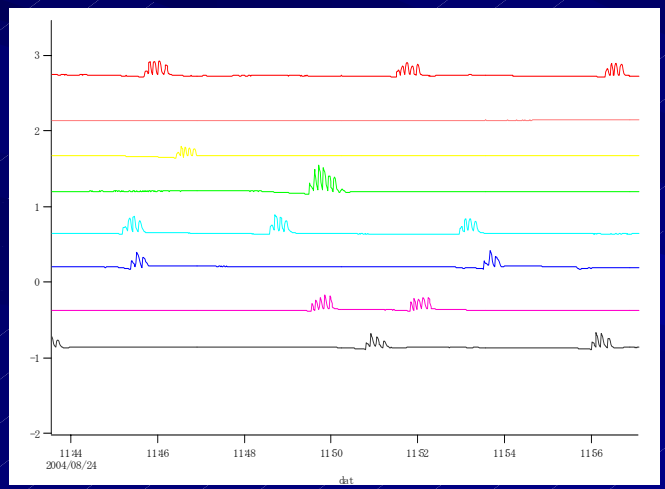
Observation on behavior of the large suspension feeding bivalve *Atrina pectinata lisckeana* under natural conditions



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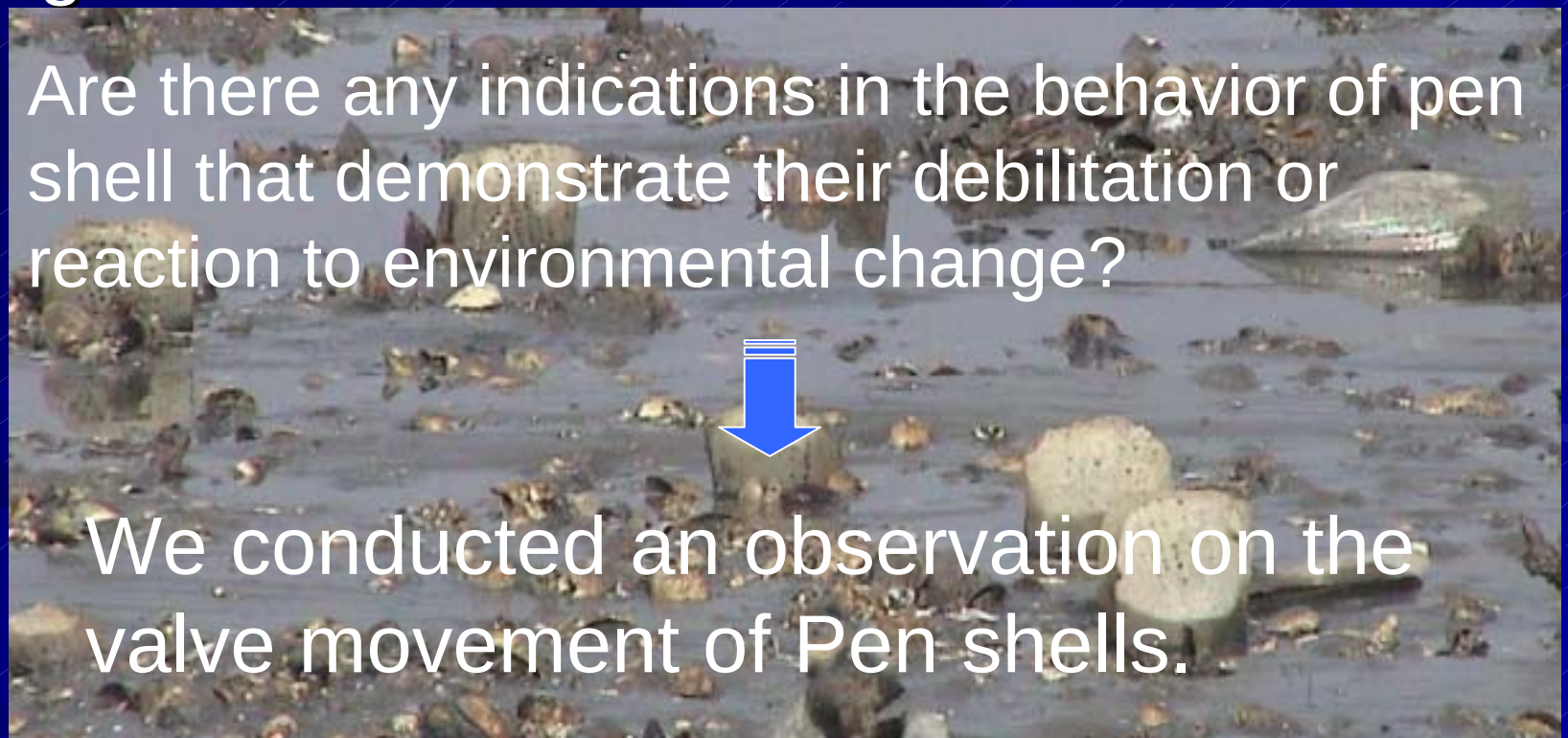
Background

- Decline of fishing catch on Pen shell fisheries
- Mass mortality of Pen shells on the fishing ground



Experiments and Objectives

Laboratory experiment

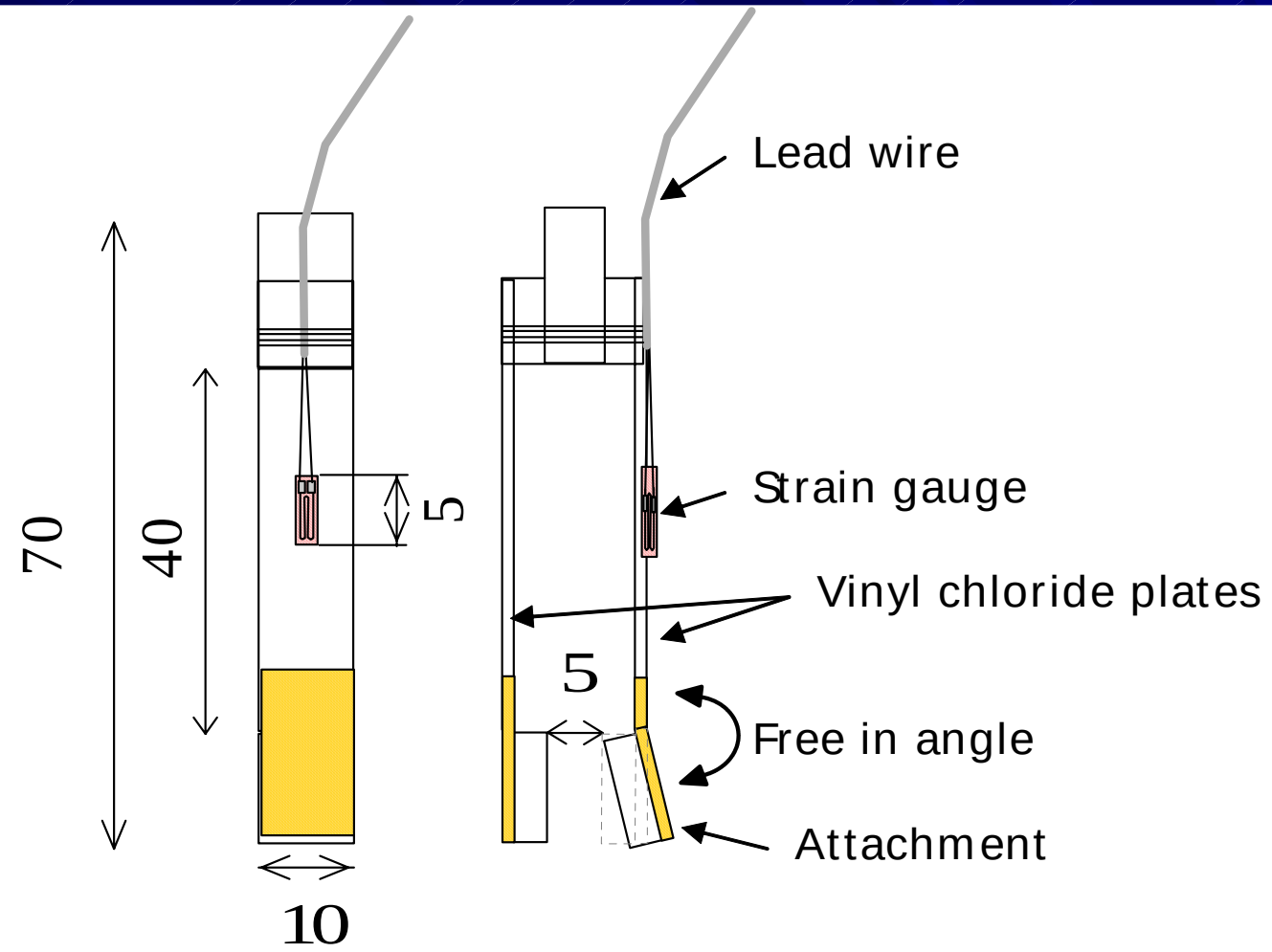
- to identify valve movement patterns of a particular behavior

Pattern identification

Laboratory experiments

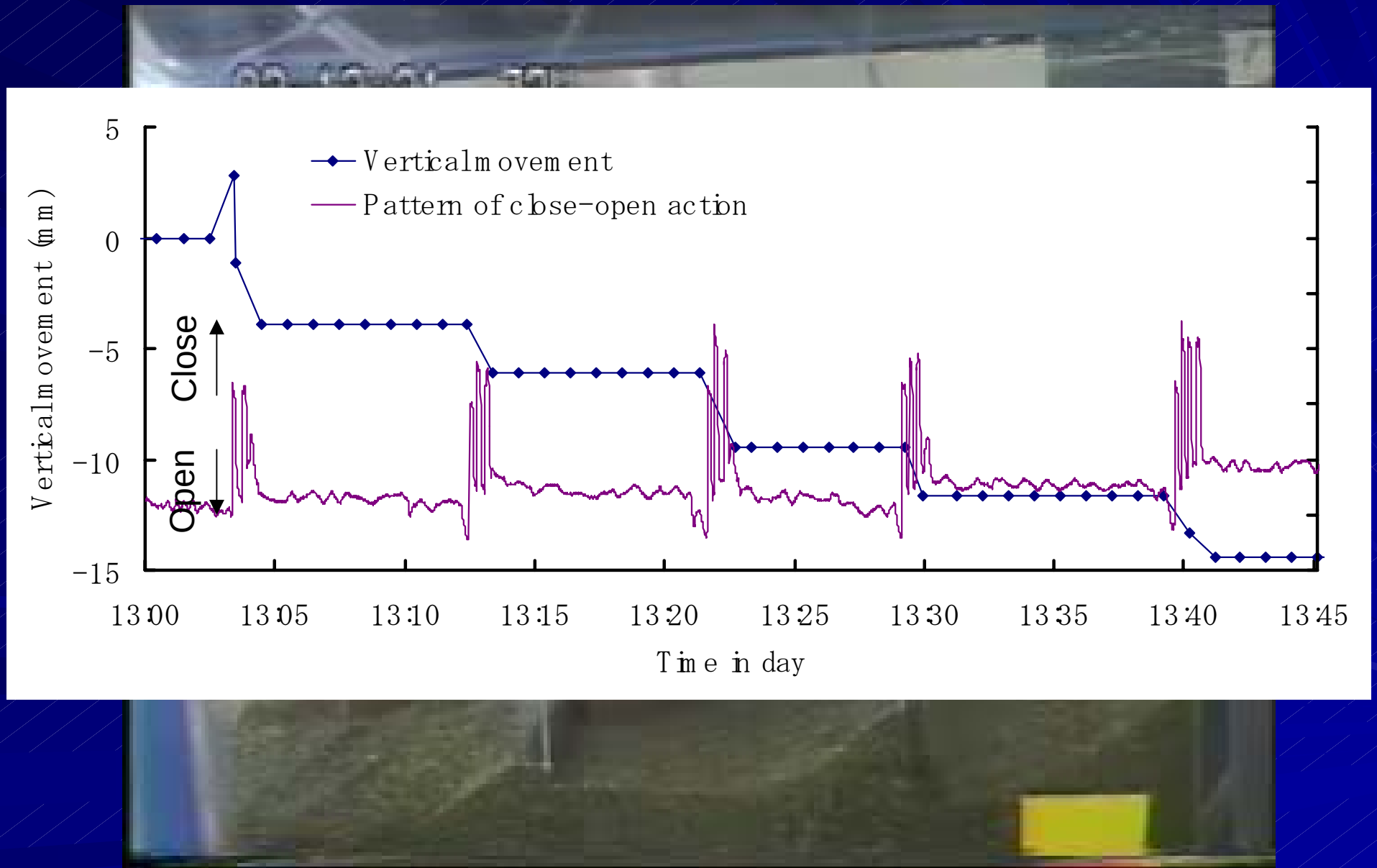
- Monitoring valve movement on the captive Pen shells by strain gauge method
- Visual recording by time-laps VTR of the behavior of Pen shells
- Comparison of valve movement and behavioral action

Apparatus

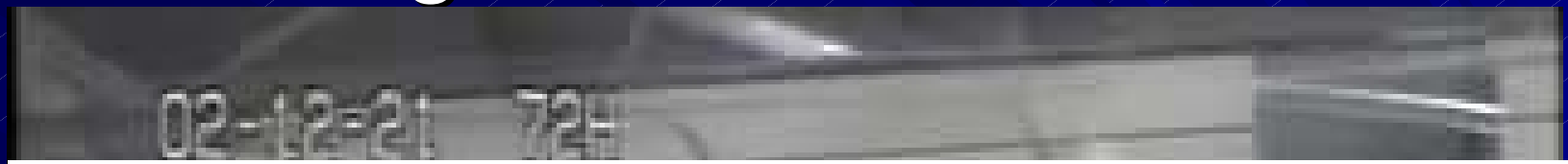


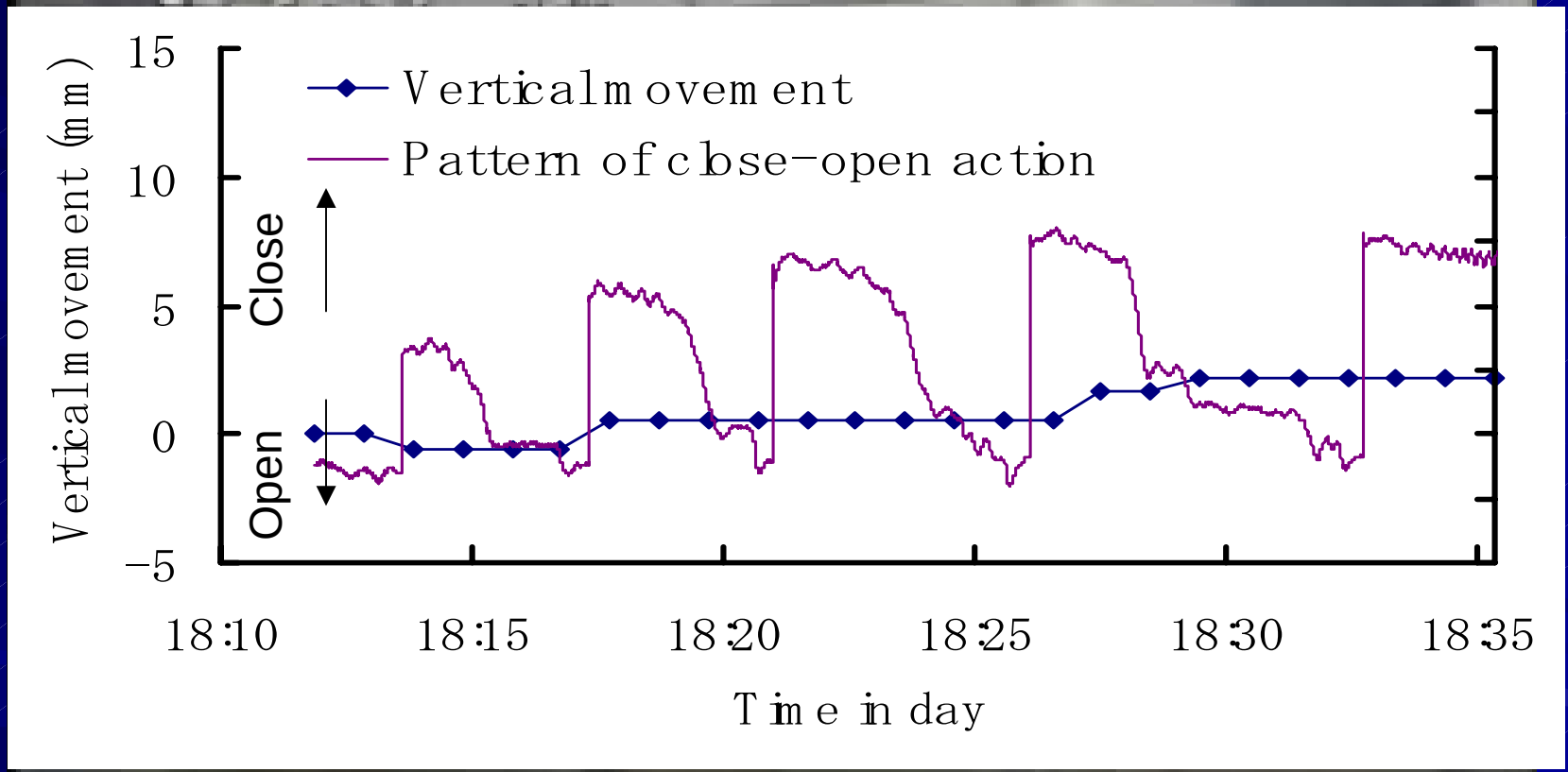
Unit : mm

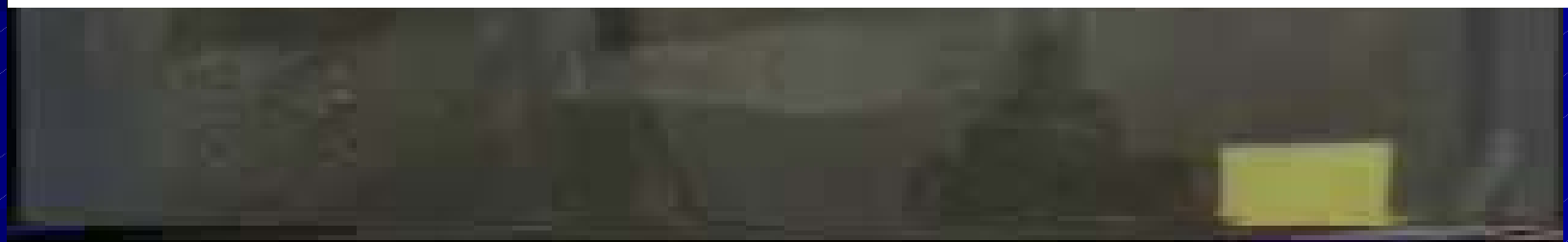
Burrowing behavior



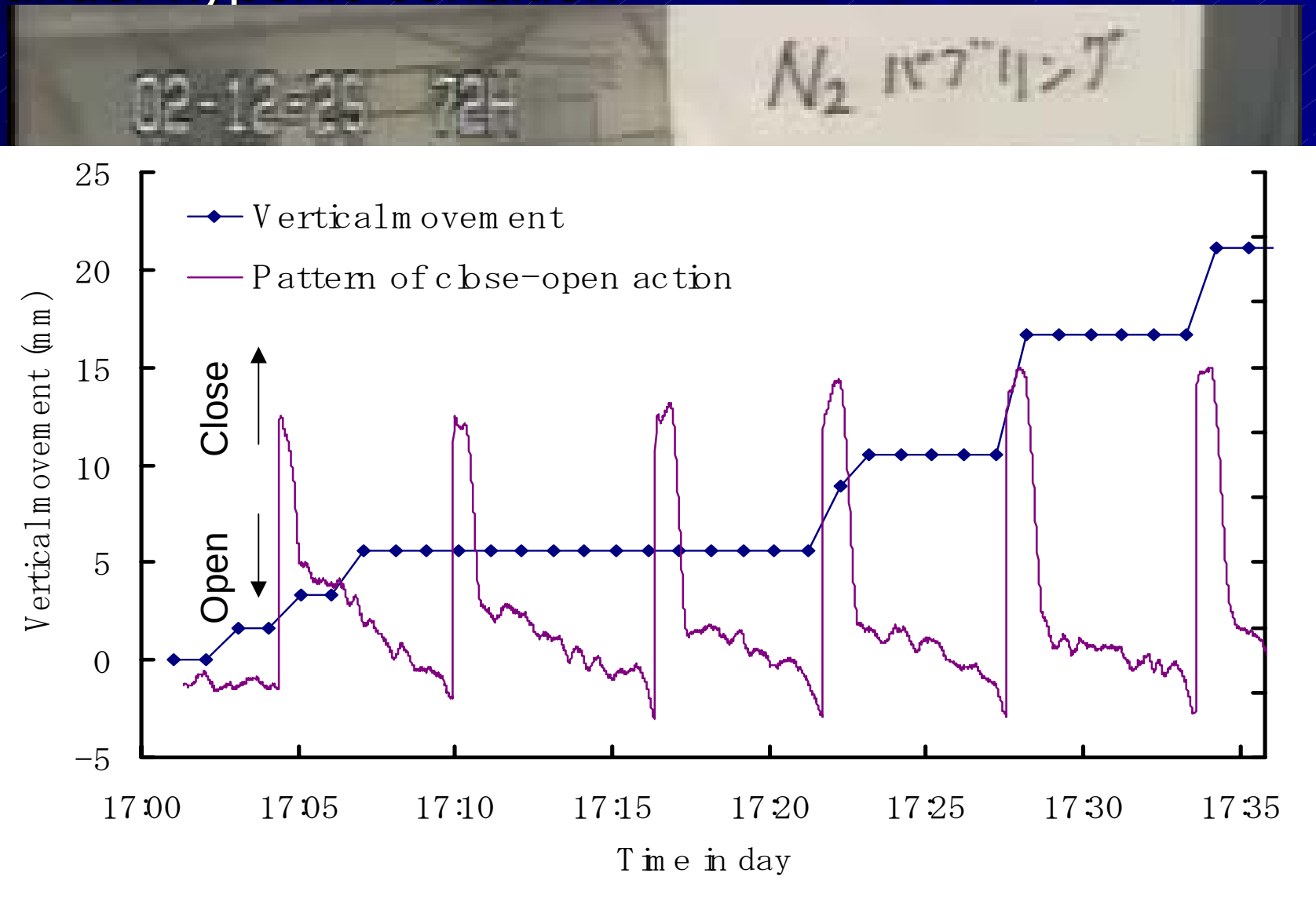
Vomiting behavior







Creep-out behavior
under hypoxic condition



Patterns of valve movement

- Multi close-open action

  indicates BURROWING behavior
- Single close-open action

  indicates VOMITING behavior
- Single close-open action repeating over more hours

  indicates CREEP-OUT behavior

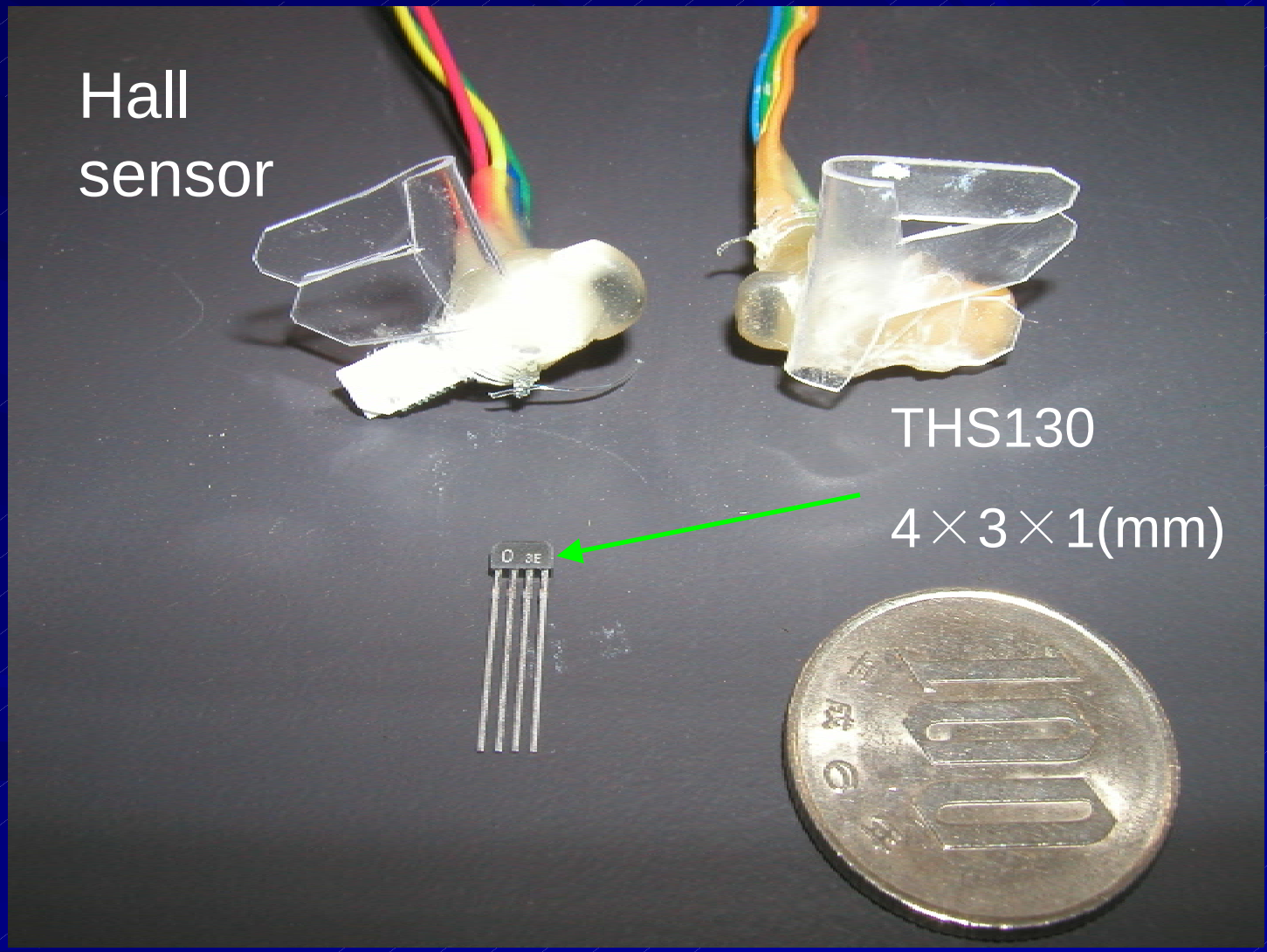
Experiments and Objectives

Field experiment

- to develop devices for use under natural conditions
- to obtain valve movement data under natural conditions

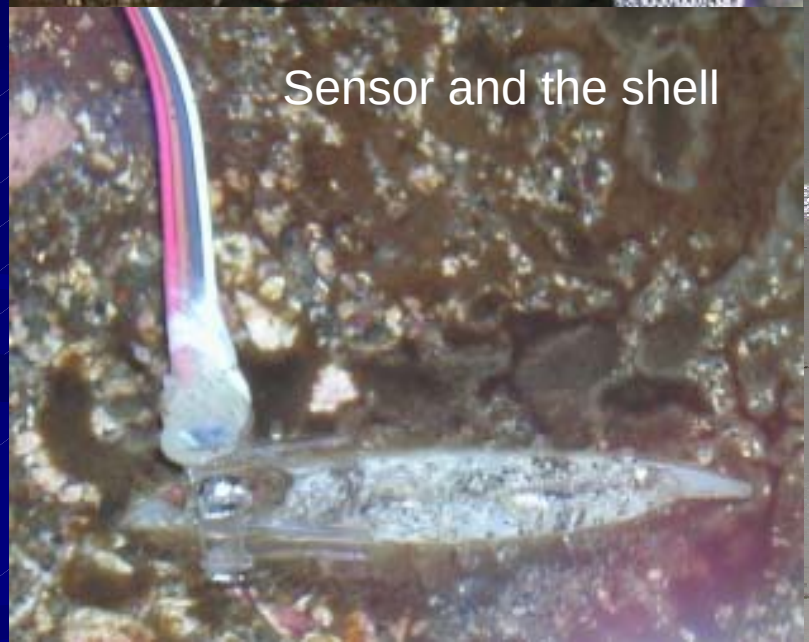
Devices for field use

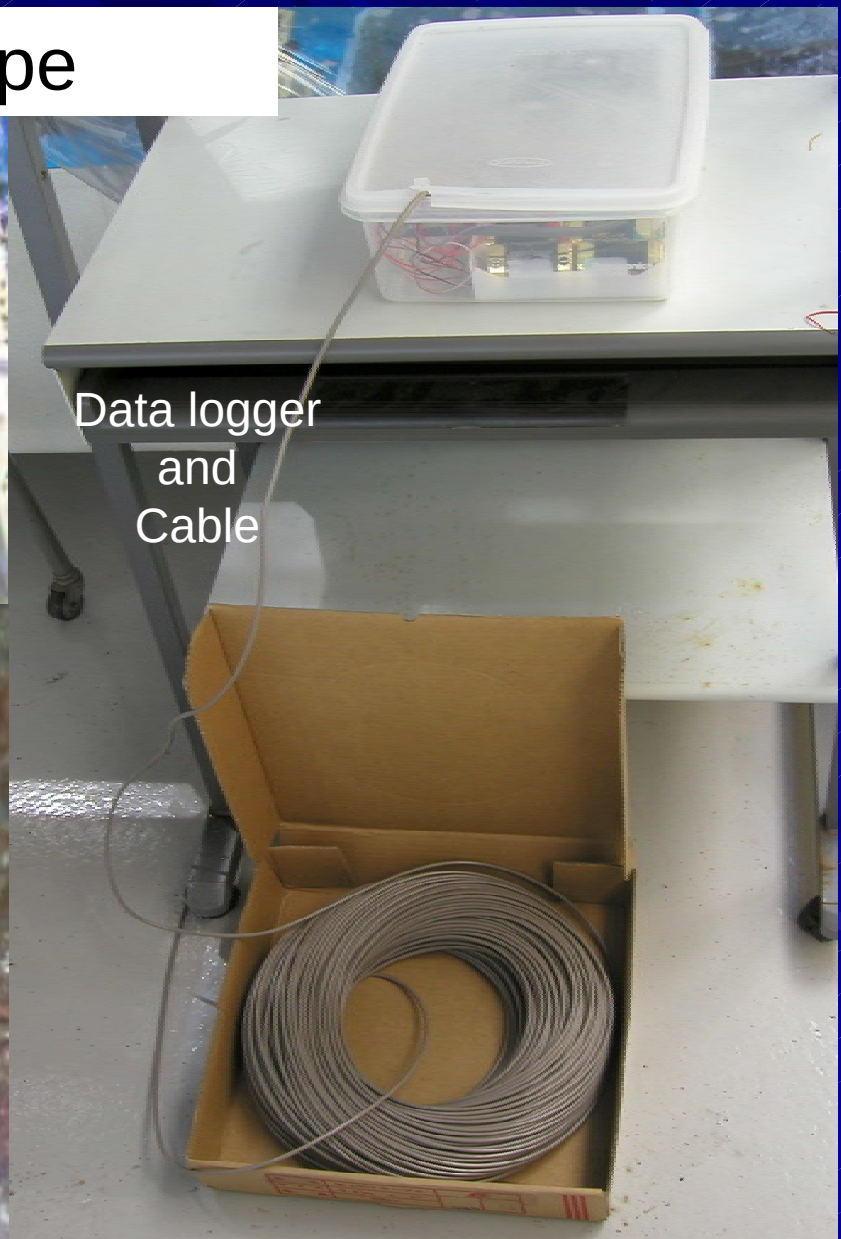
Field experiments



Data logger #1

Wire-communication type





Data logger #2

Under-water type

Location of the sites

Japan

Kyushyu

Station on the tidal flat

Station at the subtidal area

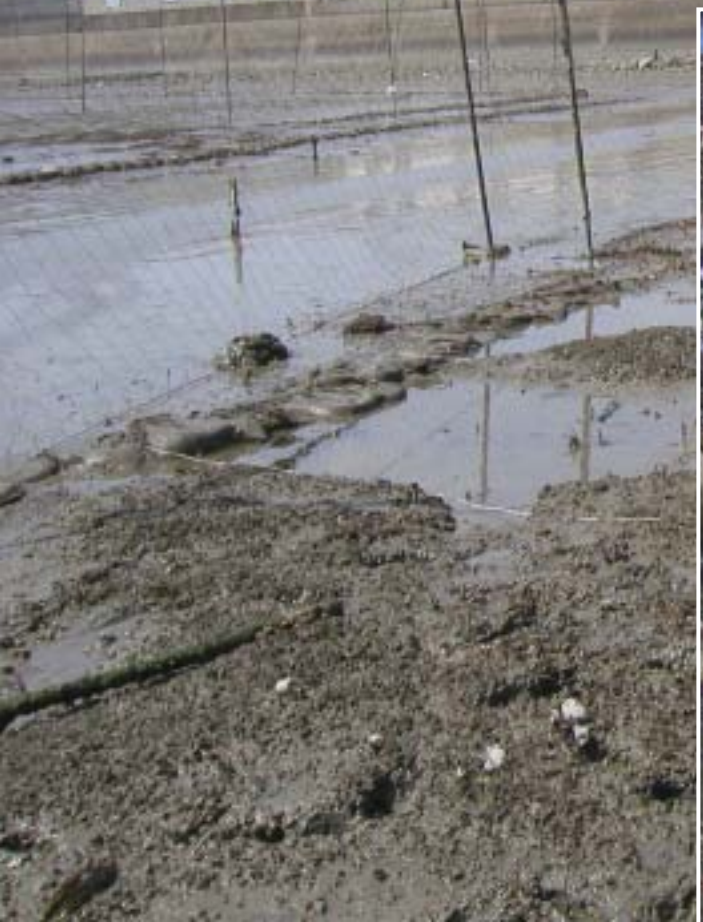
Takesaki

Konagai

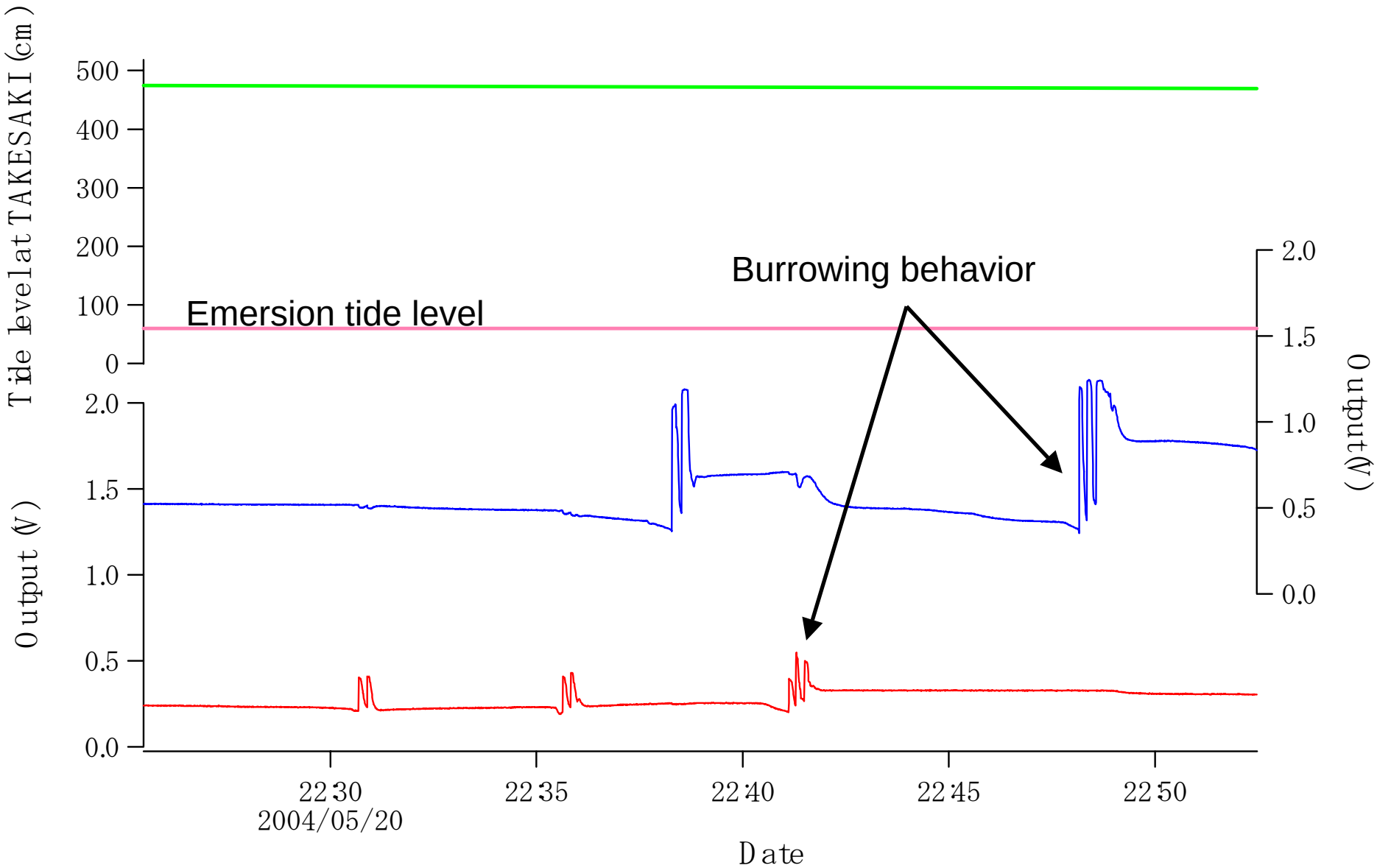
Ariake Sound

0 5 10 15 20 km

Measurement of valve movement at the mud flat

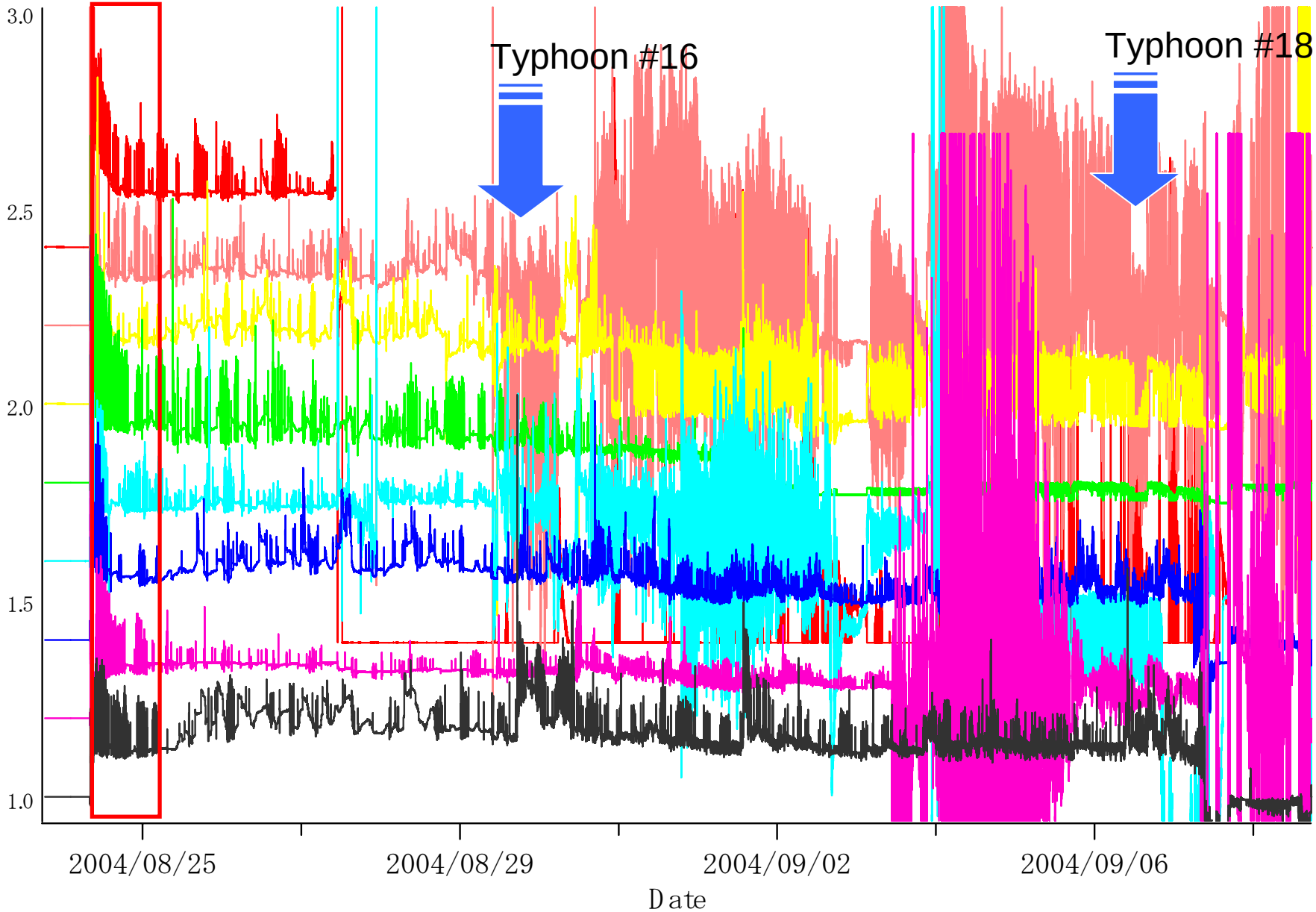


Result : motionless period recorded during emersion

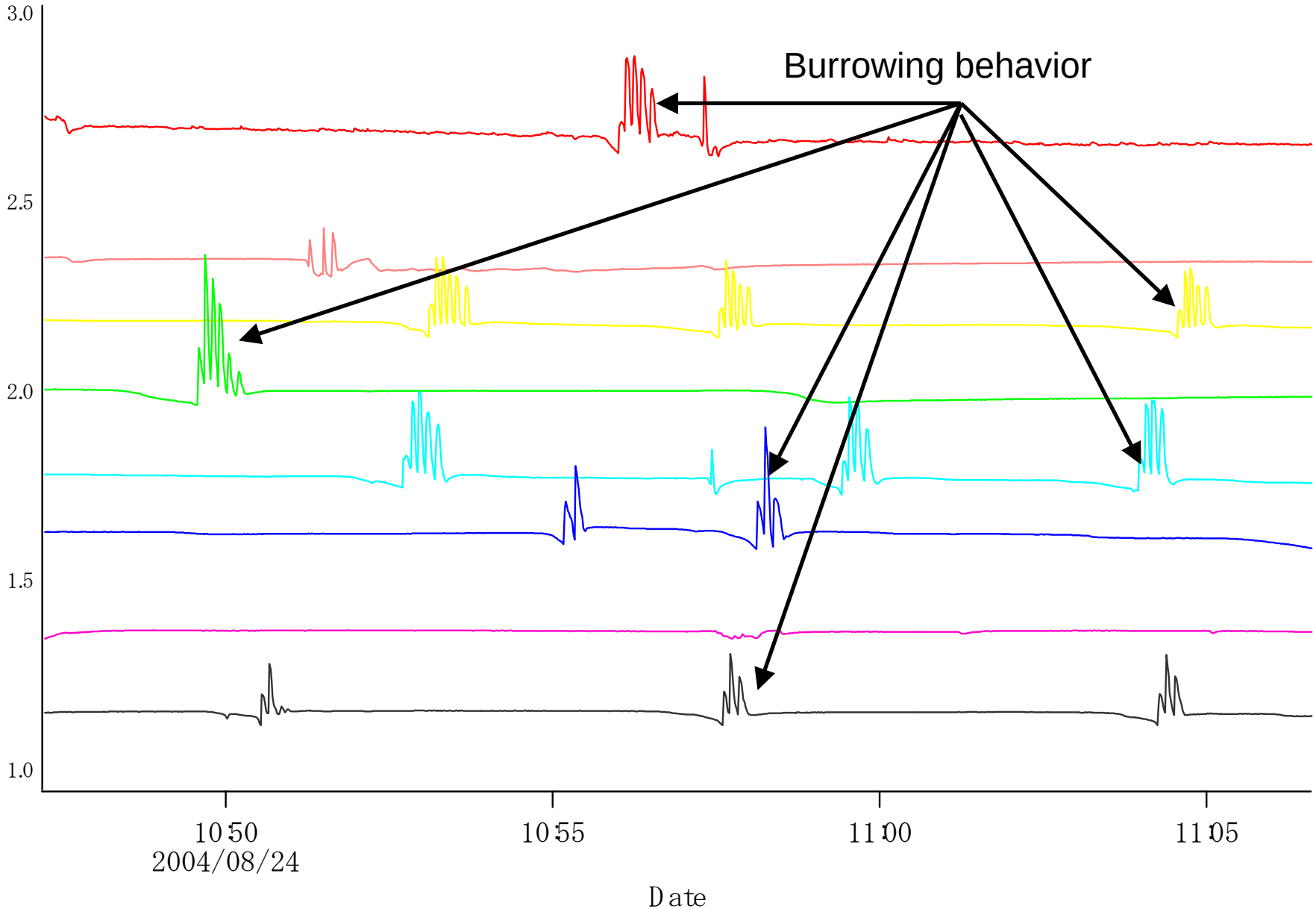


Measurement of valve movement at the subtidal station

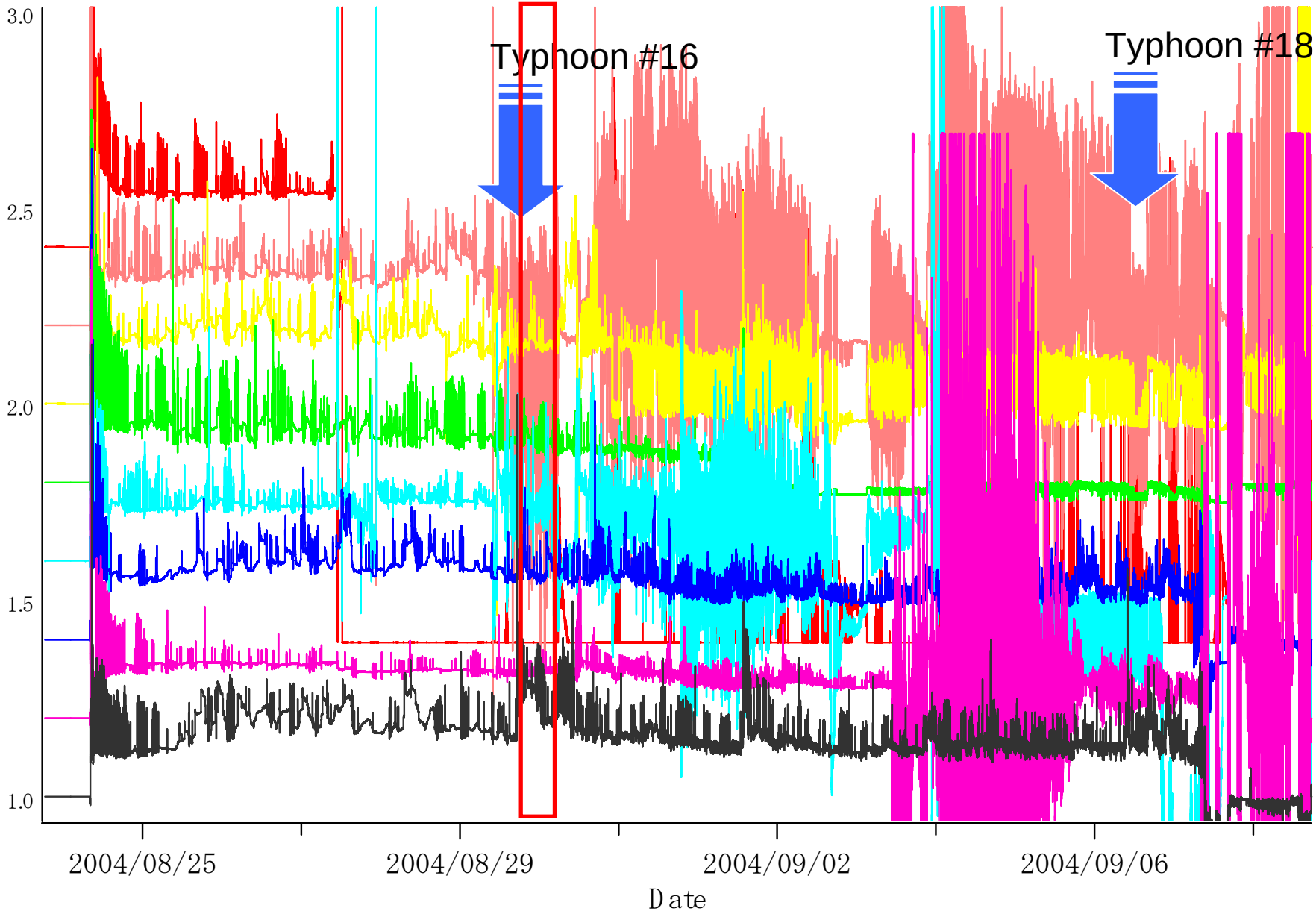
Result


Typhoon #16
Typhoon #18
3.0
2.5
2.0
1.5
1.0
2004/08/25
2004/08/29
2004/09/02
2004/09/06
Date

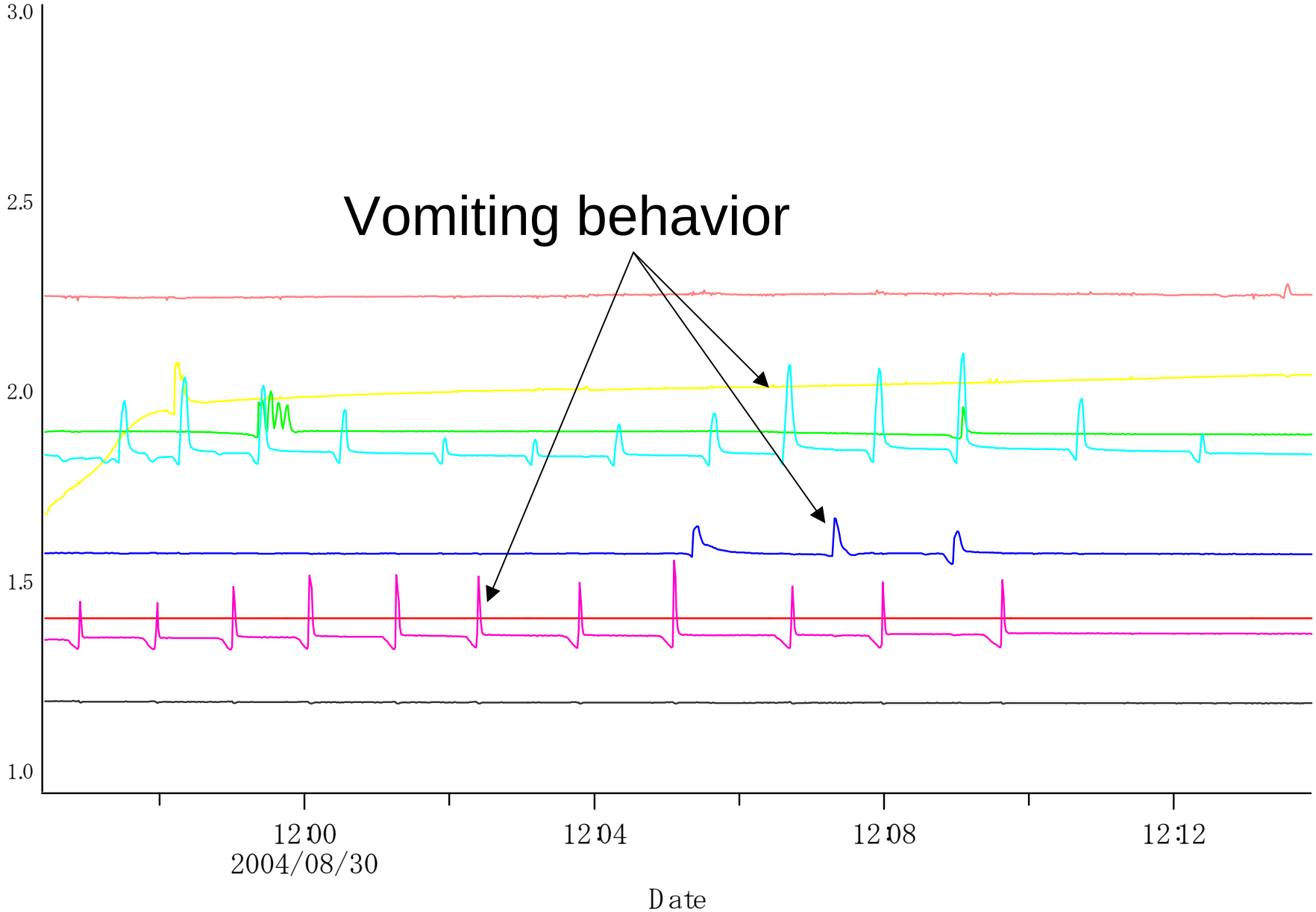
Result : Burrowing behavior after transplant



Result


Typhoon #16
Typhoon #18
3.0
2.5
2.0
1.5
1.0
2004/08/25
2004/08/29
2004/09/02
2004/09/06
Date

Result : unusual single open-close action



Summary and Discussion

- We recognized typical valve movement patterns (Burrowing, Vomiting) recorded under natural conditions
- Burrowing is most frequent just after transplanting
- Vomiting action during a storm seems to be due to high turbidity
- Repeated single close-open action which indicate creep-out behavior wasn’t observed during the measurement

Future studies

- Build up reliability of the devices
- Collection of more valve movement data under natural conditions
- Laboratory experiment carried out under varying conditions (high temperature, high turbidity, low salinity, starvation etc.)