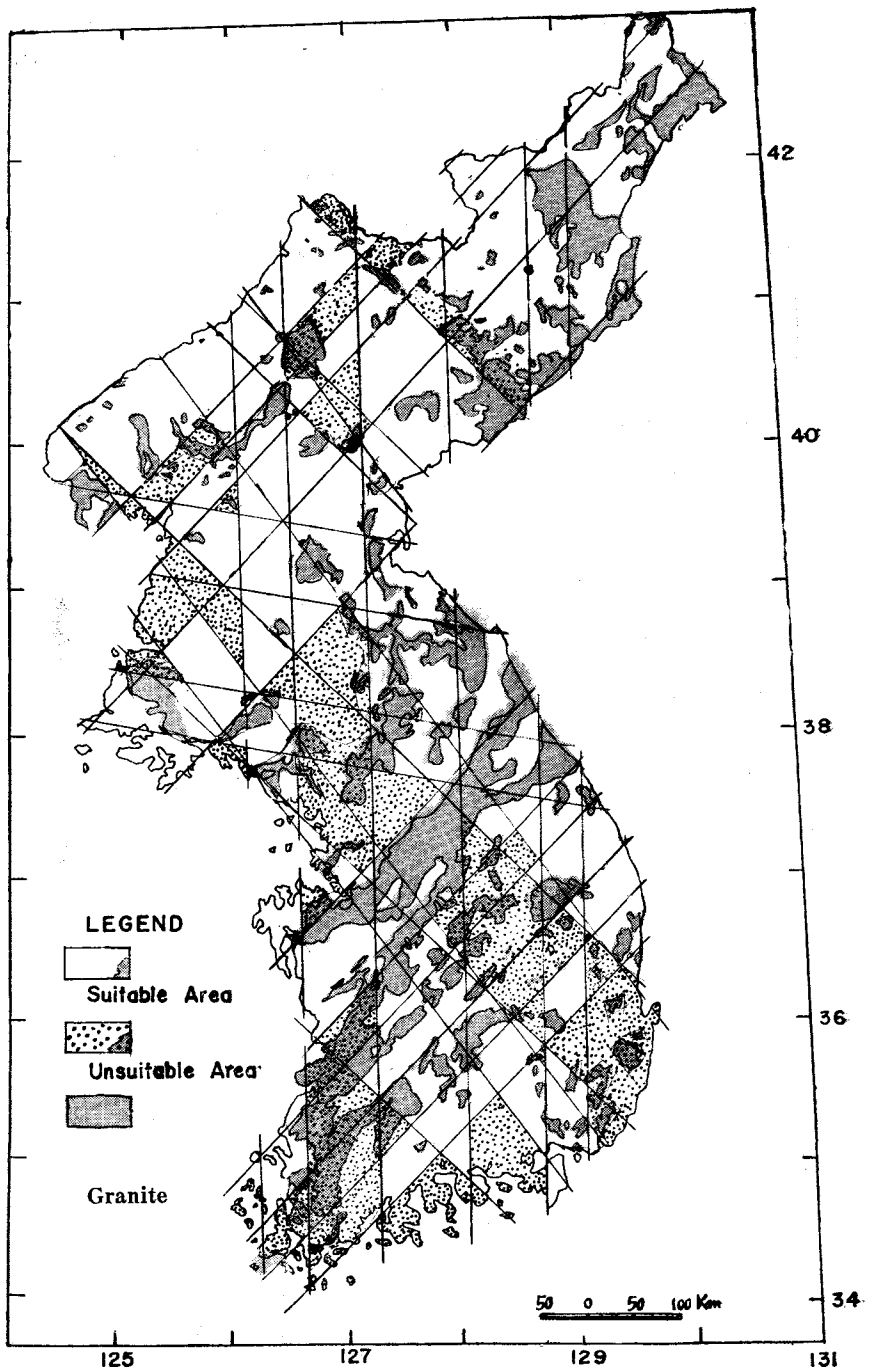

Fig. 8. The map showing structurally suitable and unsuitable areas for mineral depsits in Korea.

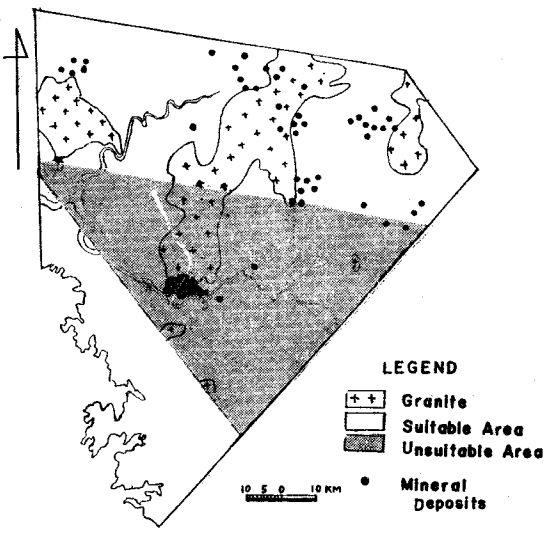

Fig. 9. The map showing relation of mineral deposits and granite with the structural condition in Seoul area.

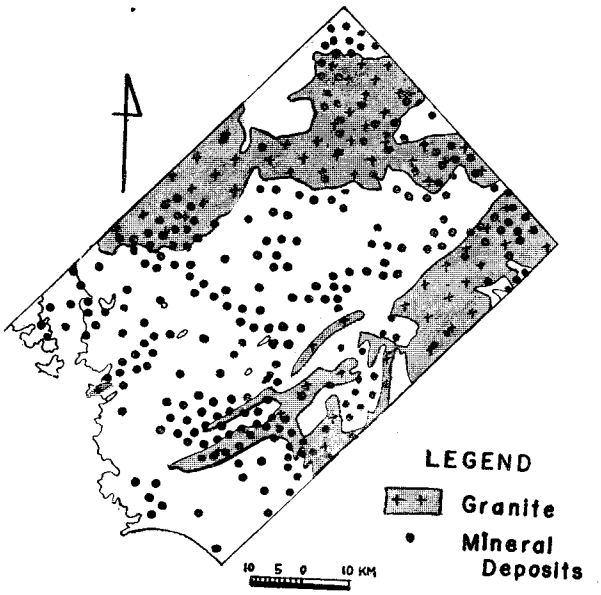

Fig. 10. The map showing a great number of amount of mineral deposits where the structural condition is suitable in Daecheon area.

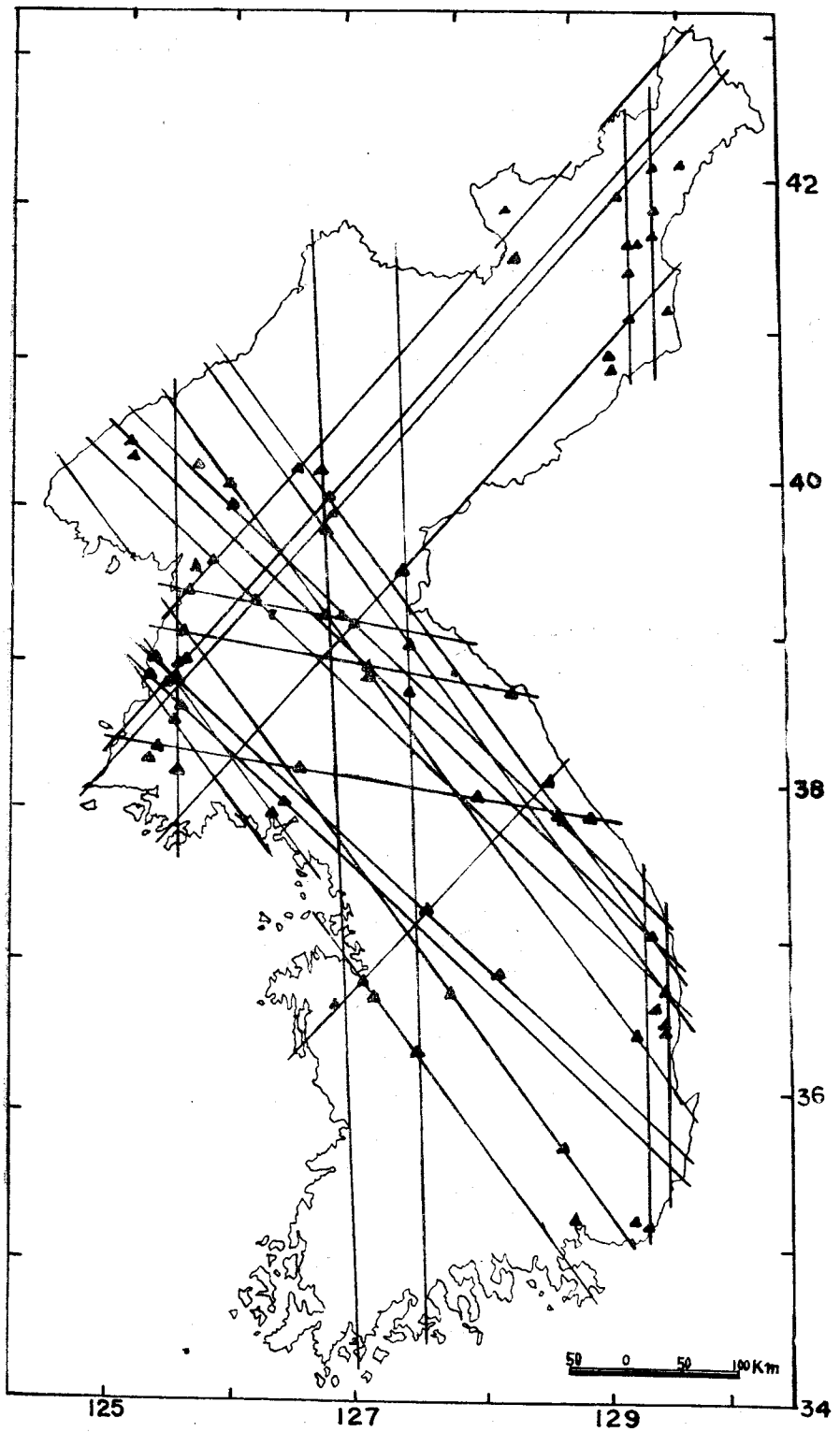

Fig. 11. The map showing the linear distribution of hot springs. The directions of the lineament of hot springs are equal to those of mineral deposits.