7/14∼15/05:

1. The 1st CTD data set from Pianosa was received through email. There are 2 SVPs. One of them shows double thermoclines. According to Pierre's guess, SVP CTD_071305_0800Z may be located further from the island and SVP CTD_071305_1530Z may be closer to the island (we also guess the 1st one was taken at 8am and the 2nd was taken 3:30 pm). Anyway, totally 4 scenarios were synthesized and AUV yoyo control was implemented in each of them. Note that it assumes at the beginning AUV is on surface and the maximum range for AUV is around 2137m. When AUV reaches that range, it will do a U-turn and float up to surface. CTD error standard deviation is 0.5(m/s)

2. The 1st scenario is from CTD_071305_0800Z and suppose SVP is range independent. The bathymetry was guessed by Pierre. AUV yoyo control was implemented in this scenario and parameters are (points=30, threshold=0.2). From Figure 5 we can see that AUV goes up and down between 10m and 50m. Note that in this case, thermocline is between 20m and 40m.

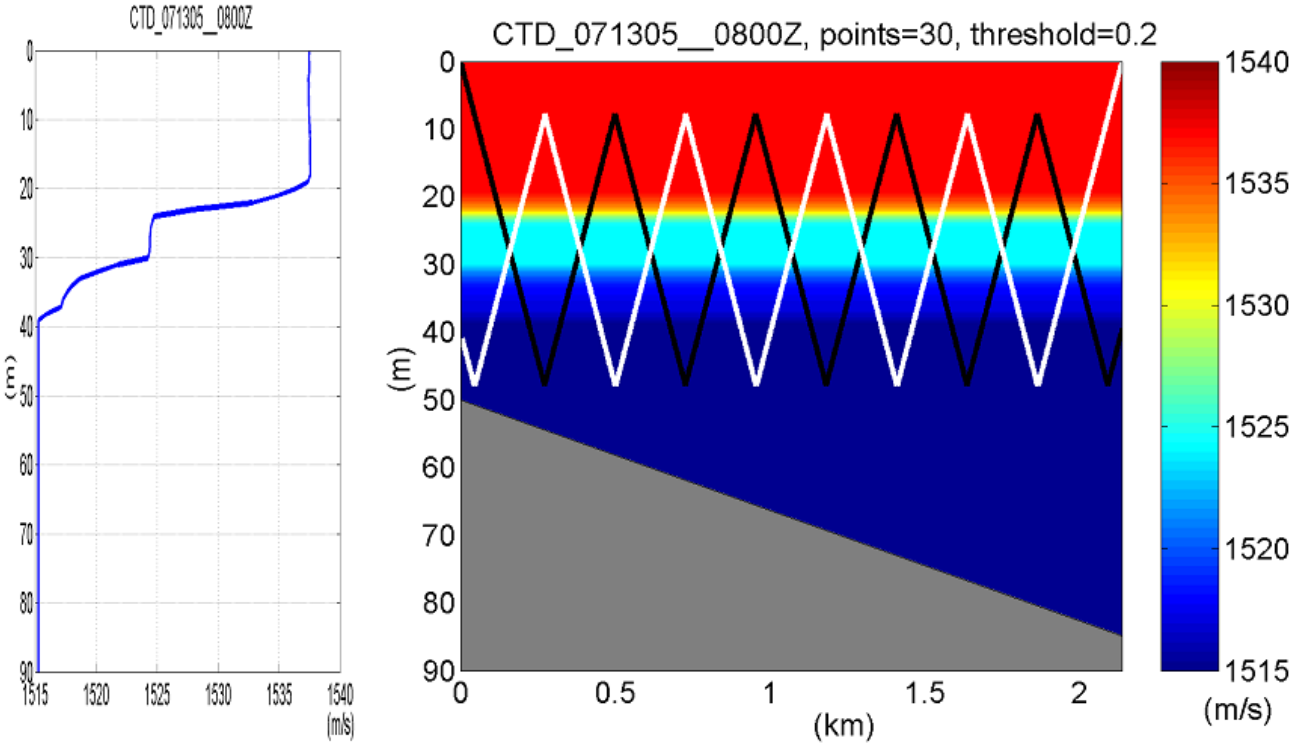

Figure 5: Yoyo control implementation in CTD_071305_0800Z. Black line is the forward path; White line is the backward path.

3. The 2nd one is from CTD_071305_1530Z and suppose SVP is range independent. The bathymetry was guessed by Pierre. AUV yoyo control was implemented in this scenario and parameters are (points=20, threshold=1). From Figure 6 we can see that AUV goes up and down between 20m and 40m. Note that in this case, thermoclines are between 20m and 40m. Compared with the 1st case, in case 2 AUV focuses more in the thermocline. This is because in case 1 there are 2 thermoclines and to make sure AUV will capture both of them, big number for 'points' is used. Consequently, AUV will make more in-situ measurements before make a turn.

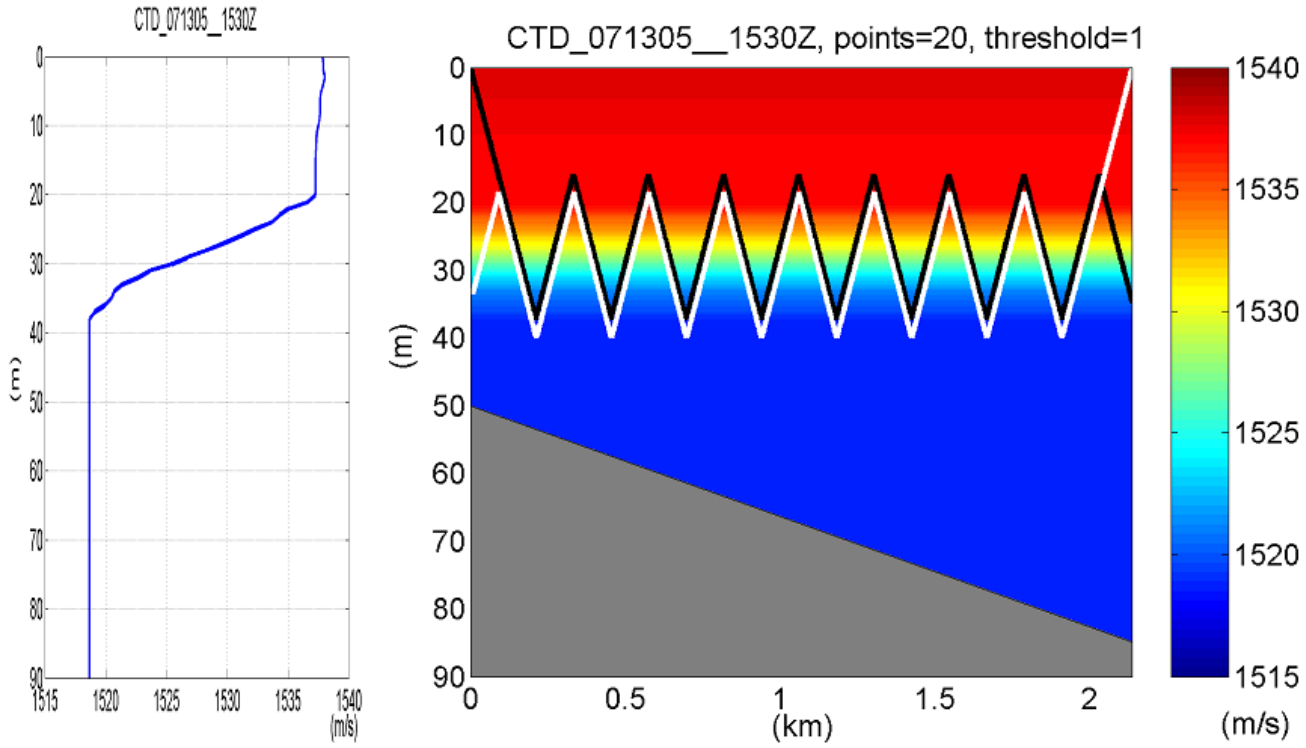

Figure 6: Yoyo control implementation in CTD_071305_1530Z. Black line is the forward path; White line is the backward path.

4. The 3rd one is the combo of CTD_071305_0800Z and CTD_071305_1530Z. From 0 to 1.25km we used CTD_071305_0800Z; beyond 1.25km, we used CTD_071305_1530Z. AUV yoyo control was implemented in this scenario and parameters are (points=30, threshold=0.2). From Figure 7 we can see that AUV goes up and down between 10m and 50m. In this case, all thermoclines are between 20m and 40m depth, so we can't see AUV's path changes much.

5. The 4th one is the combo of CTD_071305_0800Z and its truncation, where we truncated SVP in CTD_071305_0800Z at 30m depth and assume it's constant below 30m. From 0 to 1.25km we used truncated one; beyond 1.25km, we used CTD_071305_0800Z. AUV yoyo control was implemented in this scenario and parameters are (points=30, threshold=0.2). From Figure 8 we can see AUV's path firstly focus on the top thermocline and then when the 2nd one shows up, it yoyoed more widely and covered both thermoclines.

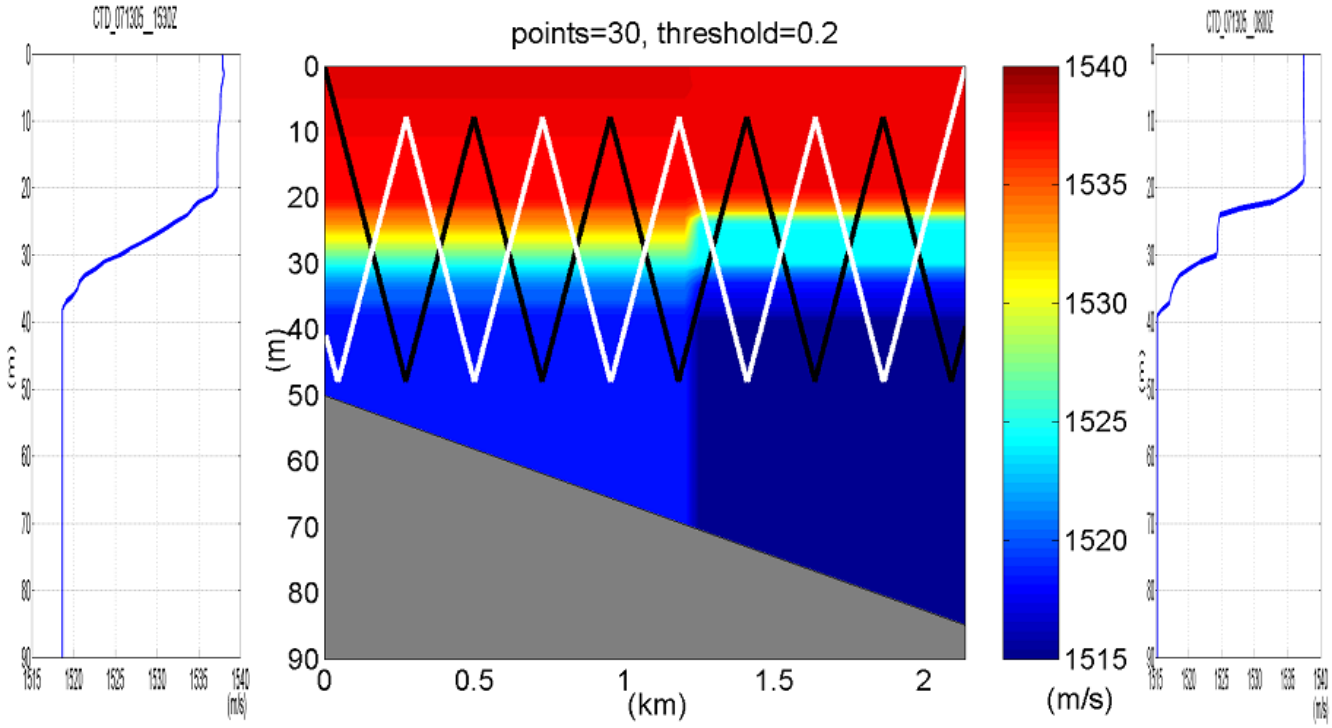

Figure 7: Yoyo control implementation in combo of CTD_071305_0800Z and CTD_071305_1530Z. Black line is the forward path; White line is the backward path.

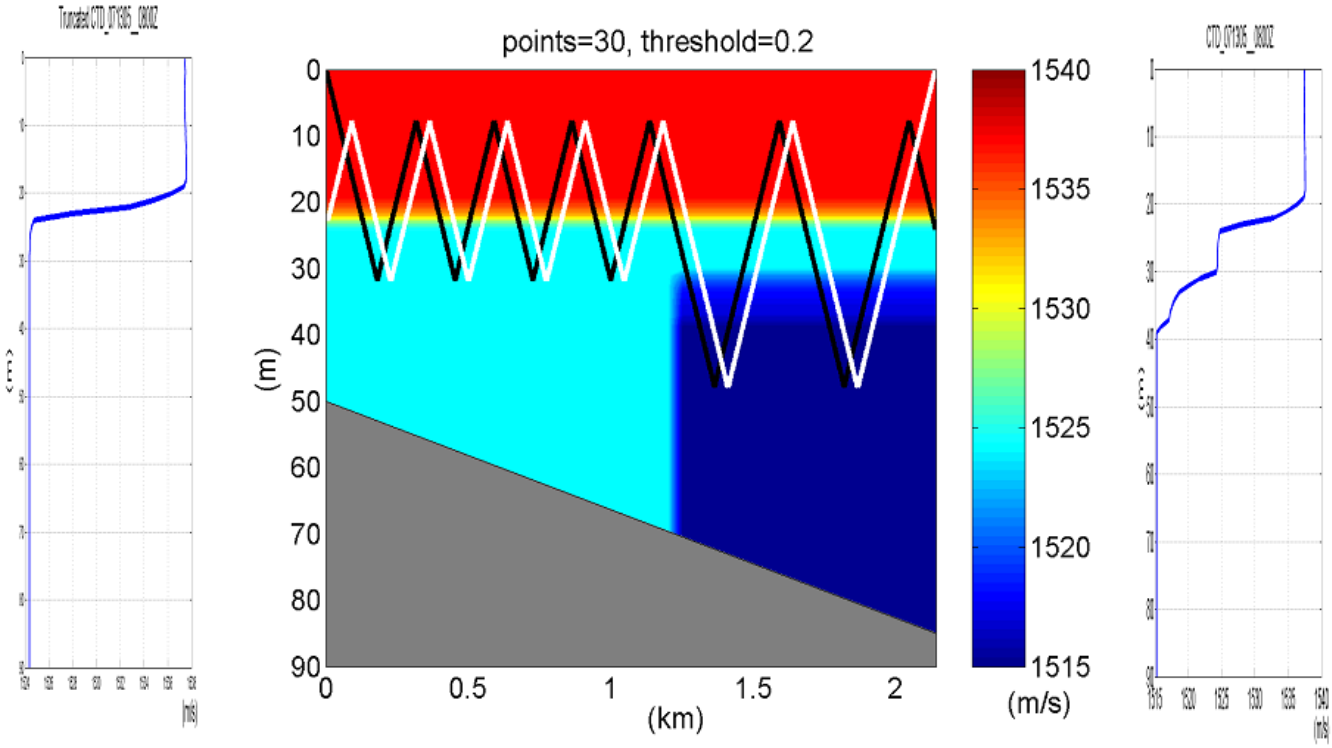

Figure 8: Yoyo control implementation in combo of CTD_071305_0800Z and its truncation. Black line is the forward path; White line is the backward path.