

Lateral Migration Rate of Ping River at Frequently Change Spots in Mae Taeng, San Sai, and Mae Rim Districts, Chiang Mai Province

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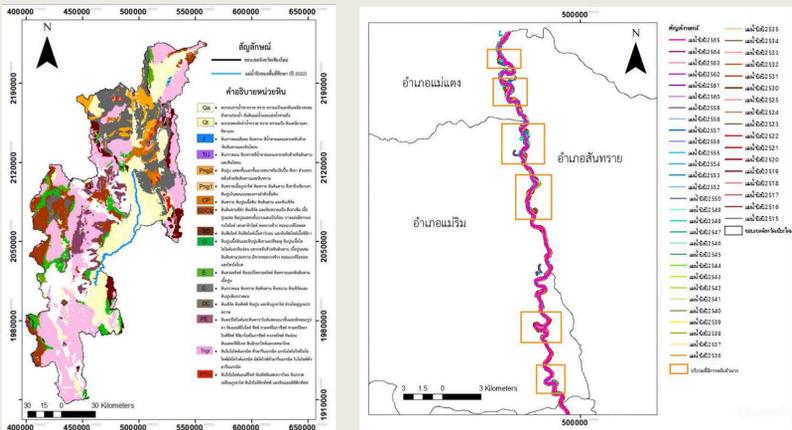
ABSTRACT

The processes of river erosion and sediment deposition occur cyclically, leading to the continuous evolution of meandering channels until pronounced river bends are formed. Since human settlements have long been closely linked to river systems, geomorphological changes resulting from the meander evolution directly impact human livelihood, often cause damages to lives and properties. This study aimed to analyze the rate and the factors influencing lateral migration of the Ping in areas with frequent morphological changes, specifically in Mae Taeng, San Sai, and Mae Rim districts of Chiang Mai Province. The research involved mapping the channel morphology of the Ping River using Landsat 1-8 satellite imagery from 1972 to 2024, processed with Erdas Imagine 2014 and ArcGIS Pro, along with supplementary satellite images from Google Earth Pro. The lateral migration distance of the river was quantified and analyzed in relation to historical rainfall data and flood events. The findings indicate that over the past 52 years, the highest rate of lateral migration occurred during 2023-2024. The primary factors influencing the river's lateral migration include both natural processes, such as flooding and bank erosion, and anthropogenic activities, such as the development of hydraulic structures, dredging and sand mining. The results of this study can be contribution to land-use planning, flood hazard mitigation, and sustainable river management strategies to minimize potential socio-economic impacts.

OBJECTIVES

- To calculate the lateral migration rate from the annual changes of the Ping River in Mae Taeng, San Sai and Mae Rim District.
- To study the factors influencing the lateral migration caused by the changes in the Ping River.

STUDY AREA

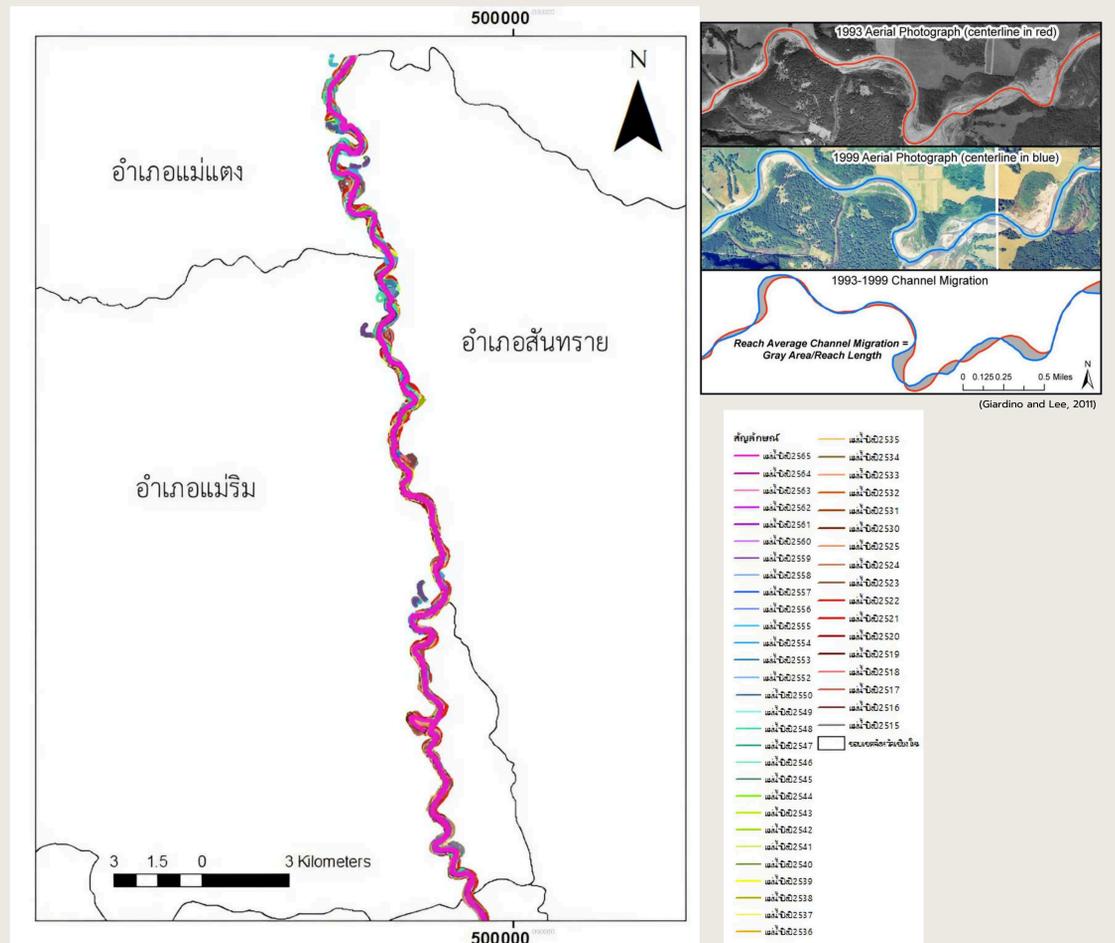


The study area of the Ping River in Mae Taeng District, San Sai District, and Mae Rim District, Chiang Mai Province.

METHODOLOGY

- Data Collection**
 - Satellite imagery
 - Geological maps and Digital Elevation Model (DEM)
- Mapping the Shape of the Ping River**
 - Geometric Correction
 - Define reference coordinates using Ground Control Points (GCPs)
 - Image Enhancement for Satellite Data
 - Create color composite images
 - Enhance image contrast
 - Apply spatial enhancement techniques
- Calculation and Analysis of Lateral Movement of the Ping River**
 - Calculate displacement distance using equations
 - Analyze and compile annual displacement rate tables
 - Identify factors influencing the lateral movement of the Ping River

RESULTS



An image showing the annual lateral movement of the Ping River in Mae Taeng, Mae Rim, and San Sai districts.

CONCLUSION

- This study analyzed the lateral migration of the Ping River in areas with frequent geomorphological changes using Erdas Imagine 2014 and ArcGIS Pro, along with satellite imagery from Google Earth Pro.
- The results indicate that over the past 52 years, the highest rate of lateral migration occurred in 2023-2024. The primary factors influencing these changes include: Natural factors such as flooding and bank erosion and human activities such as the construction of hydraulic structures, dredging, and sand mining.
- The findings of this study can be applied to land-use planning, flood risk reduction, and sustainable river management to mitigate socio-economic impacts.

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