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Independent study in geology 205499

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## ABSTRACT

The study of mineralogy, including the types and distribution of heavy minerals in water sediments collected at Khlong Mae Yon Wai Luang, Tha Pla Duk, Mae Tha District, Lamphun Province, aimed to determine the quantity and types of heavy minerals remaining from the weathering of the parent rocks. The study also sought to compare the types of heavy minerals distributed along both banks of the Doi Khun Tan mountain range to assess the potential of the mineral resources in the area. A total of 12 sediment samples were collected, and the minerals were classified using methods such as panning, flotation, magnetic separation, and further examined under a microscope. The results showed that the heavy and base-metal minerals consisted of cassiterite, zircon, hematite, tourmaline, garnet, magnetite, monazite, topaz, muscovite, and biotite. The mineral samples were then analyzed and compared for their mineral composition using X-ray diffraction (XRD) analysis.

## OBJECTIVE

1. To determine the quantity and types of heavy minerals remaining from in-situ weathering of sediment samples from the Khlong Mae Yon Wai Luang, Tha Pla Duk, Mae Tha District, Lamphun Province
2. To compare the types of heavy minerals and metallic minerals remaining from in-situ weathering along the western and eastern sides of Doi Khuntan.
3. To study the mineralogy of the heavy minerals in the Mae Yon Wai Luang Canal.

## STUDY AREA

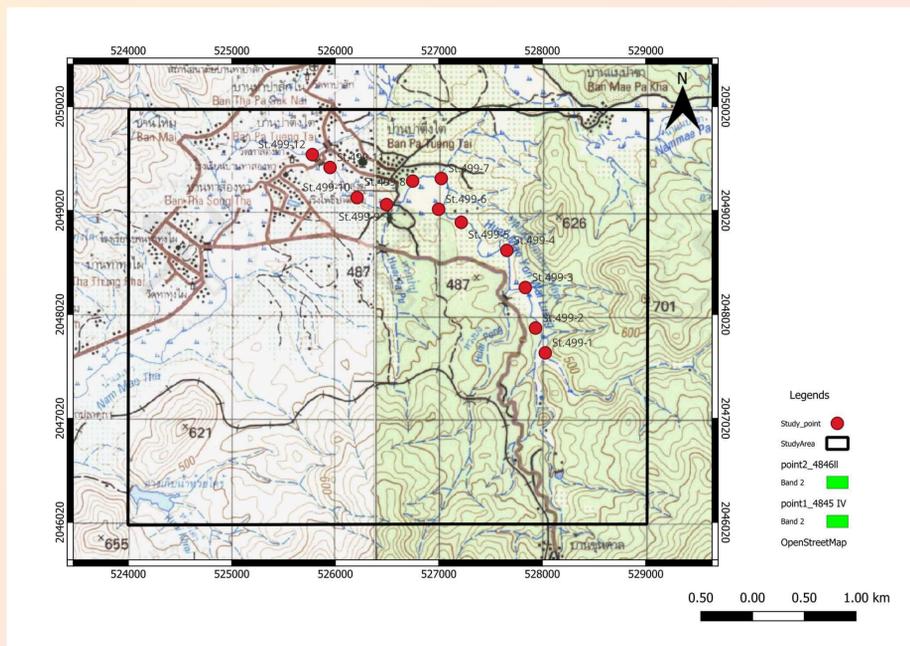


Figure.1 Topographic map of the study area showing 12 locations for sampling along

The study area of Khlong Mae Yon Wai Luang, located in Tha Pla Duk, Mae Tha District, Lamphun Province covers the area in the topographic map of Mae Tha District and Ban Don Chai, with a scale of 1:50,000, map sheet numbers 4845 IV and 4846 II, series L7018, between the coordinates 2046000 mN to 2050000 mN and 524000 mE to 529000 mE.

## MATERIALS AND METHODOLOGY

In this study, four methods of mineral separation were employed: 1) Heavy mineral separation using the heavy liquid method, 2) Heavy mineral separation using the flotation method, 3) Examination under a stereo microscope and a polarizing microscope, and 4) X-ray diffraction (XRD) analysis.

The separation of heavy minerals through panning with a mineral separation pan is based on the principle of density differences between the desired minerals and undesired minerals. Minerals with higher density will settle at the bottom, while those with lower density will float or move upward. This process utilizes Earth's gravitational force for mineral separation, and additional equipment may be used to assist the process.

This method is used for the separation of heavy minerals from light minerals using a medium known as bromoform (tribromomethane, CHBr<sub>3</sub>), which is a liquid with a high specific gravity (SG = 2.89). Heavy minerals with a specific gravity greater than that of the medium will sink into the liquid.

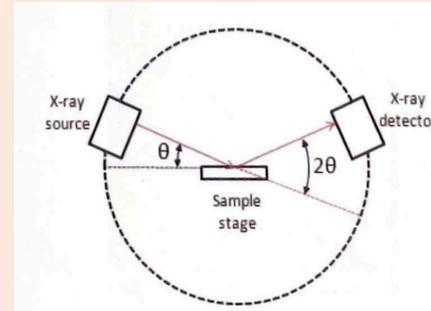


Figure.2 Working principle of X-ray Diffractometer

X-rays are high-energy electromagnetic waves with wavelengths ranging from 0.1 to 100 Å, which do not deviate in a magnetic field. They have the ability to penetrate various materials, such as mineral crystals and relatively thin metals. X-rays are generated when a stream of high-energy electrons strikes a metal target. The high-energy electrons transfer their energy to the electrons of the metal, causing the metal's electrons to be excited to higher energy levels. When these high-energy electrons return to lower energy states, they release energy in the form of X-rays.

## RESULTS

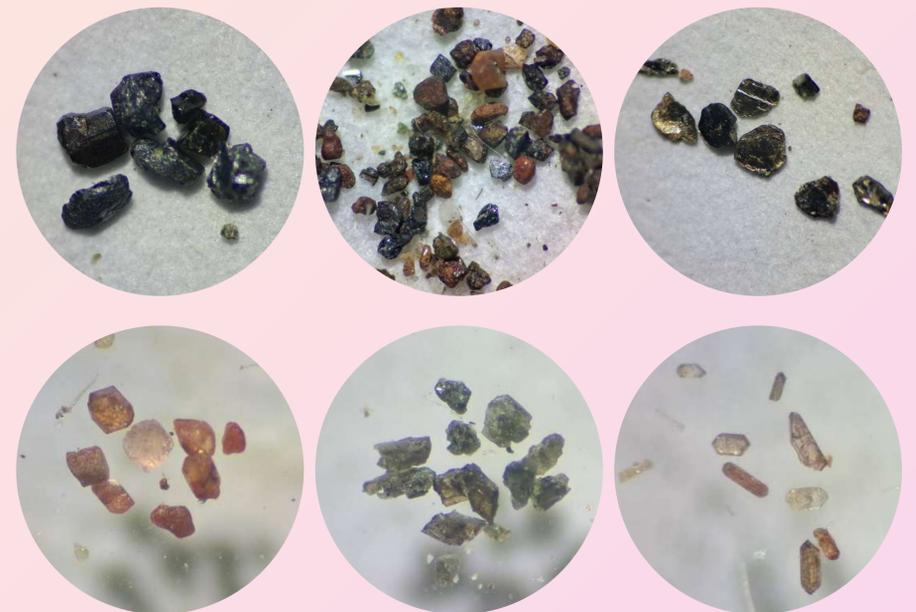


Figure.3 shows an example of heavy mineral sediments under a stereomicroscope.

Through the analysis of heavy minerals under a stereo microscope, the following minerals have been identified: magnetite, hematite, zircon, monazite, topaz, biotite, muscovite, malachite, garnet, cassiterite, and pyrite.

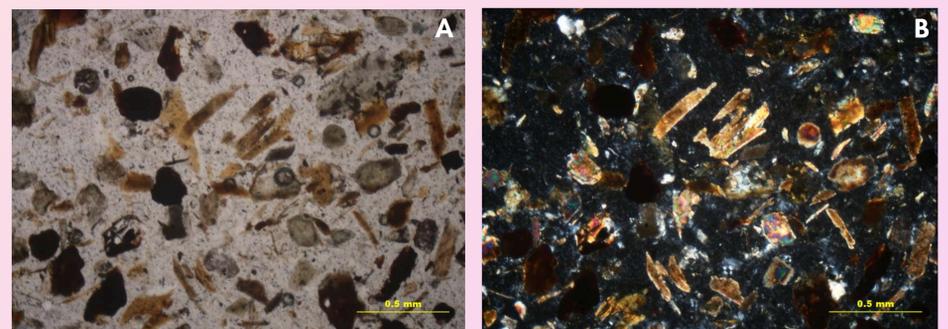


Figure.4 shows an example of heavy mineral sediments under a Polarizing Microscope. Image A is the picture without the analyzer, while Image B is the picture with the analyzer.

After conducting analysis under a stereo microscope, the samples were then prepared as slide mounts for observation under a polarizing microscope. The results, as shown in the image, primarily reveal minerals such as biotite, magnetite, and zircon.

Based on the results from the research and fieldwork, it is predicted that the Khlong Mae Yon Wai Luang cannot be an economic mineral source. Although economic minerals were found, they are in very small quantities. Additionally, the canal passes through populated areas, and the surrounding regions are involved in agricultural activities. Due to the limited data, mineral samples will be further analyzed and compared using an X-ray Diffractometer (XRD) to identify the types of minerals.

## references

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