



South China Sea Fluvial Sediments and Environmental Changes (FluSed)

Zhifei Liu

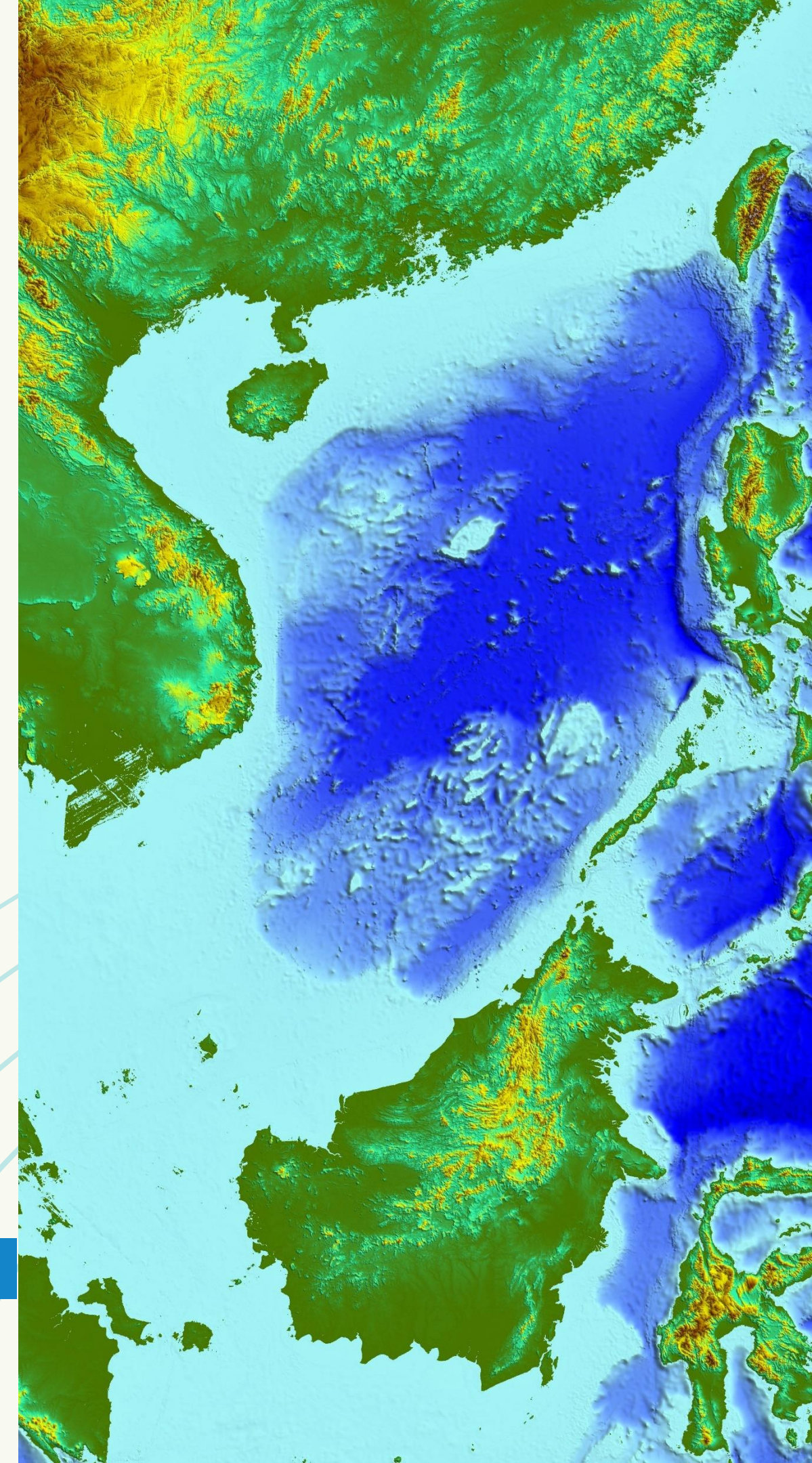
Tongji University, Shanghai, China



Summary Outline

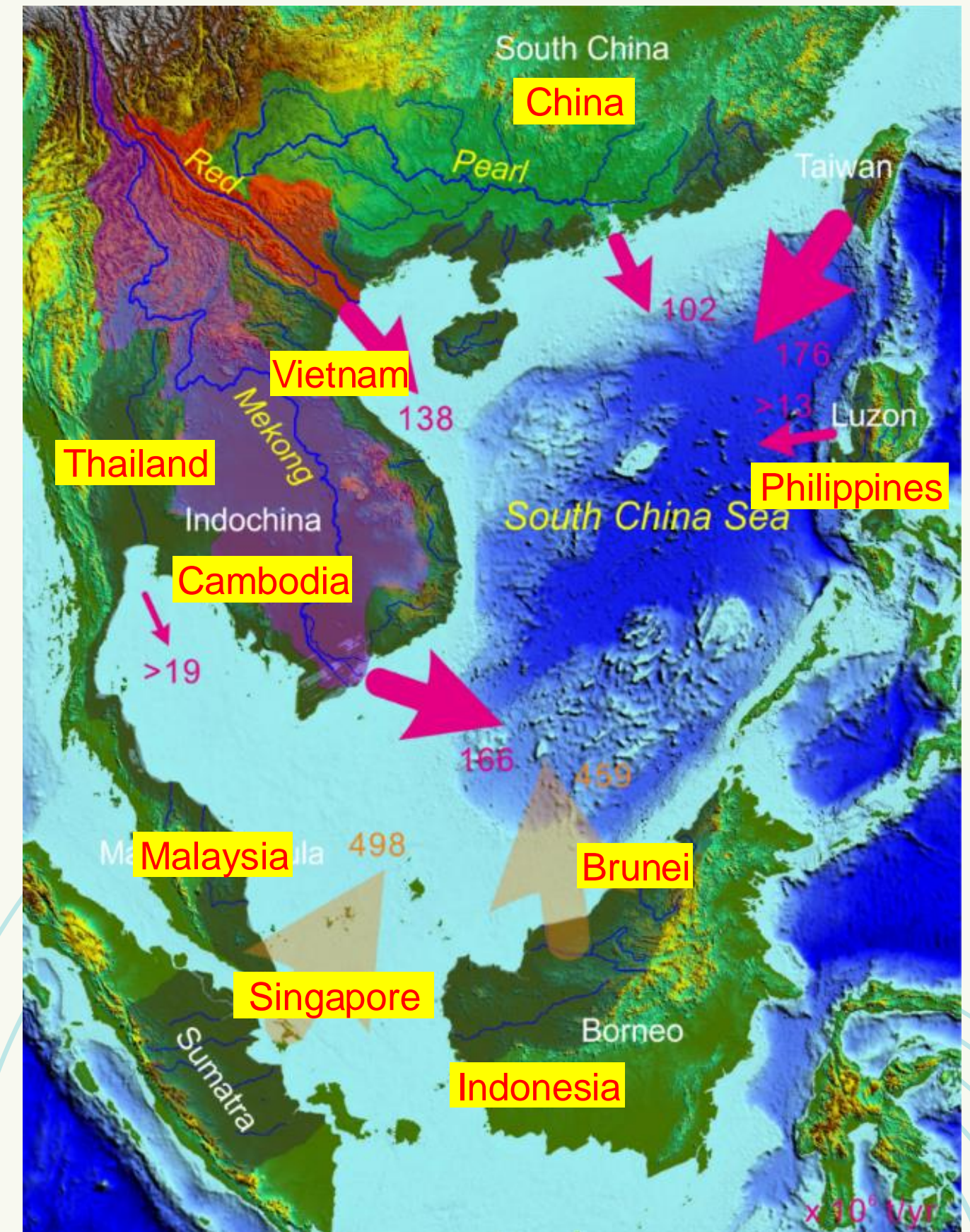


1. Justification
2. Objectives
3. Major activities, outputs & outcomes (particular those accomplished during 2023-2024)
4. Problems encountered and recommended actions
5. Potential action plans for 2025-2026 and beyond



1. Justification

- The South China Sea offers an excellent natural laboratory for studying source-to-sink transport process of fluvial sediments among the global marginal seas.
- The sediments have recorded detailed climatic and environmental changes occurring in land source regions both naturally and anthropogenically.
- Collaboration among all surrounding countries (total 9 countries) is necessary for understanding the fluvial sediment source-to-sink process and potential natural and human activity influences.



2. Objectives



- To investigate fluvial sediment source-to-sink process.
- To reconstruct time series variation of sediment transport in the past.
- To evaluate environmental change and human activity influences on fluvial sediments in the South China Sea.

Timeframe

Project start year: 2008

Expected outputs, or outcomes

- Synthesizing physical and chemical weathering and their controlling mechanism.
- Recognizing influences of environmental change and human activity on formation, transport, and deposition of fluvial sediments.
- Strengthening collaboration and young talents training among participating western Pacific countries.

3. Major activities, outputs & outcomes



Latest accomplishment, particular those during 2023 to 2024

● Two international workshops



16th FluSed Workshop was held on 6-7 Nov. 2023 at Tongji University, Shanghai, China. 30 participants from 12 countries attended the workshop.



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Seventeenth International Workshop on the Fluvial Sediment Supply to the South China Sea

25-26 November 2024, Kebumen, Indonesia



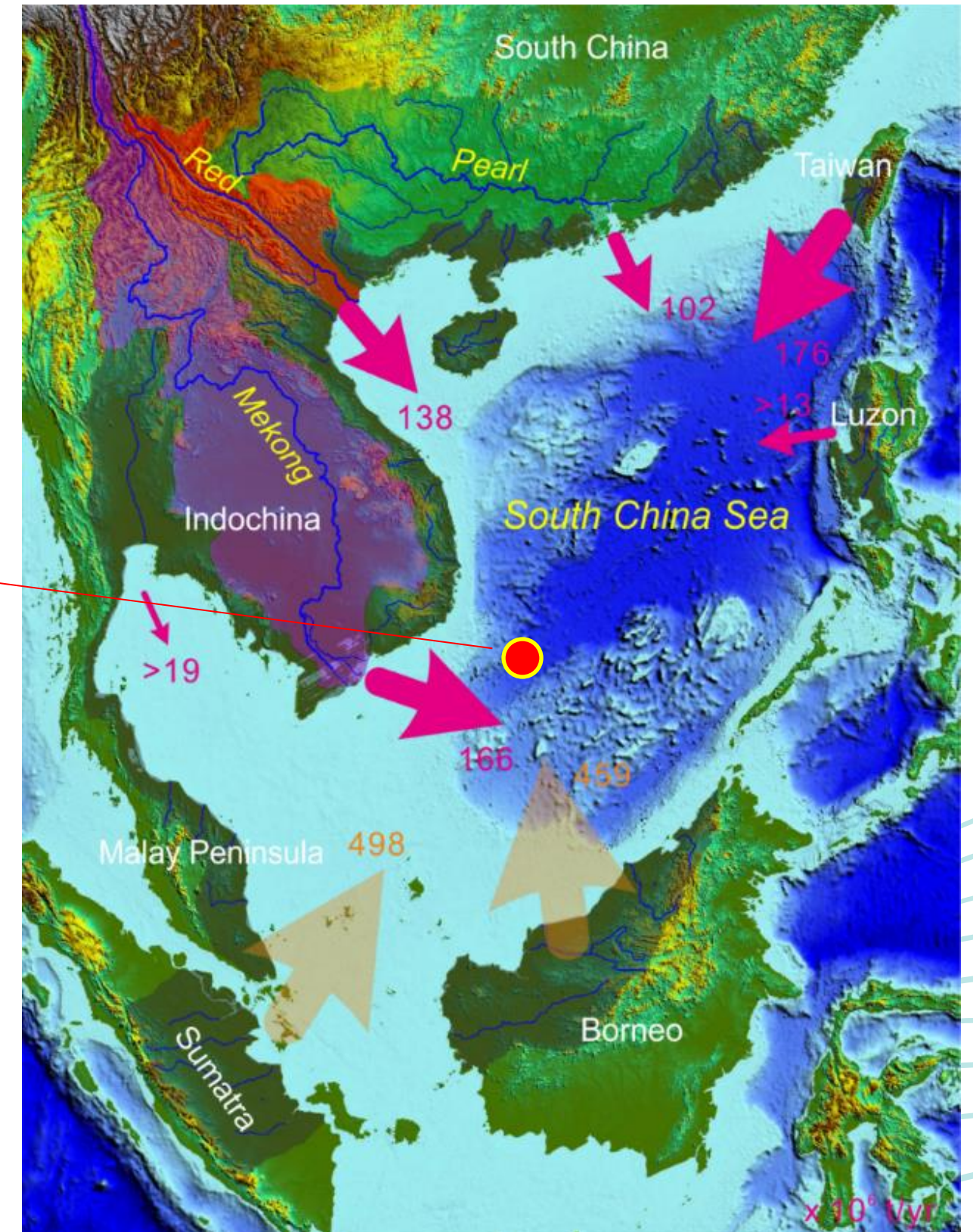
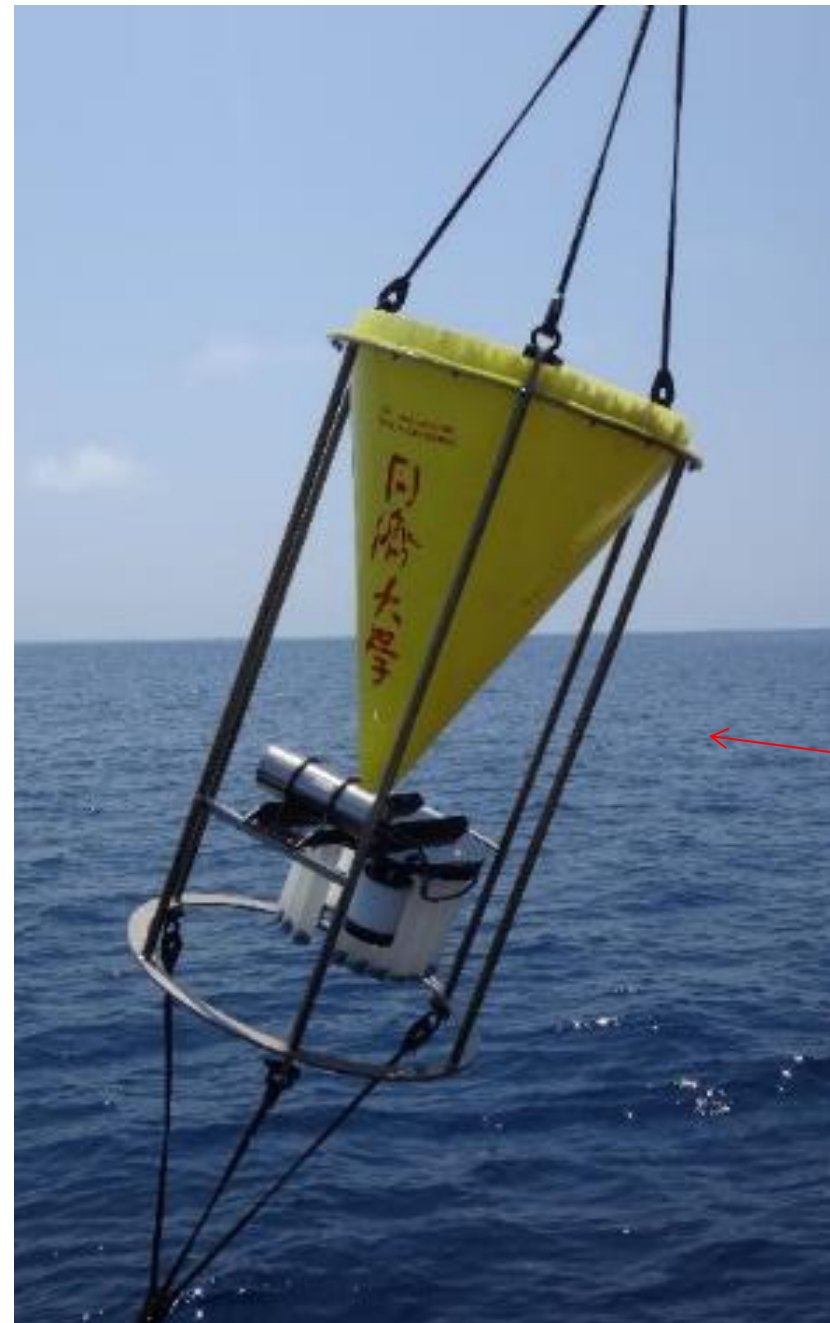
FIRST CIRCULAR (Call for Abstract & Registration)

1. About the Event

The South China Sea offers an excellent natural laboratory for studying source-to-sink transport process of fluvial sediments among the global marginal seas. Numerous rivers, including the world's large rivers (e.g., the Pearl River, the Red River, and the Mekong River) as well as small

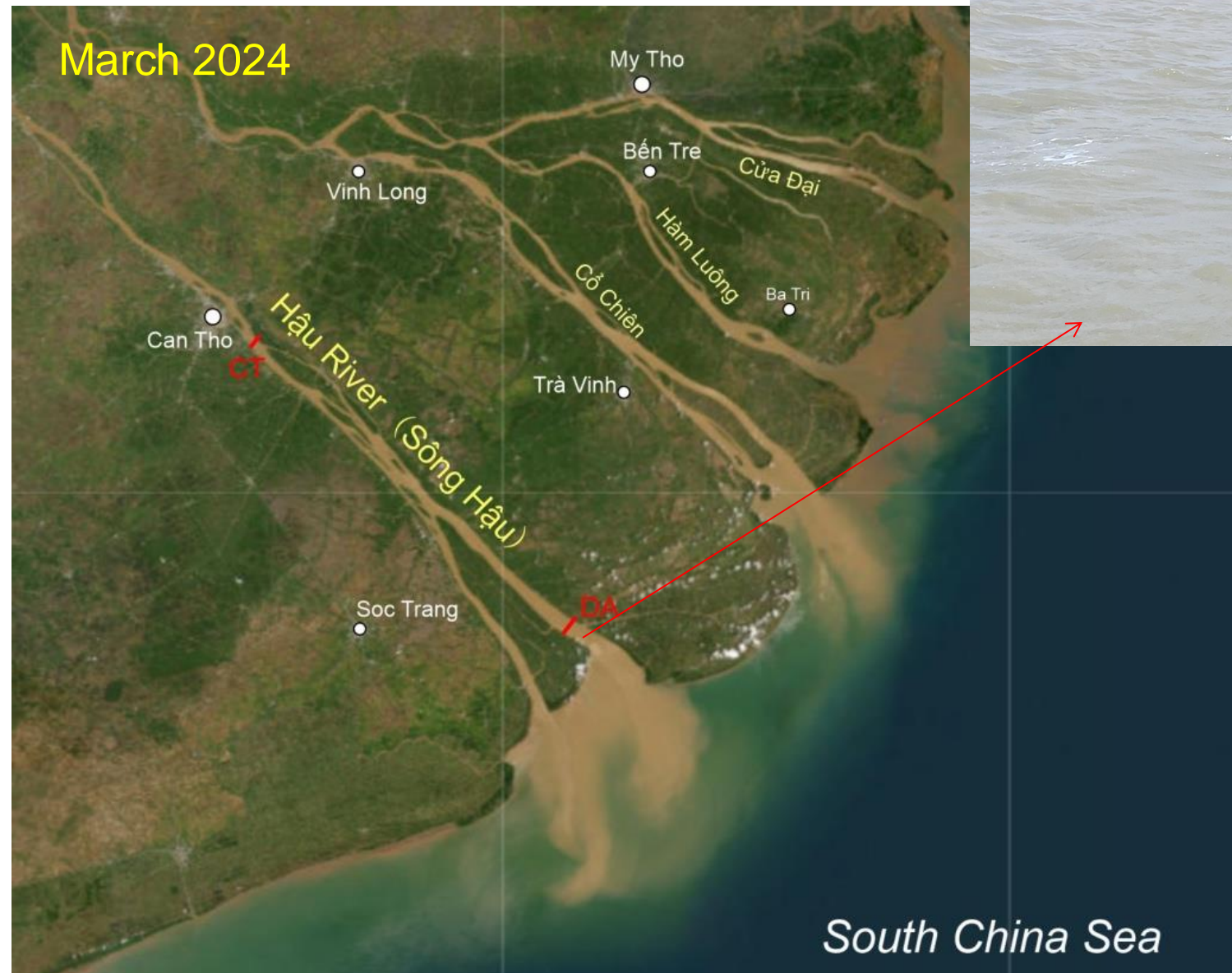
17th FluSed Workshop is to be held on 25-26 Nov. 2024 at BRIN Karangsembung, Kebumen, Indonesia.

● Two oceanic observation cruises

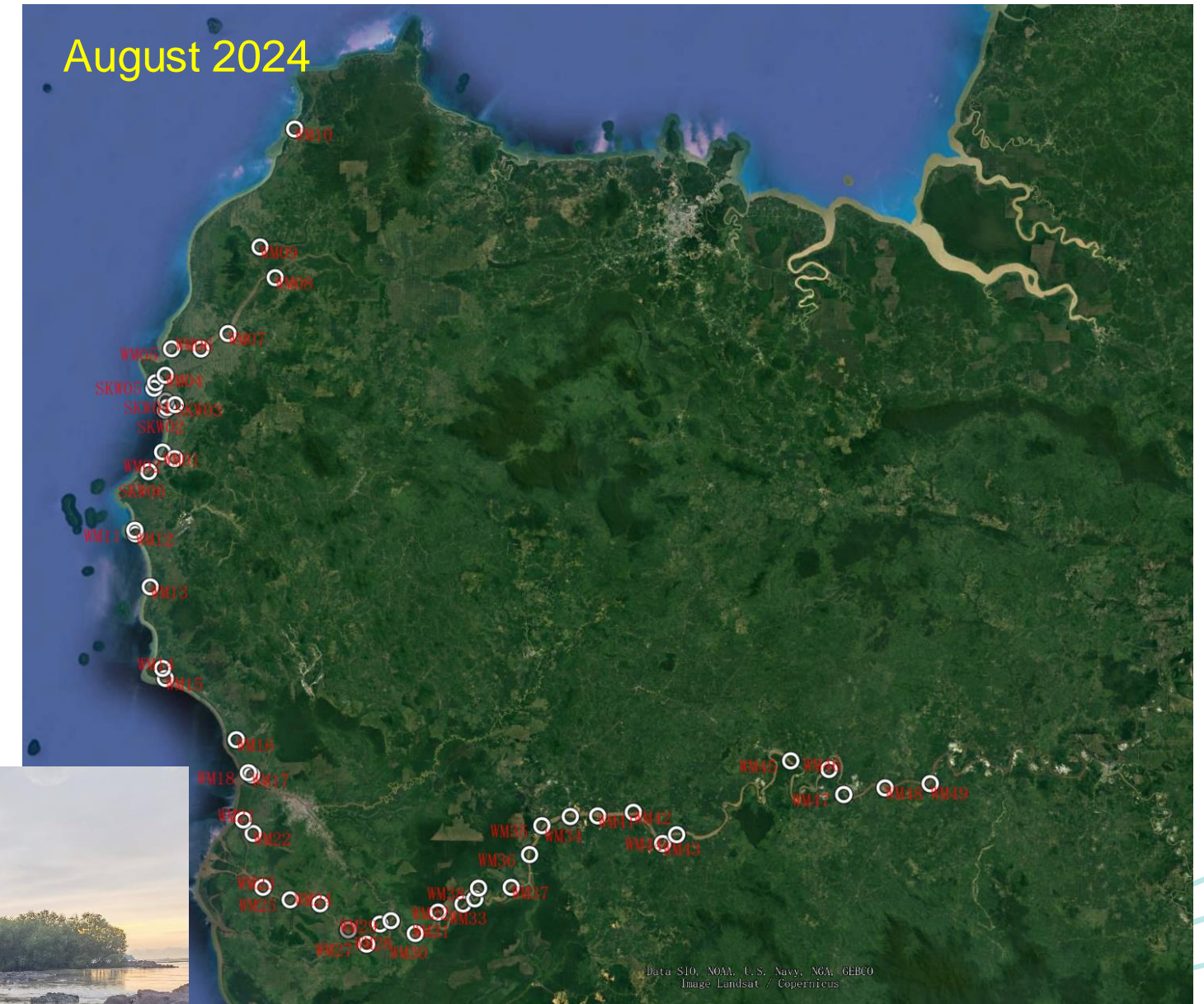


Two cruises were organized during August 2023 and July 2024 off the Mekong River for maintaining one observation mooring system equipping with moored sediment traps, for tracking source-to-sink transport process from the Mekong River estuary to the deep South China Sea.

Two sampling fieldtrips



Mekong estuary, March 2024



Sedimentary dynamic process investigation was carried out through operating an unmanned ship equipped with an ADCP at Can Tho and Dinh An transects on the Mekong estuary (Vietnam) in March 2024.

Sampling fieldtrip was organized along the coastal zone and the Kapuas River, West Kalimantan (Indonesia) in August 2024.

● Four overseas bilateral visits and cooperations



September 2023

Visit of Tongji University delegation at National Research and Innovation Agency (BRIN), Indonesia, during 11-13 September 2023.



April 2024

Visit of Tongji University delegation at Chulalongkorn University, Thailand, during 20-23 April 2024.



October 2023

Visit of Tongji University delegation at Chulalongkorn University, Thailand, during 2-5 October 2023.



August 2024

Visit of Tongji University delegation at National Research and Innovation Agency (BRIN), Indonesia, during 22-30 August 2024.

● Five come-to bilateral visits and cooperations



October 2023

Dr. Pham Trung Hieu, University of Science, Vietnam National University Ho Chi Minh City, visited at Tongji University during 26 October 2023.



November 2023

Chulalongkorn University/Thailand delegation visited at Tongji University for Gulf of Thailand study cooperation on 10 November 2023.



July 2024

Dr. Penjai Sompongchaiyakul and her team, Chulalongkorn University, Thailand, visited at Tongji University for laboratory analysis and cooperation during 18 July-15 August 2024.



November 2023

BRIN/Indonesia delegation visited at Tongji University and signed implementation agreement on 11 November 2023.



September 2024

Dr. Kim Soben and his team, Royal University of Agriculture, Cambodia, visited at Tongji University for laboratory analysis and cooperation during 22 September-8 October 2024.

● Five postdoc/PhD/master programs, Four publications



Sang Pham Nhu
Postdoctor
Vietnam, 2019-2025

Jirawat Deemuenwai
PhD student
Thailand, 2020-2024

Sopheap Den
Master student
Cambodia, 1999-2023

Adam Budi Nugroho
Master student
Indonesia, 2024-2028


Suthinun Janngarm
Master student
Thailand, 2024-2028

International journal publications:

- [1] Sang, P.N., Liu, Z., Zhao, Y., Hieu, P.T., Thav, S., Den, S., 2024. Chemical weathering in the Mekong River Basin: Clay mineralogy and element geochemistry of lower-reach river sediments. *Applied Geochemistry*, 175: 106179.
- [2] Ling, C., Liu, Z., Yu, X., Zhao, Y., Siringan, F.P., Le, K.P., Sathiamurthy, E., You, C.-F., Chen, K., 2024. Clay minerals control silicon isotope variations of fine-grained river sediments: Implication for the trade-off between physical erosion and chemical weathering. *Chemical Geology*, 662: 122249.
- [3] Song, H., Liu, Z., Lin, B., Zhao, Y., Siringan, F.P., You, C.-F., 2024. Clay mineral nanostructures regulate sequestration of organic carbon in typical fluvial sediments. *Heliyon*, 10: e25825.
- [4] Lin, B., Liu, Z., Zhao, M., Sompongchaiyakul, P., Zhang, H., Blattmann, T.M., Feng, S., Wiesner, M.G., Le, K.P., Meas, R., Sathiamurthy, E., 2023. Compositions and sources of sedimentary organic carbon on the tropical epicontinental sea. *Geochimica et Cosmochimica Acta*, 351: 32-44.


Geochimica et Cosmochimica Acta 351 (2023) 32–44

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Geochimica et Cosmochimica Acta

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Compositions and sources of sedimentary organic carbon on the tropical epicontinental sea

Baozhi Lin ^{a,1}, Zhifei Liu ^{a,*,1}, Meixun Zhao ^{b,1}, Penjai Sompongchaiyakul ^c, Hailong Zhang ^b, Thomas M. Blattmann ^d, Shuo Feng ^a, Martin G. Wiesner ^{e,f}, Khanh Phon Le ^g, Rithy Meas ^h, Edlic Sathiamurthy ⁱ

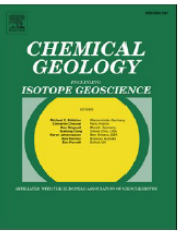
Chemical Geology 662 (2024) 122249

Contents lists available at [ScienceDirect](#)



Chemical Geology

journal homepage: www.elsevier.com/locate/chemgeo



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Clay minerals control silicon isotope variations of fine-grained river sediments: Implication for the trade-off between physical erosion and chemical weathering

Chen Ling ^a, Zhifei Liu ^{a,*}, Xun Yu ^{a,*}, Yulong Zhao ^a, Fernando P. Siringan ^b, Khanh Phon Le ^c, Edlic Sathiamurthy ^d, Chen-Feng You ^e, Kaiyun Chen ^f

4. Problems encountered & recommended actions



Problems encountered

- No serious problems were encountered during the implementation of the project.

Timeframe

Project start year: 2008

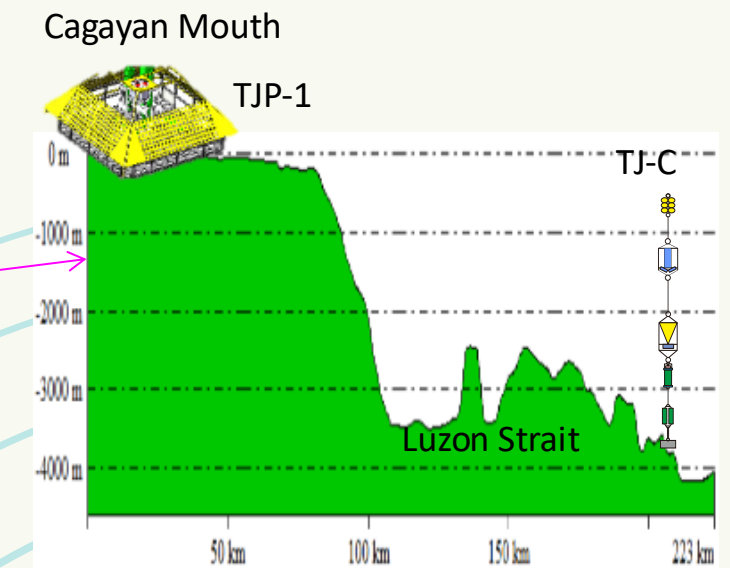
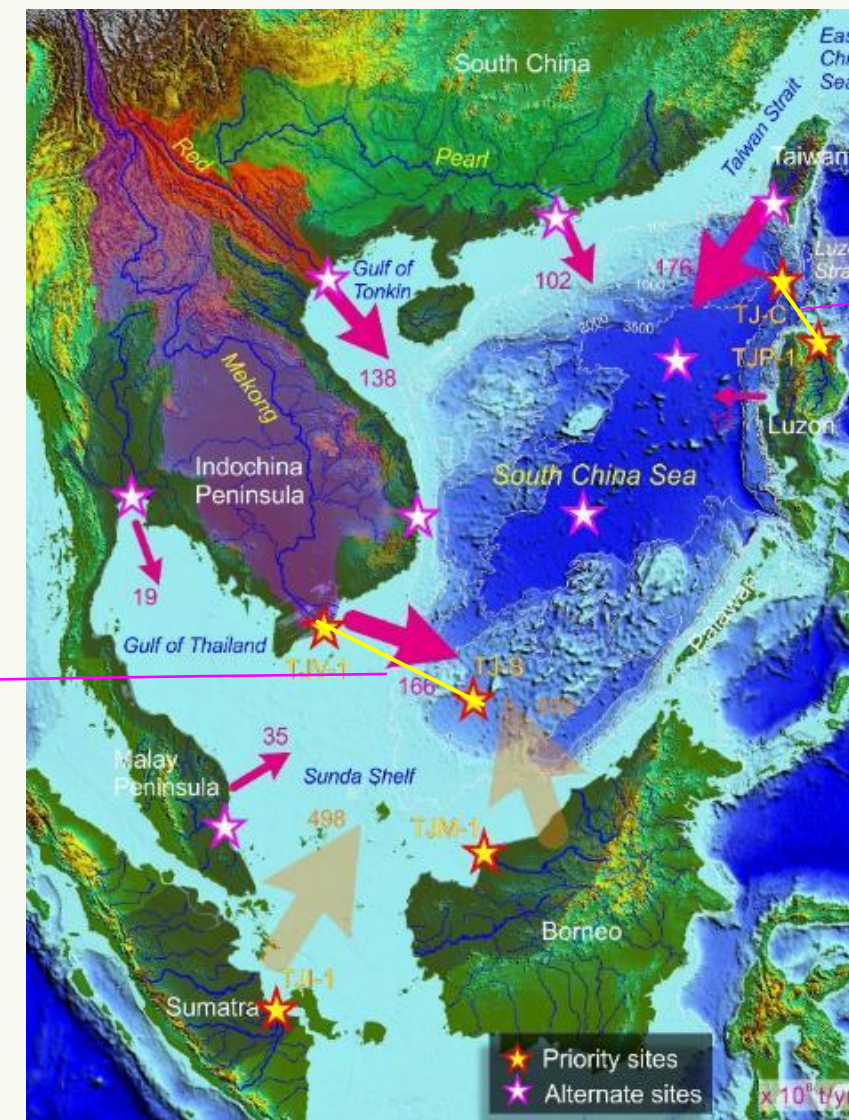
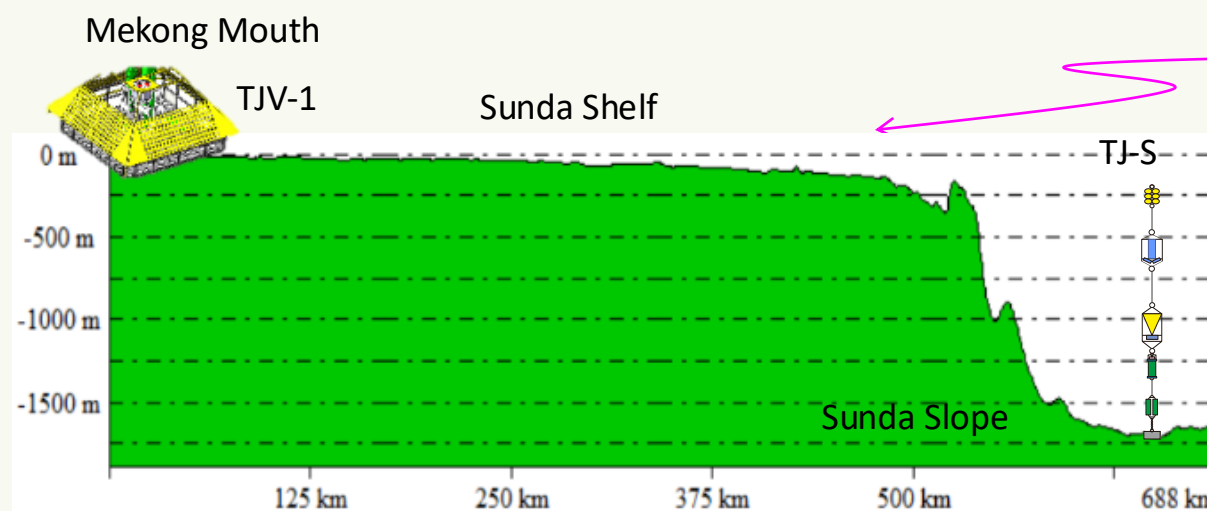
5. Potential action plans for future implementation

for the period of 2025-2026 and beyond

- To investigate fluvial sediment source-to-sink process by deploying in-situ observation systems at two estuary-deep sea transects of the Mekong River and the Cagayan river to the deep South China Sea.
- To obtain the sediment source-to-sink process of two world's river systems, the Lancang-Mekong river system and the Yarlung Zangbo-Brahmaputra-Ganges river system.

Locations of two estuary-deep sea transects (Mekong and Cagayan) to be observed over the intersessional period (2025-2026)

I: Mekong transect: world large river source-to-sink system (160 Mt/yr)



II: Cagayan transect: typhoon affected small river source-to-sink system (7 Mt/yr)

Planned activities



Program	Plan				Funding Required		Remark
	Activities	Objectives	Expected outputs/outcomes	Date and place	IOC	Other sources (i.e. from national or international)	
South China Sea Fluvial Sediments (FluSed)	1. Oceanic observation cruise	Sediment source-to-sink dynamics	Sediment transport mechanism	July 2025		US\$100K (China)	
	2. Bilateral scientific visits	Exchange and laboratory analysis	Publication and training	April 2025, Thailand/Malaysia/China		US\$20K (China)	
	3. 18th FluSed Workshop	Scientific result exchange	Collaboration and discussion	November 2025, Vietnam	US\$10K (China)		
	4. Oceanic observation cruise	Sediment source-to-sink dynamics	Sediment transport mechanism	May 2026		US\$100K (China)	
	5. Bilateral scientific visits	Exchange and laboratory analysis	Publication and training	June 2026, Indonesia/Philippines/China		US\$20K (China)	
	6. 19th FluSed Workshop	Scientific result exchange	Collaboration and discussion	November 2026, Malaysia	US\$10K (China)		
	TOTAL				US\$20K	US\$240K	



Thank You

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