oxidized copper minerals as well as chalcopyrite are disseminated. In this district, secondary enrichment zone is confirmed by drilling and a reserve of about 6 million tons of Cu 0.4% ore has already been defined. Also a similar mineralized zone exists within the sericite-tourmaline alteration zone of quartz porphyry host rock in the eastern part of this district, but it has not yet been drilled.

In the Mocha district, fluid inclusions in quartz grains from the network quartz veins consist of gas-liquid two-phase inclusions and poly-phase inclusions containing solid phase. The poly-phase inclusions with daughter minerals are considered to be the primary material. The daughter minerals are NaCl, KCl, and opaque minerals including chalcopyrite. The range of average NaCl disappearance temperature is 332~399℃ and the average salinity (NaCl) ranges from 40.5 to 42.3wt%, these values are typical of porphyry copper mineralization.

In the Soledad district located on the southeastern side of the Mocha district, intrusion of granodiorite and quartz porphyry was confirmed in the central part of annular structure found by satellite remote sensing. Sericite-tourmaline alteration zone is developed in these intrusive bodies and the Cretaceous System in the vicinity. But quartz veins are few and mineralization consists mainly of pyrite dissemination with small amount of chalcopyrite. The K-Ar age of the biotite in the altered quartz porphyry is 52.1±2.0Ma.

Notable geochemical anomaly is high Au-Cu anomaly in the Mocha district and Cu-Zn-As anomaly in the Soledad district.

2 - 2 Queen Elizabeth district

The geological map are shown in Figure 2-2-6, schematic geological section in Figure 2-2-7, location of mineral showings in Figure 2-2-8, alteration mineral distribution in Figure 2-2-9, and rock geochemical anomaly distribution in Figure 2-2-10.

The geology of this district consists of Lower Cretaceous System, Upper Tertiary-Quaternary System, and Quaternary System.

The Lower Cretaceous System consists of andesitic to dacitic lava・pyroclastics and intercalation of shale and sandstone. Intrusive bodies penetrate these units. The intrusive bodies are composed of quartz diorite, granodiorite, and quartz porphyry in the order of their

age of activity. The age of the quartz diorite intrusion is considered to be Cretaceous following published geological maps, but that of the granodiorite is inferred to be middle to late Eocene from the age of the biotitization of the host rocks of the vicinity, which will be mentioned later. Both the Lower Cretaceous System and the intrusive bodies are unconformably overlain by Upper Tertiary-Quaternary System.

The Upper Tertiary-Quaternary Systems consist of Pliocene-Pleistocene andesitic to basaltic lava and pyroclastic rocks.

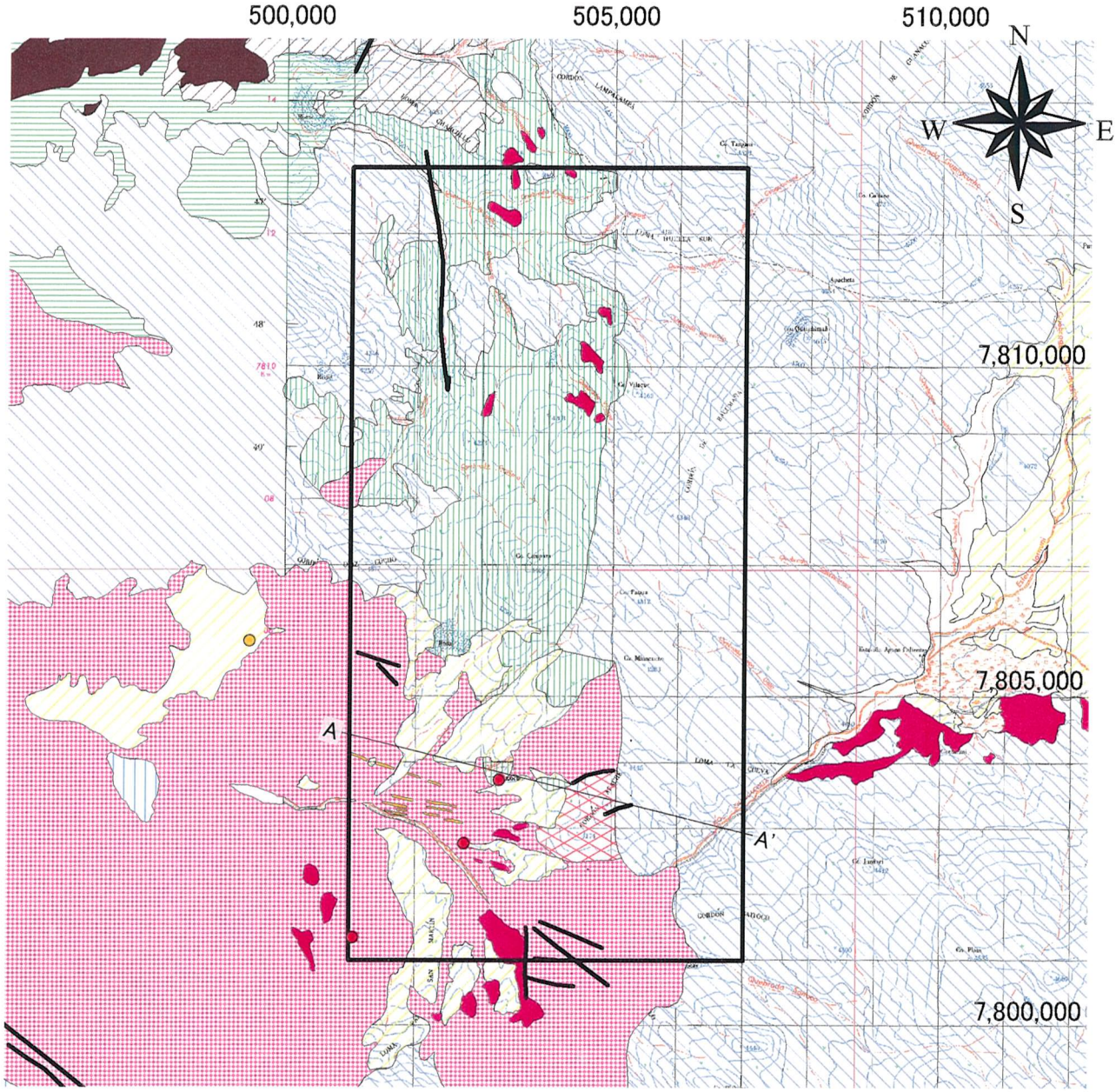
The Quaternary System is composed of fluvial deposits, alluvium, colluvium, lacustrine deposits, mudflow deposits, and talus deposits.

There are alteration zones in three parts of this area, namely northern, central, and southern parts. The former two occur in Cretaceous System and the latter in granodiorite・quartz porphyry and their vicinity.

The northern alteration zone is composed mainly of acidic alteration with abundant quartz accompanied by kaolin, and also small sericitic alteration occurs in this part. Quartz veins and pyrite dissemination are developed only locally.

The central alteration zone consists of sericite-tourmaline alteration, but ore minerals are not observed.

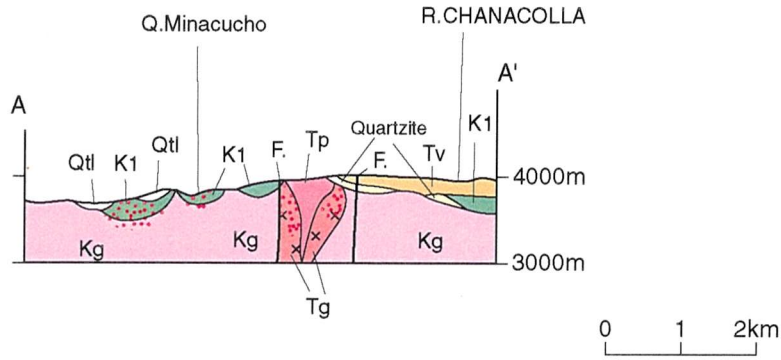
The southern alteration zone is developed in granodiorite and the Cretaceous System in the vicinity and consists mainly of biotitization and sericitization. Propylitic alteration and tourmaline alteration also occur in this part. The K-Ar age of the biotite in the Cretaceous andesite is 38.0±1.4Ms. Network quartz veinlets are widely developed and green to brown oxidized copper minerals are disseminated over 400m in the vicinity of biotite alteration zone. Fluid inclusions in quartz grains from the quartz network veins are gas inclusions with gas occupying more than 80vol% . The average gas disappearance temperature is 424℃, a typical value for porphyry copper mineralization. At the mineral showing in Cucho on the western side, green oxidized copper minerals are disseminated accompanied by chalcopyrite and pyrite. Drilling has not been carried out in these mineral showings. On the other hand, quartz porphyry occurs in the southeastern side, but parts of the porphyry are strongly crushed and the boundary with the Cretaceous sandstone is silicified. This quartz porphyry is strongly sericitized, but ore minerals are not observed. Drilling was carried out in the



Symbols for geological units refer to Table 1-3-1

Fig. 2-2-6 Geological Map of the Queen Elizabeth Area

Queen Elizabeth



Geologic Time		Columnar Section	Lithology	Intrusives	Mineralization
CENOZOIC	QUATERNARY		Fluvial,Alluvial, Colluvial,Lacust-rine,Mudflow,Talus	Granodiorite(kg) Granodiorite porphyry(Tg) Quartz porphyry(Tp)	Porphyry copper type Epithermal type
	QUATERNARY-TERTIARY	Tv	Andestic～basaltic lava/ volcaniclastics		
	LATE-MIDDLE TERTIARY				
	EARLY TERTIARY				
MESOZOIC	LATE CRETACEOUS				
	EARLY CRETACEOUS	Tp K1 Tg Tg Kg Kg K1	Andesitic～dacitic lava/volcaniclastics Intercation of sediments (shale, sandstone)		

Fig. 2-2-7 Schematic Stratigraphic Columns and Profiles of the Queen Elizabeth Area

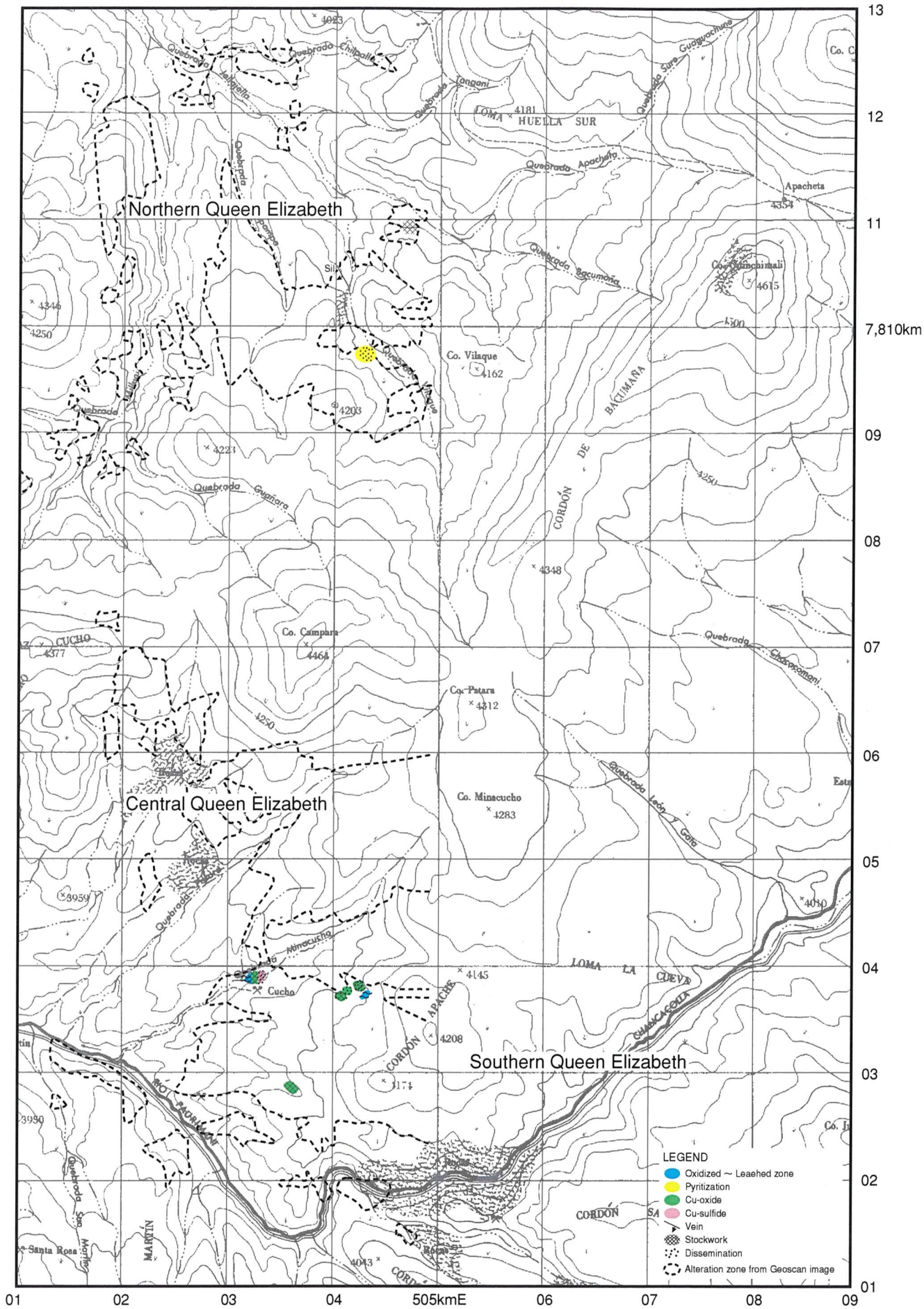


Fig. 2-2-8 Mineralization Map of the Queen Elizabeth Area

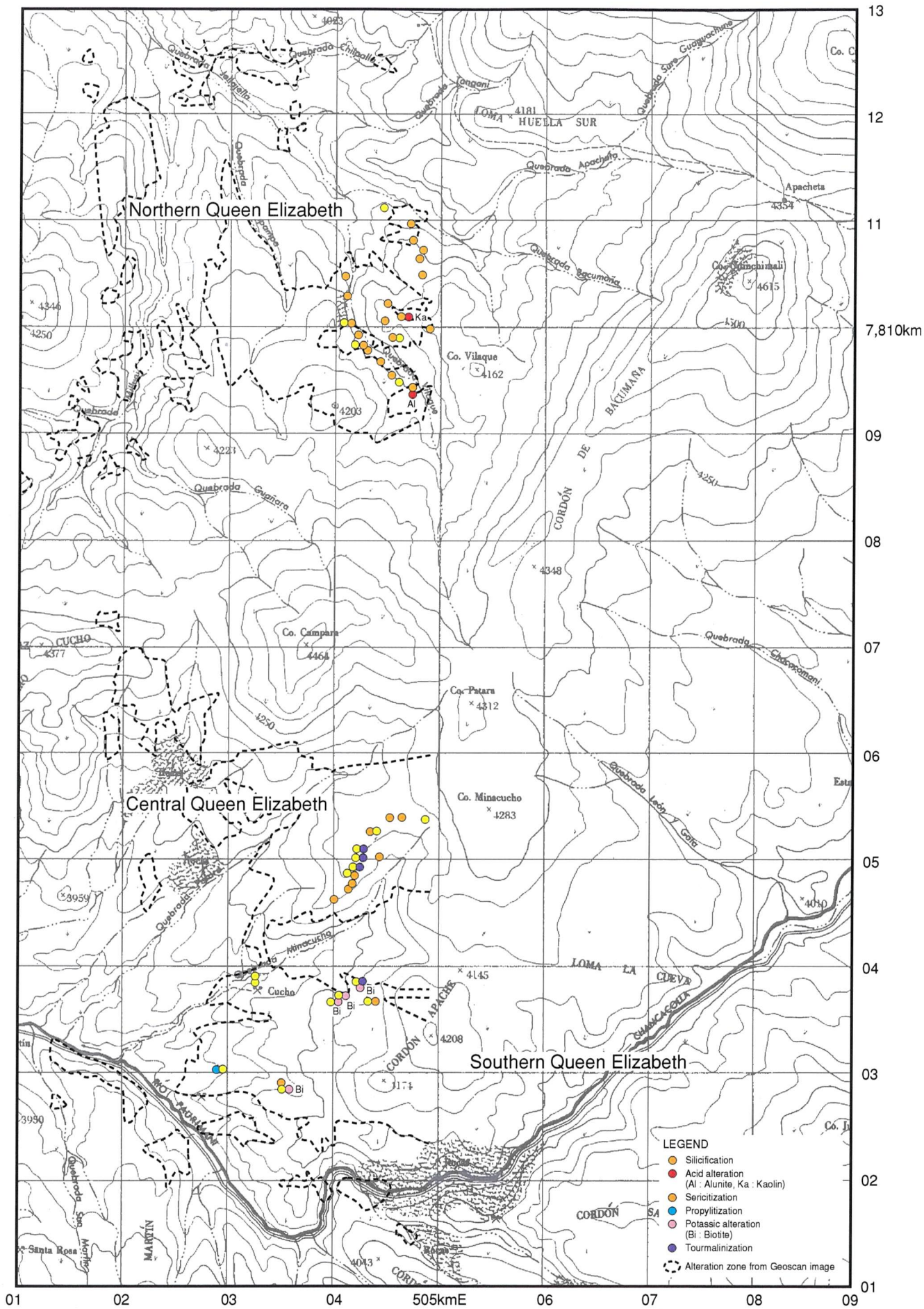


Fig. 2-2-9 Distribution Map of Alteration Minerals at the Queen Elizabeth Area

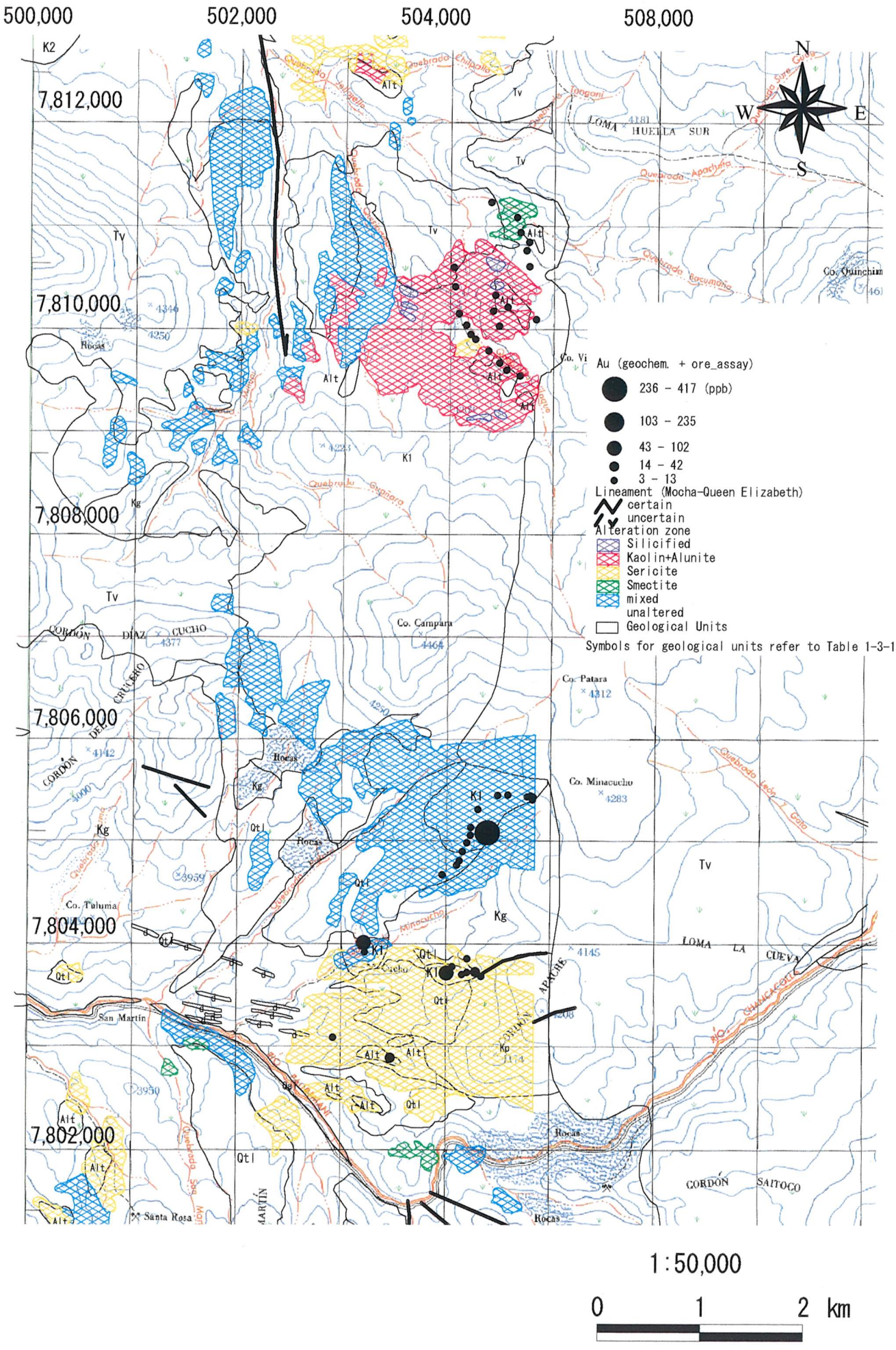


Fig. 2-2-10 (1) Geochemical Anomaly Map in the Queen Elizabeth Area (Au)

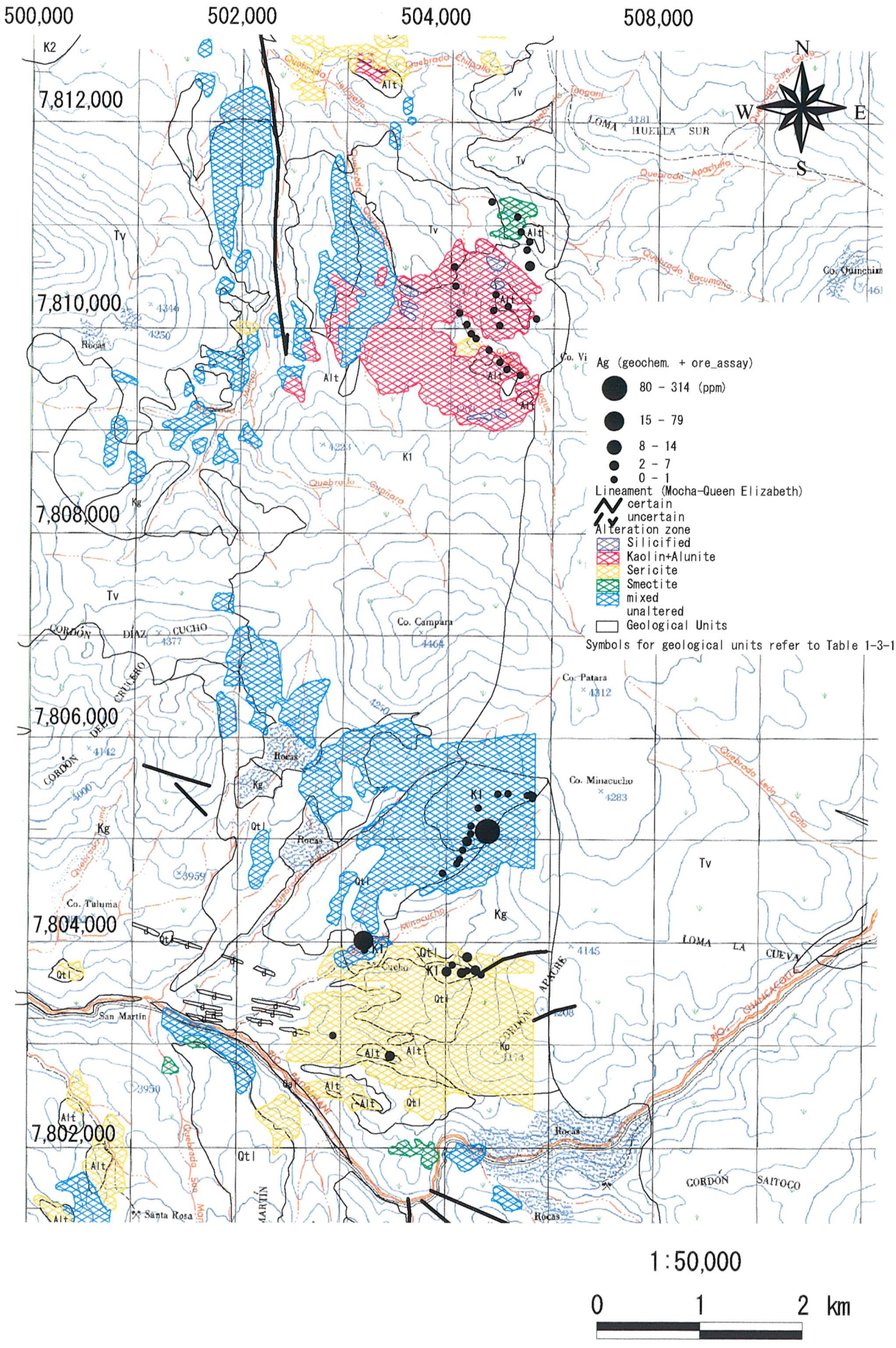


Fig. 2-2-10 (2) Geochemical Anomaly Map in the Queen Elizabeth Area (Ag)

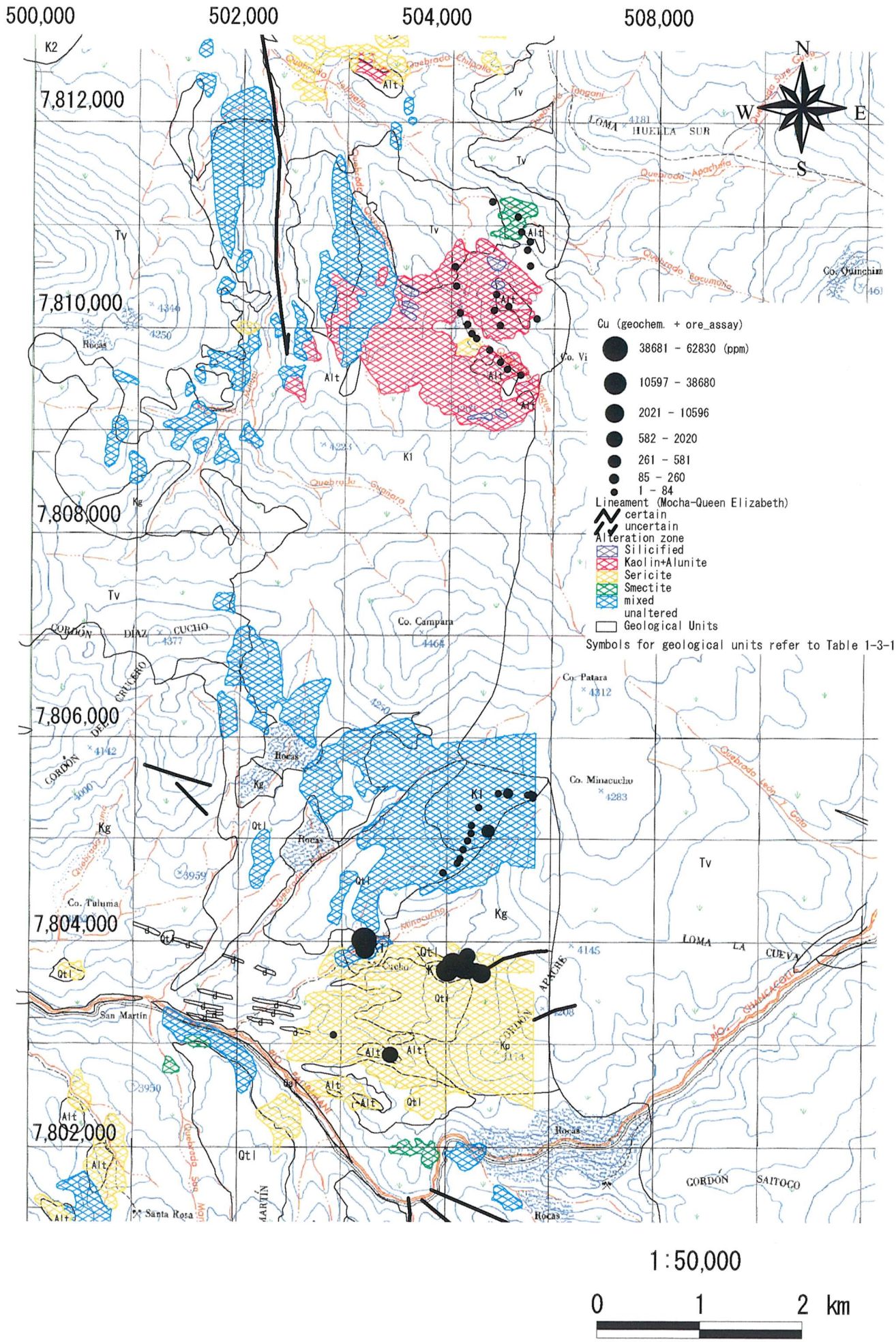


Fig. 2-2-10 (3) Geochemical Anomaly Map in the Queen Elizabeth Area (Cu)

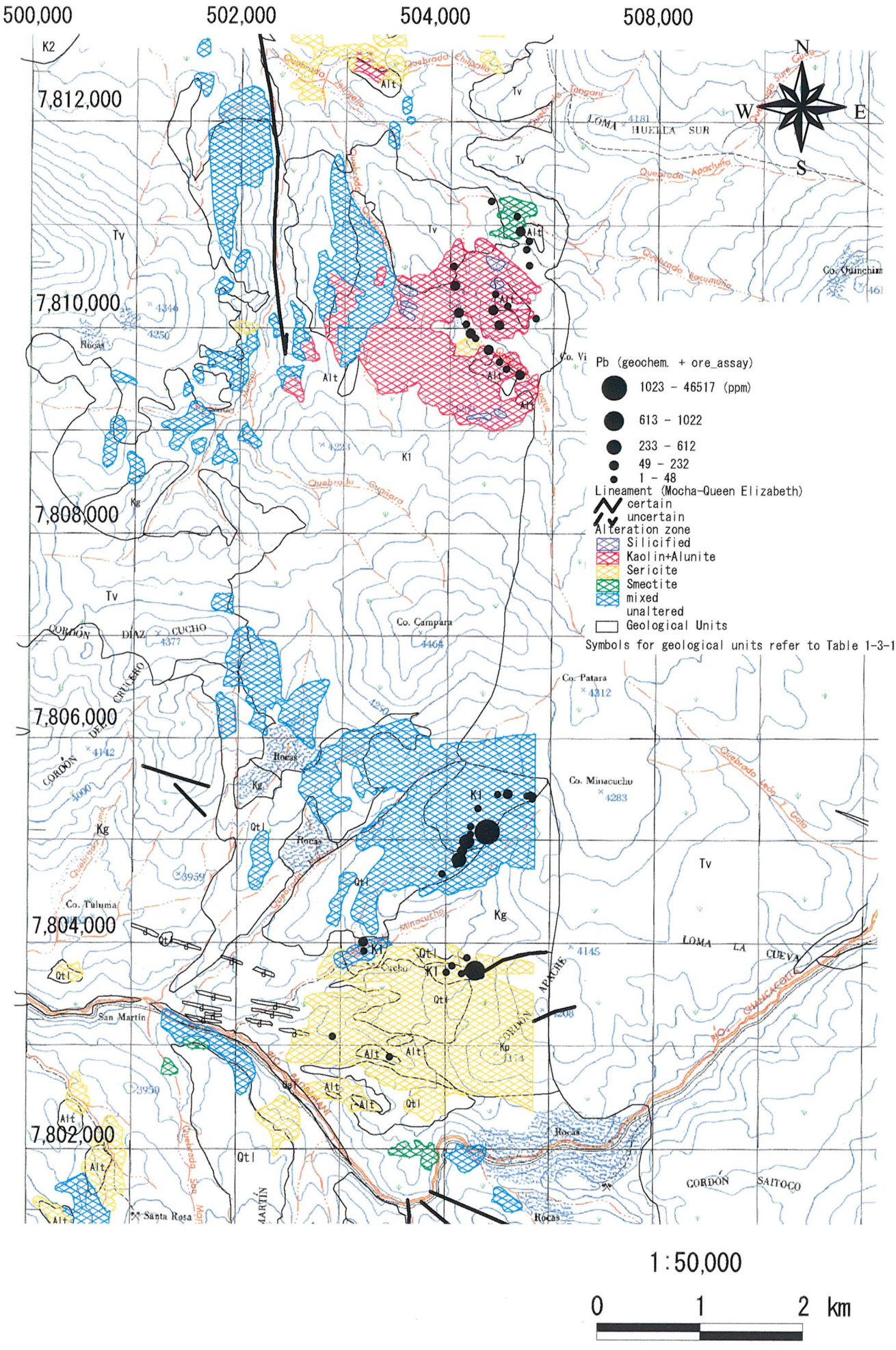


Fig. 2-2-10 (4) Geochemical Anomaly Map in the Queen Elizabeth Area (Pb)

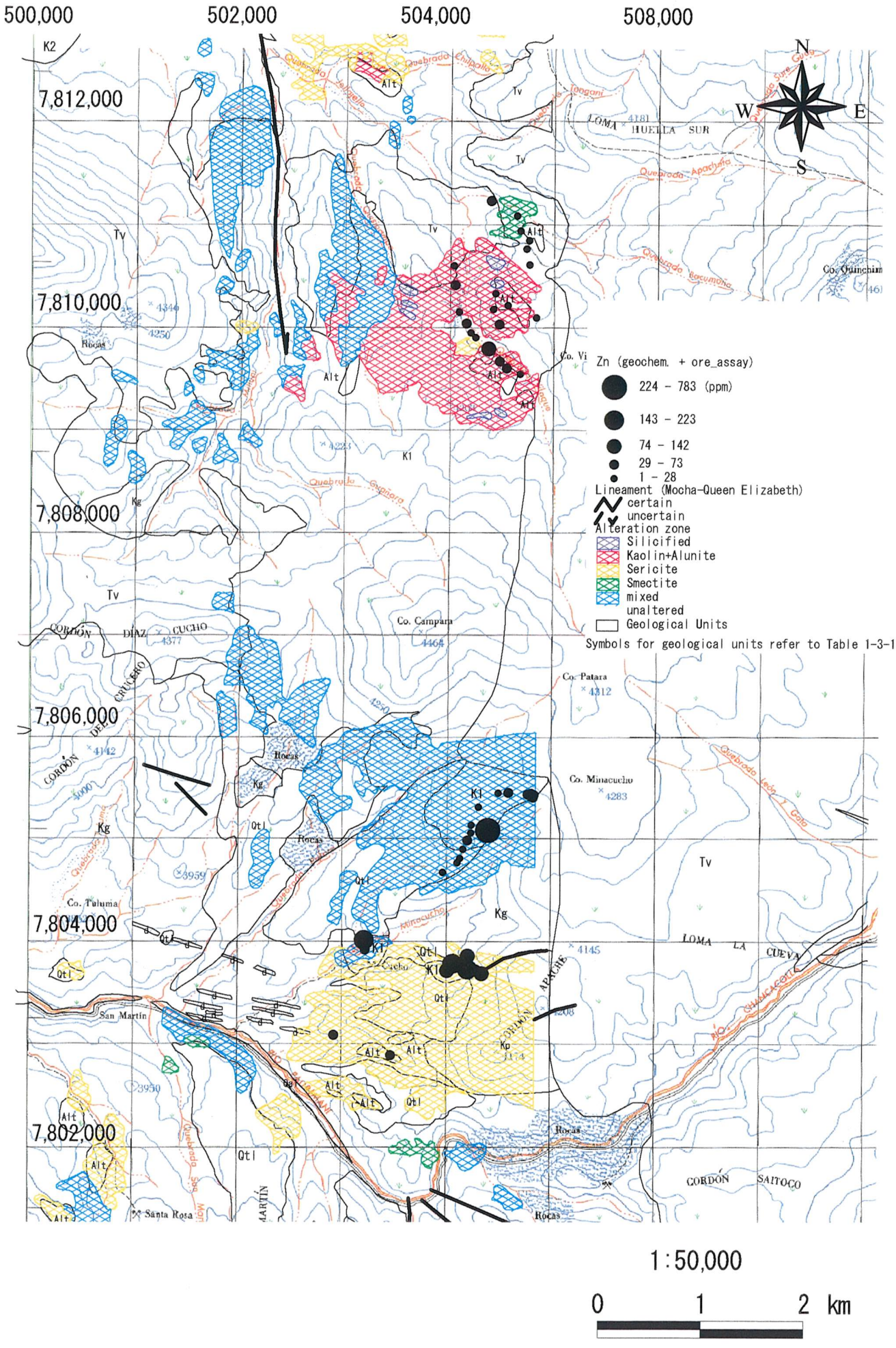


Fig. 2-2-10 (5) Geochemical Anomaly Map in the Queen Elizabeth Area (Zn)

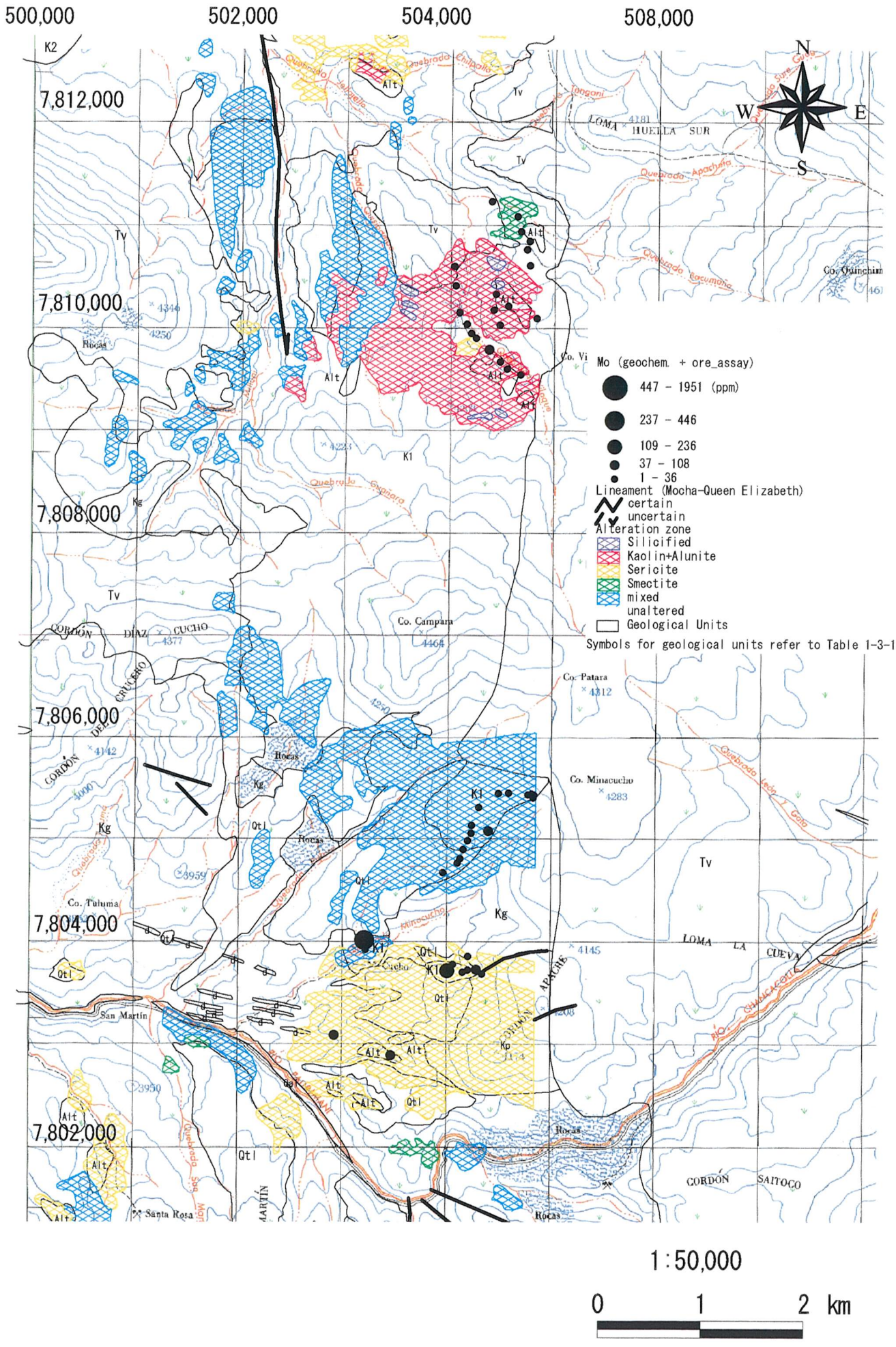


Fig. 2-2-10 (6) Geochemical Anomaly Map in the Queen Elizabeth Area (Mo)

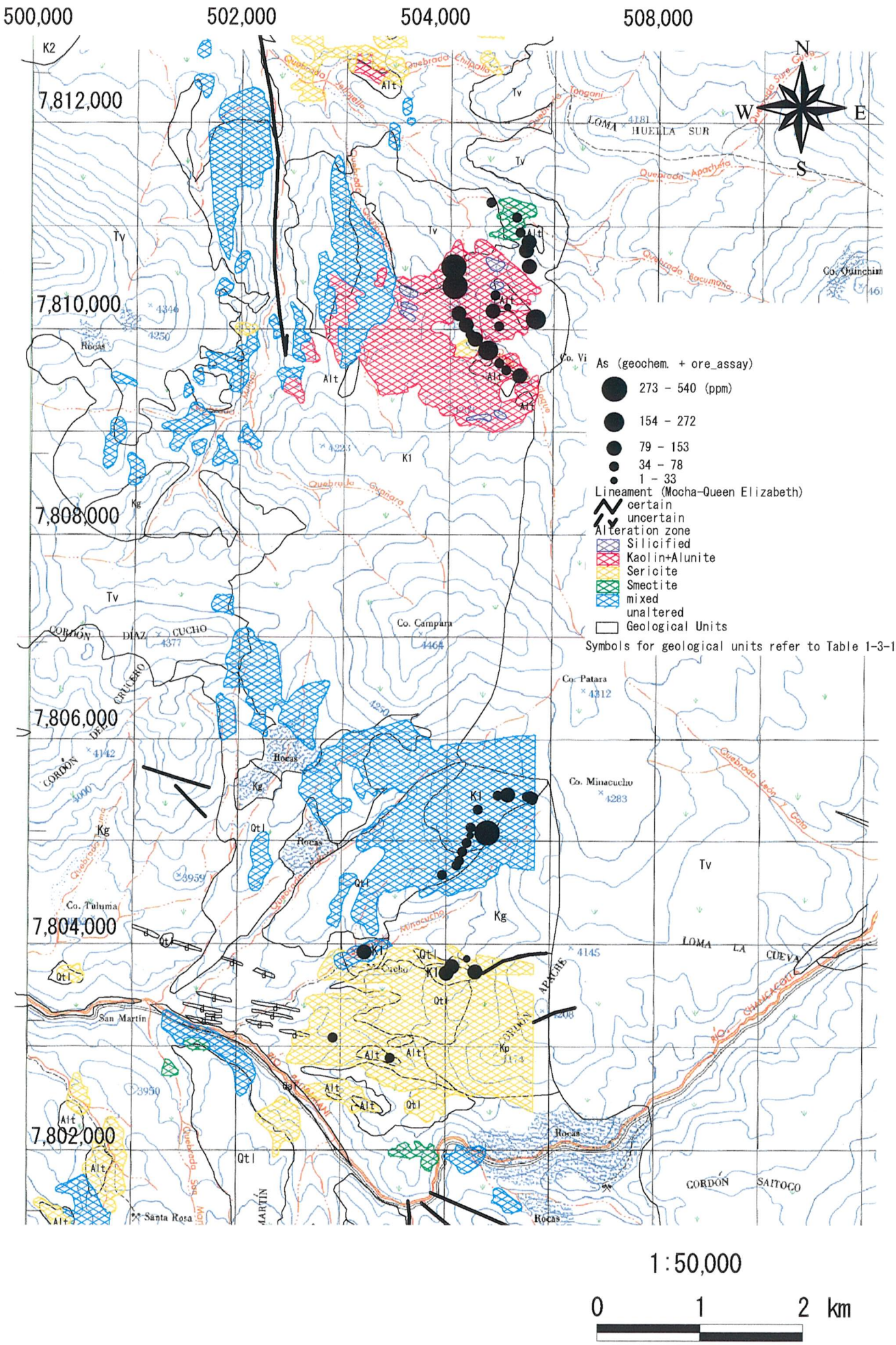


Fig. 2-2-10 (7) Geochemical Anomaly Map in the Queen Elizabeth Area (As)