

The State of the Art and Science of Coastal Engineering

FIELD OBSERVATION OF FINE SEDIMENT TRANSPORT PROCESS AROUND RIVER MOUTHS IN NORTH WESTERN JAVA ISLAND, INDONESIA

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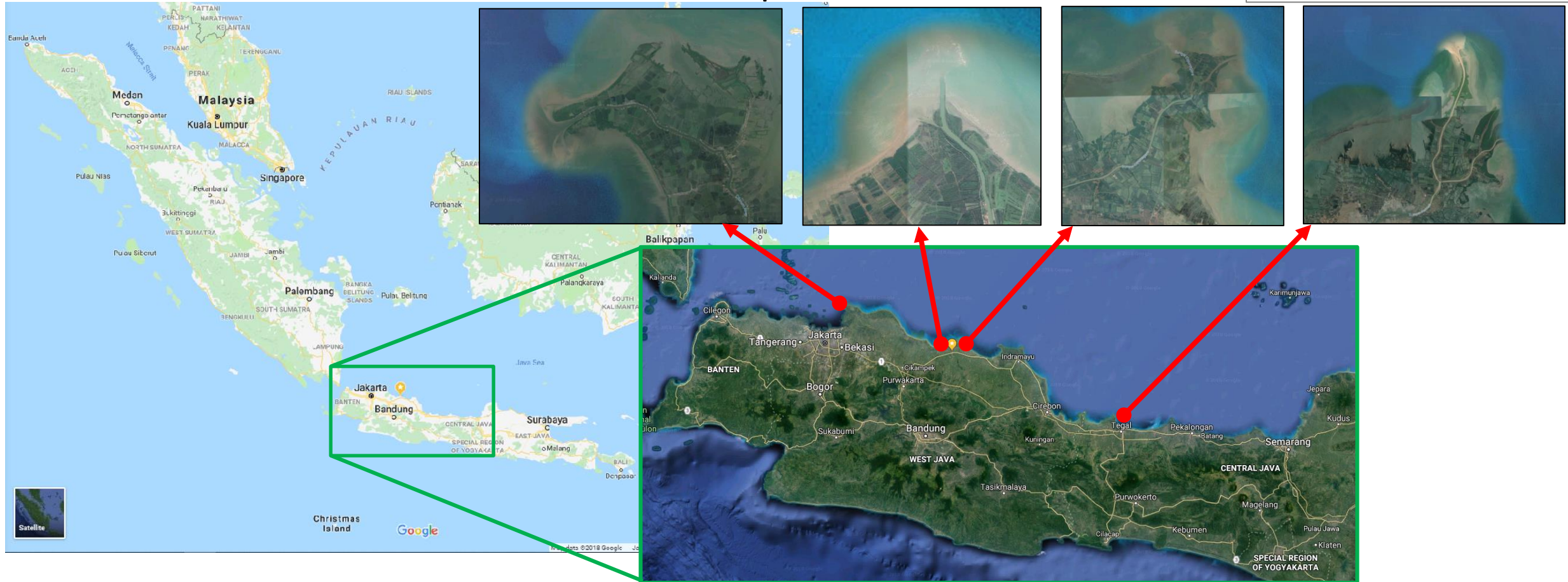
- Introduction
- Site description
- Field Monitoring
- Results and discussion
- Conclusions



- North Coast of Java Island -

Developments of river mouth delta

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River mouth morphology in tropical climate environments

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- ✓ Scientific interest on sedimentary process with fine sediments in estuarine environments
- ✓ High contrast of physical settings between dry and rainy season
- ✓ Importance from engineering view points of the process on a safety ship navigation

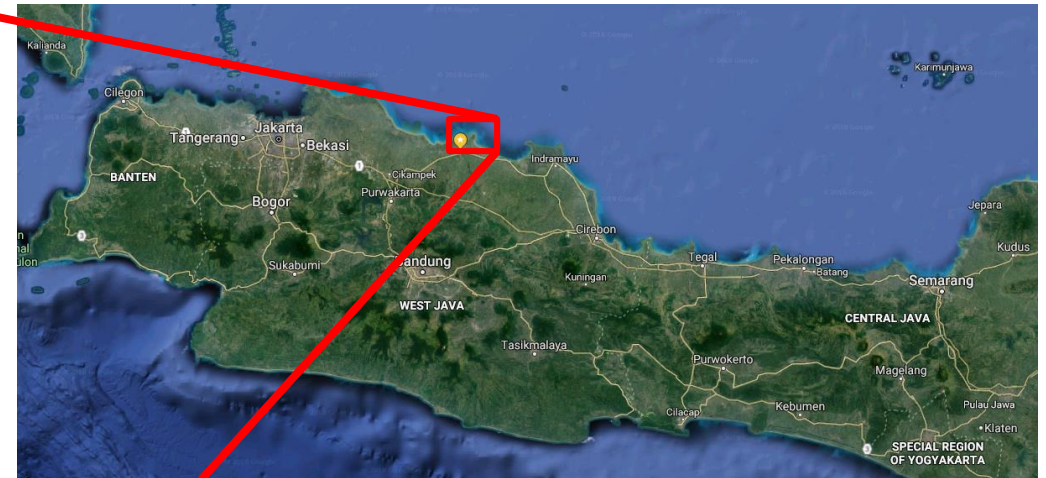
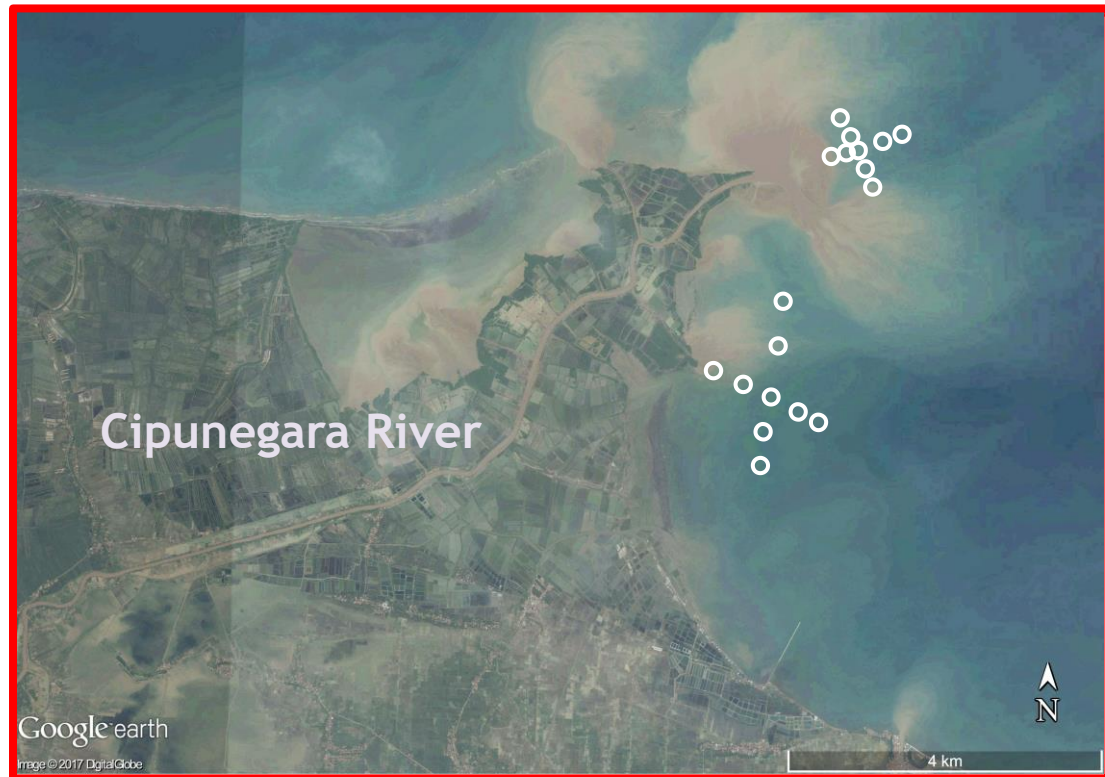
Objective of the present study

Preliminary study for getting better understanding of sedimentary system through field monitoring



Target site of the present study - Mouth of Cipunegara River -

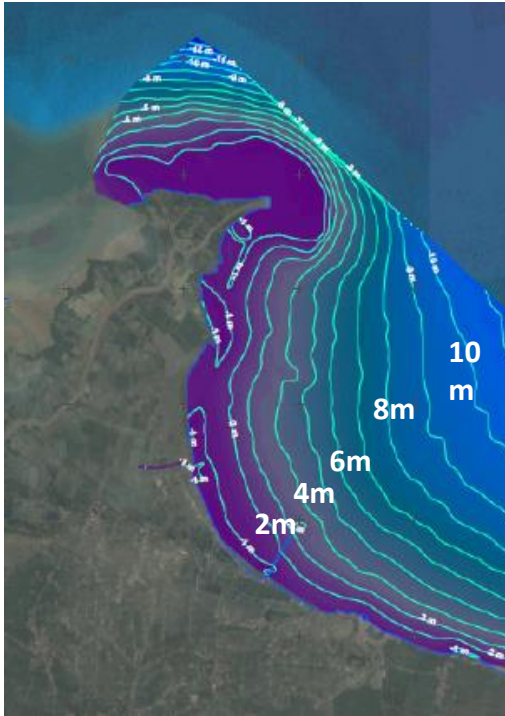
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Bathymetry and Tidal conditions of the study area

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- Site description
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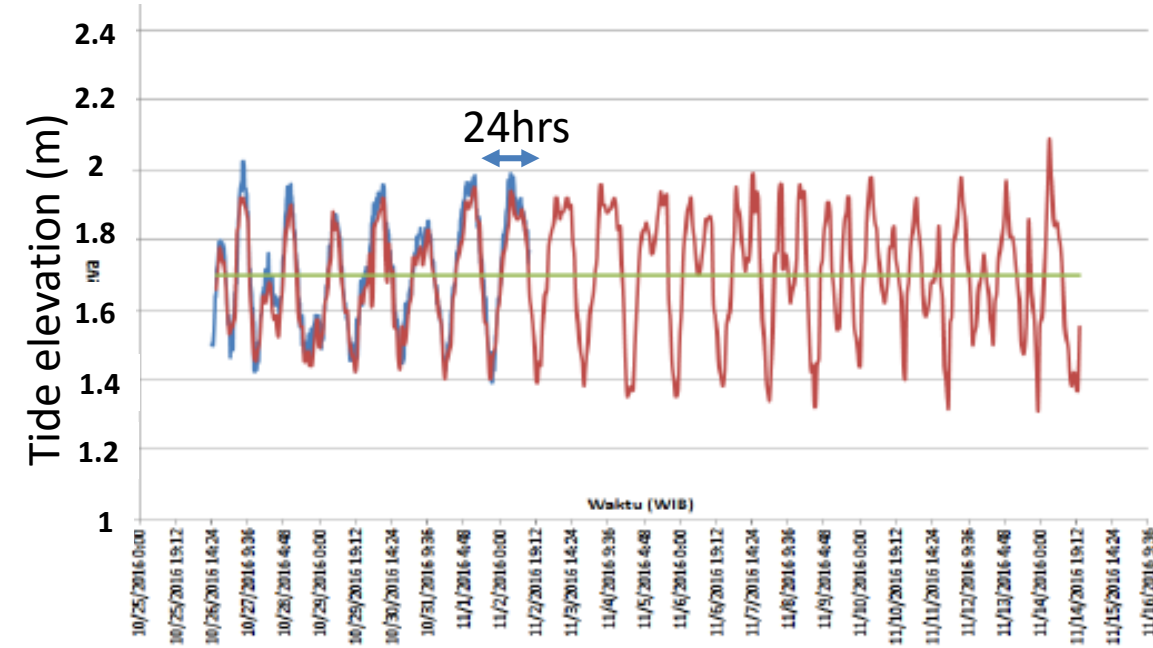
Sediment Size



Bathymetry

No.	Kode Sampel BTIPDP	Kode Sampel PARI	Kadar Air (%)	Berat Jenis (g/cm ³)	D50 (mm)	Litologi
1	SD-01		176.492	2.172	0.700	Medium Sand
2	SD-02		168.427	2.183	0.680	Medium Sand
3	SD-03		126.822	2.191	0.075	Silt
4	SD-04		156.795	2.201	0.400	Fine Sand
5	SD-05		163.948	2.165	0.300	Fine Sand
6	SD-06		149.707	2.163	0.280	Fine Sand
7	SD-07		146.562	2.155	0.140	Very Fine Sand
8	SD-08		138.867	2.130	0.130	Very Fine Sand
9	SD-09		132.530	2.142	0.400	Fine Sand
10	SD-10		144.599	2.207	0.210	Fine Sand
11		A 1	148.443	2.250	0.160	Very Fine Sand
12		A 2	151.114	2.249	0.350	Fine Sand
13		A 3 (11.50)	151.479	2.274	0.120	Very Fine Sand
14		A 3 (12.30)	122.820	2.276	0.300	Fine Sand
15		A 4	137.294	2.220	0.100	Very Fine Sand
16		A 5	145.499	2.136	0.096	Very Fine Sand
17		B 1	87.148	2.493	0.200	Fine Sand
18					0.090	Very Fine Sand
19					0.140	Very Fine Sand
20					0.140	Very Fine Sand
21					0.150	Very Fine Sand
22					0.220	Fine Sand
23		AL 2	177.316	2.138	0.150	Very Fine Sand
24		BL 2	173.169	2.116	0.190	Fine Sand
25		AR 1	115.504	2.165	0.150	Very Fine Sand
26		AR 2	78.535	2.254	0.180	Very Fine Sand
27		BR 1 (10.50)	85.106	2.391	0.147	Very Fine Sand
28		BR 1 (11.15)	142.609	2.253	0.145	Very Fine Sand
29		BR 2	123.405	2.238	0.130	Very Fine Sand

D50 = 0.096 - 0.35 mm
Fine-Very Fine sand

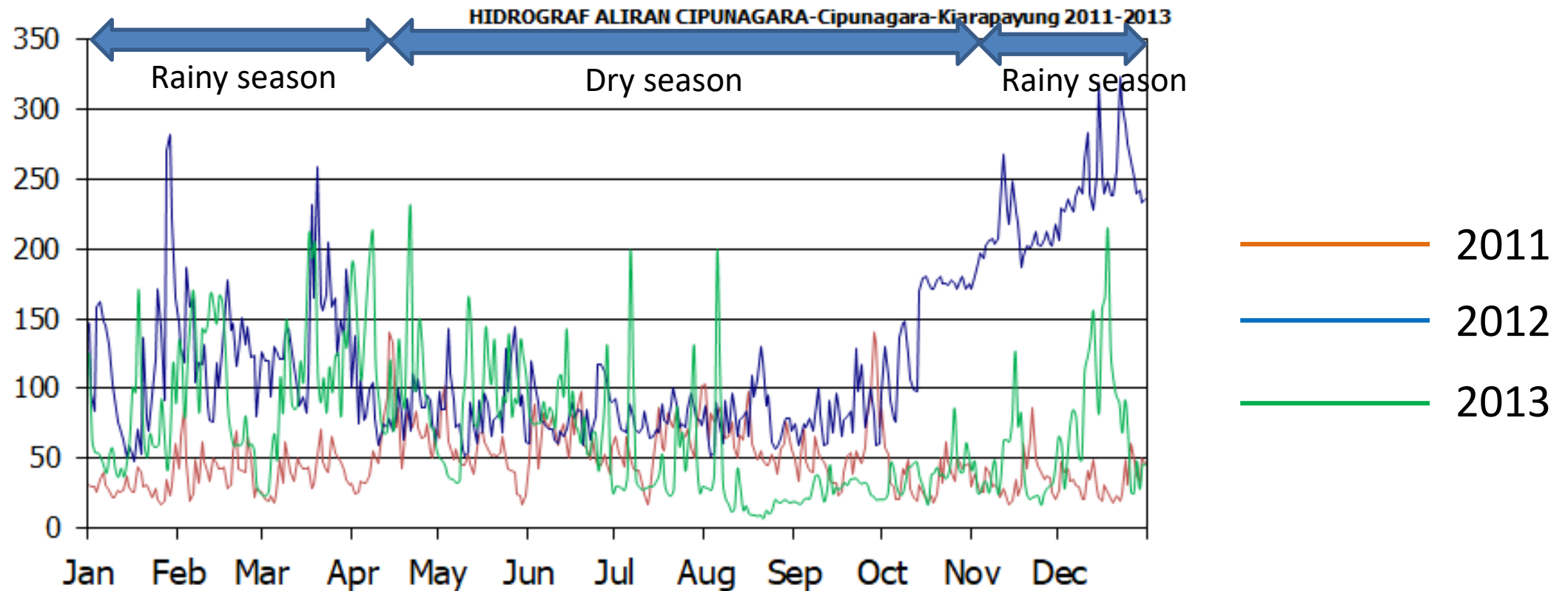


Tide: Diurnal or Semi-Diurnal Component with the range of around 0.6 m



Temporal Variation of Fresh Water Discharge through Cipunagara River

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Field Monitoring at the site

Feb. 2017 (Rainy season)

Aug. 2017 (Dry season)

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Purpose of the field survey is to take the data set, which can be applied to comparison of sedimentary conditions between the seasons



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Field Monitoring at the site

CTD (Salinity, Temperature, Turbidity)

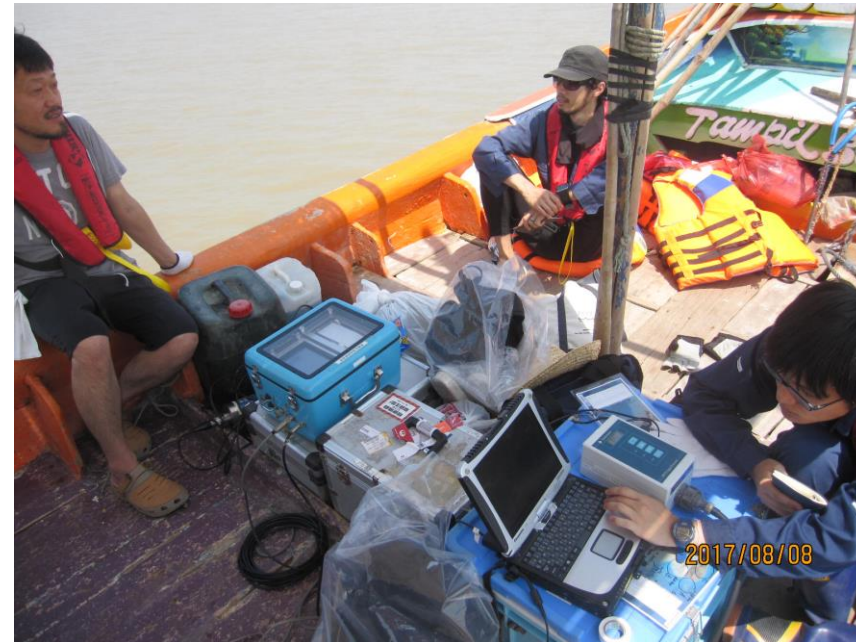


AAQ1183/JFE-Advantech

Density (In-situ bulk density of muddy bed)



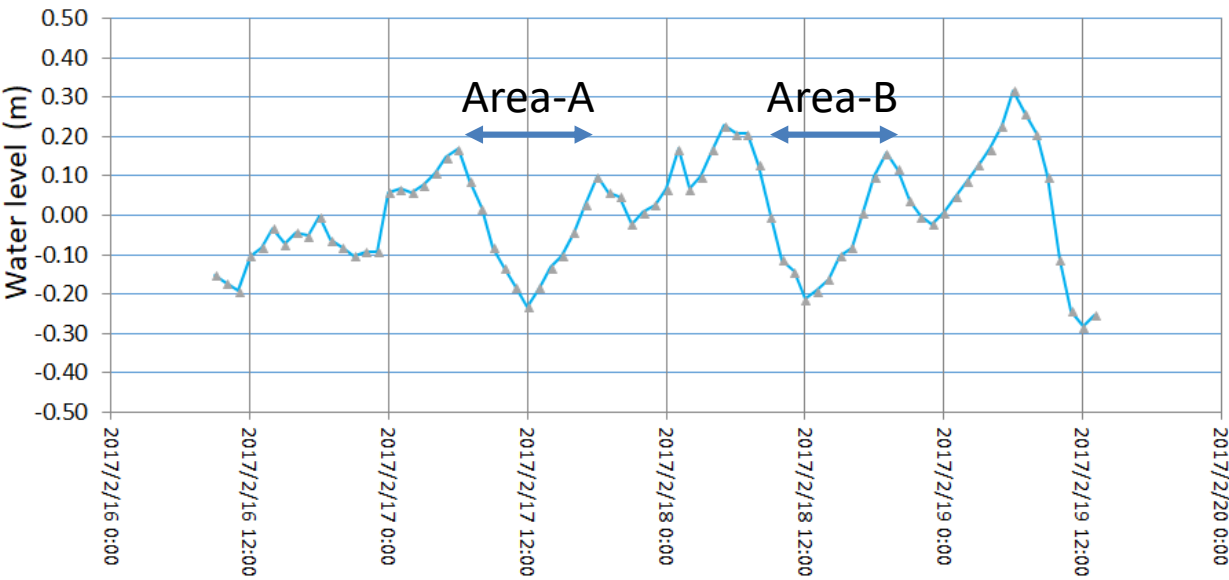
XL-4(MudBug)/Hydramotion



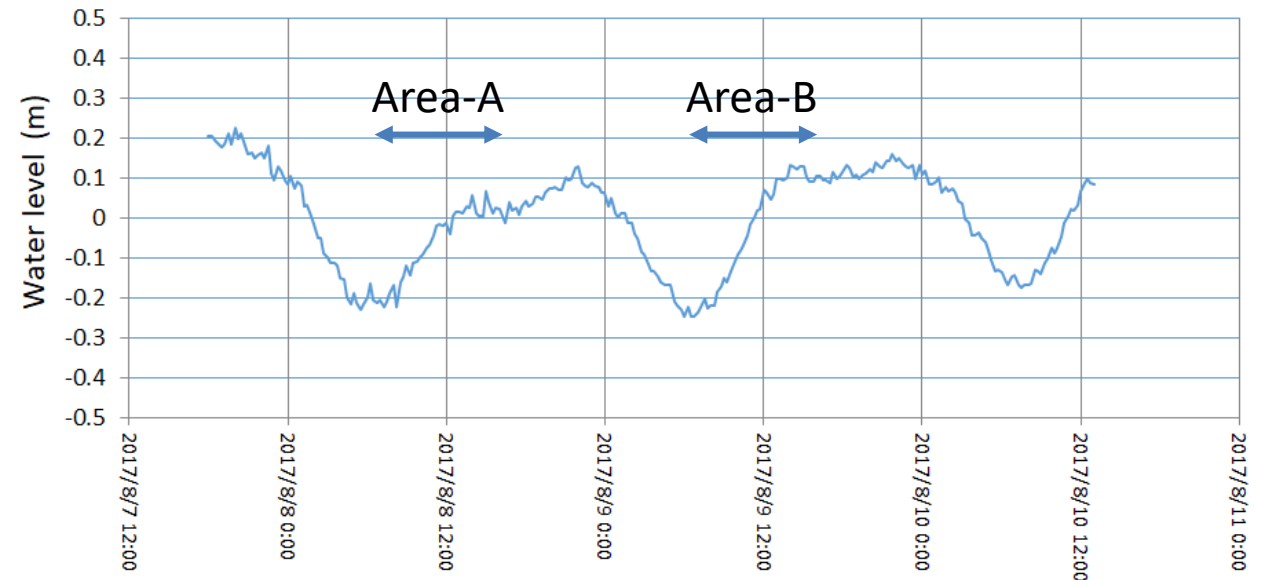
Tidal conditions during the measurements

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TIDE at Patimban- February 2017

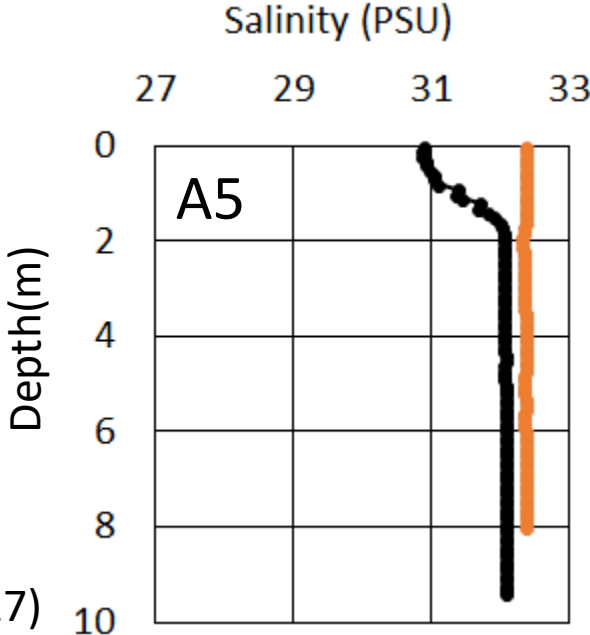
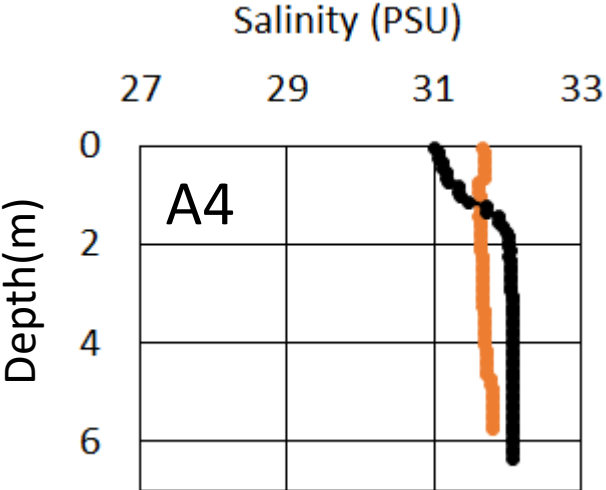
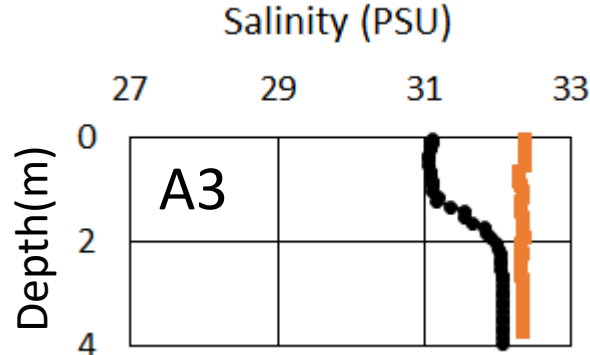
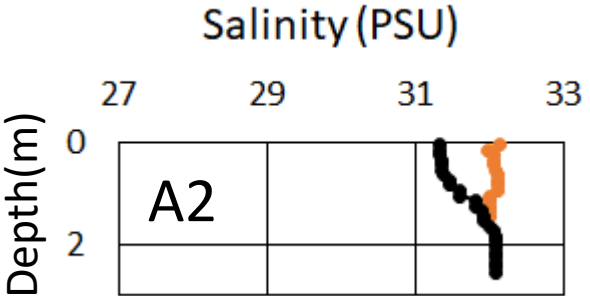
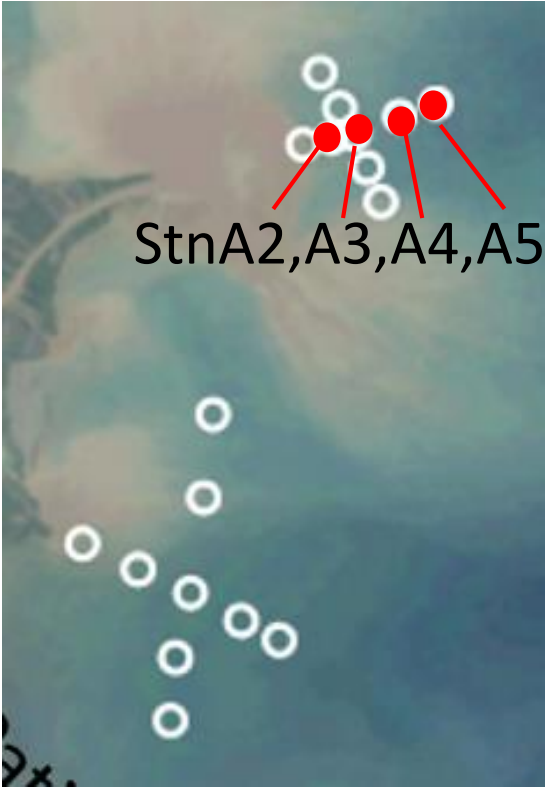


TIDE at Patimban- August 2017



Salinity Profiles along A-line

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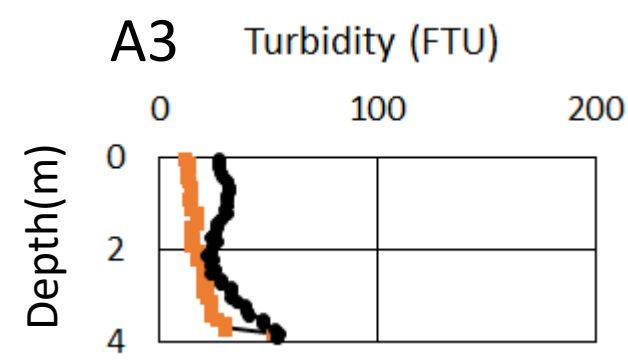
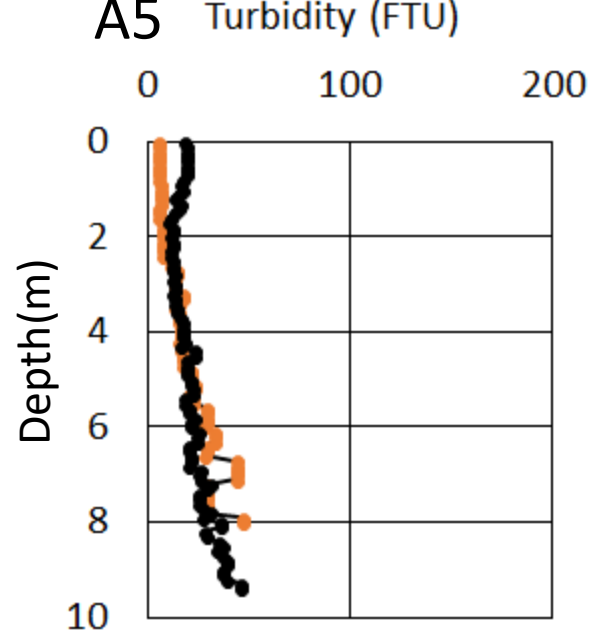
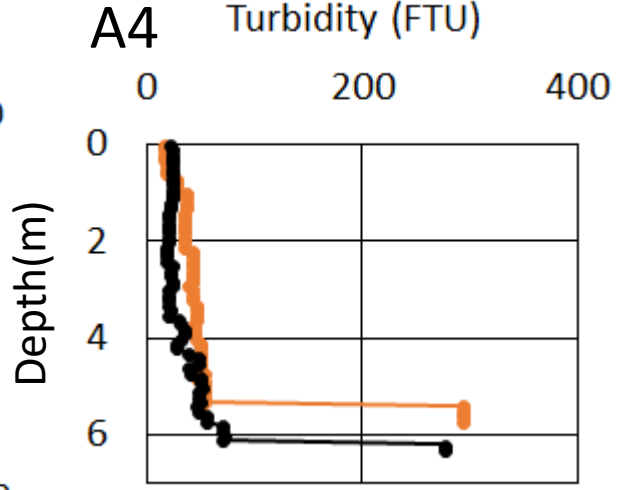
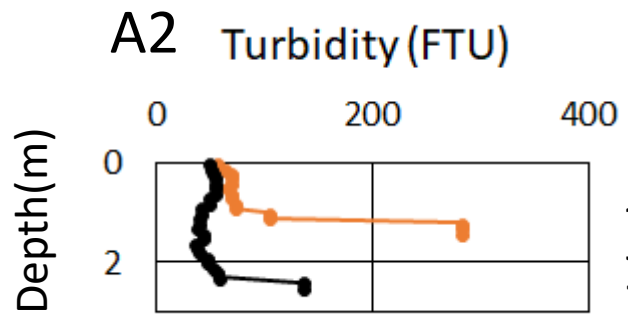
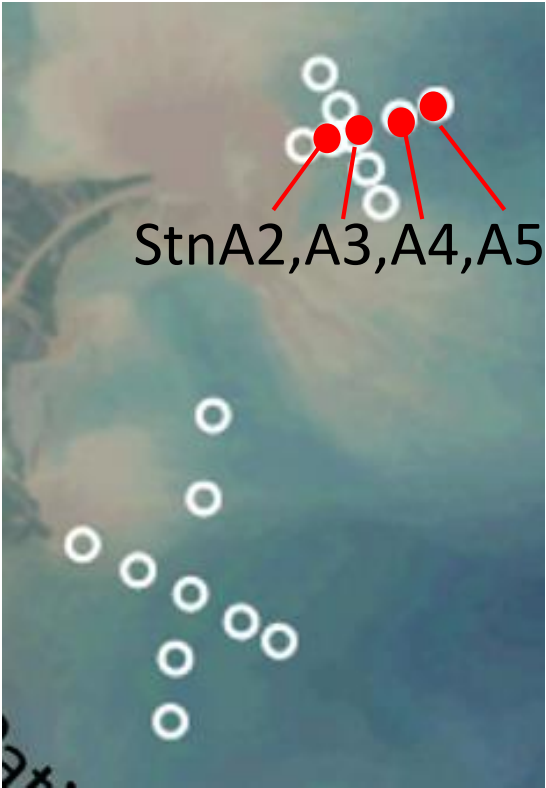
— Rainy season (Feb.2017)

— Dry season (Aug.2018)



Turbidity Profiles along A-line

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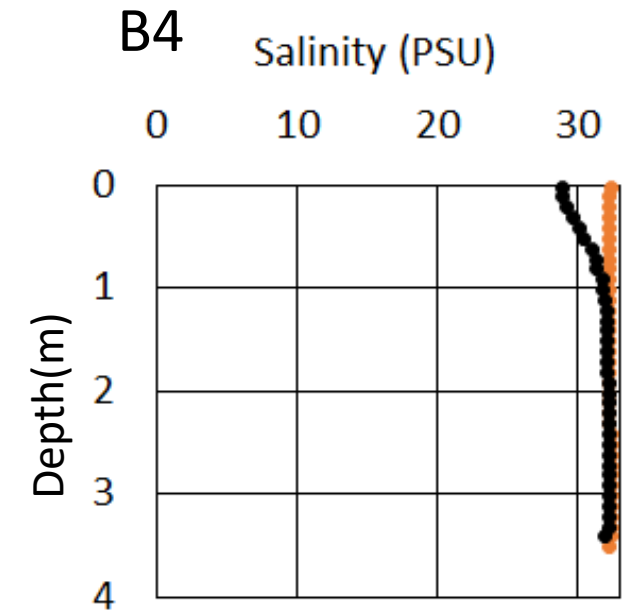
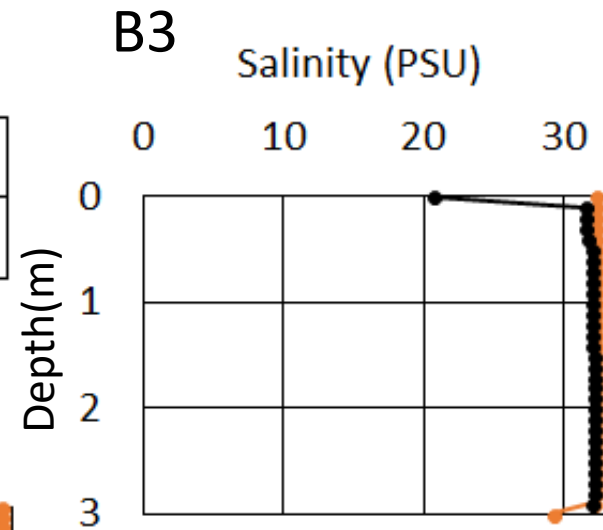
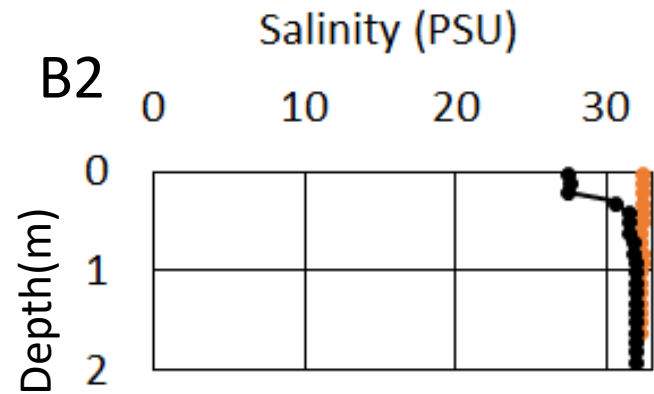
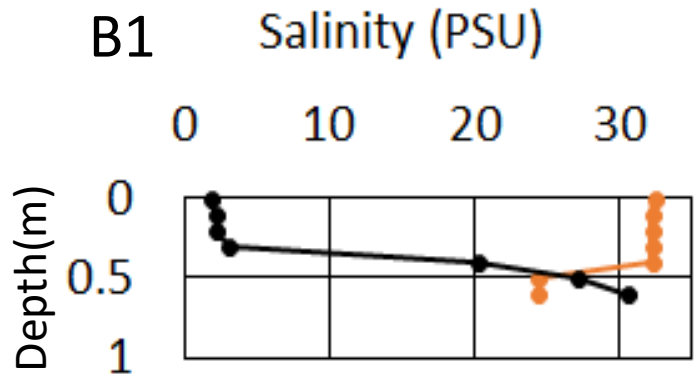
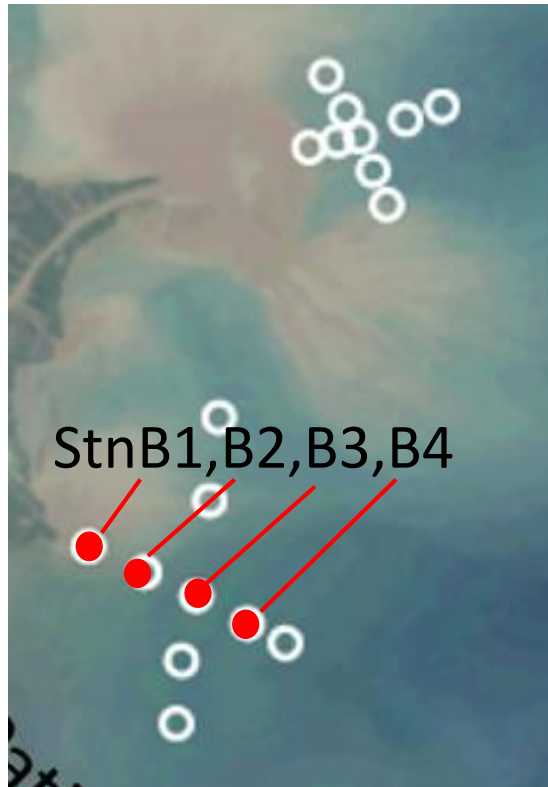


— Rainy season (Feb.2017)
 — Dry season (Aug.2018)



Salinity Profiles along B-line

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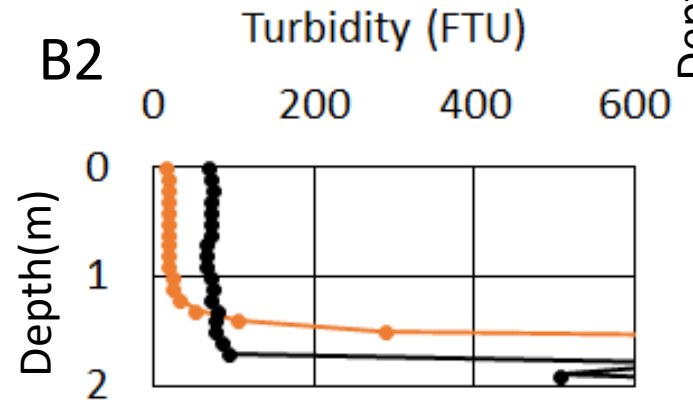
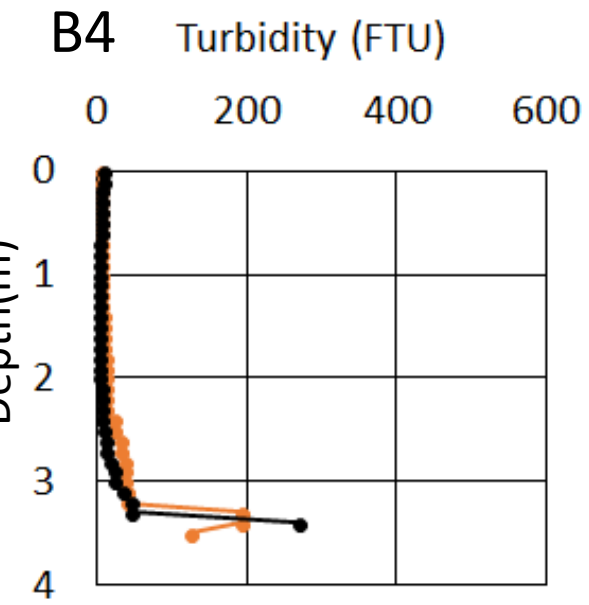
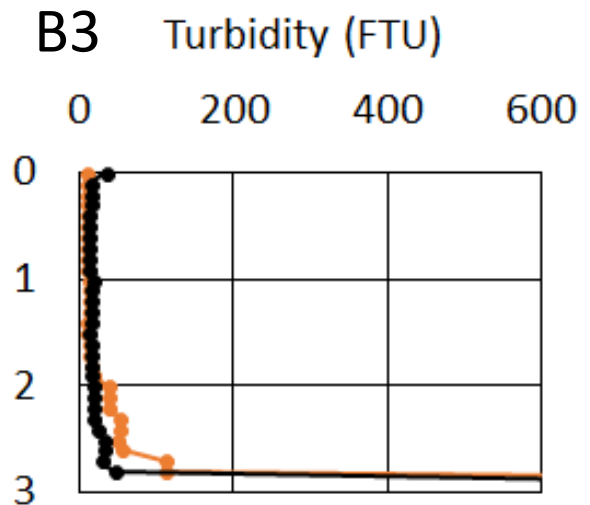
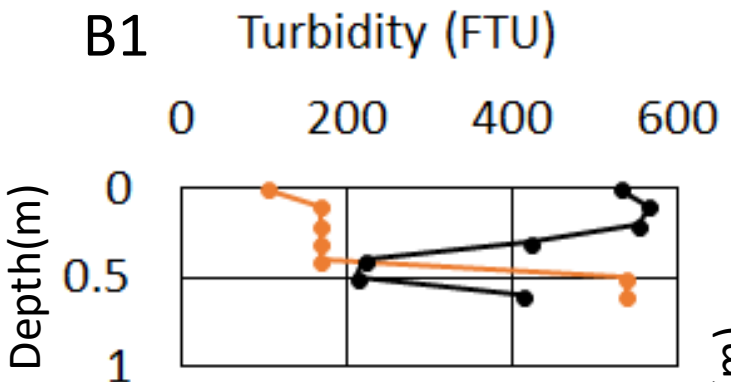


— Rainy season (Feb. 2017)
— Dry season (Aug. 2018)



Turbidity Profiles along B-line

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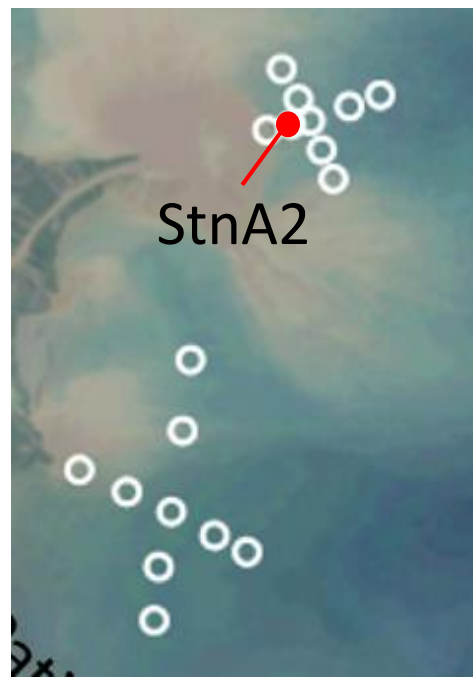
— Rainy season (Feb. 2017)
 — Dry season (Aug. 2018)



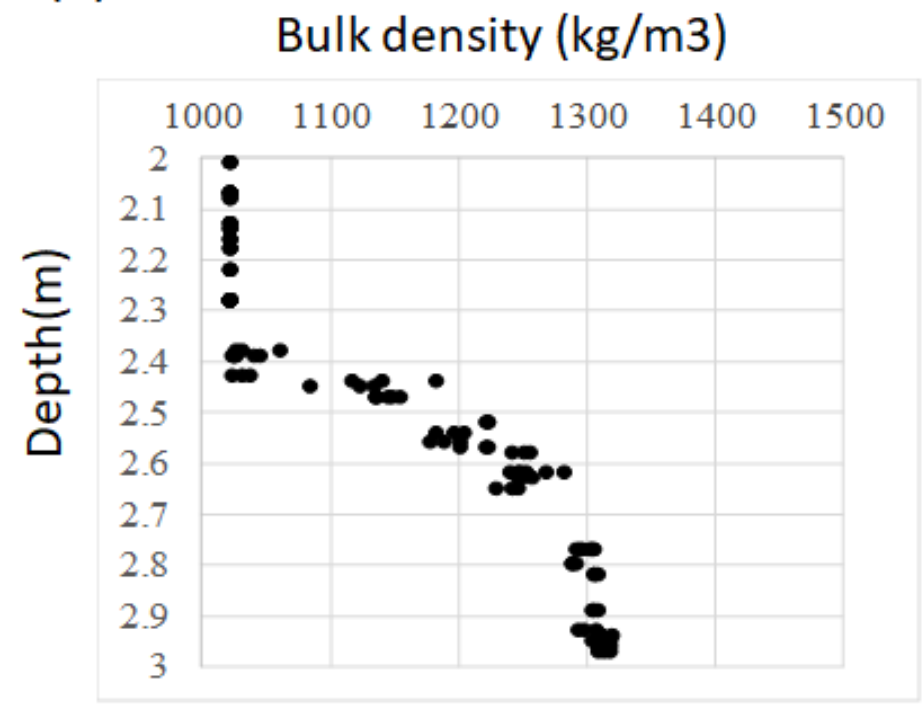
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Bulk Density Profiles

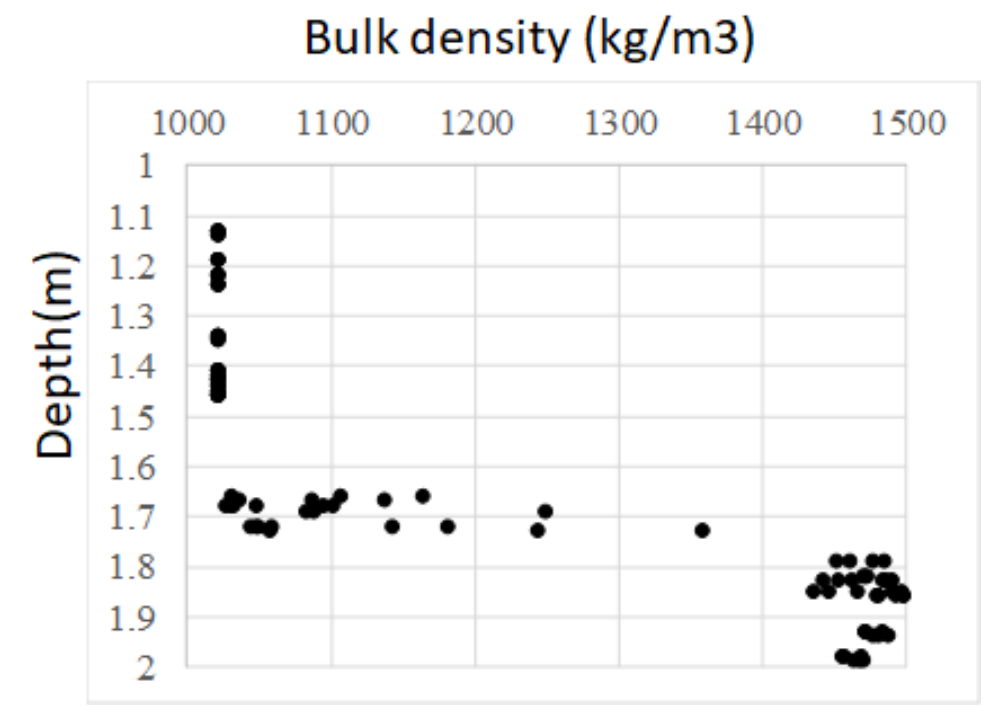
Measured Bulk density at A2

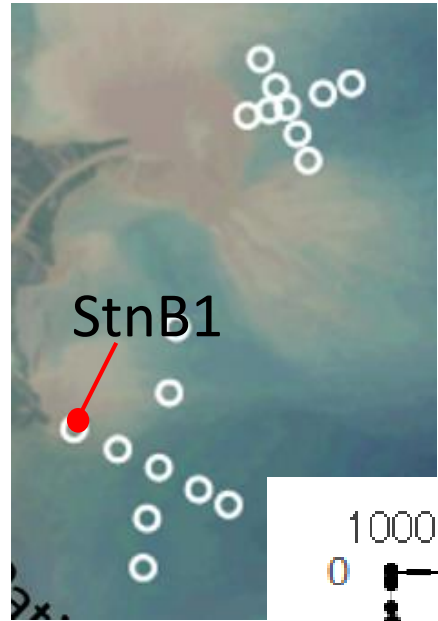


(a) Wet season



(b) Dry season





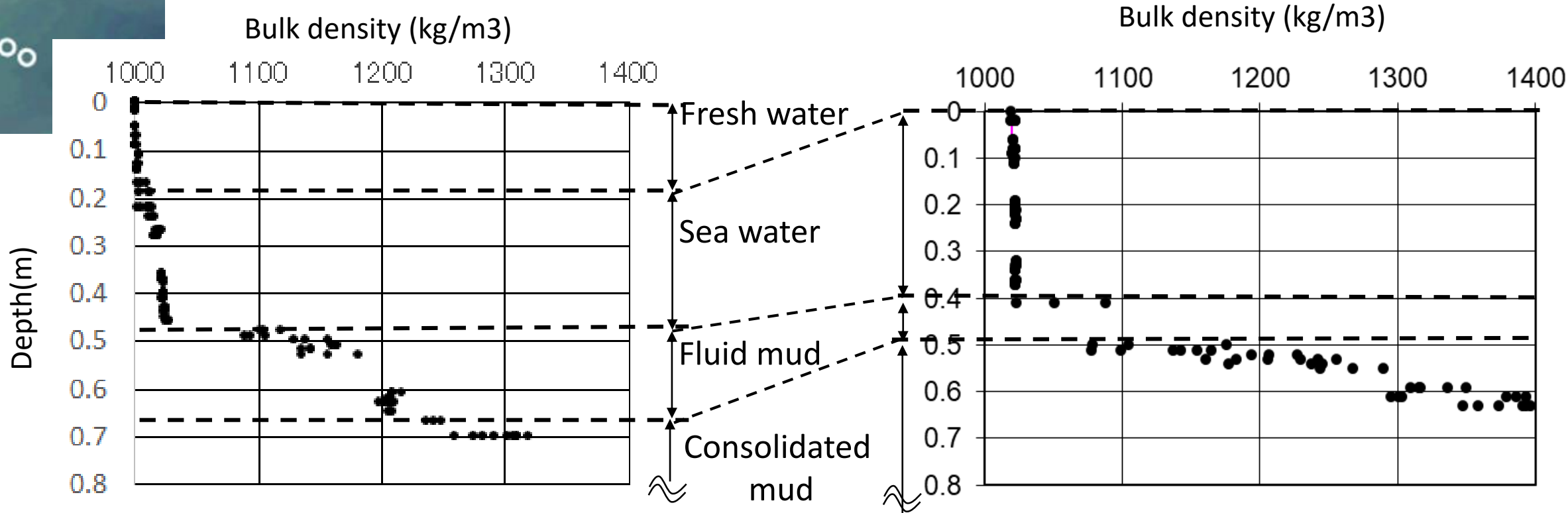
Bulk Density Profiles

Measured Bulk density at B1

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(a) Wet season (Feb.2017)

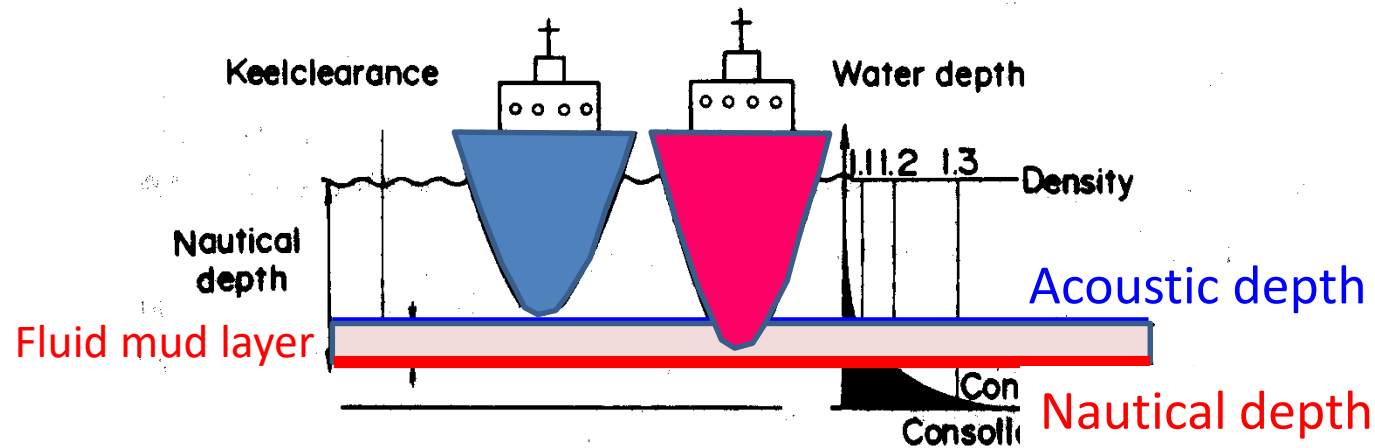
(b) Dry season (Aug.2017)



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Bulk Density Profile

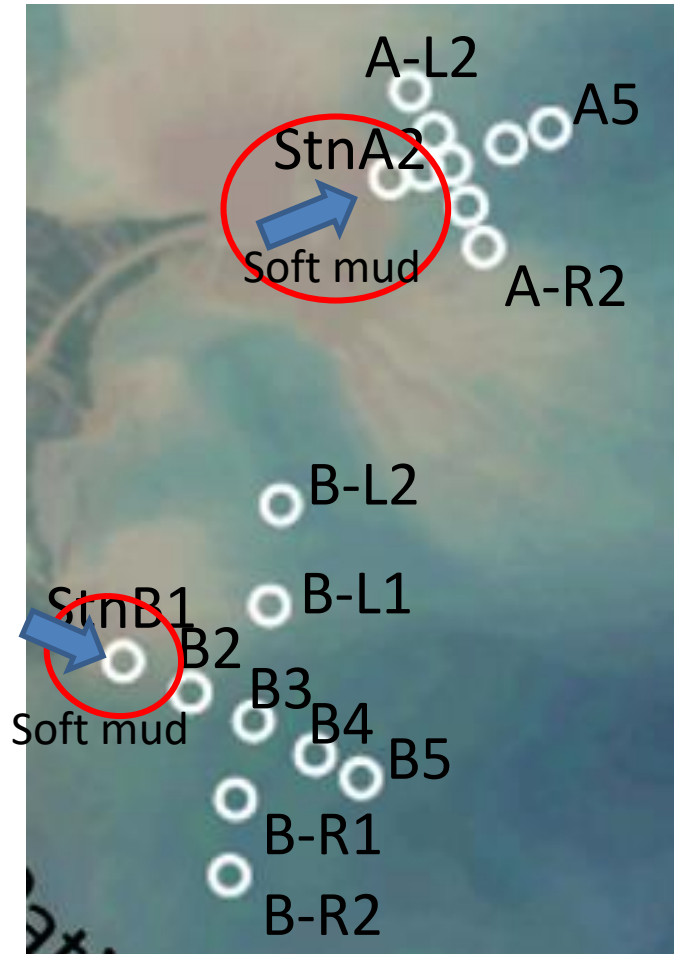
Importance of the profile from an engineering view point



In situ fluid mud density values adopted as Nautical depth :
 1.2 – 1.3 t/m³ (PIANC)



CONCLUSIONS



- Very soft mud layer observed at StnB1 and A2 during the rainy season but no fluid mud at offshore
- Clear pycnocline or stratification observed especially at StnB1 during the rainy season and relatively well mixed at offshore
- We need to consider fine sediment or fluid mud transport for estimation of growth of the river mouth delta

