# 衛星リモートセンシングによるタイ中央平原西部クラシオ川流域の洪水地形分類


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| 著者 | 大倉 博, 植原 茂次, 春山 成子, 大矢 雅彦 |
| 雑誌名 | 防災科学技術研究所　研究資料 |
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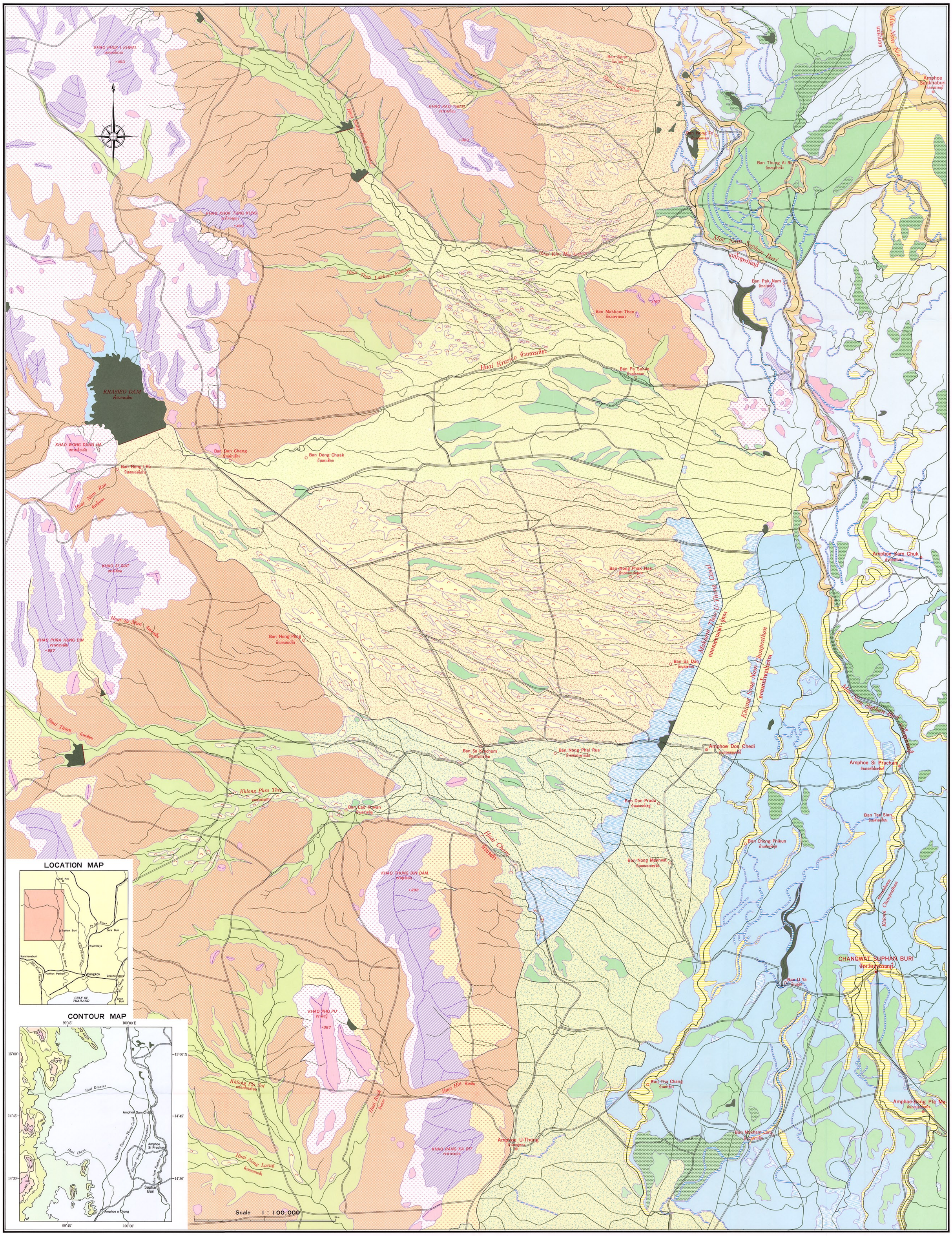
# A Geomorphological Survey Map of the Kraseio River Basin in the Western Part of the Central Plain of Thailand Showing Classification of Flood-inundated Areas.

**แผนที่สำรวจลักษณะทางธรณีสัณฐานของที่ราบภาคกลางด้านตะวันตกของประเทศไทย แสดงการจำแนกพื้นที่น้ำท่วมถึง**




## LOCATION MAP




## CONTOUR MAP




## Explanatory Notes

| | | |
|---|---|---|
| Boundary of Topography เส้นแบ่งเขตภูมิประเทศ | | |
| Slope of the Mountain and Hill ความลาดชันของภูเขาและเนินเขา | Never submerged in flood time. | |
| Monadnock เขาโดด | Never submerged in flood time. | |
| Pediment (Eroded) ลานเขาที่กร่อนเขา | Never submerged in flood time. | |
| Alluvial cone เนินตะกอนภูเกรย | Never submerged in flood time. | |
| Terrace ลานตะพัก | Never submerged in flood time. | |
| Fan I ที่ราบตีนตะกอนภูเภัคค I | This part gets submerged in an extraordinary flood time, but the water drains off well. | |
| Fan II ที่ราบตีนตะกอนภูเภัคค II | This part gets submerged in an extraordinary flood time, but the water drains off well. | |
| Fan III ที่ราบตีนตะกอนภูเภัคค III | This area gets submerged by sheet flood frequently. | |
| Sand Dune สันทราย | This part gets submerged in an extraordinary flood time, but the water drains off well. | |
| Valley Plain ที่ราบภูมเขา | This part gets submerged in an extraordinary flood time, but the water drains off well. | |
| Natural Levee I คันดินธรรมชาติ I | This part gets submerged in an extraordinary flood time, but the water drains off well. | |
| Natural Levee II คันดินธรรมชาติ II | This part gets submerged in an extraordinary flood time, but the water drains off well. | |
| Back Marsh I ที่ลุ่มในขดน้ำท่วมถึง I | This part is long submerged in flood time. Depth of stagnation is deepest, swampy in the dry season also. | |
| Back Marsh II ที่ลุ่มในขดน้ำท่วมถึง II | This part is long submerged in flood time. Depth of stagnation is deeper. | |
| Back Marsh Located Behind Artificial Construction ที่ลุ่มในขดน้ำท่วมถึง ซึ่งตั้งอยู่ด้านหลังสิ่งก่อสร้างใหม่ | This part is long submerged in flood time, but also swampy in the dry Season. | |
| Delta I ตีนตอนสามเหลี่ยม I | This part gets submerged in flood time. | |
| Delta II ตีนตอนสามเหลี่ยม II | This part gets submerged in flood time. | |
| Former River Course ลำน้ำเก่า | The flood water runs through this channel in flood time. | |
| Seasonal River ลำน้ำที่มีน้ำในยามฤดูกาล | | |
| Water Rout (Irrigation Canal, Creek, etc.) ทางน้ำ | | |
| Water Surface น้ำผิวดิน | Area under water in the dry season. | |
| Mountain Ridge สันเขา | | |

## EXPLANATION OF THE MAP

### Significance on the study

The changes of the natural environment in the ASEAN countries are substantial because of the movement of population to the urban area and expansion of the agricultural farm land due to the population increase. Recently agricultural land has expanded to the unfertile land for example on the piedmont gentle slope of the foot of mountain. This is occurring in the western part of the central plain of Thailand. The expansion of agricultural farm land has increased the number of natural disasters, such as damage from flooding and drought. We want to investigate the mitigation of the natural hazards utilizing a geomorphological survey map which includes classification of flood stricken areas.

### The purpose of the Geomorphological Survey Map Showing Classification of Flood-inundated Areas

The purpose of this Geomorphological Survey Map Showing Classification of Flood-inundated Areas, is to indicate of the features of the flooding not only in the past but also to predict the future.

The reason is that the topography of the alluvial plain is formed by the reoccurance of flooding. The micro-topography of the plain, such as the alluvial fan, natural levee, back-swamp, delta etc. shows the history of flooding. Therefore if we classify the geomorphology of the plain, we can determine the features of flooding not only in the past but also to predict those of the future.

### History of the Geomorphological Survey Map Showing Classification of Flood-inundated Areas

After the Second World War, The Japanese Archipelago was frequently devastated by big scale typhoons, especially by the Catherine Typhoon in 1947, when the embankment of the Tone River was broken and the city of Tokyo was devastated. After the 19C, the flood discharge increased continuously in spite of no change in the volume of the precipitation in the upper reaches. This phenomenon occurred because of river conservation and changes of land use. Civil engineers began to reconsider the former river works and planned integrated flood control works for the whole drainage basin. In this case precise geographical knowledge was required.

Furthermore, the need for information on the geomorphology of the fluvial plain increased because agricultural engineers designed a greater yield in the production of rice and readjustment of arable lands.

At this time the Japanese geographers were interrested in studying the alluvial plains. Before the war, topographic study was strongly influenced by studies in Europe and United States. Almost all of the studies had been done in the mountainous region formed by erosion. In contrast, the alluvial plains in Japan were formed by deposition, and some geographers wanted to begin researching the topography of depositional areas.

Due to the above mentioned reasons, geomorphological studies of alluvial plains have greatly advanced since the war. Furthermore, such study was greatly encouraged by the utilization of aerial photographs. Using aerial photographs, a geomorphological survey map showing classification of flood stricken areas was prepared by M. OYA. The first map was prepared by M. OYA of the Nobi Plain at the lower reaches of the Kiso River. Four years after the preparation of the map, the area was struck by the Ise Bay Typhoon. The features of the flooding were just as the map has predicted. Consequently, further geomorphological survey maps showing classification of flood stricken areas were prepared not only in Japan but also in South-East Asia.

In 1989, we prepared " A Geomorphological Survey Map of the Central Plain of Thailand Showing Classification of Flood-inundated Areas". The scale of the map is 1/250000. This time we have prepared " A Geomorphological Survey Map of the Kraseio River Basin in the Western Part of the Central Plain of Thailand Showing Classification of Flood-inundated Areas " which scale is 1/100000. One of the purpose of the preparation is development of the interpretation of landsat Images.

### Geomorphology of the Kraseio River Basin

The Kraseio River Basin consists of the following geomorphological elements;pediments, inselbergs, terraces, fans,vally plains, small natural levees, back-swamps, former river courses etc.

Pediments are well developed at the foot of the mountains. The area is formed by erosion, and this erosion is still continuing. In former days the area wasn't used because the soil layer was thin, and water supply was not easily accessible. But recently, the area has been changed to the upland crop fields growing, for example corn and vegetables etc. Sometimes the area suffered from drought.

Some of the valley plain was buried by mud flow. Terraces are covered by laterite. In former days the area wasn't used as agricultural farm land, but recently the area is being used as upland crop fields for corn etc.

Fan is divided into fan I, fan II and fan III. Fan I was formed during the Pleistocene age, fan II was formed by the mud flow, and fan III has been formed recently. The grain size of the fan is small and slope of the fan is gentle compared with fan in Japan.

From the lower edge of the fan to the Suphan Buri River, natural levees and deltas are developed. The city of Suphan Buri is located on a natural levee.

### Flood damage in 1988

In June, September and October of 1988, the central plain of Thailand, especially the basin of the Suphan Buri, was devastated by the flooding. Annual rainfall at Suphan Buri in 1988 was 1192mm, and the maximum daily rainfall was 103mm in June. Flooding occurred in the lower edge of the fan. The velocity of the flood current was fast, flood water flowed down as sheet flood. Deposition was noted in the paddy field located at the back-swamps. The period of inundation was long because roads and waterways blocked the flood current.

### Utilization of a Geomorphological Survey Map showing Classification of Flood inundated Areas

We can predict the state of inundation utilizing the Geomorphological Survey Map showing Classification of Flood inundated Areas as follows;

**Geomorphological Unit** : State of inundation caused by the daily rainfall 90mm and total continuous rainfall 180mm.

**Fan** : In flood time erosion and deposition is seen, shifting of the river course occurrs frequently but the water drains off well.

**Fan I** : Flood water flows down as sheet flood , erosion is seen in the upper reaches , and deposition in the lower reaches. At the lower edge of the fan, ground water is seen. If a road is constructed on the outside of the fan, inundation will be seen between the fan and road. Depth of the inundation is 40 to 70cm.

**Fan II** : This fan is formed by the mud flow inside the valley plain. The cross-section shows that the central part of plain is higher than that of the both side of the valley.

**Fan III** : Flood water flows down as sheet flood , erosion is seen in the upper reaches , and deposition, lower reaches. If a road were at the outside of the fan, the inundation would be seen between fan and road. The velocity of the flood current is faster than that of fan I .

**Natural Levee** : When the area is submerged, the water drains off well .

**Back-swamp** : When the area is submerged, the period of inundation is long, sometimes 2 or 3 months. The state of inundation will be changed by artificial construction works.

**Abandoned River Course** : In flood time flood water runs through the course. The depth of the ground water is shallow, when making and embankment careful attention must be filtration of the ground water.

**Pediment** : In flood time, the slope will be eroded.


National Research Insititute for Earth Science and Disaster Prevention, Science and Technology Agency, Japan

Researched and Cartographed by;
Hiroshi OHKURA*, Shigeko HARUYAMA**, Masahiko OYA**
Suvit VIBULSRESTH (สุวิทย์ วิบูลย์เศรษฐ์)***, Ramphing SIMKING (รำพึง สิมกิ่ง)***
and Thongchai SIMKING (ธงชัย สิมกิ่ง)***
* National Research Insititute for Earth Science and Disaster Prevention, Science and Technology Agency, Japan
** Waseda University, Japan
*** Remote Sensing Division, National Research Council of Thailand



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