The Restrained ADOS-V: A Lightweight, Self-Deploying Coastal Mooring

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Outline

- Description of the Restrained Autonomous Drifting Ocean Station with Velocity measurements capability (R-ADOS-V);

- Example of applications (ONR sponsored acoustic experiment in the southern East China Sea);

- Conlclusions.

The R-ADOS-V: rationale

The R-ADOS-V is desiged to fulfill the need for:

1) Un-expensive shallow water moorings capable of measuring temperature and velocity pofiles;

2) Real-time temperature and velocity data delivery;

3) Easy deployment (i.e. "throwing a box from a VOS")

THE EVOLUTION OF THE SURFACE DRIFTER

ADOS
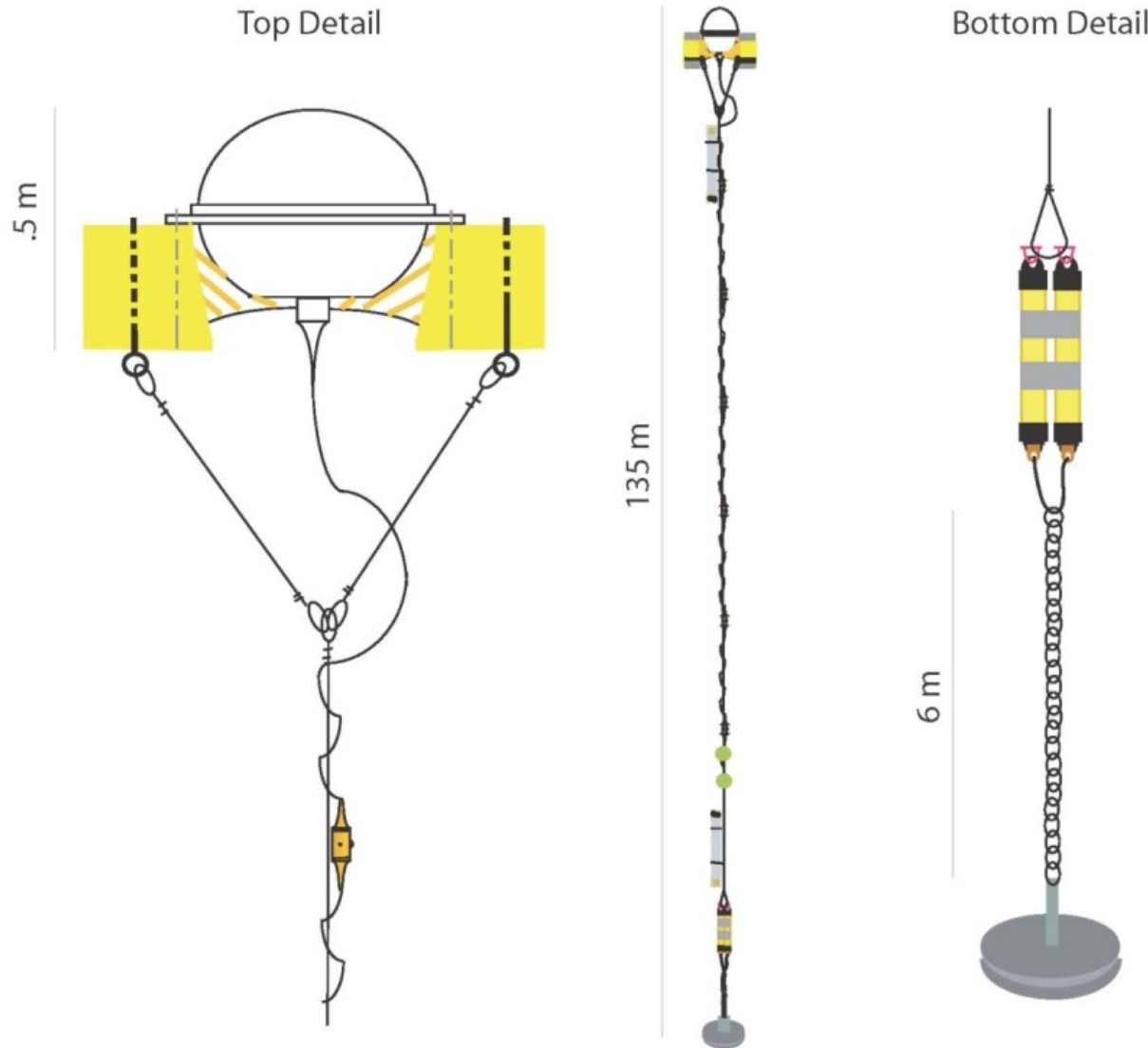- SST, SSP, V (horizontal), Wind, T (subsurface)
- Operational mode: yes

ADOS-V
- SST, V (3D, subsurface), T (subsurface)
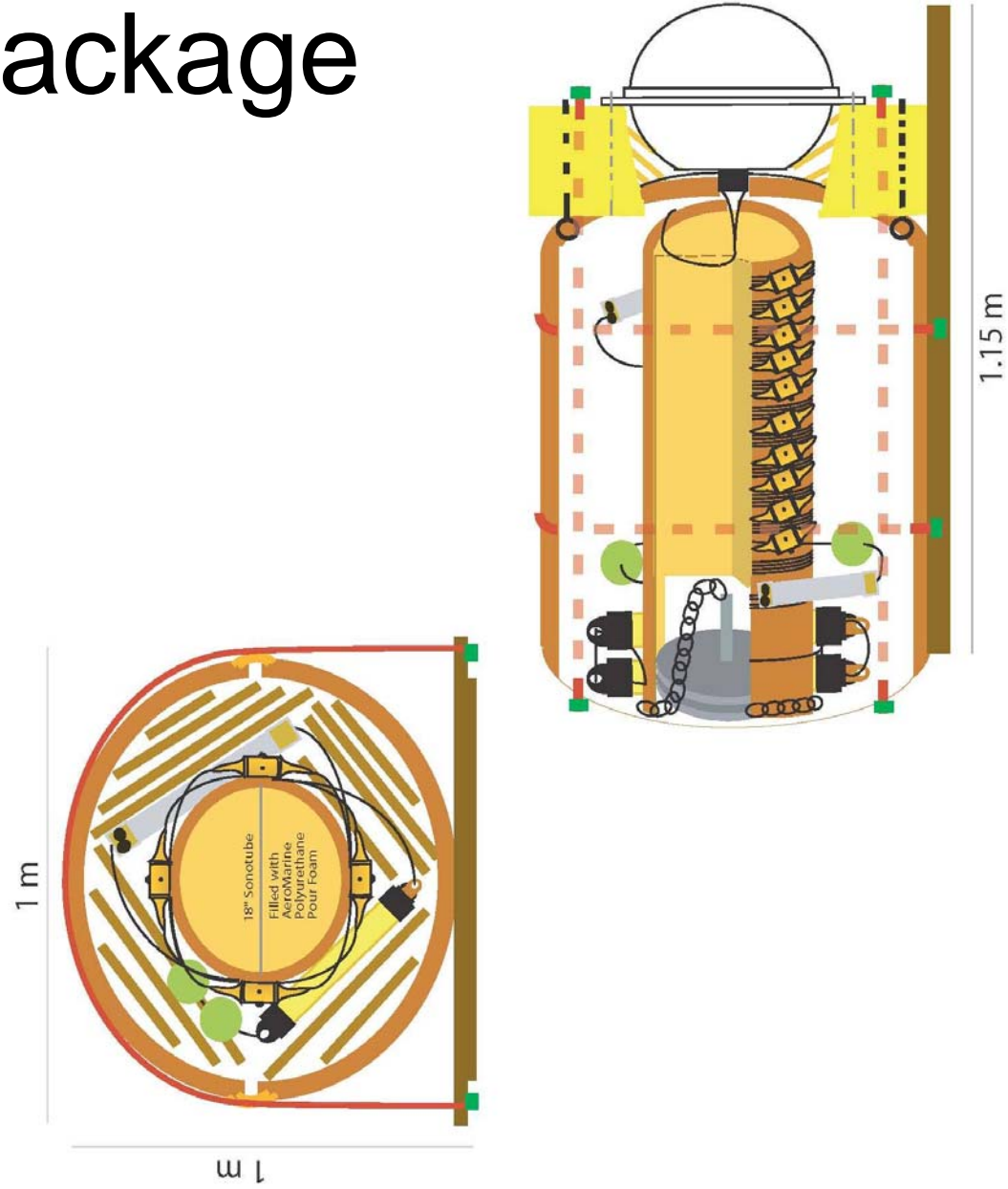- Operational mode: no

R-ADOS-V
- SST, V (3D, subsurface), T (subsurface)
- Operational mode: no

R-ADOS-V schematic

Top Detail

.5 m

135 m

Bottom Detail

6 m

R-ADOS-V: deployment package

1.15 m

18" Sonotube
Filled with
AeroMarine
Polyurethane
Pour Foam

1 m

1 m

R-ADOS-V: deployment package

R-ADOS-V: main specs

- Overall length: 135 m;
- Target depth: 120 m;
- Comms: Iridium modem;
- Dual GPS;
- Controller: clearsat by Clearwater inc.
- Endurance: 30 days;
- Thermistor coupling: inductive;
- ADCP: Nortek Aquadopp profiler;
- Internal logging: Persistor CF2 data logger;
- Acoustic releases: ORE shallow water;
- Bottom weight: 100 Kgs;
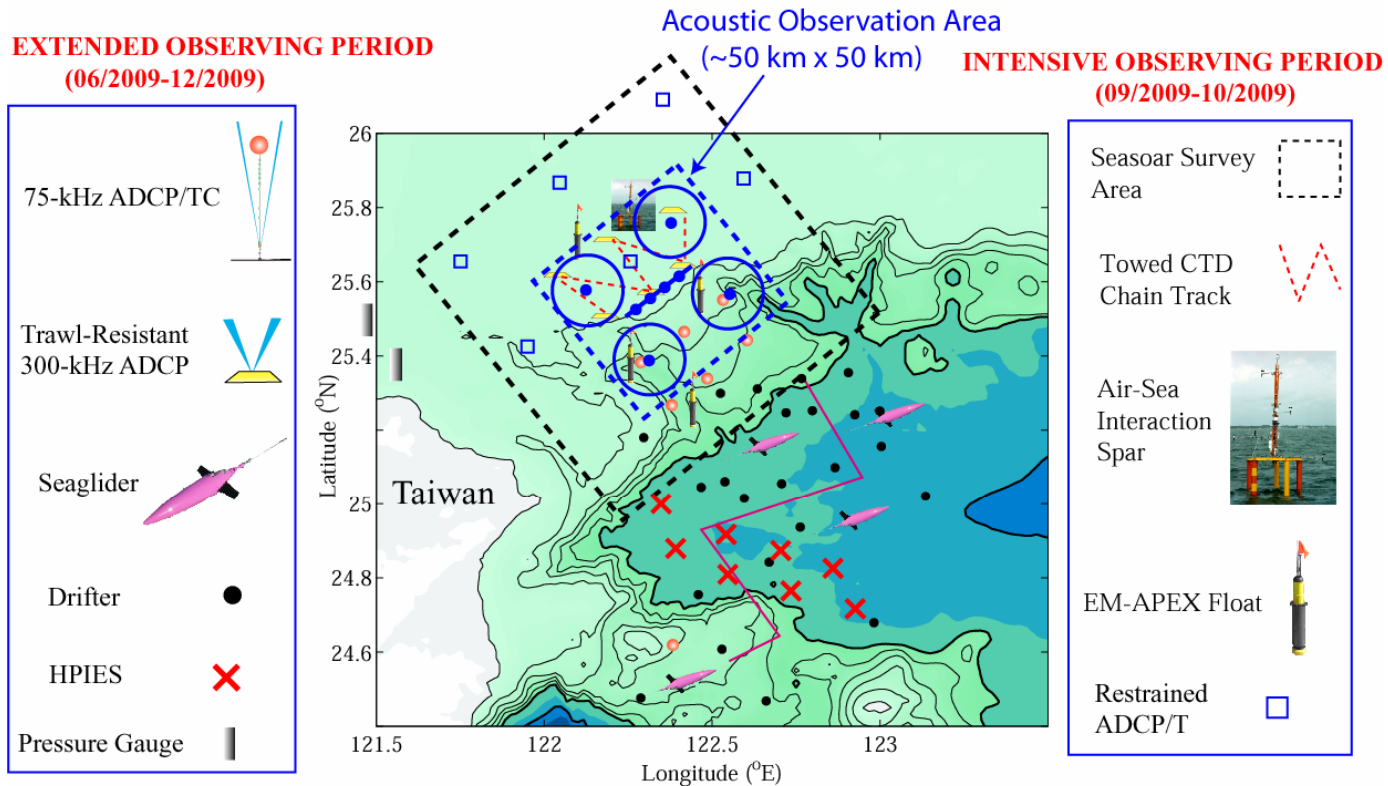- Max current withstanding: 1.5 m/s

R-ADOS-V: deployment
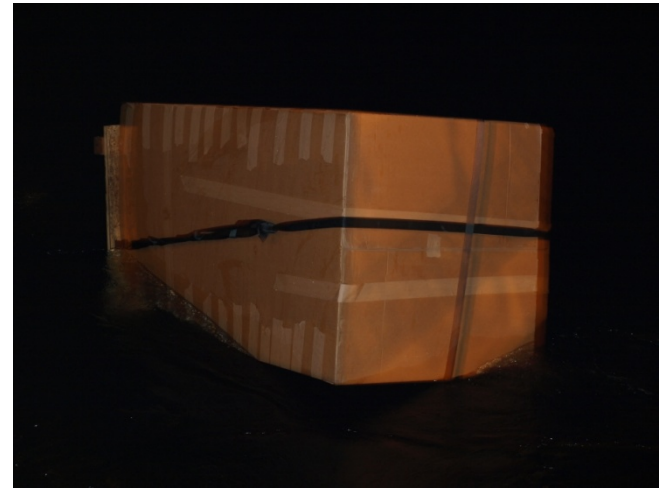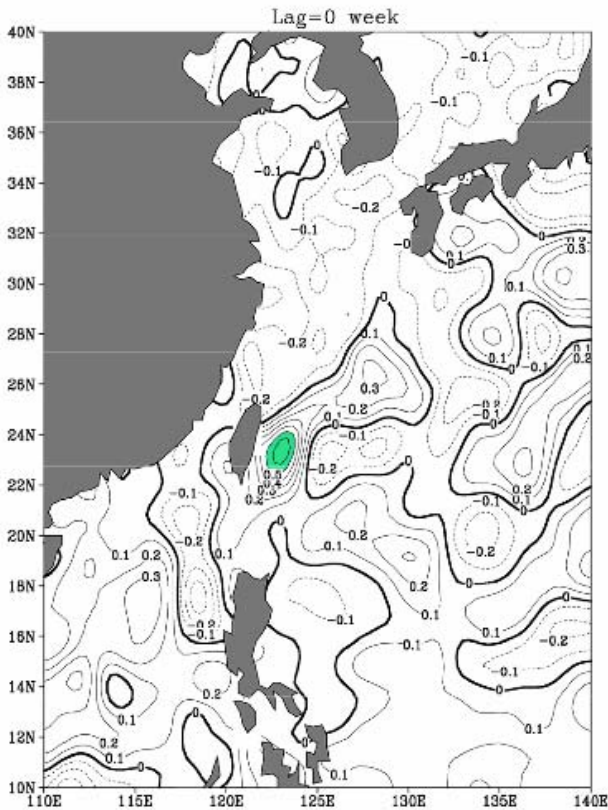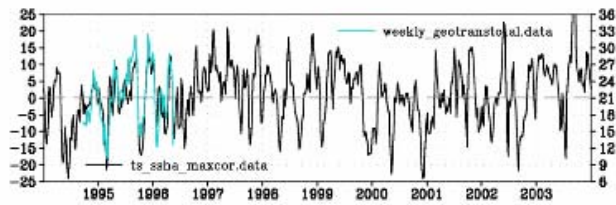
Description of the Experiment (1)
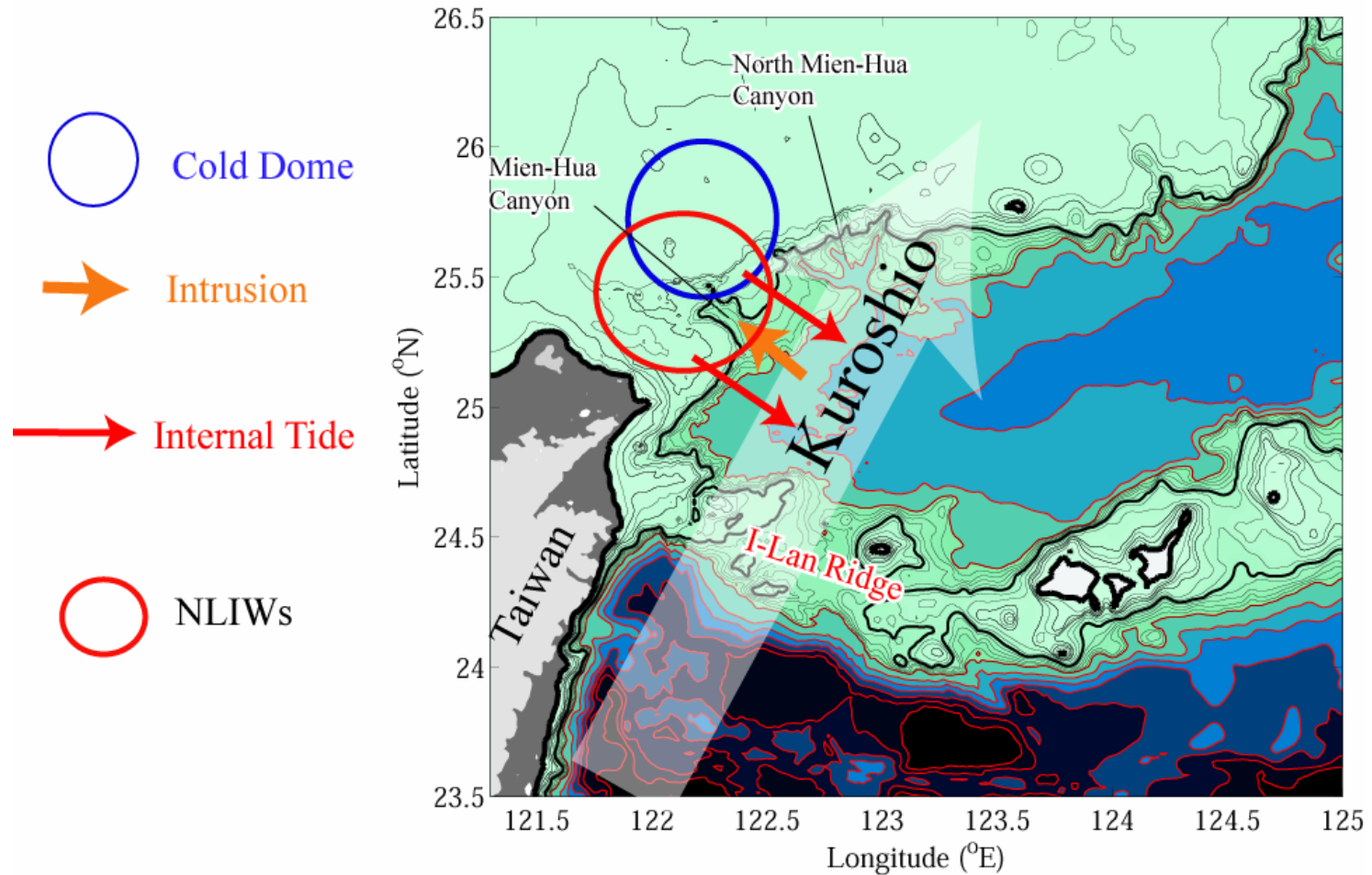
Description of Experiment (2)

Integrated Acoustic and PO Observational Plan

Upper panel shows observed Kuroshio transport in East Taiwan Channel (green line, right scale) and weekly average AVISO sea level anomaly (black line, left scale) at green "spot" on lower panel that shows the correlation coefficient between AVISO sea level anomaly in western Pacific and Kuroshio time variable transport.
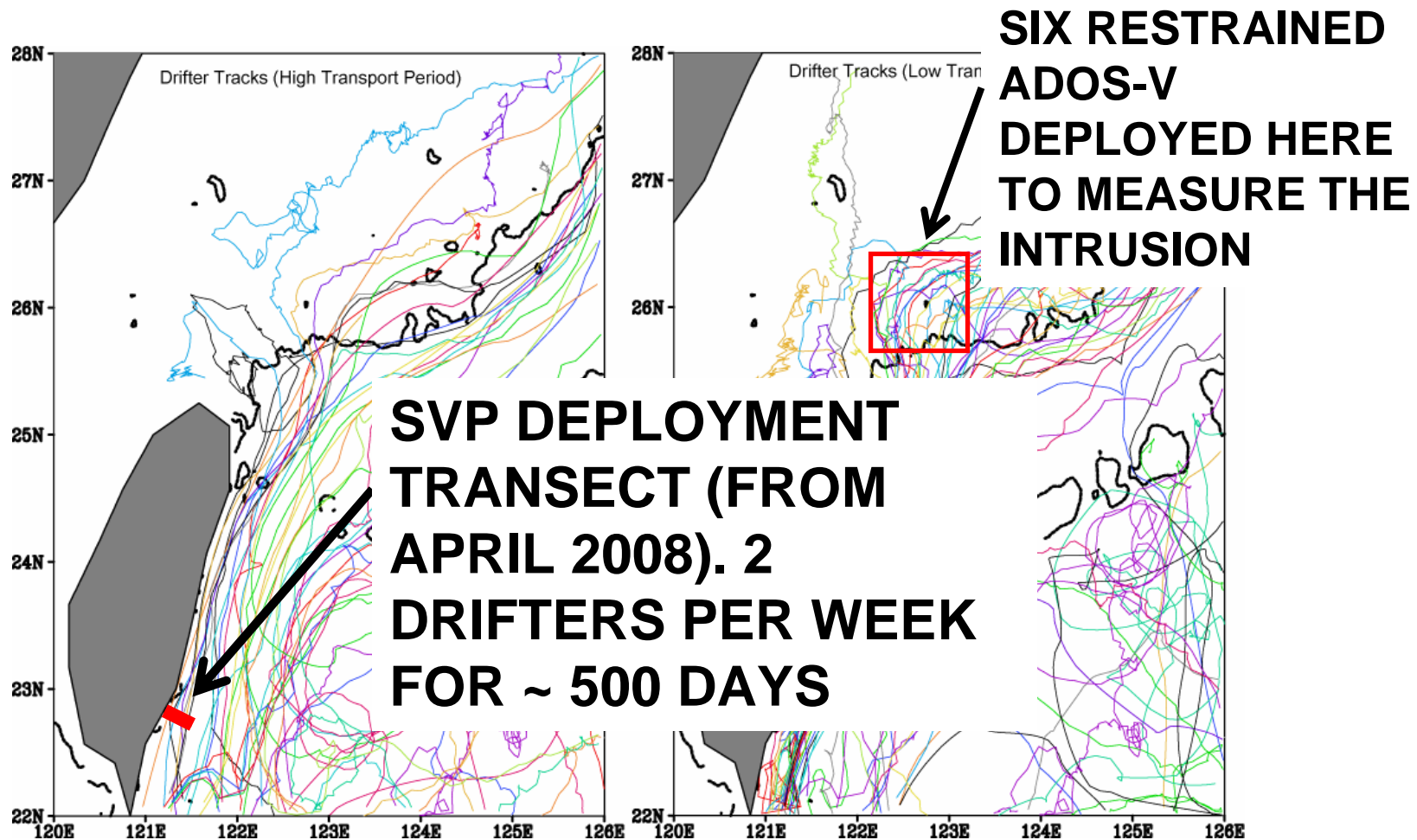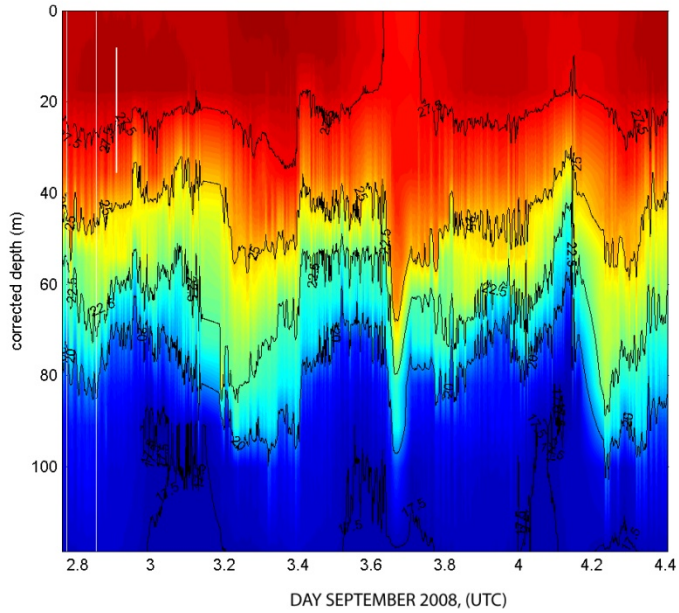
Drifter tracks during high Kuroshio transport (left panel) and low Kuroshio transport (right panel).
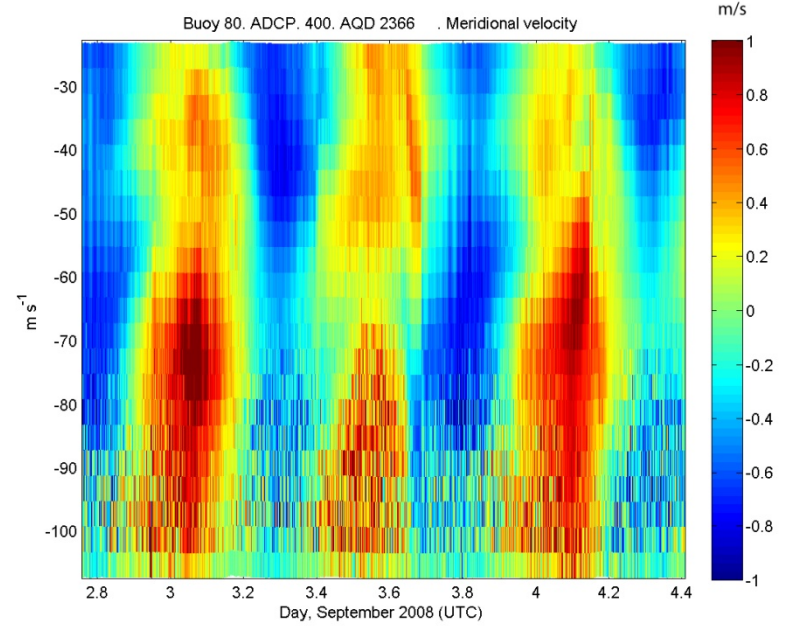
Pilot Experiment 1: svp drifters

- From yoo-yin
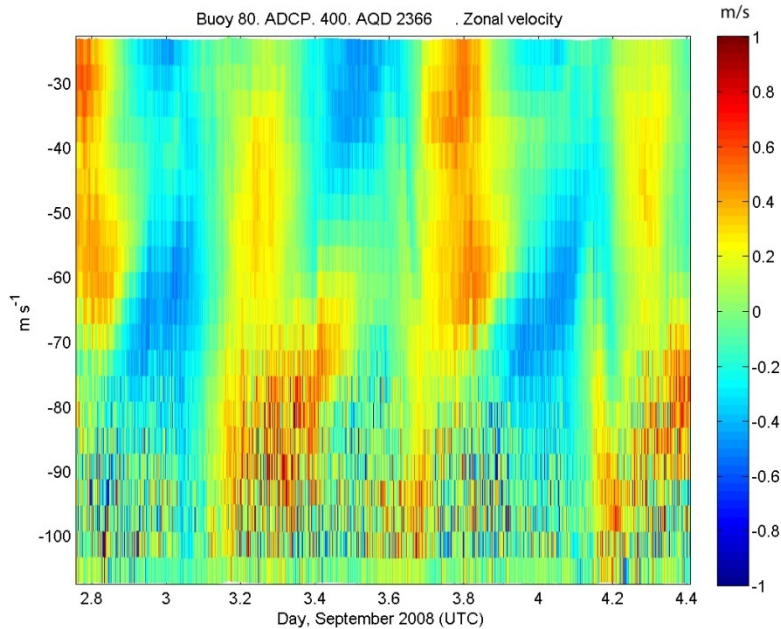
Pilot Experiment: R-ADOS-V data

R-ADOS-V: improvements

- Implement real time data transmission;
- Eliminate ADCP battery pack (by placing batteries in the surface buoy);
- Add magnetic switch to turn on the R-ADOS-V upon deployment;

conclusions

- R-ADOS-V is a low-cost, self-deploying restrained drifters that can replace a shallow water coastal mooring when research vessels/skilled crew are not available and cost is a concern;

- First successful trial for scientific applications was performed in September 2008;

- R-ADOS-V has several applications, such us observations of coherent structures when spatio-temporal resolution is needed.