

Groundwater Research in Coastal Area

A wide-angle photograph of a coastal area. In the foreground, the ocean waves gently wash onto a sandy beach. Several people are scattered across the beach, some standing and some sitting. In the middle ground, there are several buildings, including a prominent white house with a red roof. To the left, a large industrial facility with multiple towers and pipes is visible. The sky is clear and blue, and the overall scene is bright and sunny.

Makoto Taniguchi

Yu Umezawa

Tomotoshi Ishitobi

Takahiro Hosono

Dudi

Madio

Rico

Ramli

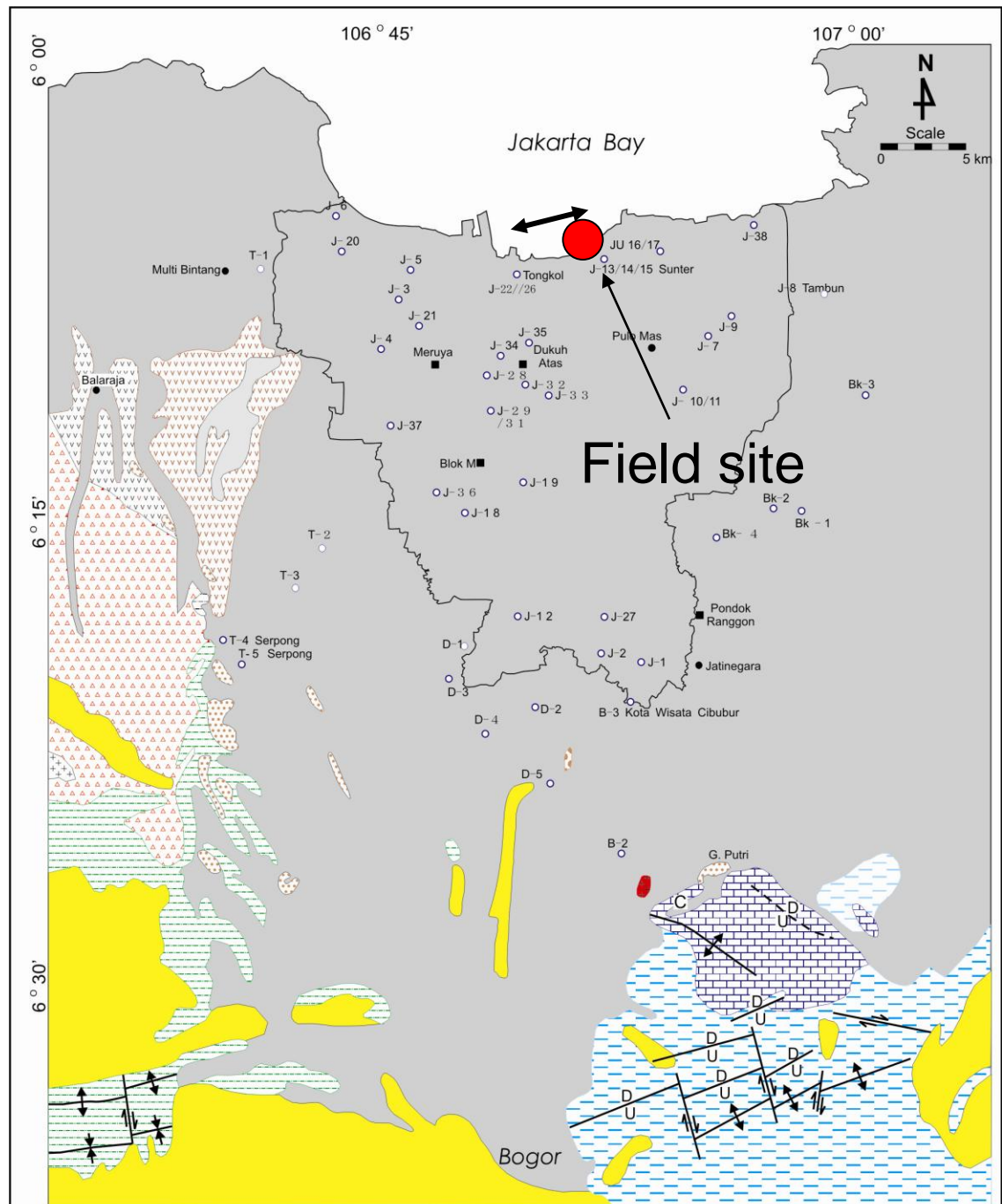
Objectives

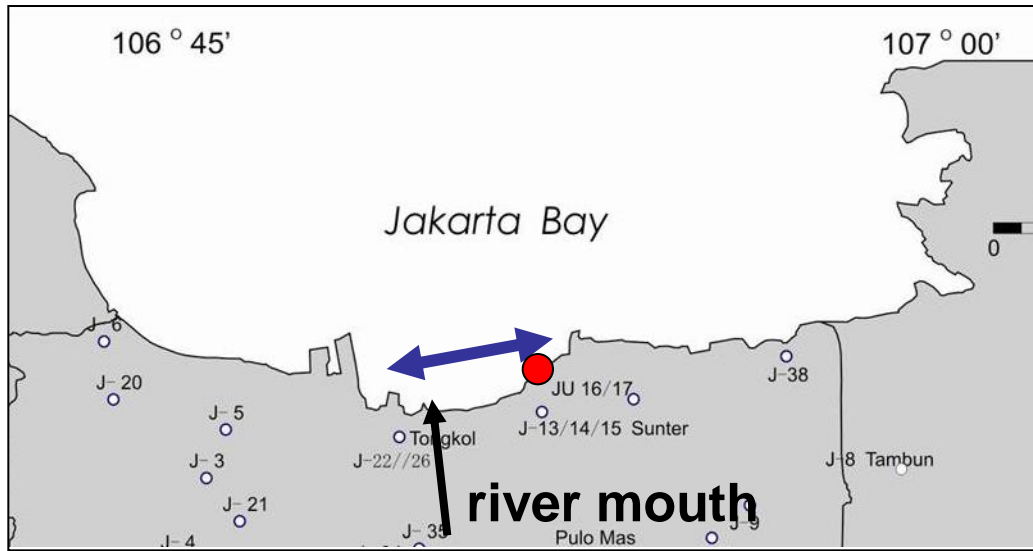
- To estimate the amount of SGD along the coastal line
- To estimate nutrients fluxes via SGD
- To understand the impacts of SGD on the coastal ecosystem (current and in near future)
- To reconstruct the anthropogenic matter discharge to the coastal area in recent 20 or 30 years.

Schedule

- 5 (Tue) --- Meeting at LIPI
- 6 (Wed) --- Survey at study area
- 7 (Thu) --- Deployment of seepage meter, piezometer,
- 8 (Fri) --- Resistivity measurement, start of incubation exp., & sediment core sampling at offshore area
- 9 (Sat) --- Time-series measurements of resistivity & Time-series monitoring of nutrients and several parameters (DO and pH.)
- 10 (Sun) --- Time-series measurements of resistivity, Time-series monitoring of nutrients and several parameters, & sediment core sampling to check nutrients profiles
- 11 (Mon) --- Time-series measurements of resistivity, Time-series monitoring of nutrients and several parameters, & sediment core sampling to check nutrients profiles
- 12 (Tue) --- Recover the equipments

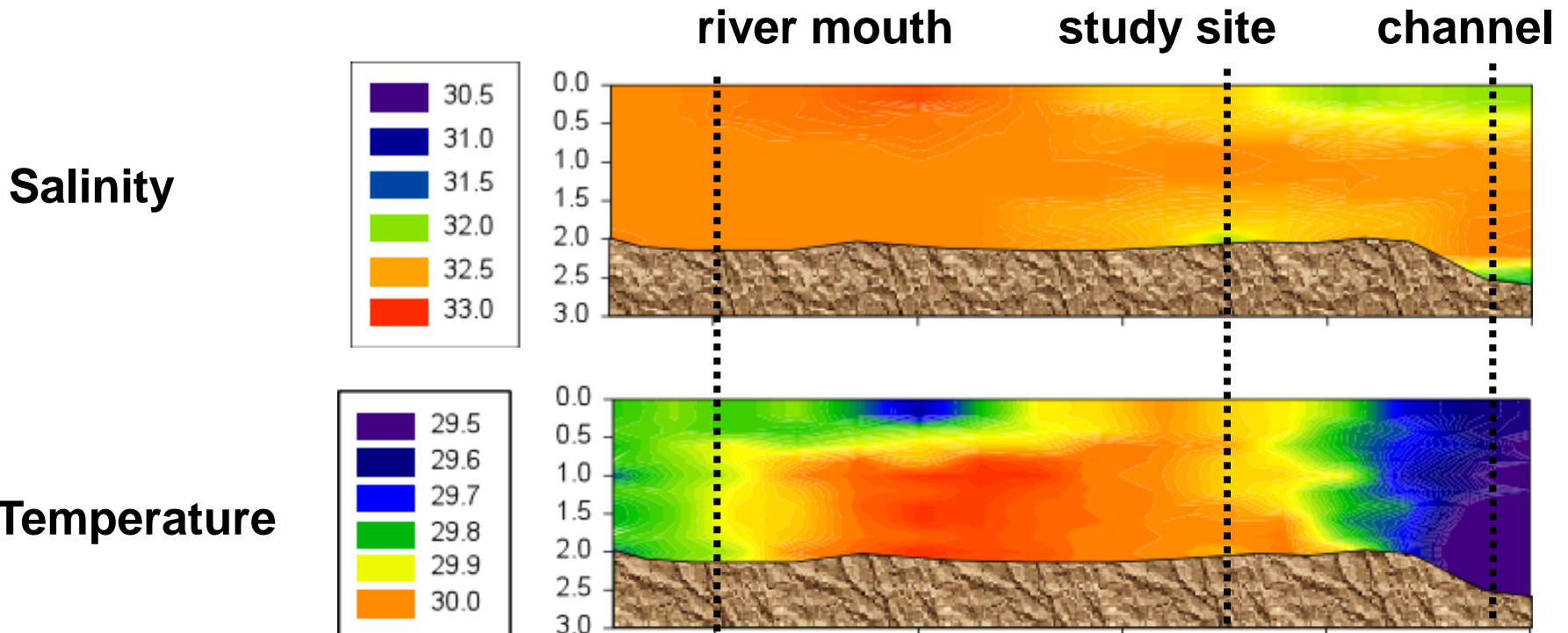
Field site





Basic info.

**CTD measurement
around study site
(during high tide)**



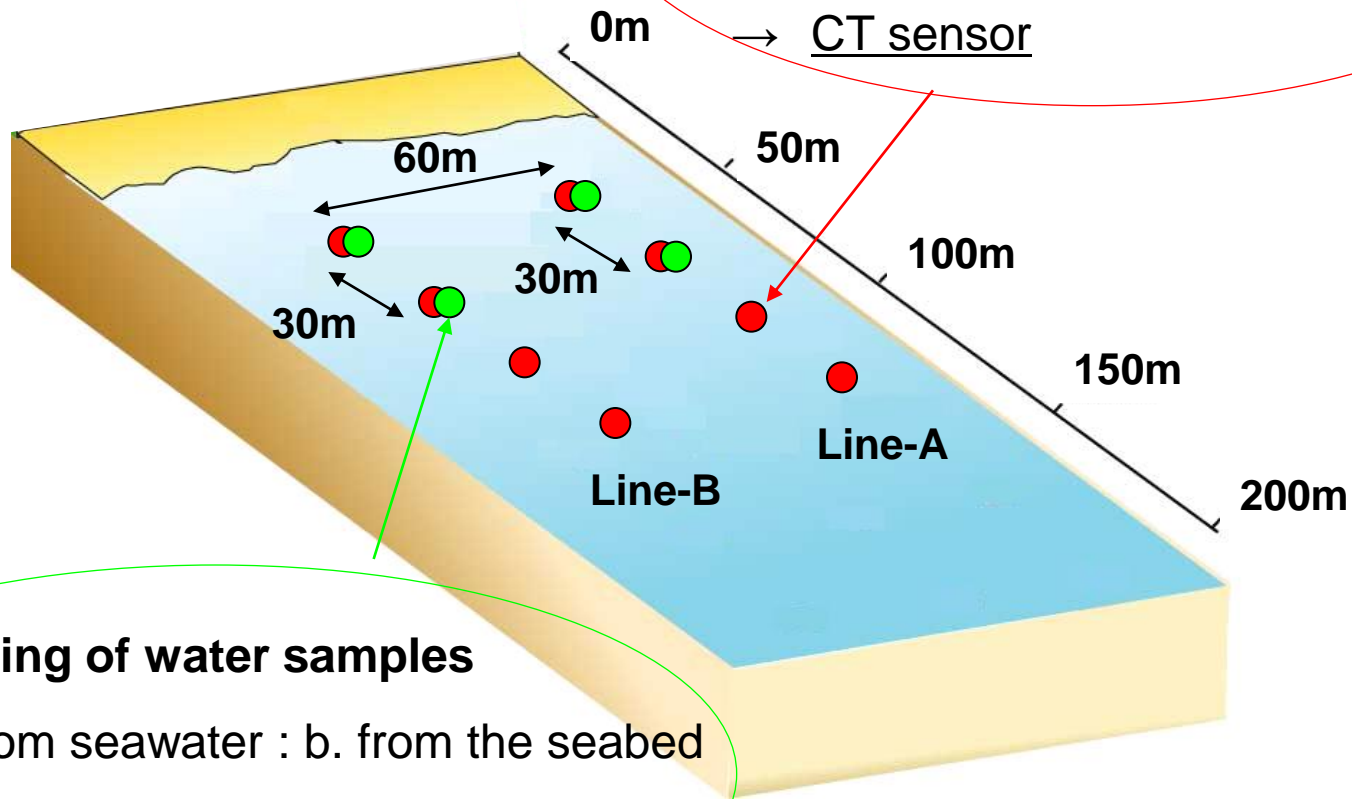
Measurement of SGD and nutrient flux

1. Measurement of SGD rates

→ Seepage meter

2. Measurement of conductivity of SGD

→ CT sensor

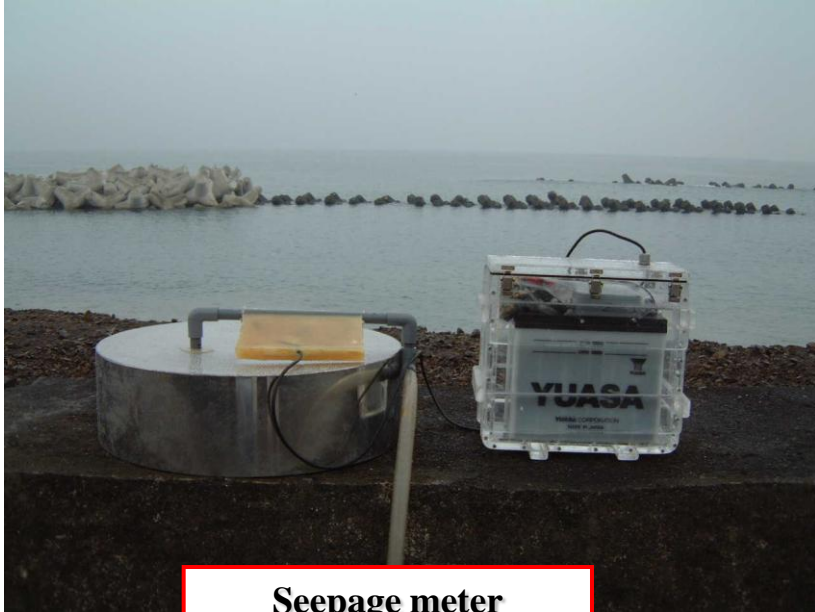


3. Sampling of water samples

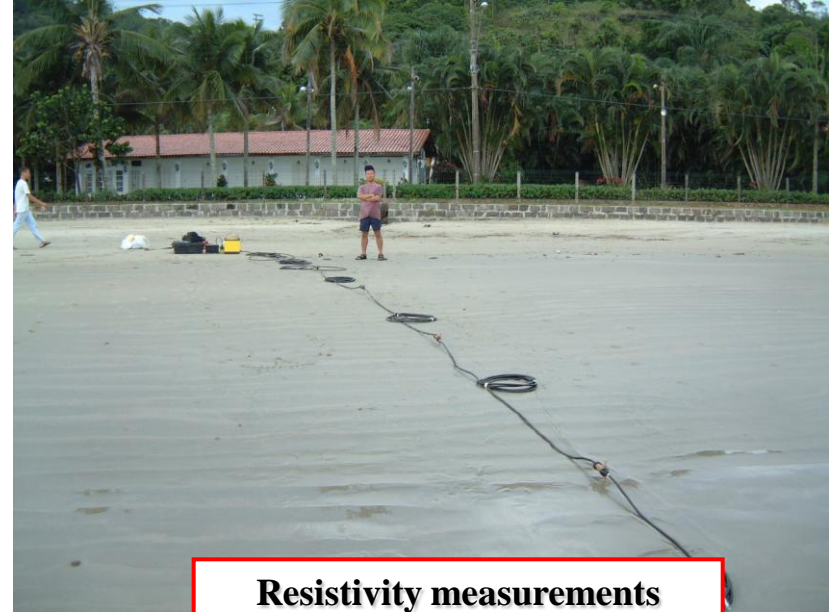
- a. bottom seawater : b. from the seabed
- c. 10cm depth from the seabed

4. Sediment core sampling

Methods



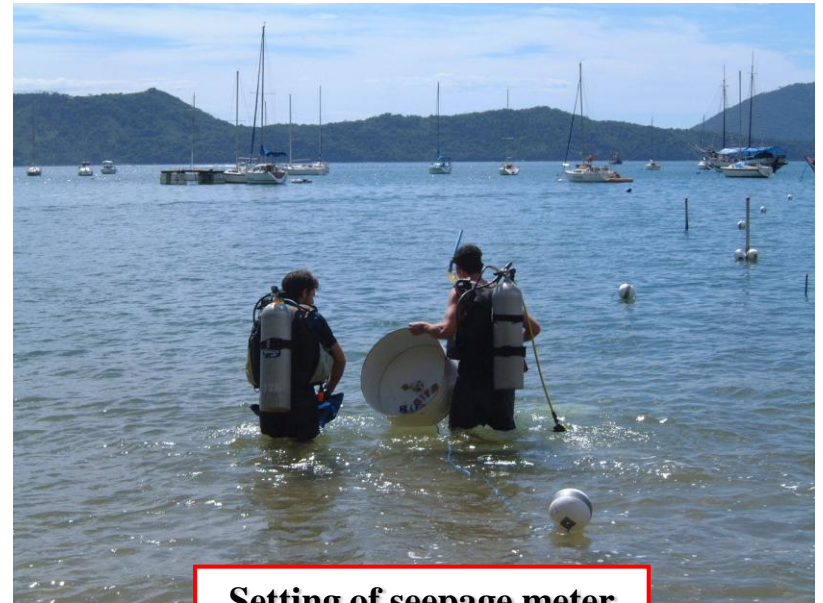
Seepage meter



Resistivity measurements



Measurement of SGD



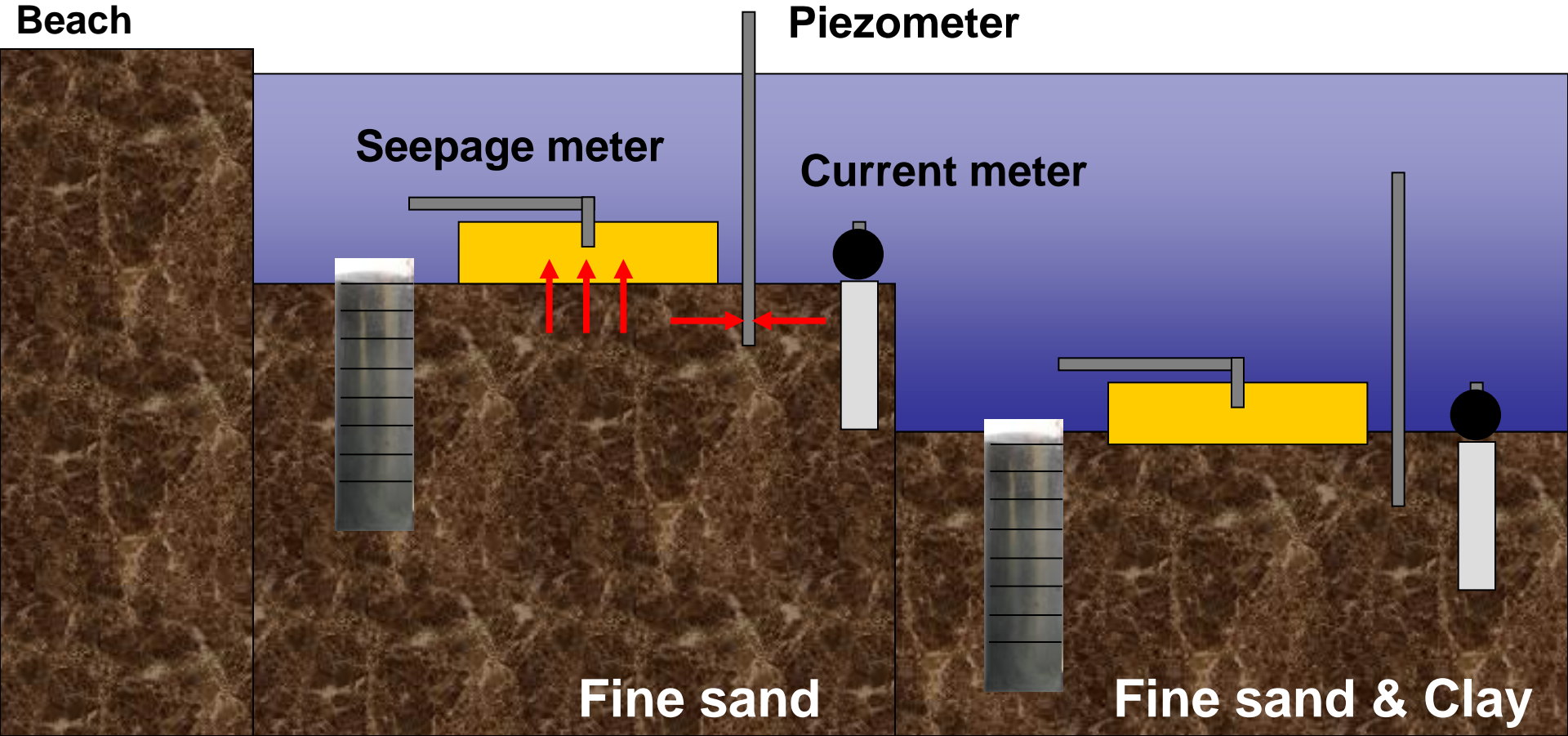
Setting of seepage meter

Estimation of nutrients fluxes through SGD according to the different ① physical condition, ② substrate & ③ method

Water depth
Wave disturbance

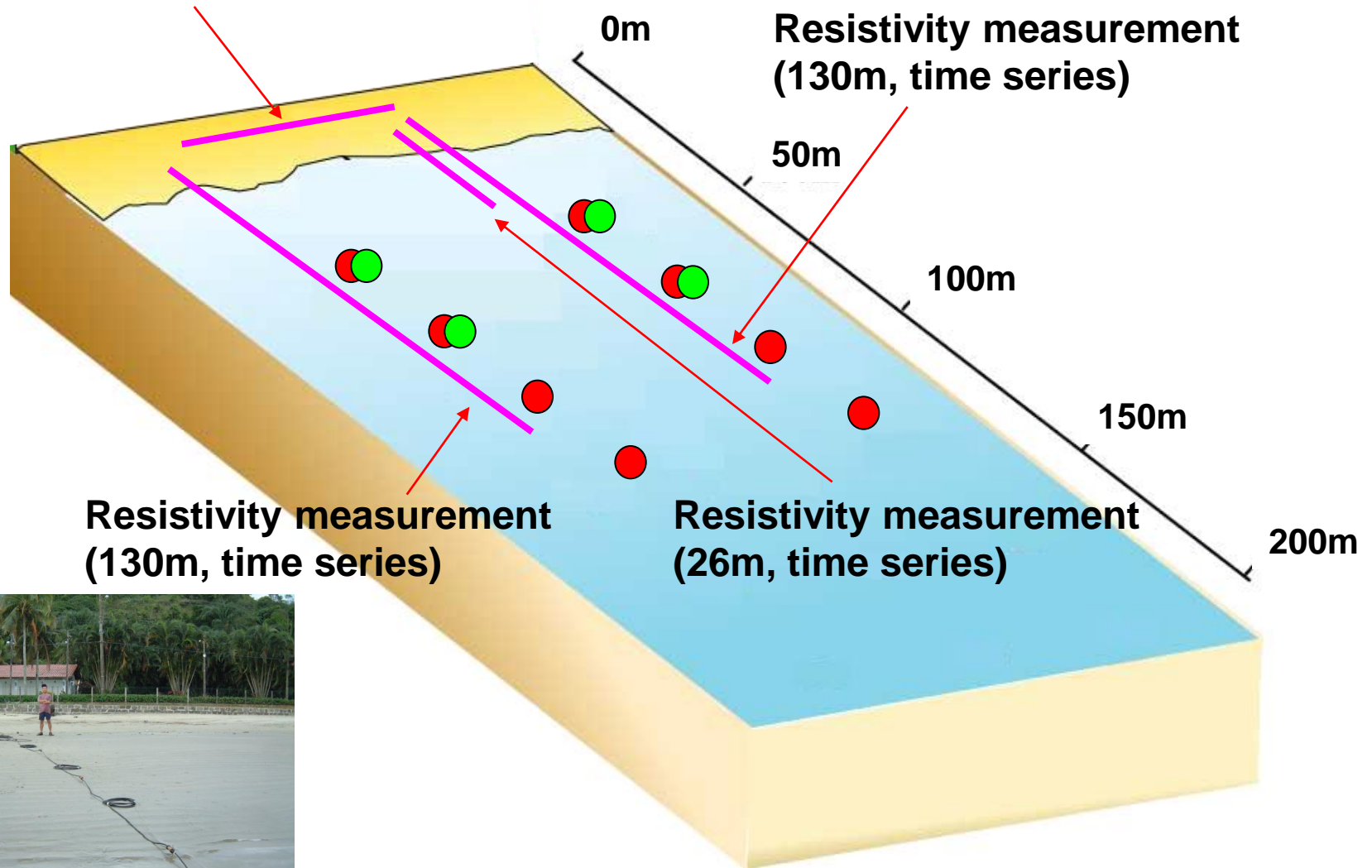
Fine sand
Clay
Organic matter conc.

Seepage meter
Piezometer
Nutrients profile

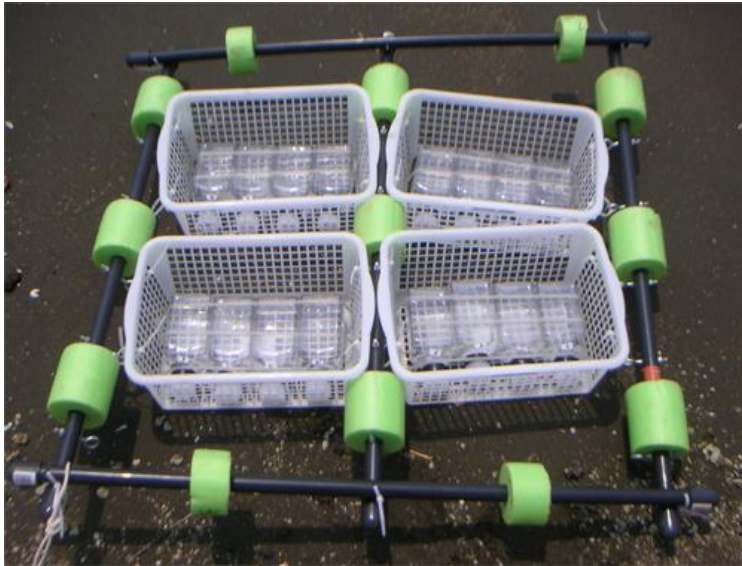


Resistivity measurement

Resistivity measurement (65m)



Phytoplankton reaction to additional nutrient input



Seawater sampling

500 ml of 0.7 μm filtered seawater

50 ml of 300 μm filtered seawater



Nutrients Addition

①② : Control

③④ : Nitrate (NO_3^-)

⑤⑥ : Ammonium (NH_4^+)

⑦⑧ : Phosphorus (PO_4^{3-})

⑨⑩ : Silicate (SiO_4^{2-})

⑪⑫ : $\text{NH}_4^+ + \text{PO}_4^{3-}$

⑬⑭ : $\text{NO}_3^- + \text{PO}_4^{3-} + \text{SiO}_4^{2-}$

⑮⑯ : $\text{NH}_4^+ + \text{PO}_4^{3-} + \text{SiO}_4^{2-}$



In situ incubation

Time series monitoring

(Nutrients & chl.a)

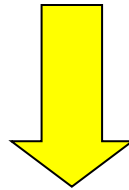
Thanks a lot for your many supports!!

Robert, Fajar, Dudi, Madio, Rico & Ramli

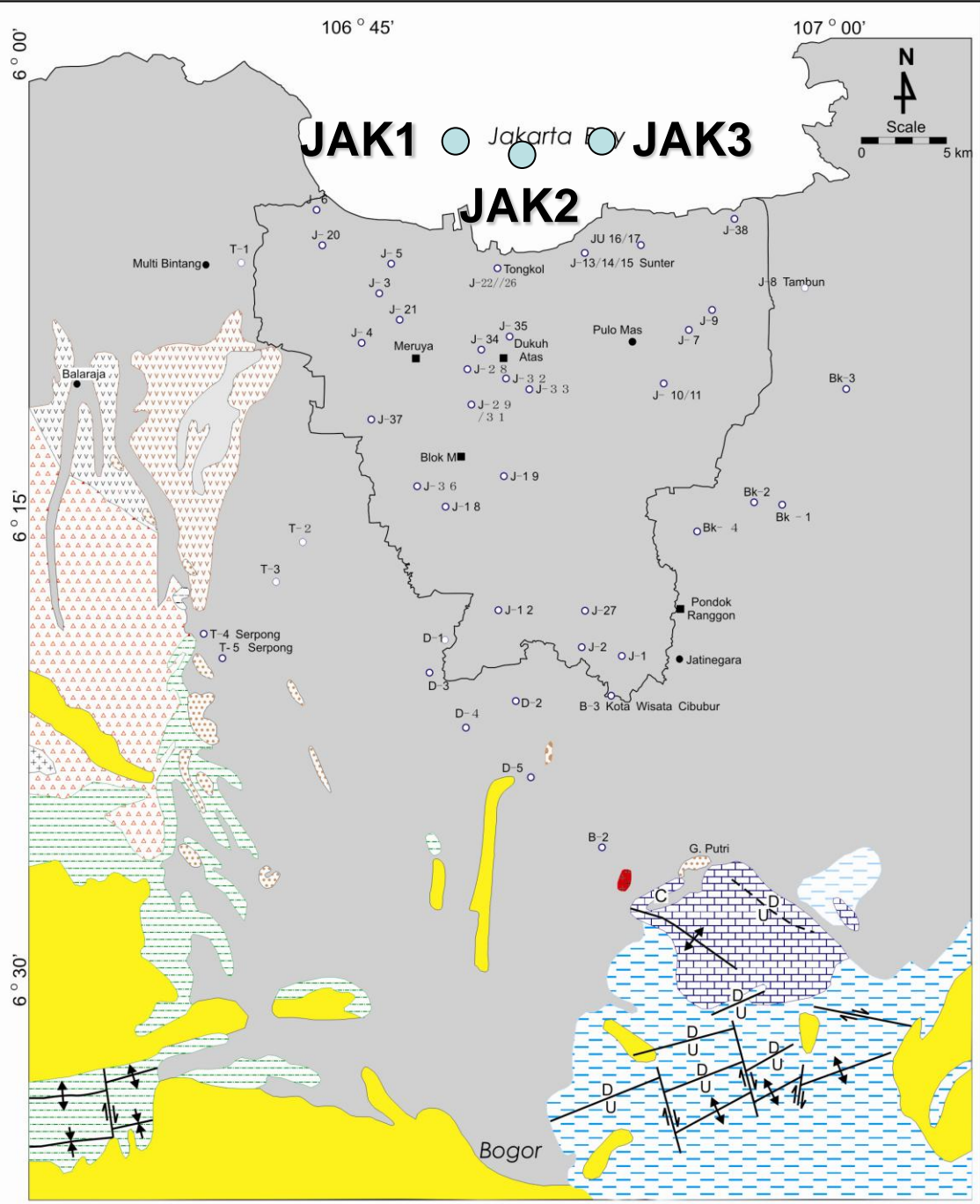


Sediment core sampling

- Day: 10 Aug (Sun)
- Three different site 14m~16m in depth



In order to understand
Sedimentation history
and
Pollution history



Legend

- Aluminum Sand Bar Deposit
- Conglomerate Deposit
- Normal Fault
- Well Name

**Collected by special diver
(Dudi and Madio)**





- 60~80cm long
- Sliced in 1cm size
- Water contents





Future analysis

- ^{210}Pb age
- Metal contents
- $^{208}\text{Pb}/^{204}\text{Pb}$
- Nutrients
- $\delta^{15}\text{N}$

Need more data

- Water chemistry data (major ion)

Terima kasih~ !!!

テレマカシー !!!