SEISORZ

The Active Seismic Component of the

PRIDE Project

November 10-30, 2014

Principal Investigators

Juan Pablo Canales, Dan Lizarralde (*WHOI*)

Kebabonye Laletsang (*Univ. of Botswana*)

Steve Harder (*Univ. of Texas, El Paso*)

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2.0 Field Participants

SEISORZ PIs

J. Pablo Canales (WHOI)	jpcanales@whoi.edu	Field Center	74460087/74024002
Dan Lizarralde (WHOI)	danl@whoi.edu	Field Center	75407849/75723250
Kebabonye Laletsang (UB)	LALETSAK@mopipi.ub.bw	Field Center	72598496/73518215
Steve Harder (UTEP)	harder@utep.edu	Drilling and Explosives	

Other PRIDE PIs

Eliot Atekwana (OSU-BIUST)	eliot.atekwana@okstate.edu	Stations	
Mark Behn (WHOI)	mbehn@whoi.edu	Stations	
Roger Buck (LDEO)	buck@ldeo.columbia.edu	Stations	
Dorsey Wanless (WHOI)	dwanless@whoi.edu	Stations	

Research Professionals

Galen Kaip (UTEP)	gkaip@utep.edu	Drilling/Loading/Shooting	75226237
Peer Jorgensen (U. Coppenhagen)	peer.jorgensen@gmail.com	Drilling/Loading/Shooting	
Mike Johnson (PASSCAL)	mrjohnson@passcal.nmt.edu	Seismic instrument engineer	
Derrick Hess (PASSCAL)	dhess@passcal.nmt.edu	Seismic instrument engineer	
Jimmy Elsenbeck (WHOI)	jelsenbeck@whoi.edu	Vehicle logistics/Stations/Shooting	
Brown Montshiwa (UB)		Stations	71677399

Other Botswana scientists

Elisha Shemang (BIUST)	shemange@biust.ac.bw	Stations	
Loago Molwalefhe (BIUST)	molwalefhel@biust.ac.bw	Stations	

Students

George Baleseng (UB)		Stations	72901214
Niki Buchena (UB)	nlikib@yahoo.com	Stations	77116324
Koketso George (UB)		Stations	75006649
Greg Horning (WHOI)	horning@MIT.EDU	Stations	
Moses Kanaimba (UB)		Stations	75457806
Keletso Kaisara (UB dr)	kaisarakeletso@yahoo.com	Stations	74232971
Dikaelo Keitsemang (UB)	dkeitsemang@yahoo.com	Stations	74284910
Amogelang Koogane (UB)		Stations	77080552
Laura Stevens (WHOI)	lstevens@whoi.edu	Stations	
Hannah Mark (WHOI)	hmark@whoi.edu	Stations	
Molefi Mathaba (UB)		Stations	71386902
Moketsi Manwela (UB)	moketsi.manwela@gmail.com	Stations	
Thatafatso Mothatego (UB)	t.s.mothatego@gmail.com	Stations	76171110
Fioana Motswaiso (UB)		Stations	76061621
Boitshepo Mpone (UB)		Stations	75810488
Ashley Nauer (UTEP)	agnauer@miners.utep.edu	Loading/Stations/Shooting	
Cancelus Nolo (UB)		Stations	75239431
Hadzisani Samuel (UB)		Stations	75527221
Otlaadisa Tafila (UB dr)		Stations	71429993
Yen Joe Tan (LDEO)	yjt@ldeo.columbia.edu	Stations	

3.0 Summary of SEISORZ objectives and outcomes

Objectives

SEISORZ is the active-source seismic component of the PRIDE project. The PRIDE project aims to understand the processes of continental rift initiation and evolution by analyzing along-axis trends in the southern portion of the East Africa rift system, from Botswana through Zambia and Malawi. The SEISORZ experiment focuses on the rift in Botswana, and in particular the rift graben in northwestern Botswana that hosts the Okavango delta. The scientific objectives of the SEISORZ experiment are to image the crustal structure across the rift and use this image to estimate total extension, determine the pattern thinning, assess the possible presence of melt within the rift zone, and assess the contrast in crustal blocks across the rift, which closely follows the trend of a mobile belt.

The practical objectives of the experiment were to drill and load 19 shot holes, deploy 900 "Texan" seismographs and geophones, detonate the shots with the Texan's deployed and recording, recover the Texans and extract the data. Details of these operations will be given in a subsequent section.

Outcomes

The practical objectives of the SEISORZ experiment were met with great success through orderly, drama-free execution of our field plan. Each of the major operations – shot loading, instrument deployment, shot detonation, and instrument recovery were executed without the use of the planned contingency time, and so the experiment operations were completed along the "ideal" minimum time line.

The primary outcome of the SEISORZ field experiment is the active-source seismic dataset. The dataset is excellent. Of the 19 shots fired, 17 were very good to excellent in quality as defined by signal-to-noise ratio and distance of energy propagation observed in the record sections. Record sections for all 19 shots are displayed in Appendix 2.

The records sections display clear crustal refraction (Pg) and mantle reflection (P_MP) phases for all 17 of the quality shots, and a mantle refraction arrival (Pn) for most sections, with the Pg-P_MP-Pn triplication appearing at ~175 km offset. There are distinct changes in the character of these phases along the transect and on either side of the rift axis. Changes in first-arrival traveltime and amplitude character seem to correlate with transitions from inferred crustal blocks, from the Damara-Ghanzi-Chobe belt to the northwest, through the Rehoboth block and onto the Magondi Belt in the southeast. The P_MP phase for shots from the NW is bright and steep for reflection points near the center of the rift, perhaps indicative of thinning beneath the rift axis. No analysis has been done on these data, and so any inferences at this point are completely speculative. It is clear, however, that substantial structure exists along the length of the SEISORZ transect.

PRIDE-SEISORZ Narrative. All times are local (GMT+2).

Sunday, Nov 9, 2014. JD 313.

Canales arrives at Gaborone 12:45pm, picks up Bushlore car.

Monday, Nov 10, 2014. JD 314.

Met with Laletsang in the morning. Visited Ecosurv consusltants, who had done the Environmental Impact Assessment. Checked out options for field clothes, got the batteries from UB, and got the drilling samples from Jayem. Afternoon of shopping supplies.

Tuesday, Nov 11, 2014. JD 315.

Canales drop the drilling samples at UB and started to Maun at ~10am. Arrived to Rakops at 5pm. Stayed at Rakops River Lodge.

Wednesday, Nov 12, 2014. JD 316.

Checked out prices for Xere Motel in Rakops for deployment teams. Drove to Maun, arriving at noon. Met with Galen, Ashley, and Peer. Picked up Jimmy and Dan at airport; Jimmy's large zargos box missing. Checked-in at the Kamanga Lodge. Went to ORI to check equipment and retrieve metal detector.

Thursday, Nov 13, 2014. JD 317.

Spent morning arranging hotels for deployment teams. Several options booked in Sepopa and Gumare, waiting for confirmation from Haina lodge. Jimmy's zargos box with supplies arrived at the airport. Galen still in town, loading explosives not ready.

Friday, Nov 14, 2014. JD 318.

Spent morning transferring equipment from ORI to Kamanga. Loading team (Galen, Peer, and Ashley) on their way north to start loading. Shopping for supplies.

Saturday, Nov 15, 2014. JD 319.

PASSCAL folks Michael and Derick arrive; picked them up at airport. Galen reports loading 1, 2, 3 completed.

Sunday, Nov 16, 2014. JD 320.

Dan and Jimmy drove to near Shot 8 to install a couple of Texans and measure noise levels associated with power lines and water pipes. When they were there Galen reported that their loading team is stuck in the sand at Shot 5. Dan and Jimmy drove there to see if they could help. They were back in Maun in the afternoon. US participants arrive: Mark, Roger, Yen Joe, Greg, Hannah, Laura. Mark checked in at Kamanga, the others at Rivernest,

Monday, Nov 17, 2014. JD 321.

Went to ORI with Michael and Derick to pick up UB car. After 1.5 hr wait they told us that we can't drive it, we need a driver. We don't take it. Galen reports that they haven't been able to load shot 5. The problem is that the truck with the emulsion is too large and can't make it through those tracks. Things are starting to get delayed. We explore the potential for using 1 or 2 of our cars to transport the emulsion to the holes. We need open-bed trucks, so US participants check how to unassembled the canopy form the Hiluxes. Batteries installed in Texans.

Tuesday, Nov 18, 2014. JD 322.

Botswana participants arrive: Eliot, Elisha and Loago from BIUST; Brown (KB's tech) with his UB car, and students by bus. Report from Galen: they can't use our cars for loading (licensing problem). They have rigged a barrel and there is a BME pickup truck on its way from Francistown to be used for loading.

Wednesday, Nov 19, 2014. JD 323.

Training day. We give a brief overview of the project. Participants are shown how to install Texans, use GPSs, field notes, driving 4WD, etc. Group lunch at Kamanga. KB arrives. Participants trained on Texan deployment procedures. Group dinner at Kamanga. Loading Team completes holes 6, 7, 8, 9, 10, 11, and 12!!!

Thursday, Nov 20, 2014. JD 324.

Teams get ready for deployment next day. Loading of 13, 14, 15 completed.

Friday, Nov 21, 2014. JD 325.

Deployment starts. Michael and Derick start programing at 1am. Programming is for 3 days of continuous recording (Nov. 24-26) for 11 hr/day, from 06:00 to 17:00 (local time). First teams arrive at 5:30 and start leaving by 6am. Last team to departure (Safari team) at 7:30am. Soon after got call from Molefi that they've been stopped at a road check outside of Maun. There is a BURS inspector claiming that the Bushlore vehicles don't have the proper paperwork (something about a tax form to use the vehicles in Botswana for non-tourism purposes). We drove there and tried to solve it. We put BURS in contact with Bushlore and they should fix it. They let our teams proceed and we go to the BURS office so they can photocopy my license. We got a call form Galen: he hasn't been able to load holes 17-20 yet because the new truck with explosives coming form Francistown is broken down in Orapa. He asks that we bring all his equipment to Haina Lodge so he can start testing it. KB and Pablo drive to Haina with his boxes. Galen is optimistic that loading will proceed next day. After we get back to Maun, Galen calls and says the BME truck is fixed and at Rakops. They will resume loading at Hole 17 at 6am. That's good news!

Teams start to report: Team 1 having gas problems in Shakawe. Teams 1-3 spend night at Sepopa Swamp Stop. Teams 4, 5, 7 done about half deployment, spend night in Gumare. Team 6 completed all stations in one day(!), spend night in Gumare. Team 9, 10 done half, back in Maun for the night. Teams 11-14 spend night at Haina lodge.

Saturday, Nov 22, 2014. JD 326.

Loading of all shots completed!! Team reports: Teams 1-3 finished, spend night at Sepopa. Team 4: finished, but missing one geophone. Will leave Texan at Kamore Inn in Gumare and Dan will install station 255 on his way north before shooting. Team 5 finished, stays in Gumare. Team 6 back in Maun. Team 6 finished, stays in Gumare. Team 8 (Safari) finished, back in Maun. Team 9 not finished, back in Maun. Teams 10-11 finished, back in Maun. Teams 12-14 stay in Haina (only 12 is finished).

Sunday, Nov 23, 2014. JD 327.

Team reports: Teams 1-3 on their way back. Team 2 had small car incident by crashing into a fence. Teams 4-5 back in Maun. Teams 7, 9 finished, back in Maun. Teams 12-13 back in Maun. Shooting team 01 goes north: Peer, Dan, Jimmy, and Boitshepo. They will do shots 1-11. Spend night at Drostky's.

Monday, Nov 24, 2014. JD 328.

Shooting starts. Shooting team 2 (Galen, Pablo, Ashley, Greg, and Moses) will do 12-20. Everyone goes to see shot 12, which is the closest to Maun. **Shot 12**: 06:10; **Shot 01**: 06:25; **Shot 02**: 07:25; **Shot 03**: 08:25; **Shot 13**: 08:40; **Shot 04**: 09:15; **Shot 05**: 10:05; **Shot 14**: 10:20; **Shot 06**: 10:55; **Shot 15**: 11:30; **Shot 07**: 12:15; **Shot 08**: 13:15; **Shot 09**: 14:05; **Shot 17**: 15:30; **Shot 10**: 15:35; **Shot 11**: 16:35. Shots 1-17 completed, Shooting Team 1 back in Maun, Shooting Team 2 stays at Haina.

Tuesday, Nov 25

Shooting Team 2 completes shots 18-20: **Shot 18**: 10:00; **Shot 19**: 10:50; **Shot 20**: 12:00. Returns to Maun. Teams 11-14 drive to Haina in preparation for recovery next day.

Wednesday, Nov 26

Recovery starts. Teams 1-10 depart Maun. Teams 1, 3, 6, 7, 8 ,10, 11, 12: completed, back in Maun. Data offload starts. BUIST participants Elisha and Loago leave.

Thursday, Nov 27

Teams 2, 4, 5, 9, 13, 14 finished; all back in Maun. A few Texans have been vandalized, and 2 of them are reported missing (Team 14, stations 877, 882). Team 14 reports missing stations to Rakops police. Data offloading continues. UB students meet with KB, Dan, and JP to discuss issues of payments, per diem, and future access to data. Thanksgiving dinner (Nando's peri-peri chicken!) at Rivernest.

Friday, Nov 28

Data offloading finished. SEGY from ph5 done: data look very nice! All Texans and geophones cleaned and stored in boxes. Jimmy, Dorsey, Mark drive to Kasane for hot-spring sampling. Galen, Peer and Ashley go north to start remediation of holes.

Saturday, Nov 29

Batteries removed from Texans. Jimmy, Dorsey, Mark back from Kasane at 16:00.
Galen, Peer and Ashley back: all holes to the north (01-12) have been fixed. Presentation of shot videos and data at 16:00. Braal dinner courtesy of Kamanga at 19:00.
Some UB participants leaving.

Sunday, Nov 30

Rest of UB participants leave. Galen and Peer go south to remediate holes 13-20.

5.0 Operations

Conducting this project involved a series of coordinated operations. The main operations consisted of logistical aspects (shipping equipment, establishing field center, accommodation for participants, transportation, etc.) as well as technical ops (drilling and loading explosives into the holes; programming, deploying and recovering seismic stations; detonating the explosive; and offloading data).

5.1 Logistics overview

5.1.1. Shipping IRIS/PASSCAL equipment.

The primary person responsible for shipping equipment was Jackie Gonzales at PASSCAL. Transportation from and to the PASSCAL Center at Socorro, NM, and to and from Maun, Botswana was done by Unitrans International Corporation and WorldNet Logistics. Equipment was delivered to us at the Okavango Research Center (ORC), a University of Botswana research campus in Maun. The equipment was stored at ORC until the field center was set up.

The timeline of events is:

Oct 14: Equipment picked up at PASSCAL warehouse.
Oct 22-26: Equipment audited for inspection by US Customs.
Oct 27: Equipment arrives to Amsterdam (AMS).
Oct 29: Equipment arrives to Johannesburg (JNB). It needs to be consolidated with two other shipments: one from UTEP and another from PASSCAL with the server.
Nov. 3: Equipment leaves JBN in transit to Botswana (truck).
Nov 4: Equipment at Botswana border awaiting customs examination.
Nov 6: Equipment in transit to Maun (truck).
Nov 7: Equipment delivered to Dr. Laletsang at ORC.
Dec 3: Equipment picked up at Kamanga for return to PASSCAL center.

5.1.2. Accommodation for participants and Field Center.

We rented the Kamanga Safari Hotel (www.kamangaonline.com) from Nov. 16 through Dec 03. The lodge has a 90 m^2 conference room that was used as field center. The equipment was moved from ORC to Kamanga as soon as Canales and Lizarralde arrived to Maun.

Kamanga has 15 rooms that were used to accommodate 17 of our participants. The remaining 18 participants were accommodated at Rivernest Boutique Cottages (www.rivernestmaun.com), only a few hundred meters away from Kamanga. Rivernest was booked for our experiment also from Nov 16 through Dec 03 in its entirety (10 rooms).

Equipment boxes stationed at the Kamanga Field Center.

5.1.3. Transportation and field vehicles.

Fieldwork in Botswana requires reliable vehicles for off-road driving in harsh conditions, mostly tracks with deep sand. We used Bushlore, a reputable self-drive safari rental company based in South Africa to rent 13 4WD vehicles (5 Toyota Land Cruisers, 6 Toyota Hilux, and 2 Toyota Fortuners). One of the vehicles was delivered to Canales in Gaborone on Nov. 9, a second vehicle was delivered to Lizarralde in Maun on Nov 12, and the remaining 11 vehicles were delivered to the group in Maun on Nov 17. University of Botswana contributed 2 4WD vehicles, and collaborator E. Atekwana contributed his private vehicle.

In addition to this, we hired the services of Kalahari Skies, a Maun-based safari company, to drive and camp one of the deployment teams overnight within the section of the seismic profile where driving was most complicated and far away from villages for overnight stay.

5.2 Shot site ops

Shot operations encompass all aspects of the explosive's component of this active-source experiment. These operations include site selection, permitting, contracting, shot-hole drilling, shot-hole loading, source detonation, and post-detonation shot-hole remediation. These operations were led by S. Harder and his team from UTEP.

Shot site selection began soon after the proposal was funded. This involved several scouting trips to locate and visit each and review these sites with the drilling company. Shot site selection underwent an important second iteration when our project was brought in line with the Okavango Delta Management Plan (ODMP). The Okavango Delta was designated a RAMSAR site in 1996, and the ODMP is a wide-ranging framework for managing the Okavango Delta region that closely follows the guidelines of the RAMSAR convention. The ODMP was written in 2008 and implemented beginning in 2009.

When beginning the permitting process for our project in 2011, there was some uncertainty within the Botswana Department of Environmental Affairs over how our project and in particular the shot sites should be reviewed, whether via an environmental management plan (EMP) or an environmental impact assessment (EIA), and the extent to which the ODMP applied to our work. This uncertainty led to substantial delays for the project and required two additional trips to Botswana to meet with DEA officials and to contract an environmental consulting firm, EcoSurv, to guide us through this process, as well as considerable efforts by K. Laletsang to shepherd the process along in Botswana. Ultimately, a complete EIA was done fully consistent with the guidelines of the ODMP, and the EIA was approved by the DEA in 2014. This led to 6 shot sites and 150 km of station locations that had been planned to pass through the delta being moved to the main road (A3) that passes around the delta. The region surrounding the delta is also subject to the ODMP, and three of the northernmost shots were also moved farther from the Okavango Panhandle.

Drilling and loading. A drilling company, Jayem Drilling, and an explosives company, BME (Beyond Mining Explosives), were contracted early on for the project. G. Kaip arrived in Botswana early in October 2014 to drill shot holes. Shot holes were drilled to

~30 m depth, cased with steal casing, capped and locked. Kaip returned to the U.S. after drilling was complete and was back in Botswana to begin loading operations on November 14. Shot holes were bulk loaded with emulsion from a very large truck. This truck had difficulty driving to several holes early into the loading, notably Shot 4 and Shot 5, and a methodology of pumping emulsion into barrels, driving the barrels to shot holes, and "pouring" the emulsion into the holes from the barrels was developed and employed in several instances to avoid further delays. Loading was complete for holes 01-15 by November 20, the day before our first planned deployment day. The final three holes were loaded on November 21, during our first deployment day.

Shot detonation. Shot detonation was done in two days using two shooting teams. The northern team detonated Shots 01-11, and the southern team detonated Shots 12-20. The northern team consisted of P. Jorgensen, who wired the charges to the shooting box and controlled the shooting box through all the detonations, two blast technicians from BME, and D. Lizarralde, J. Elsenbeck and B. Mpone, who helped to secure the area prior to shooting and to secure the shot site after shooting, filling holes and stacking the sites as necessary. Similarly, the southern team consisted of G. Kaip, two BME techs, and J.P. Canales, G. Horning, and M Kanaimba. Shooting took place over two days, Nov. 24 and 25, and was done during daylight ours to avoid the substantial hazard of animals at night, including farm animals along roads and also wild animals in the bush.

Shots 01-11 were all detonated on Nov. 24. Of those 11 shots, 9 were observed as high quality shots on detonation and resulted in quality record sections. Two shots, 01 and 11, were observed as poor quality shot on detonation and resulted in poor quality record sections. All shots 01-11 detonated. Shots 01, 03, 05, and 08 held completely, with no geyser produced after the detonations. Shot 02 produced a geyser that began 14s after detonation. Shots 04, 06, 07, 09, 10 and 11 produced geysers nearly synchronous with detonation, and the steal casing was elevated to some extent at all of these shots. Casing remained elevated, protruding from the hole, at Shots 04 (~4 m) and 09 (~0.5 m). Casing was ejected from the hole at Shot 07, leaving ~10 m of casing lying horizontal on the ground. Shots 06 and 07 produced large holes and Shot 10 produced a small crater, and these sites were secured with stakes and caution tape. The hole at Shot 06 was small enough to be filled with surrounding dirt. Shots 07 and 10 required more remediation.

Shots 12-20 were all detonated on Nov. 24 and Nov. 25. Shot 12 was detonated …

Shot hole remediation began on Nov. 26, the day after shooting was complete. G. Kaip, P. Jorgensen and A. Nauer began inspecting sites and developing a remediation plan. Exposed casing was cut into small pieced with an acetylene torch, and the resulting pieces of steal were given away or sold for scrap. A backhoe was hired to fill the large holes at Shots 07, 10, and 20.

Top: *left,* S04, casing; *right*, S06 filled, staked hole.

Mid: *left*, S07 geyser with elevated casing; *right*, S07 hole with section of casing on the ground.

Bot: *left*, S10 small crater. Peer Jorgensen in foreground.

5.3 "Texan" operations

RefTek RT-125 (aka "Texan") dataloggers and Sercel L28 4.5 Hz geophones were used to record the explosive shot energy. These instruments were provided by PASSCAL along with two engineers, M. Johnson and D. Hess, who oversaw all aspects of in-lab Texan operations. Texan operations include instrument inventory, battery loading, instrument programming, assignment and checkout of instruments to teams, deployment and then recovery from the field, instrument cleaning, checking in of instruments, downloading data, post-deployment inventory, battery removal, and repacking.

The Texan data loggers operate with 2 D-size alkaline batteries. For 900 Texans we purchased 2,000 batteries in Gaborone, which were then transported to Maun by car. The batteries were loaded into the Texans on Nov. 17. Recording parameters were set as 4 ms sampling rate and 11-hr per day continuous recording for 3 days. These parameters gave a power consumption enough for having the Texans operating for 9 days from the moment of programing. We planed for 3 days of deployment time, 3 days of recording while shooting, and 3 days for recovery. These time windows included ample contingency time. Our goal was to send deployment teams to the field at sunrise on Nov 21, and start shooting at sunrise on Nov 24. In most active-source studies, shooting at night is preferred because of lower noise levels. However conditions in Botswana (i.e., difficult driving and wildlife) make this option too dangerous, so shooting was planed during daylight hours.

On Nov. 19 we trained participants on the use, installation, and recovery of Texans, as well as on the use of GPSs and protocols for documenting station installation. For Texan deployment/recovery ops, we formed 14 two-person Teams. Each Team was assigned a set of contiguous stations that varied between 45, 60, or 75 Texans (3, 4, or 5 boxes), depending on driving conditions for the Team. Some of the Teams had to drive a few hundred km away from Maun, so accommodation was arranged for them for both the deployment and recovery. The northern Teams used the villages of Sepopa (Sepopa SwampStop) and Gumare (Kamore Inn) as overnight locations. Teams near the center of the line returned to Maun every day (except Team 9 who was on the Safari team). Teams along the southern third of the profile regrouped and stayed overnight at the Haina Kalahari Lodge, the only accommodation available along that section of the line.

Texan deployment started Nov. 21 as scheduled. Instrument programing began at 01:00 Nov. 21 so that they were ready to go to the field when the first team arrived but no soon. The first teams arrived at the field center at 05:30 and were on their way at 06:00. All teams were on the road by 07:30. One Team completed their deployment on the same day, and the majority completed deployment on Nov 22. All teams were back at the Kamanga Field Center in Maun on Nov 23.

Shooting ops were completed in two days, and some recovery teams were sent to the field on Nov 25 in preparation for starting recoveries on Nov 26. Recoveries were done faster than deployments, and 8 Teams had completed their recoveries and returned to the Field Center by Nov 26. The remaining teams completed recoveries on Nov 27. Of the 900 Texans, only 2 were reported as “stolen”, and a few others showed signs of having been tampered with or vandalized.

Data offload was complete on Nov. 28 and shot gathers in SEG-Y format were produced from PH5 soon after metadata were handed to D. Hess. All Texan and geophone boxes were inventoried, closed and stacked, and all PASSCAL gear was broken down and packed by Nov. 29.

Training Day: Texan installation instructions by Mike Johnson (red hat) and off-road driving tips by Jimmy Elsenbeck.

NAME		TEAM	Stations	# of boxes	wpt file	Accomodation during deployment/recovery	PHONE NUMBER
Eliot Atekwana	OSU-BIUST	**1**	**1**	4.0	S-001-450	Shakawe	76356373
Thatafatso Mothatego	LDEO		**60**				76171110
Elisha Shemang	BIUST	**2**	**61**	4.0	S-001-450	Shakawe/Sepopa	
Cancelus Nolo	UB		**120**				75239431
Loago Molwalefhe	BIUST	**3**	**121**	4.0	S-001-450	Sepopa	71234975
Mooketsi Manwela	UB		**180**				
Amogelang Koogane	UB	**4**	**181**	5.0	S-001-450	Sepopa/Gumare	77080552
George Baleseng (D)	UB		**255**				72901214
Fioana Motswaiso (D)	UB	**5**	**256**	5.0	S-001-450	Gumare	76061621
Niki Buchena	UB		**330**				77116324
Greg Horning	WHOI	**6**	**331**	4.0	S-226-675	Gumare	
Moses Kanaimba	UB		**390**				75457806
Yen Joe Tan	UB	**7**	**391**	4.0	S-226-675	Gumare	
Dikaelo Keitsemang (D)	UB		**450**				74284910
Laura Stevens	WHOI	**8**	**451**	5.3	S-226-675	Safari camping	
Hannah Mark	WHOI		**530**				
Koketso George	UB	**9**	**531**	3.7	S-451-900	Maun	75006649
Molefi Mathaba	UB		**585**				71386902
B. Montshiwa	UB	**10**	**586**	4.0	S-451-900	Maun	71677399
Ashley Nauer	UTEP		**645**				
Mark Behn	WHOI	**11**	**646**	4.0	S-451-900	Haina Kalahari	75723367
Boitshepo Mpone	UB		**705**				75810488
Jimmy Elsenbeck	M	**12**	**706**	3.0	S-451-900	Haina Kalahari	75723347
Hadzisani Samuel	UB		**750**				75527221
Roger Buck	M	**13**	**751**	5.0	S-451-900	Haina Kalahari/Rakops	
Keletso Kaisara (D)	UB		**825**				74232971
Dorsey Wanless	WHOI	**14**	**826**	5.0	S-451-900	Haina Kalahari/Rakops	75773022
Otlaadisa Tafila (D)	UB		**900**				71429993

Appendix 1: Station Information

station ID	station ID	serial number	lat	lon	elevation
R001	001	3953	-18.26142	21.75392	997.6
R002	002	4081	-18.26273	21.75808	992
R003	003	4008	-18.26472	21.76365	994.2
R004	004	4069	-18.26593	21.76748	993.2
R005	005	2505	-18.26939	21.77063	993.6
R006	006	2206	-18.27423	21.7743	993.1
R007	007	3856	-18.27757	21.77764	993.7
R008	008	4012	-18.27983	21.78237	987.6
R009	009	2682	-18.28226	21.78819	992.7
R010	010	2720	-18.28658	21.78842	993.7
R011	011	2616	-18.29308	21.78789	993.1
R012	012	2879	-18.29853	21.78817	995.7
R013	013	4080	-18.30226	21.78922	995
R014	014	1909	-18.30467	21.7906	996.8
R015	015	4036	-18.30812	21.79348	997.7
R016	016	2699	-18.31116	21.79758	997.1
R017	017	2988	-18.31482	21.80263	994.7
R018	018	2464	-18.31656	21.80438	993.1
R019	019	3960	-18.32107	21.80844	991
R020	020	2452	-18.32561	21.81091	995.5
R021	021	2481	-18.32889	21.81266	992.2
R022	022	2078	-18.3322	21.81426	988.2
R023	023	1782	-18.33676	21.8173	989.3
R024	024	2155	-18.33989	21.8199	989.6
R025	025	1683	-18.3439	21.8226	991.9
R026	026	1814	-18.34705	21.82495	991.1
R027	027	2004	-18.35263	21.82607	993.8
R028	028	1667	-18.3567	21.82728	993.6
R029	029	1621	-18.35886	21.82864	996.5
R030	030	1860	-18.36268	21.83011	988.8
R031	031	1550	-18.36733	21.83143	988.3
R032	032	2989	-18.37074	21.83932	988.9
R033	033	3818	-18.37341	21.84241	984.8
R034	034	1699	-18.38094	21.84171	988.8
R035	035	2246	-18.3832	21.84333	989.6
R036	036	1849	-18.38695	21.84689	990.2
R037	037	1735	-18.39195	21.8481	991.2
R038	038	1579	-18.39454	21.85028	992.6
R039	039	2243	-18.39663	21.85322	988.8
R040	040	3889	-18.40188	21.85622	983.9
R041	041	2673	-18.40569	21.85773	986.9
R042	042	2761	-18.408495	21.859135	988.25
R043	043	2732	-18.41269	21.86276	988.6
R044	044	3595	-18.416265	21.866725	989.6
R045	045	1992	-18.41923	21.86969	989.45
R046	046	3903	-18.422795	21.87284	990.1
R047	047	3720	-18.42612	21.87596	988.45

R048	048	2646	-18.42901	21.879755	989.05
R049	049	2897	-18.43259	21.88223	987.85
R050	050	1697	-18.434795	21.886865	986.05
R051	051	2926	-18.438515	21.891385	983.65
R052	052	2546	-18.44033	21.8939	984.85
R053	053	2240	-18.44589	21.895745	984.6
R054	054	3703	-18.447195	21.89956	982.35
R055	055	1885	-18.45174	21.900855	984.8
R056	056	3936	-18.45648	21.903235	984.6
R057	057	2877	-18.460515	21.904265	987.45
R058	058	1664	-18.464435	21.90638	987.35
R059	059	2985	-18.469025	21.907695	985.05
R060	060	2228	-18.47178	21.91156	986.3
R061	061	2213	-18.474525	21.91571	986.25
R062	062	3001	-18.47799	21.918235	984.9
R063	063	2166	-18.482505	21.921135	985
R064	064	1708	-18.48508	21.923465	986.6
R065	065	1911	-18.48868	21.925865	988.3
R066	066	2603	-18.49254	21.92871	986.4
R067	067	1775	-18.496135	21.93154	987.35
R068	068	3888	-18.499815	21.93428	986.5
R069	069	2502	-18.50331	21.9369	986.5
R070	070	2882	-18.5067	21.93959	986.2
R071	071	3601	-18.510795	21.94433	983.65
R072	072	1922	-18.51343	21.94656	983.95
R073	073	4060	-18.51742	21.94785	983
R074	074	1795	-18.521935	21.94918	984.4
R075	075	3666	-18.526185	21.951335	984.75
R076	076	3934	-18.529625	21.954495	987.4
R077	077	1677	-18.533375	21.956485	985.7
R078	078	1908	-18.53726	21.958285	986.5
R079	079	3007	-18.54053	21.961965	984.85
R080	080	3862	-18.543955	21.96472	984.1
R081	081	4075	-18.547665	21.96751333	984.45
R082	082	2204	-18.55127	21.97001	984.8
R083	083	3808	-18.555145	21.972405	981.8
R084	084	2069	-18.558605	21.97552	984.85
R085	085	2573	-18.561405	21.979435	984.55
R086	086	2218	-18.5642	21.982965	982.5
R087	087	1679	-18.566715	21.98608	984.5
R088	088	2998	-18.569975	21.990365	983.65
R089	089	1652	-18.571435	21.99221	983.55
R090	090	3612	-18.57724	21.99253	979.95
R091	091	2549	-18.58802	21.99595	983.55
R092	092	3585	-18.5903	21.9979	983.35
R093	093	2849	-18.592415	21.99995	986.35
R094	094	1599	-18.59444	22.002	984.65
R095	095	2767	-18.597515	22.00529	986.05
R096	096	1952	-18.60107	22.0085	984.35

R097	097	2681	-18.60427	22.012055	984.45
R098	098	2564	-18.60728	22.015525	985.15
R099	099	1558	-18.61009	22.019055	984.1
R100	100	3650	-18.613405	22.022335	995.3
R101	101	2104	-18.616455	22.025495	992.8
R102	102	1752	-18.619295	22.029235	983.5
R103	103	3891	-18.62178	22.033285	982.15
R104	104	2144	-18.62466	22.03896	981.15
R105	105	3718	-18.626485	22.042505	981.6
R106	106	2111	-18.62832	22.0474	980.3
R107	107	3728	-18.629905	22.052755	979.25
R108	108	4032	-18.632435	22.05768	980.75
R109	109	2269	-18.63594	22.059745	979.85
R110	110	2123	-18.639735	22.06188	983.35
R111	111	2524	-18.644705	22.063905	980.3
R112	112	2390	-18.64676	22.06754	981.45
R113	113	2170	-18.65128	22.07233	982.9
R114	114	2430	-18.654035	22.07412	981.75
R115	115	2497	-18.657415	22.07669	980.1
R116	116	1702	-18.660245	22.07956	980.3
R117	117	2110	-18.66274	22.08419	980.5
R118	118	2981	-18.66447	22.089765	980.35
R119	119	1609	-18.6736	22.09771	981.85
R120	120	1846	-18.675585	22.099115	980.7
R121	121	2454	-18.67697	22.09999	977.7
R122	122	1799	-18.67893	22.10129	977.3
R123	123	2908	-18.681515	22.10337	979.7
R124	124	3633	-18.68522	22.10619	984.05
R125	125	3751	-18.68842	22.10836	988.4
R126	126	2714	-18.69235	22.111385	988.75
R127	127	2984	-18.695075	22.11422	986.8
R128	128	2534	-18.696215	22.119215	985.7
R129	129	3624	-18.697025	22.12358	986
R130	130	3002	-18.698355	22.128325	985.5
R131	131	2939	-18.70214	22.134855	984.65
R132	132	4065	-18.705325	22.13942	982.6
R133	133	3611	-18.70762	22.1431	983.95
R134	134	3674	-18.71327	22.14736	984.35
R135	135	2845	-18.71696	22.149695	982.05
R136	136	2858	-18.71956	22.15197	979.85
R137	137	2638	-18.72234	22.15487	982.5
R138	138	2412	-18.724365	22.157655	982.15
R139	139	4000	-18.726465	22.161305	981.45
R140	140	3928	-18.728345	22.166135	978.4
R141	141	2941	-18.730525	22.171275	983.25
R142	142	2641	-18.732425	22.174225	985.9
R143	143	1724	-18.74103	22.177915	977.8
R144	144	1526	-18.74689	22.17753	983.85
R145	145	1976	-18.750765	22.17707	982.6

R146	146	1938	-18.75498	22.179205	981.85
R147	147	1830	-18.758505	22.181645	982.5
R148	148	3759	-18.76273	22.18358	981.95
R149	149	2402	-18.767165	22.185125	984.9
R150	150	3678	-18.77164	22.186775	982.45
R151	151	2432	-18.775975	22.18824	983.85
R152	152	2128	-18.780965	22.19096	982
R153	153	2397	-18.78346	22.192815	982.15
R154	154	1521	-18.78697	22.19565	982.05
R155	155	3636	-18.79045	22.198505	980.85
R156	156	2645	-18.794335	22.2013	982.8
R157	157	2176	-18.797895	22.203235	981.65
R158	158	2647	-18.802555	22.205165	981.85
R159	159	2749	-18.806335	22.20667	979.65
R160	160	2545	-18.81078	22.20844	978.55
R161	161	3837	-18.81452	22.21027	981.1
R162	162	2260	-18.818345	22.21311	980.5
R163	163	3772	-18.8218	22.21659	981.15
R164	164	2679	-18.824845	22.219675	980.65
R165	165	4015	-18.828	22.222855	980.7
R166	166	1980	-18.831475	22.225725	981.05
R167	167	2878	-18.835455	22.228245	980.2
R168	168	1687	-18.840255	22.230285	980.35
R169	169	2986	-18.84396	22.231845	978.6
R170	170	2597	-18.847505	22.233785	974.75
R171	171	3918	-18.851155	22.23654	974.1
R172	172	3607	-18.85419	22.239585	975.75
R173	173	2562	-18.85739	22.242865	976.4
R174	174	2983	-18.86067	22.24636	978
R175	175	1751	-18.863765	22.24962	978.35
R176	176	3785	-18.86702	22.252775	974.95
R177	177	1753	-18.87053	22.25566	975.9
R178	178	2928	-18.873995	22.258365	976.4
R179	179	2512	-18.877775	22.260865	975.5
R180	180	2687	-18.88155	22.26353	973.6
R181	181	2229	-18.88522	22.266355	976.25
R182	182	3581	-18.888985	22.268905	975.85
R183	183	2803	-18.893405	22.27121	975.4
R184	184	2731	-18.897655	22.2726	975.25
R185	185	2106	-18.90158	22.273895	974.35
R186	186	2812	-18.906535	22.27492	976.85
R187	187	3620	-18.911655	22.27499	975.5
R188	188	3727	-18.91791	22.27367	976.15
R189	189	3987	-18.923915	22.272025	975.15
R190	190	1924	-18.930785	22.270365	977.1
R191	191	1998	-18.93617	22.270075	973.4
R192	192	1647	-18.9418	22.270335	974.45
R193	193	1598	-18.946405	22.27108	972.15
R194	194	3994	-18.9516	22.27163	977.45

R195	195	2695	-18.95659	22.272795	974.05
R196	196	3904	-18.96038	22.274525	975.95
R197	197	2945	-18.964295	22.277485	973.65
R198	198	2518	-18.96785	22.280095	974.05
R199	199	3621	-18.97147	22.28277	975.2
R200	200	2217	-18.97504	22.28495	972.25
R201	201	3848	-18.97896	22.287425	970.05
R202	202	2018	-18.98306	22.28893	971.05
R203	203	2447	-18.988045	22.289915	969.75
R204	204	1523	-18.993295	22.291045	971.9
R205	205	1698	-18.99778	22.291855	972.5
R206	206	3887	-19.002525	22.292335	971
R207	207	2613	-19.008555	22.29119	974
R208	208	1649	-19.01623	22.288695	973.2
R209	209	3845	-19.02273	22.287035	973.65
R210	210	3604	-19.02877	22.28605	970.9
R211	211	3706	-19.034515	22.285085	969.75
R212	212	2741	-19.041185	22.283915	967
R213	213	3596	-19.047475	22.282275	967.65
R214	214	1663	-19.05485	22.279245	965.7
R215	215	3605	-19.062935	22.2753	966.4
R216	216	3867	-19.07078	22.271985	968.8
R217	217	2593	-19.076255	22.27141	968.9
R218	218	2122	-19.08116	22.27194	966.45
R219	219	1650	-19.086125	22.27238	966.45
R220	220	2887	-19.091405	22.27273	967.55
R221	221	2997	-19.09687	22.272935	966.1
R222	222	1850	-19.103315	22.271535	969.55
R223	223	3654	-19.109345	22.270205	966.3
R224	224	2212	-19.116	22.26824	965.8
R225	225	2194	-19.128835	22.25747	968.3
R226	226	1694	-19.14095	22.247545	968
R227	227	4054	-19.15011	22.24221	965.8
R228	228	1631	-19.15656	22.240445	967.45
R229	229	1856	-19.162865	22.239	966.1
R230	230	2635	-19.17175	22.23421	966.05
R231	231	1953	-19.180825	22.228195	966.6
R232	232	1874	-19.18911	22.22436	967.35
R233	233	1727	-19.198685	22.21872	968.05
R234	234	2446	-19.21607	22.200155	965.65
R235	235	2120	-19.22405	22.19656	963.95
R236	236	2179	-19.231295	22.1937	964.6
R237	237	1769	-19.23813	22.192005	963.25
R238	238	2940	-19.24482	22.190385	963.6
R239	239	1623	-19.251365	22.187675	963.35
R240	240	2650	-19.25936	22.184065	961.65
R241	241	2581	-19.26623	22.181345	960.15
R242	242	3829	-19.27362	22.17952	958.8
R243	243	1743	-19.279605	22.177915	962.05

R244	244	1600	-19.287085	22.17509	959.35
R245	245	3671	-19.295695	22.170115	961.55
R246	246	1519	-19.3041	22.166295	961
R247	247	2883	-19.309475	22.165655	964.5
R248	248	2738	-19.31499	22.16634	959.35
R249	249	2131	-19.31962	22.16745	960.5
R250	250	3781	-19.32364	22.168235	962.2
R251	251	3842	-19.329205	22.168495	961.15
R252	252	3673	-19.335835	22.16735	963.7
R253	253	2508	-19.34171	22.165835	959.8
R254	254	2746	-19.348525	22.163515	959.25
R255	255	3773	-19.355785	22.16015	960.75
R256	256	1182	-19.3627133	22.1547	957.6
R257	257	1197	-19.36826	22.151155	957.8
R258	258	1115	-19.376395	22.154405	956.6
R259	259	2327	-19.381245	22.15418	958.55
R260	260	855	-19.38632	22.15572	958.1
R261	261	1958	-19.39124	22.15512	959.2
R262	262	1177	-19.3965	22.15514	958.1
R263	263	668	-19.40274	22.15381	960.05
R264	264	1116	-19.410245	22.150975	958.8
R265	265	2342	-19.419115	22.145735	958.8
R266	266	1304	-19.43028	22.13724	957.3
R267	267	2329	-19.446165	22.12118	955.35
R268	268	2324	-19.45527	22.115845	956.95
R269	269	2274	-19.46344	22.11167	956.05
R270	270	1970	-19.47037	22.10965	956.8
R271	271	712	-19.47585	22.109675	956.55
R272	272	992	-19.48086	22.11018	955.4
R273	273	2312	-19.485725	22.11112	956.35
R274	274	806	-19.489945	22.112795	956.2
R275	275	2300	-19.493885	22.11511	954.95
R276	276	2381	-19.497655	22.11745	955.65
R277	277	682	-19.50151	22.11991333	955
R278	278	1302	-19.5052917	22.12216833	955.65
R279	279	1029	-19.509475	22.123805	955.75
R280	280	2368	-19.51446	22.124725	957.65
R281	281	785	-19.51949	22.125295	957.55
R282	282	1015	-19.52443	22.12571	957.5
R283	283	703	-19.52919	22.12669	958.15
R284	284	1175	-19.533785	22.128045	957.1
R285	285	1146	-19.538235	22.129465	957.6
R286	286	994	-19.54263	22.130765	956.35
R287	287	957	-19.54689	22.132635	955.8
R288	288	804	-19.550835	22.135015	954.4
R289	289	2378	-19.55449	22.1374	953.05
R290	290	803	-19.5583	22.13976	953.3
R291	291	2286	-19.56249	22.141595	953.45
R292	292	823	-19.566915	22.142895	953.55

R293	293	964	-19.571545	22.14408	953.8
R294	294	779	-19.57593	22.145645	954.2
R295	295	2332	-19.580005	22.14759	958.35
R296	296	2354	-19.5839	22.14981	958.6
R297	297	708	-19.587745	22.15169	953.7
R298	298	2308	-19.59178	22.154	952.7
R299	299	2317	-19.596	22.15592	953.05
R300	300	1011	-19.60047	22.1573	953.95
R301	301	1301	-19.60487	22.15877	953.45
R302	302	1071	-19.60927	22.16039	952.9
R303	303	2284	-19.6133	22.16232	951.95
R304	304	2352	-19.61708	22.16484	952.3
R305	305	752	-19.62071	22.16744	956
R306	306	999	-19.624895	22.16909	953.95
R307	307	1063	-19.62947	22.170385	952.95
R308	308	879	-19.633965	22.17157	957.35
R309	309	873	-19.63816	22.17354	955
R310	310	1008	-19.642405	22.17521	951.4
R311	311	1056	-19.647145	22.176095	952.5
R312	312	862	-19.66847	22.15198	954.45
R313	313	745	-19.66793	22.161285	952.4
R314	314	833	-19.66725	22.17054	950.7
R315	315	671	-19.69147	22.142195	951.9
R316	316	3746	-19.695105	22.14454	952.6
R317	317	2199	-19.698945	22.14702	952.35
R318	318	2655	-19.7026683	22.14955	953.65
R319	319	3985	-19.70648	22.151855	951.55
R320	320	2672	-19.71037	22.153965	951.1
R321	321	2102	-19.71424	22.156185	951.75
R322	322	2628	-19.71824	22.15862	951.6
R323	323	1601	-19.722165	22.161035	950.4
R324	324	1945	-19.72588	22.163385	952.35
R325	325	2530	-19.729965	22.165605	949.65
R326	326	1764	-19.733665	22.16781	948.15
R327	327	2856	-19.73749	22.170185	948.7
R328	328	1871	-19.741135	22.17283	948.2
R329	329	2081	-19.74507	22.1751	946.15
R330	330	3592	-19.74887	22.17742	947.05
R331	331	1859	-19.752405	22.179475	952
R332	332	2462	-19.756195	22.18178	953
R333	333	1514	-19.76014	22.184195	948.75
R334	334	2467	-19.763825	22.18644	953
R335	335	3883	-19.7678	22.188255	951.5
R336	336	3894	-19.771825	22.189985	950.45
R337	337	2621	-19.776205	22.19172	948.85
R338	338	2223	-19.78063	22.193495	946.7
R339	339	2092	-19.785785	22.19562	949.85
R340	340	1880	-19.7898	22.19728	952.85
R341	341	2586	-19.79546	22.19957	952.6

R342	342	1883	-19.79815	22.20069	951.7
R343	343	3643	-19.801625	22.202045	949.6
R344	344	2094	-19.80627	22.203995	949.1
R345	345	1547	-19.810425	22.205595	950.65
R346	346	2838	-19.81514	22.20751	948.6
R347	347	1866	-19.81929	22.20925	947.9
R348	348	2670	-19.823565	22.210935	947.2
R349	349	1738	-19.828395	22.212825	948.65
R350	350	2658	-19.832475	22.2145	946.8
R351	351	1813	-19.836395	22.21611	945.25
R352	352	3663	-19.84071	22.21787	946.85
R353	353	3768	-19.84502	22.219505	947.4
R354	354	3508	-19.84961	22.221365	950.85
R355	355	2570	-19.85342	22.222985	946.45
R356	356	3591	-19.857755	22.224615	947.45
R357	357	2702	-19.862255	22.226435	946.65
R358	358	1554	-19.866425	22.228075	946.4
R359	359	1560	-19.870505	22.22972	945.35
R360	360	3659	-19.8748	22.23147	946.2
R361	361	2905	-19.87914	22.233155	941.15
R362	362	2895	-19.88327	22.23484	945.85
R363	363	2173	-19.8876	22.2365	943.7
R364	364	2238	-19.892335	22.237735	941.15
R365	365	2141	-19.896885	22.238765	943.5
R366	366	2125	-19.901475	22.239775	944
R367	367	2685	-19.906345	22.240825	944.15
R368	368	2733	-19.911105	22.241875	942.3
R369	369	3608	-19.9156	22.242805	938.9
R370	370	1896	-19.920435	22.2438	943.15
R371	371	2675	-19.925245	22.244815	943.5
R372	372	2727	-19.92991	22.24561	941.6
R373	373	2371	-19.934745	22.246535	945.45
R374	374	1756	-19.939655	22.247205	940.55
R375	375	1790	-19.94475	22.24766	943.1
R376	376	1629	-19.949895	22.24792	947.7
R377	377	2577	-19.95525	22.24817	943.3
R378	378	3797	-19.96044	22.248405	939.75
R379	379	2221	-19.96643	22.248755	942.05
R380	380	3661	-19.970885	22.249015	942.95
R381	381	2444	-19.97571	22.24967	941.25
R382	382	2063	-19.980045	22.25117	942.45
R383	383	2473	-19.98384	22.25376	939.75
R384	384	2235	-19.986325	22.25824	942.3
R385	385	4045	-19.988665	22.262445	941.15
R386	386	1575	-19.991365	22.266855	943.1
R387	387	3849	-19.994275	22.27058	940.85
R388	388	4041	-19.994465	22.278115	942.3
R389	389	1969	-19.994435	22.286195	944.15
R390	390	4073	-19.99623	22.29178	942.65

R391	391	1869	-19.998125	22.297785	940.6
R392	392	4053	-19.99945	22.302435	940.85
R393	393	2117	-20.00228	22.30685	941.8
R394	394	1966	-20.00507	22.31061	940.5
R395	395	1826	-20.00806	22.314795	937.65
R396	396	1722	-20.010565	22.318195	936.45
R397	397	2451	-20.013455	22.32185	933.75
R398	398	4061	-20.01678	22.325155	935.45
R399	399	1716	-20.019415	22.32946	936.95
R400	400	1587	-20.02149	22.33482	940.05
R401	401	4009	-20.023465	22.339405	938.4
R402	402	1754	-20.02449	22.34566	941.5
R403	403	2737	-20.026405	22.352315	940.95
R404	404	4028	-20.028835	22.35693	936.4
R405	405	2936	-20.031545	22.35943	938.9
R406	406	2703	-20.03484	22.362955	938.75
R407	407	2591	-20.037735	22.366535	935.85
R408	408	3602	-20.04048	22.37101	936.65
R409	409	1848	-20.04223	22.37627	937.5
R410	410	1678	-20.042545	22.3835	937.05
R411	411	1568	-20.040625	22.39455	937.7
R412	412	1853	-20.02998	22.417975	938.45
R413	413	2760	-20.03225	22.423155	937.7
R414	414	1829	-20.03524	22.42675	938.45
R415	415	3615	-20.038305	22.430085	939.2
R416	416	2209	-20.041315	22.433545	937.8
R417	417	2636	-20.04396	22.437315	935.7
R418	418	2544	-20.046875	22.44146	935
R419	419	2526	-20.05011	22.44448	935.35
R420	420	3955	-20.053345	22.44761	937.5
R421	421	2076	-20.056885	22.45071	939.05
R422	422	1744	-20.059745	22.454265	937.1
R423	423	4071	-20.062495	22.45836	939.05
R424	424	3913	-20.063865	22.46248	938.35
R425	425	2414	-20.066455	22.46768	938.5
R426	426	3644	-20.069345	22.47248	936.65
R427	427	1508	-20.071865	22.475805	936.15
R428	428	1661	-20.074555	22.47985	936.4
R429	429	2114	-20.07677	22.48474	939
R430	430	4011	-20.07948	22.488925	937
R431	431	2643	-20.081795	22.49353	937.55
R432	432	1549	-20.083565	22.498005	938.75
R433	433	2840	-20.08633	22.50294	938
R434	434	1796	-20.088905	22.50759	940
R435	435	1618	-20.09096	22.51177	937.25
R436	436	2892	-20.09373	22.516145	936.85
R437	437	2008	-20.0955	22.51968	938.8
R438	438	2691	-20.09787	22.524775	937.95
R439	439	1525	-20.101705	22.52848	936.3

R440	440	2277	-20.104995	22.531735	937
R441	441	2079	-20.10757	22.534945	936.85
R442	442	3631	-20.109845	22.539925	937.55
R443	443	3787	-20.112455	22.544715	936.2
R444	444	3648	-20.11488	22.548715	934.1
R445	445	2226	-20.11711	22.553165	937.85
R446	446	2805	-20.119805	22.557765	935.9
R447	447	3924	-20.122905	22.56057	934.15
R448	448	4094	-20.12576	22.56414	933
R449	449	1578	-20.128775	22.56792	936
R450	450	2100	-20.131065	22.57251	935.6
R451	451	1265	-20.133505	22.57743	936.15
R452	452	2678	-20.135195	22.58423	935.55
R453	453	2886	-20.135485	22.58895	934.1
R454	454	1573	-20.137935	22.5948	933.8
R455	455	2747	-20.14047	22.600155	933.85
R456	456	2742	-20.142265	22.60537	934.3
R457	457	1595	-20.1444	22.60914	934.35
R458	458	2980	-20.147165	22.614305	932
R459	459	3653	-20.149685	22.61882	932.25
R460	460	2578	-20.152805	22.62279	933.85
R461	461	3747	-20.15473	22.62604	932.1
R462	462	2528	-20.15865	22.630395	467.55
R463	463	2854	-20.160755	22.63331	933.7
R464	464	2492	-20.163745	22.637035	933.55
R465	465	1583	-20.16748	22.639685	933.75
R466	466	3639	-20.170205	22.64353	931.7
R467	467	839	-20.172445	22.64825	930.65
R468	468	3774	-20.175045	22.652815	930.05
R469	469	2917	-20.17775	22.657185	931.4
R470	470	1768	-20.180225	22.661025	933.85
R471	471	2169	-20.18282	22.66479	928.65
R472	472	2942	-20.183485	22.671585	930.15
R473	473	2654	-20.18335	22.680345	928.05
R474	474	3802	-20.18337	22.688285	929
R475	475	2768	-20.184645	22.69483	929.05
R476	476	2814	-20.184615	22.70248	930.4
R477	477	3776	-20.18588	22.70988	930.3
R478	478	1989	-20.18598	22.71641	930.75
R479	479	2426	-20.186685	22.723815	931.55
R480	480	2706	-20.187215	22.73009	931.55
R481	481	3587	-20.18824	22.73718	931.2
R482	482	2852	-20.19062	22.743085	931.55
R483	483	2884	-20.19182	22.750145	927.55
R484	484	1994	-20.190575	22.755525	927.4
R485	485	3832	-20.18667	22.771625	928.45
R486	486	3879	-20.181955	22.786635	930.8
R487	487	3704	-20.17752	22.801345	930.65
R488	488	3755	-20.172885	22.815275	932.05

R489	489	2167	-20.167895	22.83125	931.75
R490	490	2178	-20.161945	22.84804	932.3
R491	491	2719	-20.15297	22.86916	935.25
R492	492	4027	-20.14123	22.894615	931.95
R493	493	2859	-20.133395	22.914885	930.9
R494	494	2149	-20.12804	22.92968	933.95
R495	495	2070	-20.126765	22.94082	933.65
R496	496	2644	-20.125015	22.95078	933.35
R497	497	3749	-20.124125	22.960665	934.95
R498	498	2066	-20.12244	22.971635	933.65
R499	499	3641	-20.125505	22.97365	936.95
R500	500	1507	-20.129395	22.976055	935.55
R501	501	1553	-20.13308	22.97824	936.1
R502	502	3657	-20.13684	22.980935	935.55
R503	503	2429	-20.14099	22.98304	934.65
R504	504	720	-20.14486	22.985475	930.75
R505	505	1658	-20.148705	22.98782	931.55
R506	506	2248	-20.15223	22.990265	931.85
R507	507	1610	-20.156535	22.992635	933.2
R508	508	2028	-20.160235	22.994925	930.25
R509	509	2044	-20.16408	22.99775	933.1
R510	510	2521	-20.16782	22.99992	931.5
R511	511	1570	-20.17156	23.002255	931.9
R512	512	3569	-20.175525	23.004465	932.55
R513	513	2517	-20.179765	23.00703	932.45
R514	514	2690	-20.183165	23.009425	932.9
R515	515	2610	-20.18709	23.01165	931.7
R516	516	2130	-20.19083	23.014245	932.65
R517	517	3709	-20.194455	23.016535	927.45
R518	518	2540	-20.1982	23.018715	929.7
R519	519	2394	-20.202465	23.02139	932.3
R520	520	1675	-20.205865	23.023675	931.65
R521	521	1590	-20.210215	23.02581	931.75
R522	522	2168	-20.21363	23.02851	928.05
R523	523	2935	-20.2177817	23.03099	930.75
R524	524	3970	-20.221785	23.032895	929.15
R525	525	2533	-20.23332	23.021795	930.15
R526	526	2457	-20.24021	23.01857	929.2
R527	527	1581	-20.2478683	23.01393167	931.6
R528	528	2560	-20.25435	23.0116	929.3
R531	531	1949	-20.247115	23.06837	933.4
R532	532	664	-20.249505	23.070325	939.55
R533	533	878	-20.254045	23.07198	938.25
R534	534	2296	-20.257675	23.07518	935.75
R535	535	1128	-20.261595	23.077245	934.4
R536	536	867	-20.2652	23.07845	935.65
R537	537	747	-20.269755	23.081085	935.4
R538	538	1127	-20.27421	23.08257	934.75
R539	539	760	-20.27725	23.08563	936

R540	540	784	-20.27718	23.092115	938.95
R541	541	676	-20.27343	23.098815	939.7
R542	542	2387	-20.27118	23.10472	937.7
R543	543	2276	-20.26863	23.110825	938.6
R544	544	769	-20.26936	23.113285	934.7
R545	545	693	-20.275455	23.112485	933.2
R546	546	2323	-20.280505	23.112995	932.65
R547	547	1046	-20.284375	23.116275	934.15
R548	548	1121	-20.287225	23.119225	937.65
R549	549	980	-20.29115	23.12226	937.3
R550	550	665	-20.294735	23.12506	937.1
R551	551	792	-20.29825	23.127105	937.85
R552	552	2318	-20.301415	23.13072	936.75
R553	553	1007	-20.30558	23.13337	928.7
R554	554	2288	-20.308635	23.13695	925.8
R555	555	731	-20.310895	23.140105	928.65
R556	556	810	-20.314125	23.145065	941.75
R557	557	1269	-20.31701	23.146945	944
R558	558	2293	-20.3198	23.151115	948.85
R559	559	732	-20.323325	23.153855	950.8
R560	560	2309	-20.327385	23.15611	951.9
R561	561	2340	-20.33128	23.158	948
R562	562	777	-20.3348	23.16054	948.45
R563	563	733	-20.339085	23.16242	950
R564	564	717	-20.34026	23.167865	951.4
R565	565	1028	-20.34116	23.17556	950
R566	566	1018	-20.342055	23.183	952
R567	567	719	-20.343	23.188515	950.9
R568	568	698	-20.34409	23.1952	954.1
R569	569	725	-20.344985	23.20213	953.15
R570	570	700	-20.34596	23.208785	955
R571	571	875	-20.34679	23.214515	960.45
R572	572	689	-20.34768	23.220475	960.15
R573	573	736	-20.34879	23.227995	964.3
R574	574	2282	-20.34988	23.235045	964.25
R575	575	757	-20.35071	23.24097	967.3
R576	576	2376	-20.35373	23.24376	971
R577	577	2373	-20.35902	23.24403	970.6
R578	578	790	-20.364665	23.244495	971.4
R579	579	1142	-20.369845	23.244815	973.1
R580	580	2334	-20.37403	23.245085	973.85
R581	581	2275	-20.37968	23.245415	974.6
R582	582	765	-20.382005	23.25125	975.4
R583	583	749	-20.37914	23.263365	974
R584	584	856	-20.3761	23.276335	975.7
R585	585	2279	-20.37315	23.288925	977.35
R586	586	2382	-20.36986	23.301575	975.65
R587	587	2383	-20.366985	23.31393	976.3
R588	588	2270	-20.364215	23.325885	974.6

R589	589	1024	-20.361465	23.338	975.75
R590	590	828	-20.35892	23.349555	975.05
R591	591	959	-20.356345	23.361375	974.8
R592	592	1148	-20.354565	23.37211	974.85
R593	593	958	-20.352945	23.3825	973.9
R594	594	808	-20.35738	23.3842	974.25
R595	595	880	-20.36296	23.384155	973.9
R596	596	1003	-20.36827	23.38416	974.5
R597	597	2377	-20.373625	23.38413	977.95
R598	598	1016	-20.37916	23.384135	976.2
R599	599	1083	-20.384615	23.384115	977.6
R600	600	2344	-20.38999	23.38411	976.95
R601	601	1045	-20.395255	23.384095	978.45
R602	602	851	-20.400555	23.384075	979.95
R603	603	1026	-20.406145	23.38406	979.55
R604	604	2350	-20.40926	23.387635	976.8
R605	605	1313	-20.40901	23.395995	977.15
R606	606	738	-20.4088	23.40454	977.1
R607	607	2090	-20.408605	23.41194	977.55
R608	608	2314	-20.40833	23.42104	974.95
R609	609	2360	-20.408125	23.42919	975.85
R610	610	697	-20.407285	23.43867	977.55
R611	611	761	-20.405875	23.448695	976.45
R612	612	2357	-20.40441	23.45831	973.55
R613	613	1117	-20.41153	23.45591	976.2
R614	614	1130	-20.418875	23.453595	976.2
R615	615	1968	-20.425015	23.45202	976.3
R616	616	1303	-20.431465	23.45038	975.05
R617	617	1935	-20.43869	23.447815	977.9
R618	618	743	-20.44627	23.444715	976.7
R619	619	1002	-20.453695	23.44172	977.25
R620	620	1009	-20.46073	23.439395	977.35
R621	621	1196	-20.46573	23.440115	978.4
R622	622	812	-20.47084	23.440605	979.1
R623	623	2363	-20.475985	23.44082	980.85
R624	624	811	-20.48133	23.441045	980.2
R625	625	1047	-20.48664	23.44118	980.25
R626	626	2292	-20.492045	23.44126	981.6
R627	627	2320	-20.493985	23.446395	980.25
R628	628	2326	-20.49512	23.45281	980.5
R629	629	667	-20.49623	23.459105	980.5
R630	630	2330	-20.49735	23.465445	981.25
R631	631	1153	-20.498465	23.471785	977.8
R632	632	1068	-20.49957	23.47807	976.45
R633	633	1189	-20.50086	23.484475	975.75
R634	634	2145	-20.501945	23.490755	970.85
R635	635	1192	-20.50308	23.496955	974.5
R636	636	793	-20.505235	23.50177	972.2
R637	637	1014	-20.508275	23.50522	973.65

R638	638	1187	-20.51125	23.509005	975.9
R639	639	2271	-20.51443	23.51208	977.65
R640	640	1198	-20.517445	23.515885	977.85
R641	641	813	-20.51986	23.520205	976.05
R642	642	2290	-20.52268	23.524065	978.55
R643	643	2281	-20.52556	23.528025	977.35
R644	644	801	-20.528045	23.53211	979.15
R645	645	2287	-20.530785	23.53631	978.85
R646	646	3905	-20.533885	23.540025	978.05
R647	647	2796	-20.53683	23.5431	975.7
R648	648	2995	-20.5404	23.547005	978.7
R649	649	2507	-20.54238	23.54943	973.55
R650	650	4033	-20.54566	23.554605	976.55
R651	651	2489	-20.548635	23.558055	977.25
R652	652	3826	-20.552375	23.561375	978.4
R653	653	2559	-20.55562	23.564125	977.65
R654	654	1674	-20.55908	23.567015	979.4
R655	655	3766	-20.562355	23.570015	979.65
R656	656	3983	-20.56615	23.572795	977.9
R657	657	4064	-20.570045	23.574765	978.3
R658	658	2107	-20.57876	23.56953	980.45
R659	659	2683	-20.58427	23.56969	977.2
R660	660	2667	-20.589775	23.56983	977.35
R661	661	2881	-20.594875	23.57001	977.55
R662	662	2756	-20.599845	23.570165	977.7
R663	663	4021	-20.60538	23.57031	977.05
R664	664	3841	-20.611505	23.570495	974.3
R665	665	3908	-20.62358	23.5595	980.55
R666	666	3821	-20.625115	23.56582	980.2
R667	667	2677	-20.62674	23.570985	978.8
R668	668	3715	-20.632005	23.571115	979.2
R669	669	2084	-20.637065	23.571245	978.25
R670	670	4074	-20.642955	23.57144	979.7
R671	671	2943	-20.64566	23.575225	977.9
R672	672	2625	-20.64984	23.5777	979.25
R673	673	2551	-20.65333	23.57978	979.7
R674	674	1789	-20.657065	23.58194	979.7
R675	675	1951	-20.66098	23.58429	980.75
R676	676	3721	-20.66259	23.58698	975.85
R677	677	3675	-20.66566	23.59067833	977.8
R678	678	2563	-20.66961	23.595905	976.65
R679	679	3805	-20.672215	23.600435	975.65
R680	680	1582	-20.67443	23.60433	975.25
R681	681	3988	-20.67753	23.60769	975.3
R682	682	1950	-20.681365	23.610155	975.75
R683	683	1972	-20.68634	23.61106833	976
R684	684	2364	-20.69084	23.612135	974.85
R685	685	1801	-20.69535	23.613645	976.15
R686	686	1800	-20.700005	23.61487	975.2

R687	687	3801	-20.7042	23.61652	974.8
R688	688	2513	-20.70848	23.619055	971.45
R689	689	1574	-20.712885	23.620015	971.5
R690	690	1644	-20.718035	23.62034	972.1
R691	691	2836	-20.722695	23.621095	972.2
R692	692	3933	-20.727115	23.62353	969.05
R693	693	1779	-20.73095	23.62499	969.5
R694	694	2925	-20.733655	23.62882	970.8
R695	695	2874	-20.73629	23.632985	968.75
R696	696	1838	-20.737575	23.63943	967.9
R697	697	1685	-20.738675	23.64562	966.3
R698	698	3005	-20.74008	23.651365	966.45
R699	699	2889	-20.741505	23.65756	964.95
R700	700	3809	-20.742915	23.663105	963.75
R701	701	3972	-20.74371	23.67042	964
R702	702	3656	-20.744915	23.67581	960.25
R703	703	1851	-20.74634	23.682725	959.9
R704	704	1645	-20.75152	23.68287	959.25
R705	705	2460	-20.75742	23.682205	959.65
R706	706	2401	-20.76316	23.681485	968.9
R707	707	1686	-20.76913	23.68087	962.85
R708	708	2994	-20.77503	23.680195	967.65
R709	709	1832	-20.780875	23.679525	964.65
R710	710	2651	-20.78546	23.679035	965.45
R711	711	2944	-20.792705	23.67824	964.45
R712	712	3839	-20.798555	23.677655	964.5
R713	713	3714	-20.80429	23.67708	965.95
R714	714	2629	-20.810205	23.67636	971.2
R715	715	2694	-20.81614	23.675745	964.9
R716	716	1900	-20.8216	23.67565	963.55
R717	717	2890	-20.82456	23.679025	959.1
R718	718	3978	-20.826975	23.684045	962.1
R719	719	2633	-20.82565	23.693825	957
R720	720	1879	-20.82548	23.701925	955.05
R721	721	1843	-20.82358	23.7126	956.4
R722	722	4018	-20.82248	23.722035	951.45
R723	723	1700	-20.821005	23.73249	949.3
R724	724	2050	-20.81867	23.74367	949.1
R725	725	2443	-20.817055	23.754245	948.3
R726	726	2745	-20.816095	23.763755	947
R727	727	3878	-20.820265	23.76554	946.6
R728	728	2251	-20.82618	23.76448	947.3
R729	729	4078	-20.833365	23.762145	946.35
R730	730	2232	-20.838245	23.762235	946.25
R731	731	2417	-20.845655	23.76014	946.4
R732	732	3723	-20.85424	23.755395	947.45
R733	733	3789	-20.86228	23.75153	948.95
R734	734	2475	-20.86847	23.750395	949.8
R735	735	2671	-20.874545	23.74982	947.25

R736	736	1626	-20.878985	23.75086	946.65
R737	737	2642	-20.88363	23.751985	945.15
R738	738	1655	-20.88841	23.7531	947.05
R739	739	1884	-20.89304	23.754185	945.8
R740	740	2947	-20.897805	23.755295	945.7
R741	741	2622	-20.90248	23.756405	946.15
R742	742	2197	-20.907195	23.75742	948.85
R743	743	2693	-20.91194	23.75848	947.6
R744	744	3806	-20.91649	23.75957	947
R745	745	1577	-20.921275	23.76069	947.05
R746	746	1606	-20.92597	23.76178	947.5
R747	747	3810	-20.930665	23.762865	946.75
R748	748	4087	-20.93536	23.763945	947.8
R749	749	2711	-20.94001	23.765045	949.35
R750	750	3833	-20.94475	23.766065	948.35
R751	751	2717	-20.949465	23.767225	948.45
R752	752	3784	-20.9541	23.768295	949.55
R753	753	3919	-20.95875	23.76939	948.7
R754	754	1605	-20.963345	23.770445	949.35
R755	755	3695	-20.96869	23.771705	950.6
R756	756	2552	-20.9728	23.77264	950.35
R757	757	2041	-20.977595	23.773755	950.8
R758	758	2566	-20.982275	23.77486	953.05
R759	759	2729	-20.98666	23.77586	949.9
R760	760	3672	-20.991535	23.777	949.8
R761	761	2220	-20.9963	23.77811	951
R762	762	3667	-21.00085	23.78076	949.65
R763	763	1761	-21.000855	23.787545	948.85
R764	764	1745	-21.00089	23.79544	948.4
R765	765	2448	-21.00089	23.803595	945.75
R766	766	2900	-21.00088	23.811315	946.85
R767	767	2494	-21.00088	23.81925	945.2
R768	768	2048	-21.00091	23.827455	945.15
R769	769	1781	-21.000885	23.835365	946.2
R770	770	1613	-21.000885	23.8434	945.85
R771	771	4058	-21.0009	23.851735	943.2
R772	772	1868	-21.000885	23.85934	944.05
R773	773	4030	-21.000905	23.867075	942.35
R774	774	3598	-21.00091	23.87527	943.3
R775	775	2154	-21.000895	23.88308	942.7
R776	776	1750	-21.00418	23.88682	939
R777	777	3975	-21.007715	23.889615	939.15
R778	778	1725	-21.01124	23.892375	938
R779	779	2710	-21.01448	23.89493	940.7
R780	780	2420	-21.01806	23.89783	937.8
R781	781	1693	-21.0219	23.9008	940.3
R782	782	3969	-21.02532	23.90356	941.4
R783	783	2718	-21.02893	23.906345	938.9
R784	784	2885	-21.03228	23.908985	938.9

R785	785	1630	-21.035815	23.91179	939.1
R786	786	2468	-21.03932	23.914535	939.35
R787	787	3733	-21.04296	23.917385	938.2
R788	788	2810	-21.04644	23.920155	938.45
R789	789	2841	-21.05007	23.923025	941.55
R790	790	3705	-21.0534	23.925725	939.15
R791	791	1726	-21.057015	23.928525	939.5
R792	792	3737	-21.06067	23.931375	940.05
R793	793	3980	-21.06428	23.93433	941.85
R794	794	3820	-21.067815	23.937035	939.3
R795	795	3692	-21.0714	23.93986	941.55
R796	796	3758	-21.074555	23.942325	940.9
R797	797	2310	-21.078425	23.94539	939
R798	798	1585	-21.081755	23.94803	943.1
R799	799	2074	-21.085415	23.9509	941.15
R800	800	2161	-21.088925	23.953665	939.6
R801	801	3870	-21.092475	23.956465	940.4
R802	802	3977	-21.095975	23.959245	941.45
R803	803	3998	-21.099525	23.96212	941.65
R804	804	2740	-21.10305	23.964825	940.7
R805	805	1640	-21.10658	23.967695	941.85
R806	806	3947	-21.11023	23.970585	941.95
R807	807	4013	-21.11386	23.973465	940.35
R808	808	4055	-21.117265	23.976145	939.8
R809	809	4066	-21.120695	23.978845	942.7
R810	810	4044	-21.12421	23.98163	942.15
R811	811	3926	-21.1277	23.984395	941.65
R812	812	4063	-21.131385	23.987275	941.5
R813	813	1616	-21.13492	23.990065	940.6
R814	814	4062	-21.138145	23.99265	942.85
R815	815	2991	-21.14199	23.995625	942.7
R816	816	2477	-21.145525	23.99841	943.15
R817	817	2245	-21.14902	24.00121	941.95
R818	818	2800	-21.152395	24.003875	945.4
R819	819	3669	-21.156115	24.006725	944.1
R820	820	1878	-21.159535	24.009445	943.15
R821	821	1624	-21.16332	24.012505	941.55
R822	822	1503	-21.16659	24.01509	943.05
R823	823	1842	-21.170205	24.0179	943.65
R824	824	2598	-21.173715	24.02066	944.8
R825	825	3852	-21.17736	24.023625	941.95
R826	826	2265	-21.18067	24.02624	943.35
R827	827	2520	-21.184295	24.02906	944.5
R828	828	2257	-21.187925	24.031915	942.3
R829	829	2134	-21.191665	24.03484	944.15
R830	830	1914	-21.19539	24.037765	945.5
R831	831	2632	-21.19876	24.0405	944.8
R832	832	4051	-21.20226	24.043265	945.75
R833	833	3996	-21.205745	24.045995	944.6

R834	834	2686	-21.209325	24.048845	944.7
R835	835	2910	-21.212935	24.05166	945.2
R836	836	1794	-21.21662	24.0546	943.05
R837	837	3957	-21.220135	24.05737	946.15
R838	838	1763	-21.223175	24.05975	945.05
R839	839	3959	-21.226745	24.062625	945.15
R840	840	2035	-21.23036	24.06546	945.9
R841	841	2159	-21.234065	24.0684	946.3
R842	842	4091	-21.237655	24.07125	945.05
R843	843	1867	-21.24141	24.074225	946.7
R844	844	3899	-21.24459	24.076755	946.25
R845	845	2762	-21.24808	24.079535	946.5
R846	846	2097	-21.251705	24.0824	946.95
R847	847	2987	-21.25541	24.08534	945.1
R848	848	2916	-21.258885	24.08809	947.25
R849	849	3788	-21.262135	24.09069	948.3
R850	850	2574	-21.265695	24.093495	949.65
R851	851	1818	-21.26924	24.0963	946.95
R852	852	2866	-21.272805	24.099135	947.6
R853	853	4023	-21.27636	24.101955	946.05
R854	854	1777	-21.280125	24.104945	946.6
R855	855	2469	-21.28352	24.10762	947.8
R856	856	2871	-21.28708	24.11044	949.15
R857	857	2872	-21.290605	24.113255	947.2
R858	858	1877	-21.294165	24.116075	946.3
R859	859	1653	-21.29756	24.11876	947.15
R860	860	1824	-21.301225	24.12168	947.15
R861	861	3618	-21.304625	24.12438	947
R862	862	3961	-21.308215	24.127215	944.05
R863	863	4090	-21.31166	24.12996	946.4
R864	864	3854	-21.315395	24.13291	945.6
R865	865	1820	-21.31906	24.135805	947.55
R866	866	1688	-21.322535	24.138565	946.8
R867	867	3871	-21.326125	24.141405	947.95
R868	868	4026	-21.329625	24.14418	945.85
R869	869	4088	-21.333165	24.14701	945.05
R870	870	4010	-21.3366	24.149735	946.25
R871	871	2558	-21.34007	24.152505	945.4
R872	872	2408	-21.34374	24.155425	946.8
R873	873	2722	-21.347185	24.158155	946.25
R874	874	2398	-21.35058	24.160855	945.35
R875	875	2688	-21.35412	24.16368	944.85
R876	876	1973	-21.35781	24.166615	946.75
R877	877	0	-21.36126	24.169345	944.75
R878	878	1580	-21.3649	24.17223	945
R879	879	2214	-21.36844	24.17504	944.4
R880	880	2608	-21.371925	24.177825	945.4
R881	881	2583	-21.37542	24.1806	943.3
R882	882	0	-21.37889	24.18334	472.55

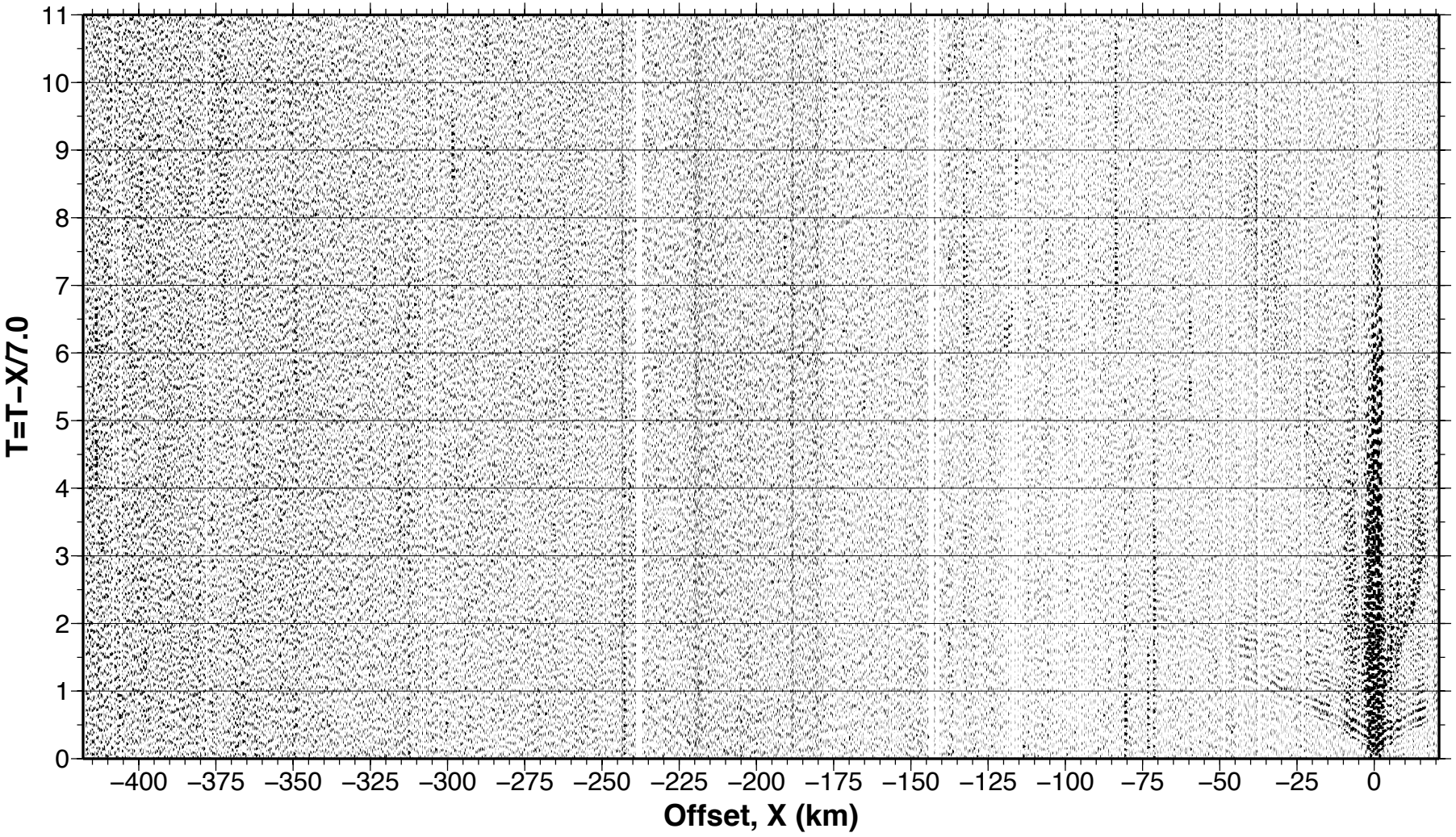
R883	883	1802	-21.38257	24.186235	943.9
R884	884	2072	-21.386045	24.18902	942.4
R885	885	4035	-21.38962	24.191845	940.5
R886	886	2867	-21.39315	24.19465	939.75
R887	887	2807	-21.396665	24.19745	940.95
R888	888	2901	-21.39999	24.200095	938.9
R889	889	2501	-21.403765	24.20311	939.45
R890	890	3836	-21.4074	24.205995	939.45
R891	891	1772	-21.411	24.20901	940.45
R892	892	2921	-21.414305	24.211605	940.35
R893	893	2255	-21.417925	24.214485	938.3
R894	894	2909	-21.42159	24.217295	935.6
R895	895	3507	-21.4249	24.220035	939.25
R896	896	3756	-21.428325	24.22277	937.4
R897	897	2698	-21.432	24.225745	940.7
R898	898	2553	-21.4354633	24.22845833	942.25
R899	899	1967	-21.43901	24.2313	943.85
R900	900	2692	-21.442305	24.233885	942.4

Appendix 2: Data examples

This appendix presents records sections for all 19 shots. Data are plotted as a function of source-to-receiver offset and reduced traveltime, with a reduction velocity of 7.0 km/s. Data processing for these sections consists of a predictive deconvolution and bandpass filtering between 4-15 Hz. Trace amplitudes are individually normalized to the median absolute amplitude of each trace.

Appendix 2: Data examples

This appendix presents records sections for all 19 shots. Data are plotted as a function of source-to-receiver offset and reduced traveltime, with a reduction velocity of 7.0 km/s. Data processing for these sections consists of a predictive deconvolution and bandpass filtering between 4-15 Hz. Trace amplitudes are individually normalized to the median absolute amplitude of each trace.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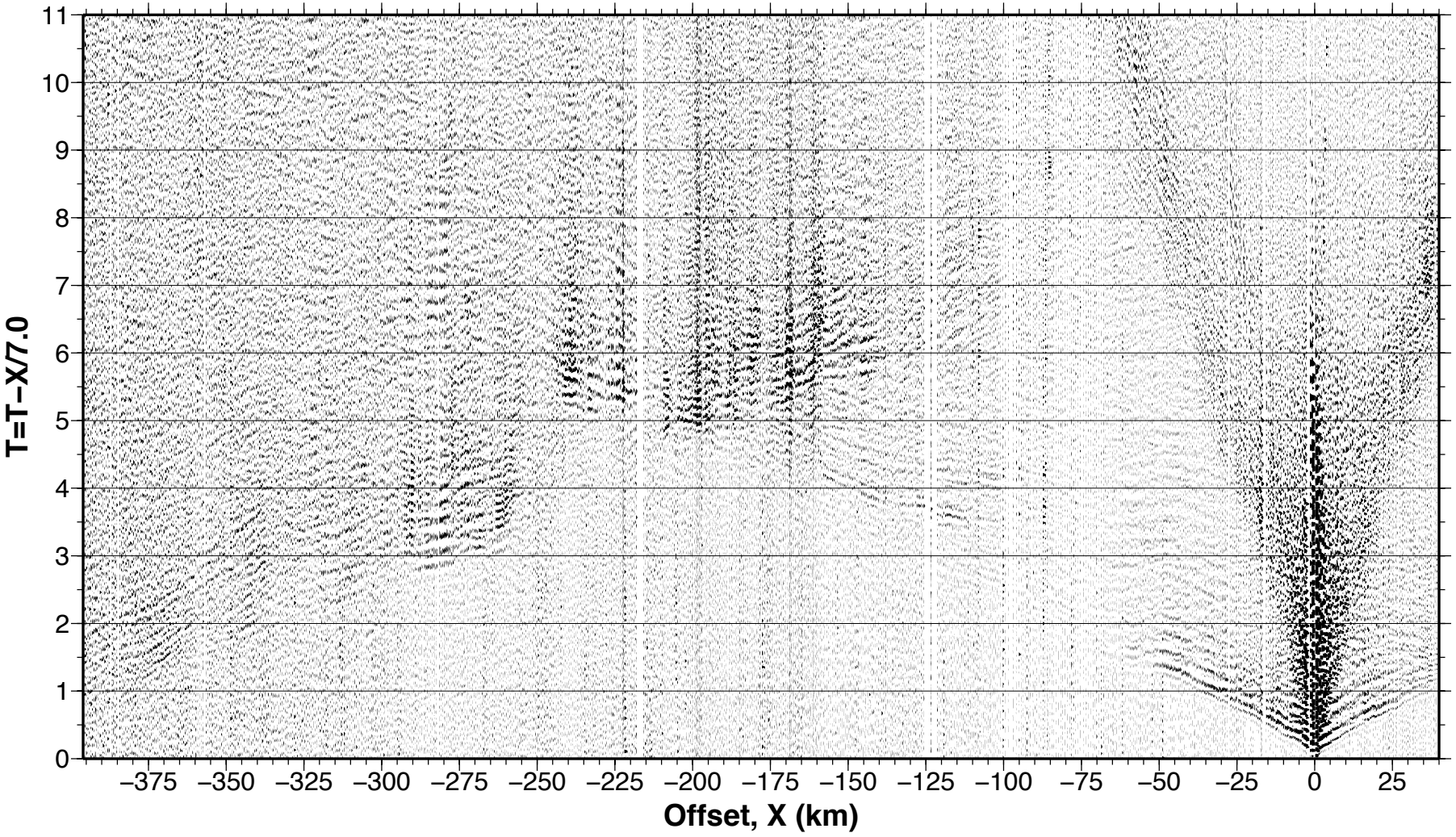
11
10
9
8
7
6
5
4
3
2
1
0
–400 –375 –350 –325 –300 –275 –250 –225 –200 –175 –150 –125 –100 –75 –50 –25 0
Offset, X (km)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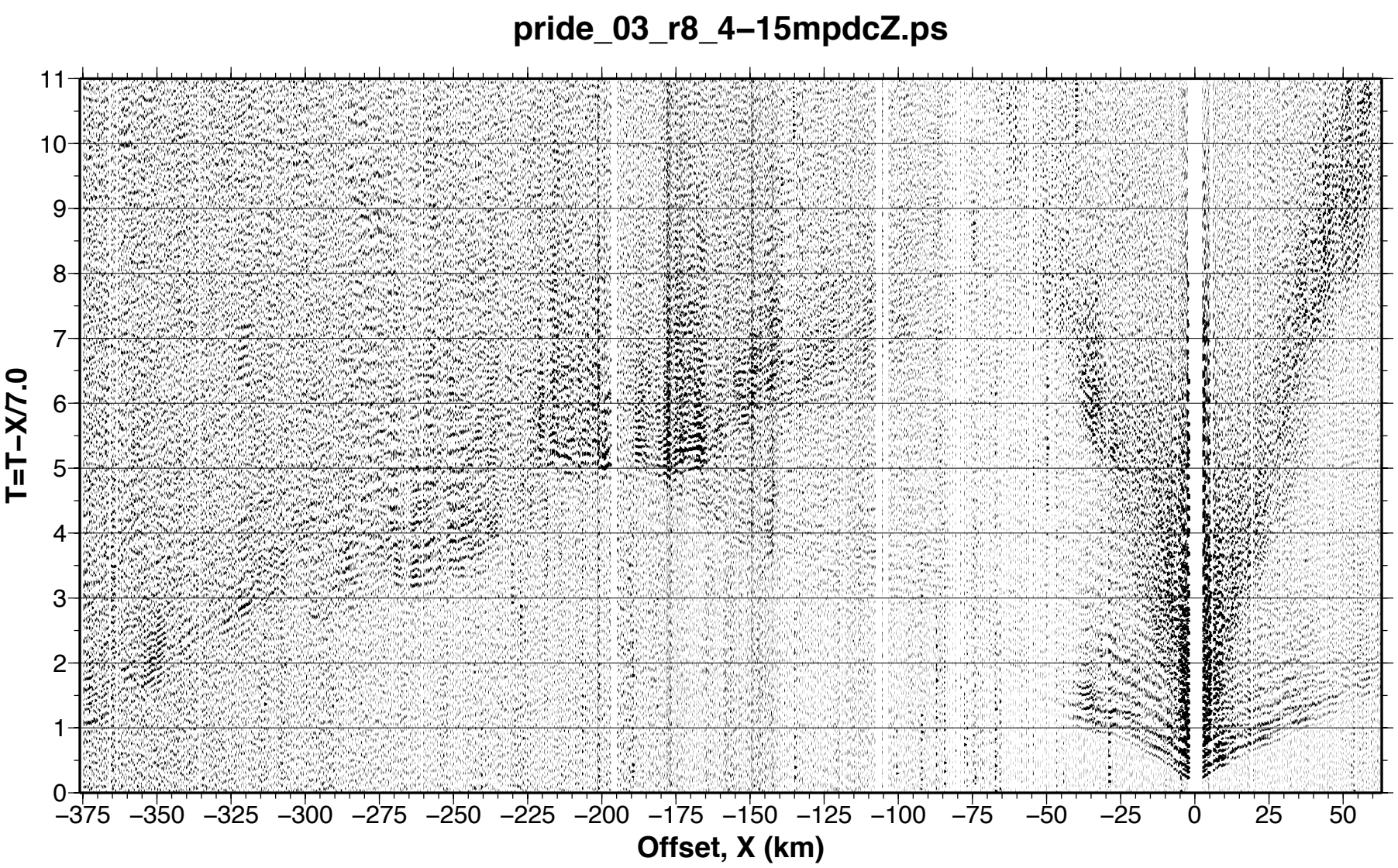
10
9
8
7
6
5
4
3
2
1
0
–375
–350
–325
–300
–275
–250
–225
–200
–175
–150
–125
–100
–75
–50
–25
0
25
Offset, X (km)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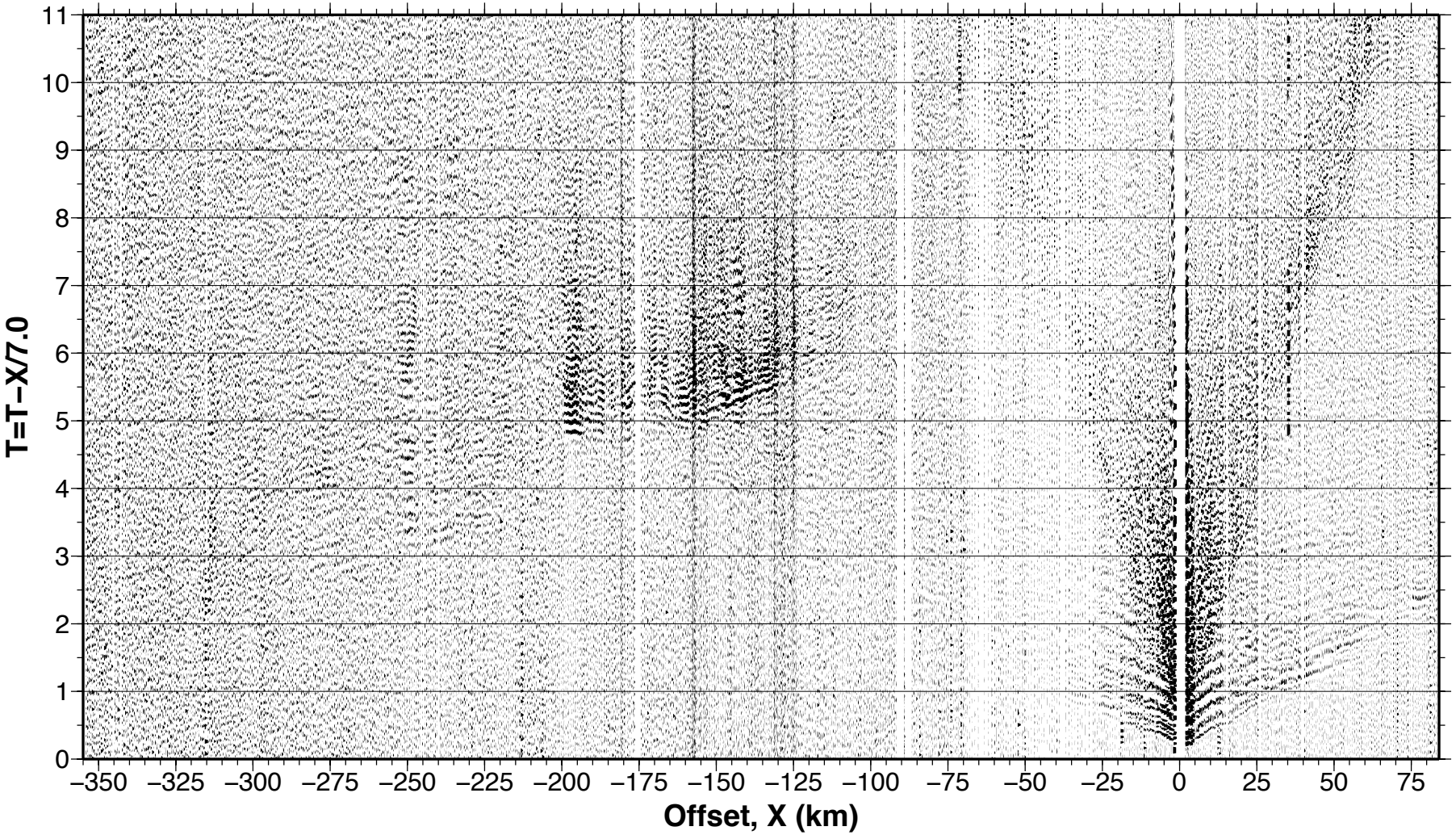
2
3
4
5
6
7
8
9
10
11
–375
–350
–325
–300
–275
–250
–225
–200
–175
–150
–125
–100
–75
–50
–25
0
25
50
Offset, X (km)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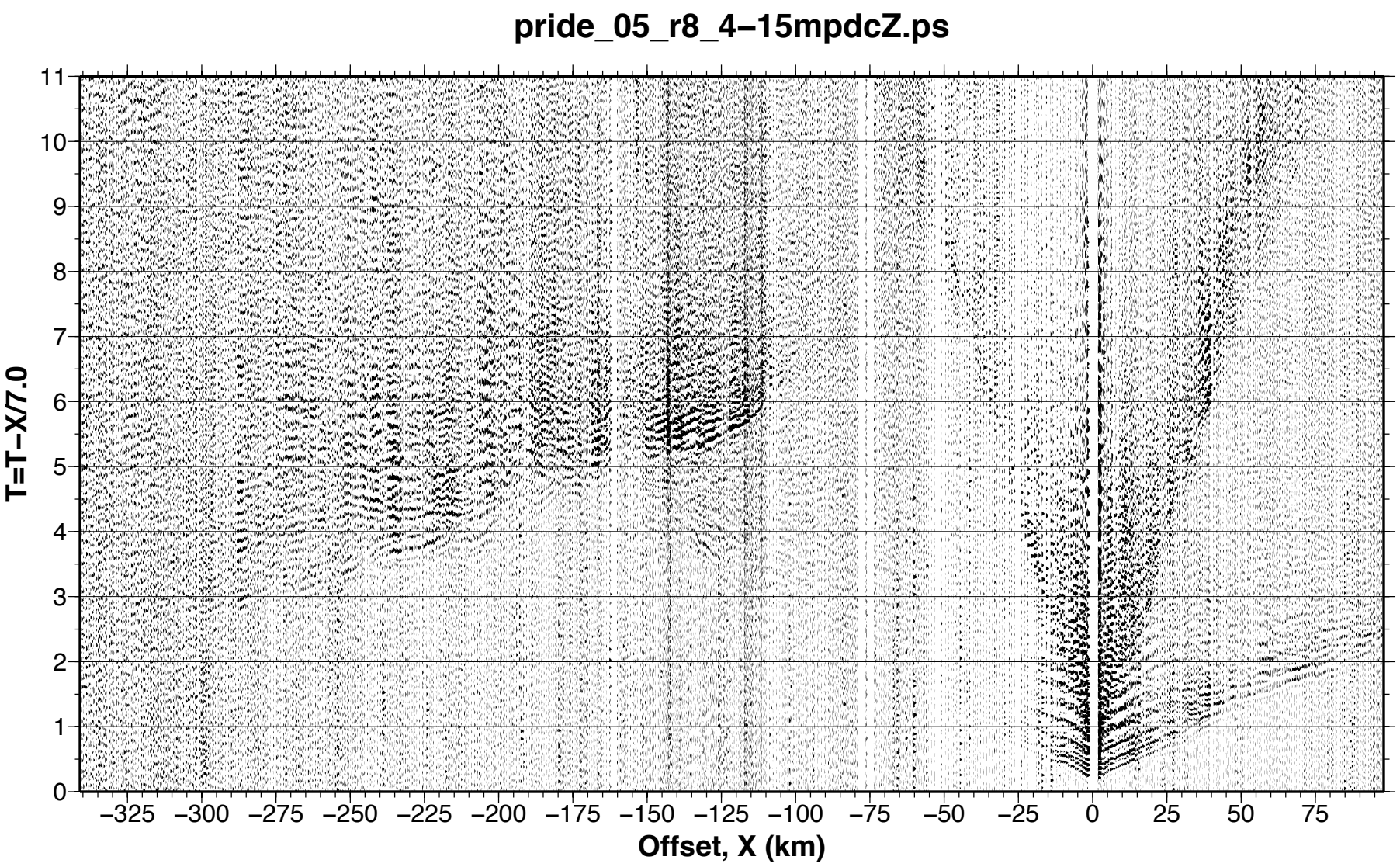
10
9
8
7
6
5
4
3
2
1
0
–350
–325
–300
–275
–250
–225
–200
–175
–150
–125
–100
–75
–50
–25
0
25
50
75
Offset, X (km)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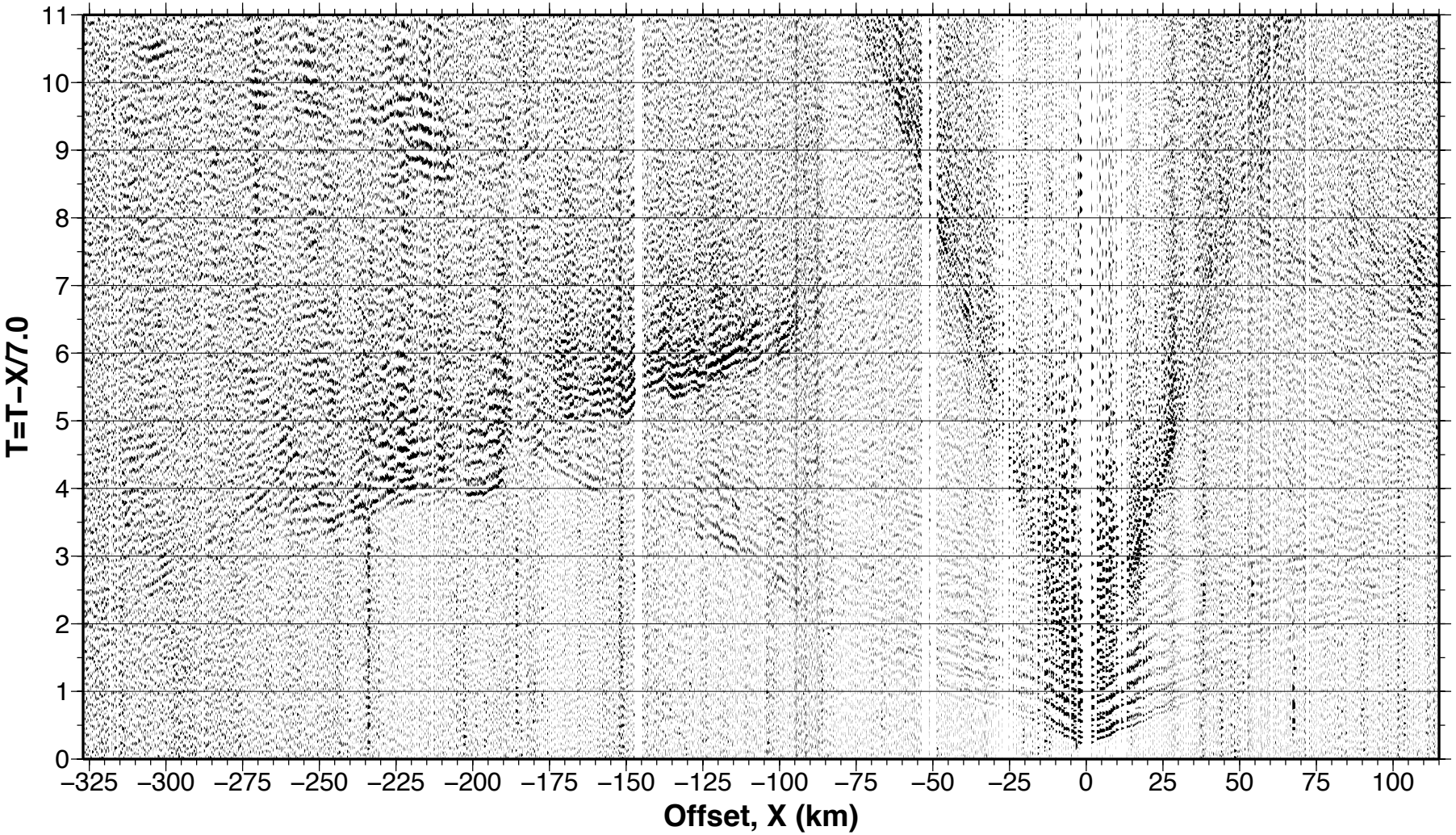
11
10
9
8
7
6
5
4
3
2
1
0
–325
–300
–275
–250
–225
–200
–175
–150
–125
–100
–75
–50
–25
0
25
50
75
Offset, X (km)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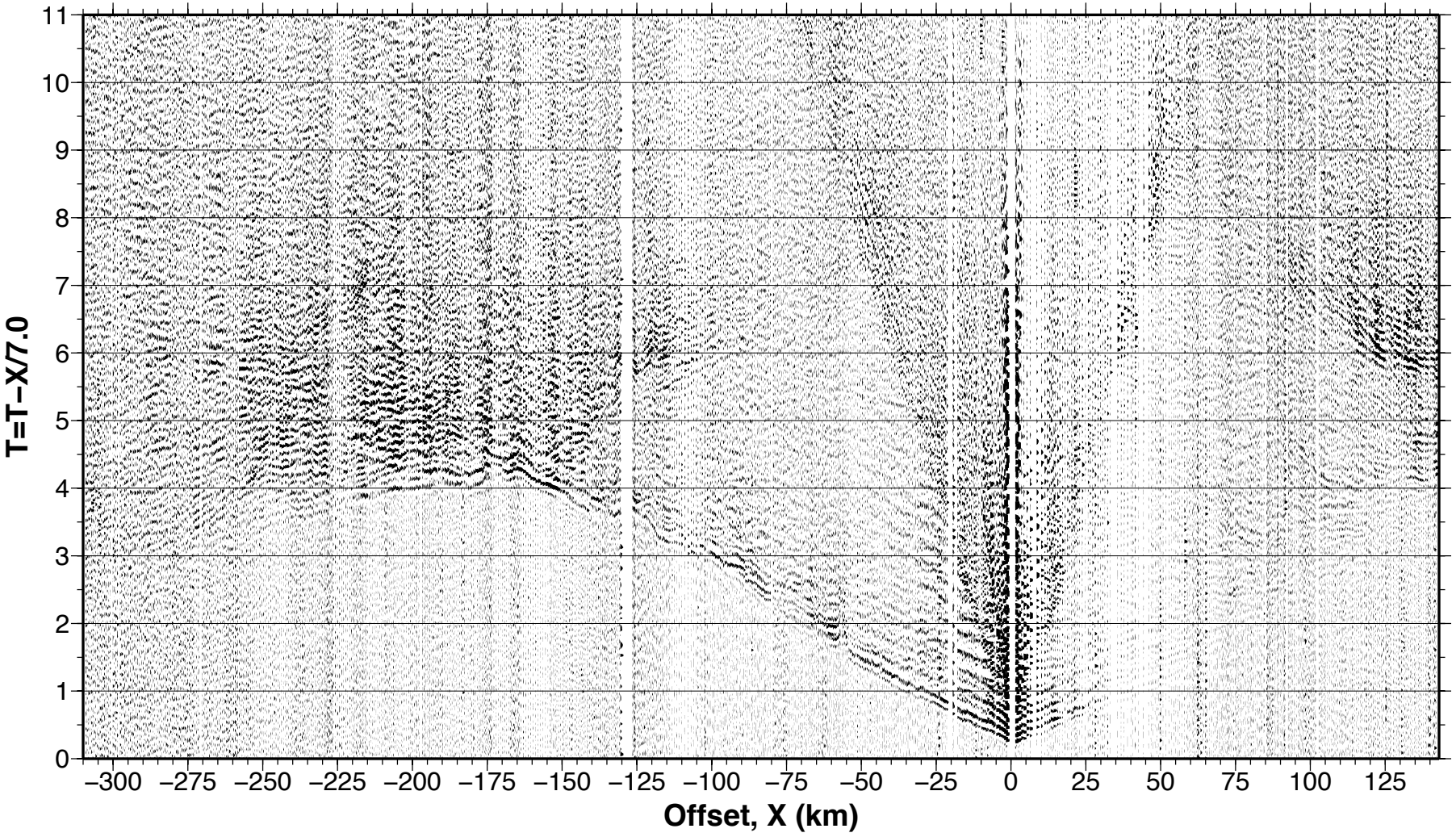
10
9
8
7
6
5
4
3
2
1
0
–325
–300
–275
–250
–225
–200
–175
–150
–125
–100
–75
–50
–25
0
25
50
75
100
Offset, X (km)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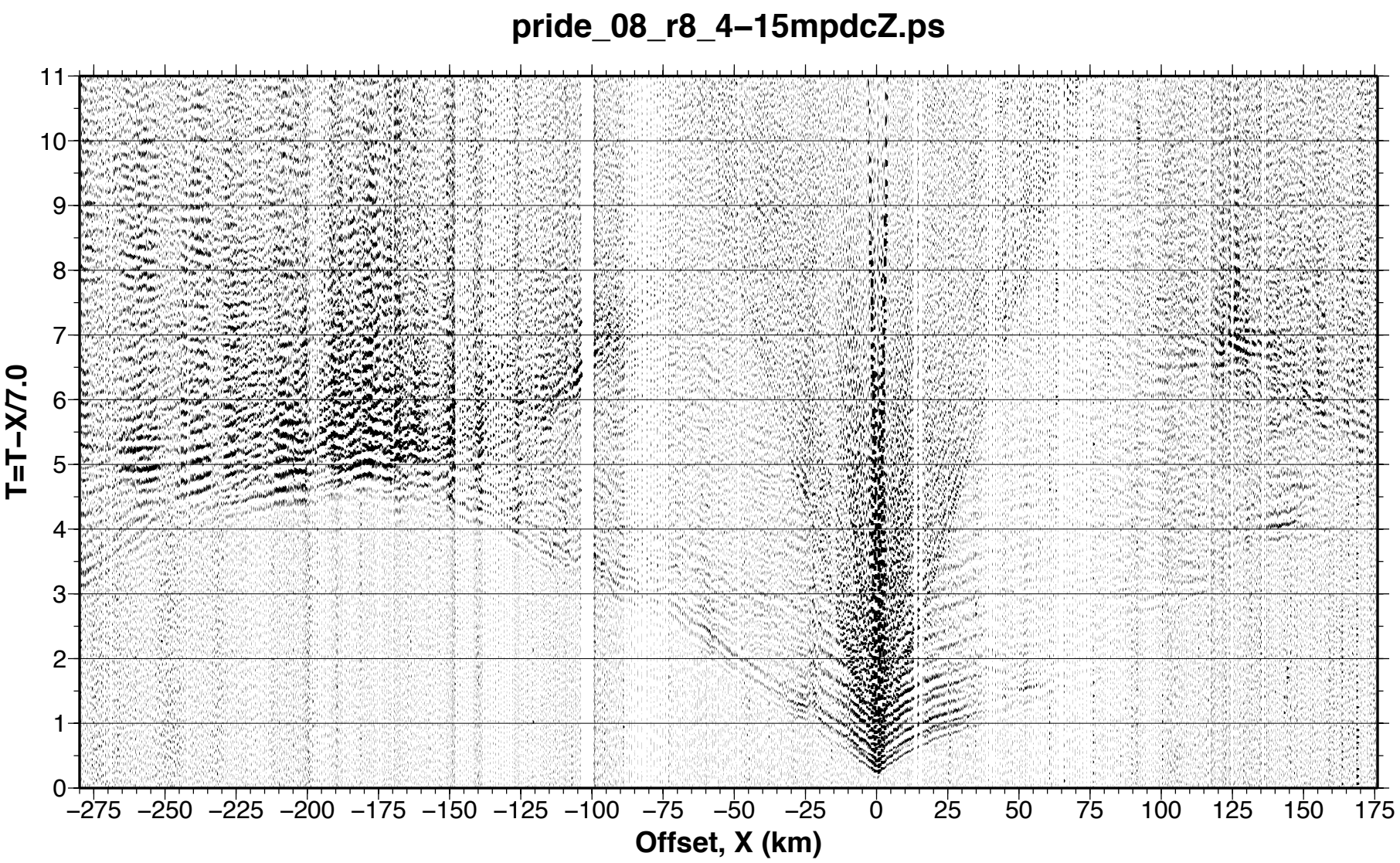
10
9
8
7
6
5
4
3
2
1
0
–300 –275 –250 –225 –200 –175 –150 –125 –100 –75 –50 –25 0 25 50 75 100 125
Offset, X (km)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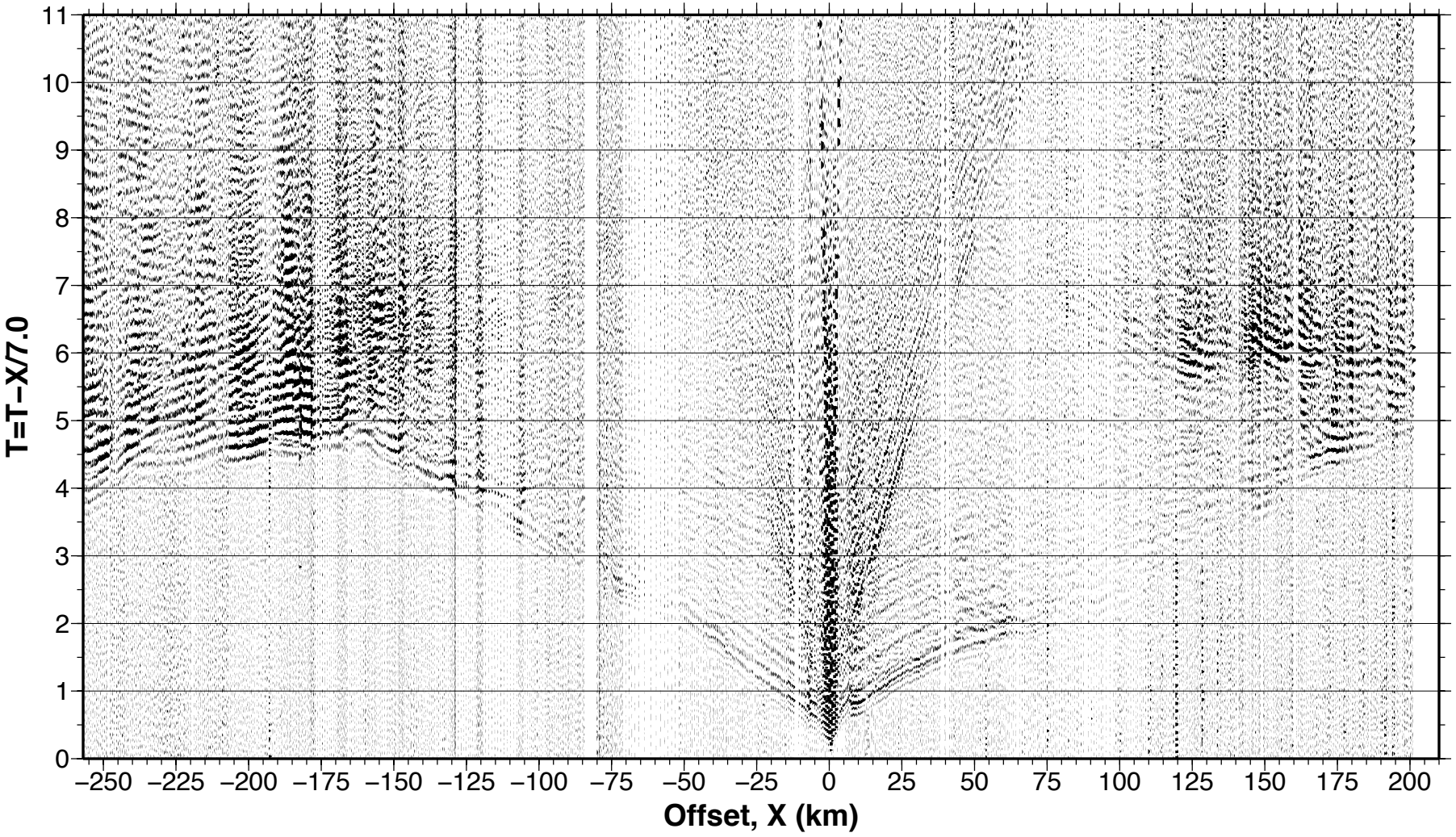
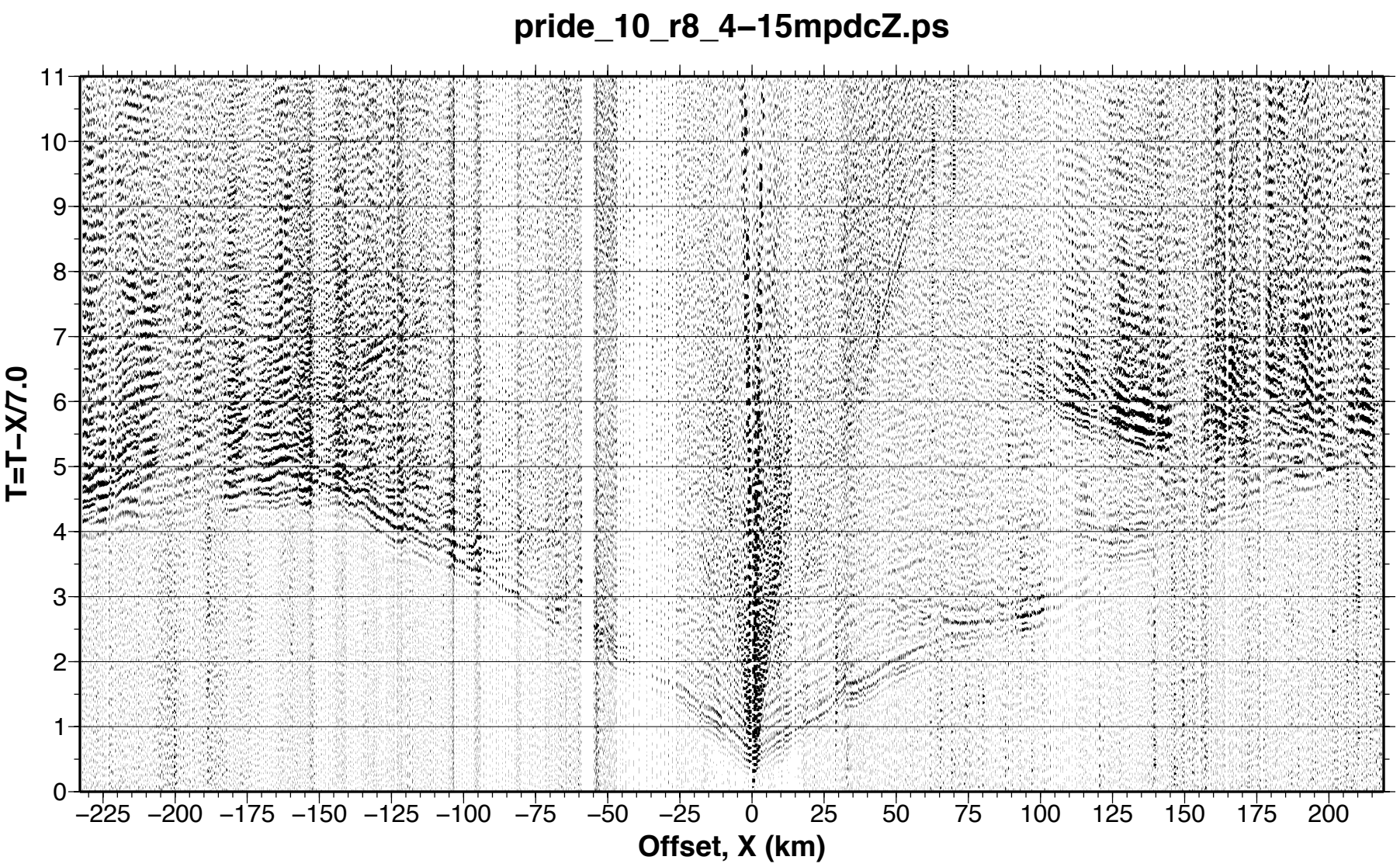
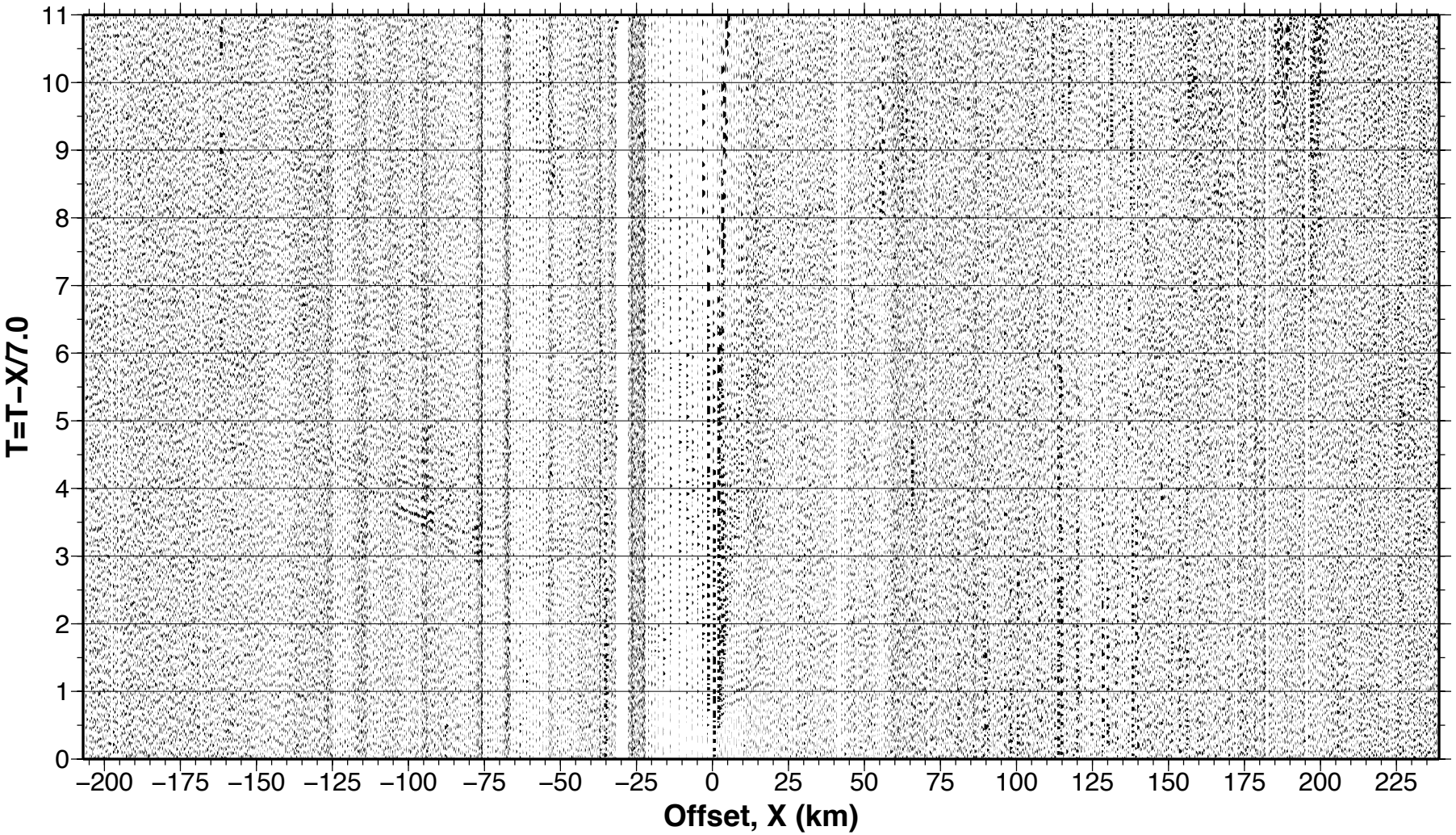
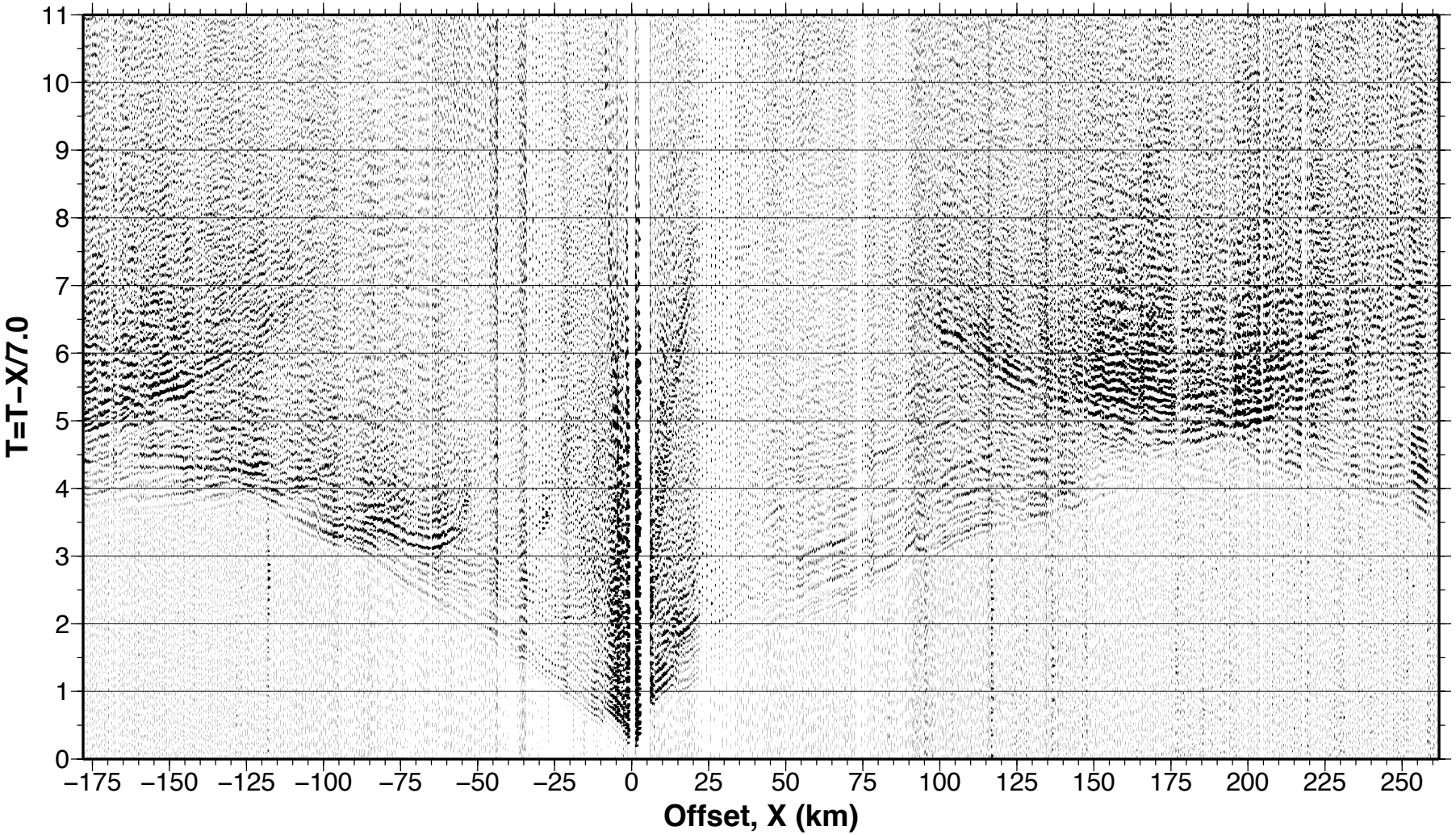
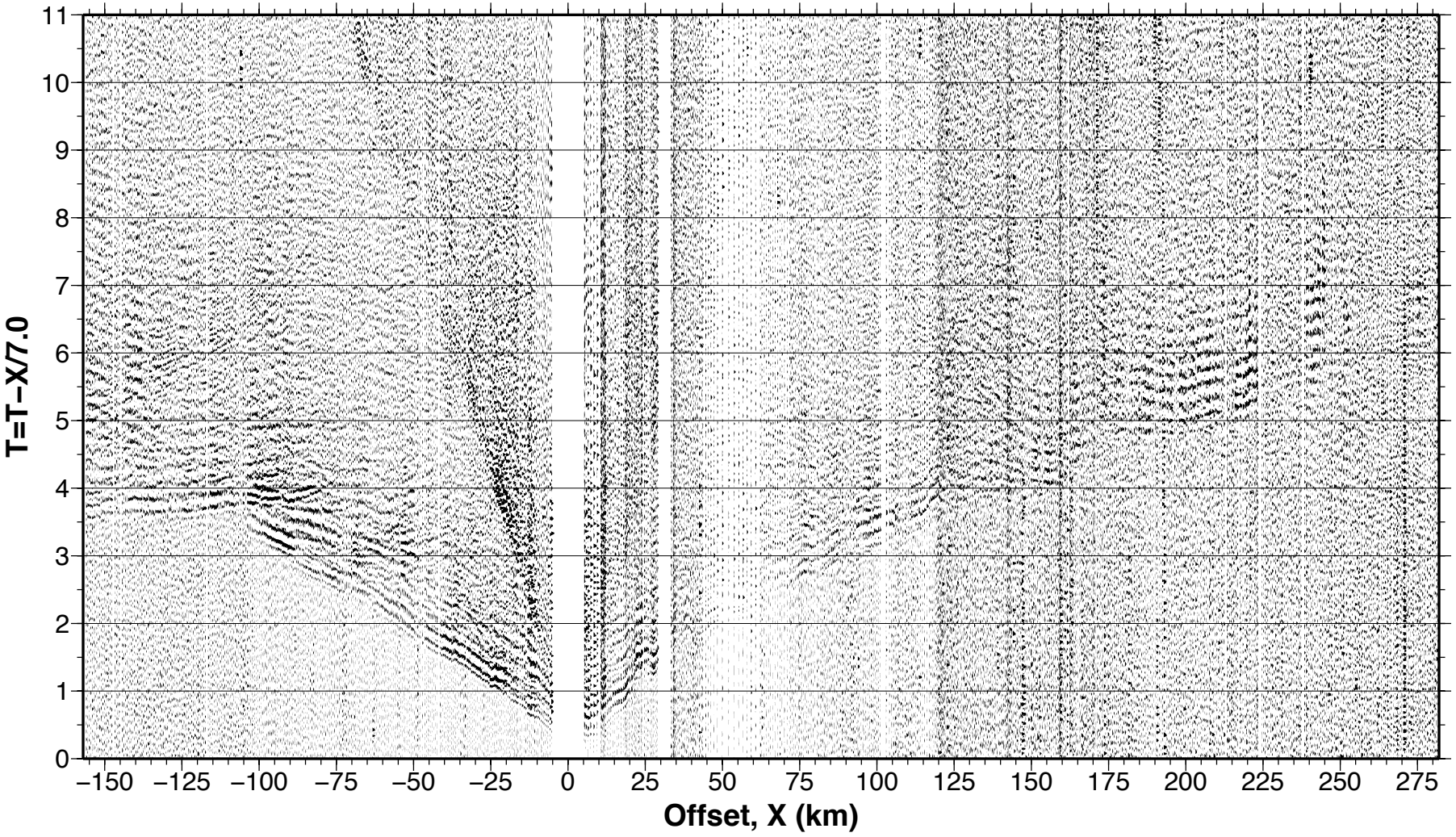
9
8
7
6
5
4
3
2
1
0
–275 –250 –225 –200 –175 –150 –125 –100 –75 –50 –25 0 25 50 75 100 125 150 175
Offset, X (km)

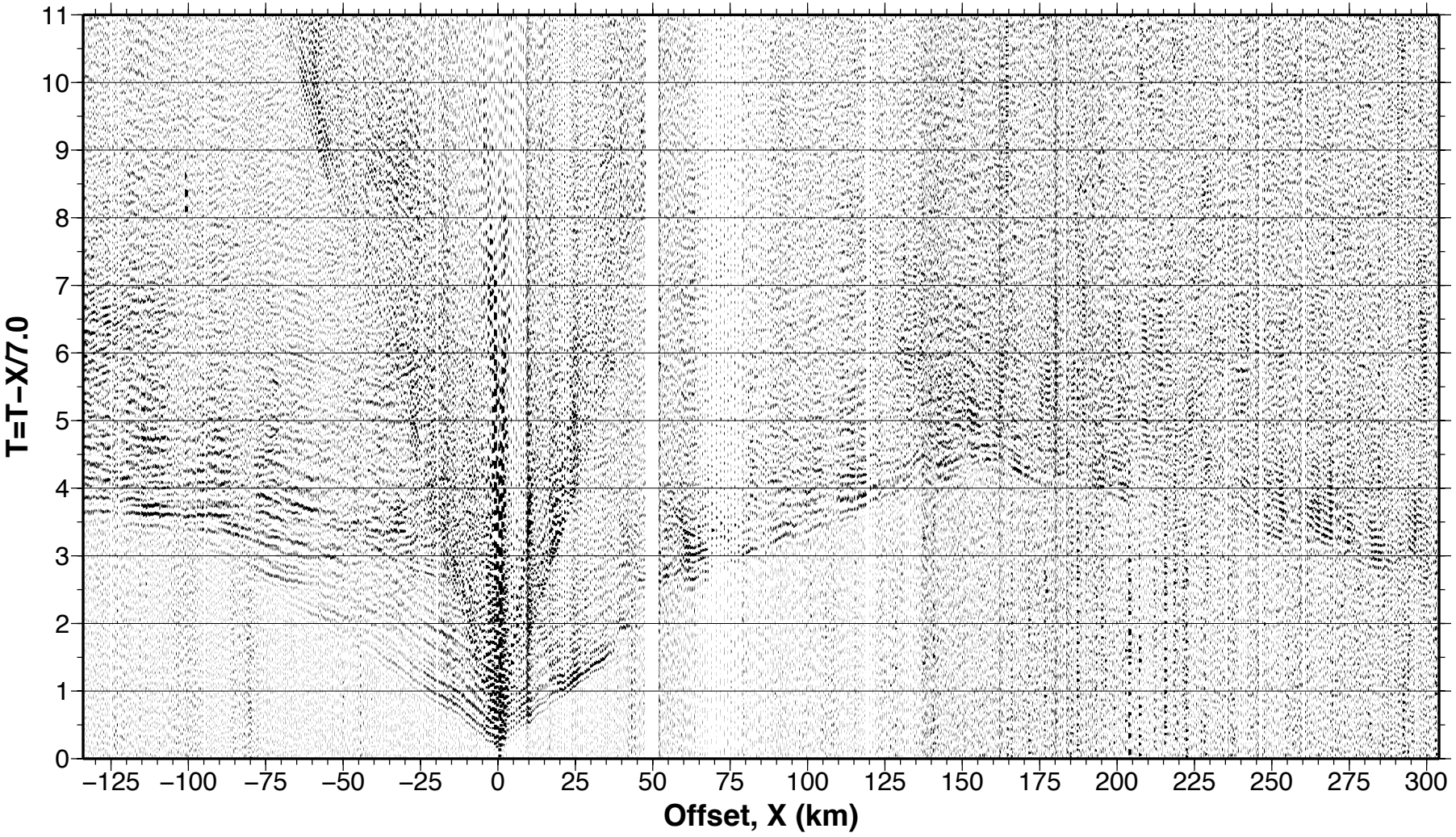

pride_09_r8_4–15mpdcZ.ps
T=T–X/7.0
11
10
9
8
7
6
5
4
3
2
1
0
–250 –225 –200 –175 –150 –125 –100 –75 –50 –25 0 25 50 75 100 125 150 175 200
Offset, X (km)

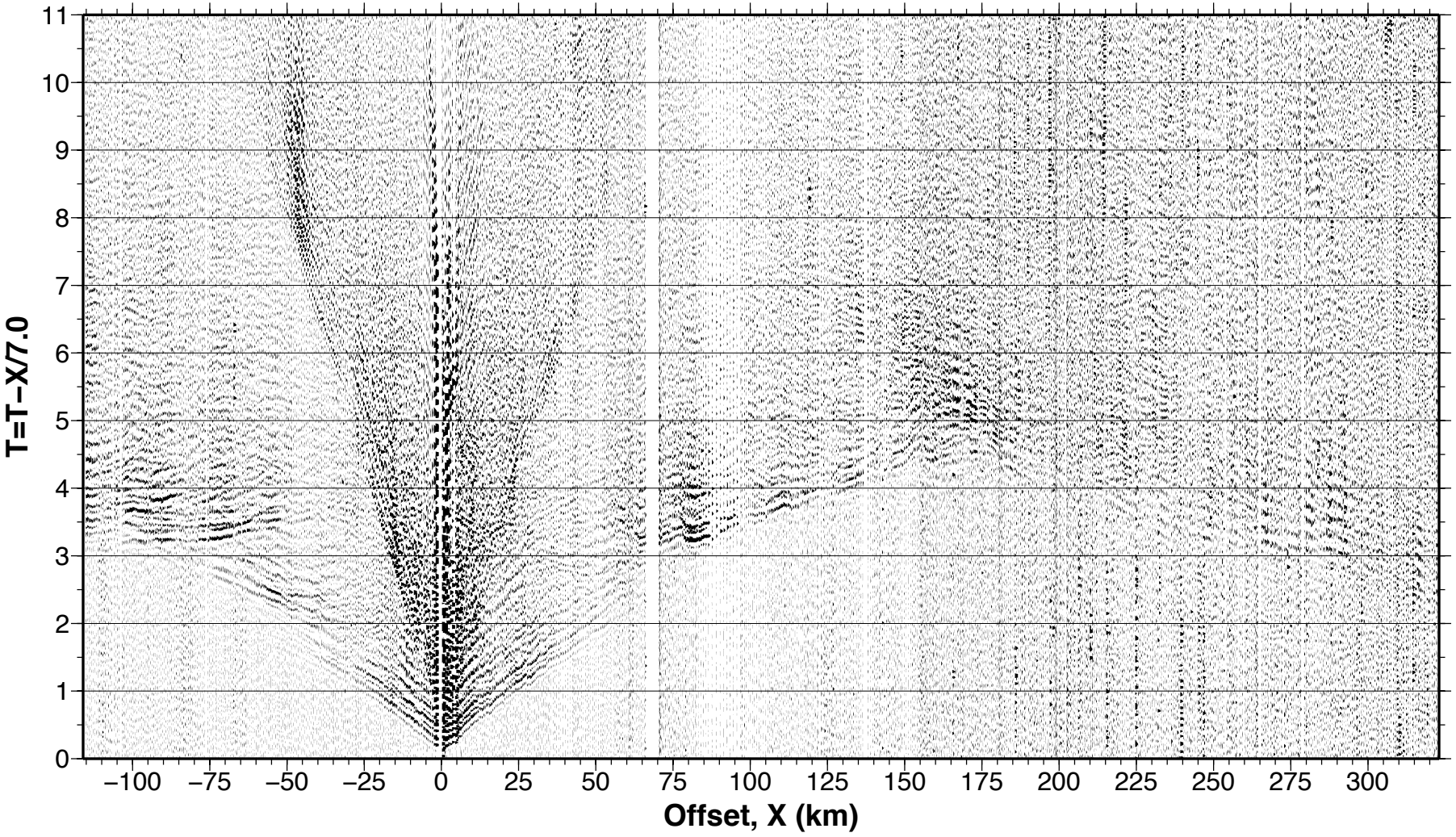

pride_10_r8_4–15mpdcZ.ps
T=T–X/7.0
0
1
2
3
4
5
6
7
8
9
10
11
–225
–200
–175
–150
–125
–100
–75
–50
–25
0
25
50
75
100
125
150
175
200
Offset, X (km)

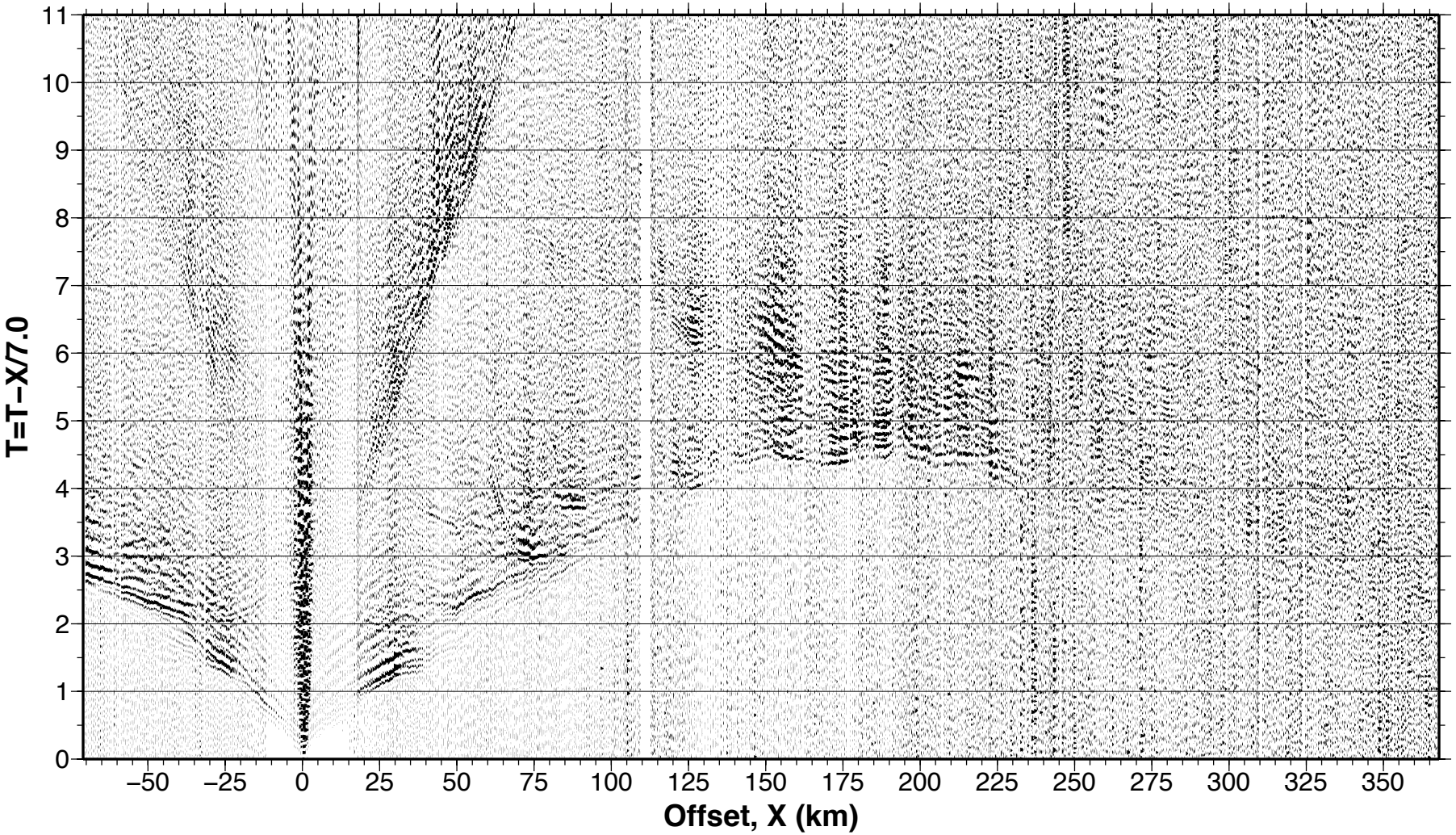

pride_11_r8_4–15mpdcZ.ps
T=T–X/7.0
11
10
9
8
7
6
5
4
3
2
1
0
–200
–175
–150
–125
–100
–75
–50
–25
0
25
50
75
100
125
150
175
200
225
Offset, X (km)

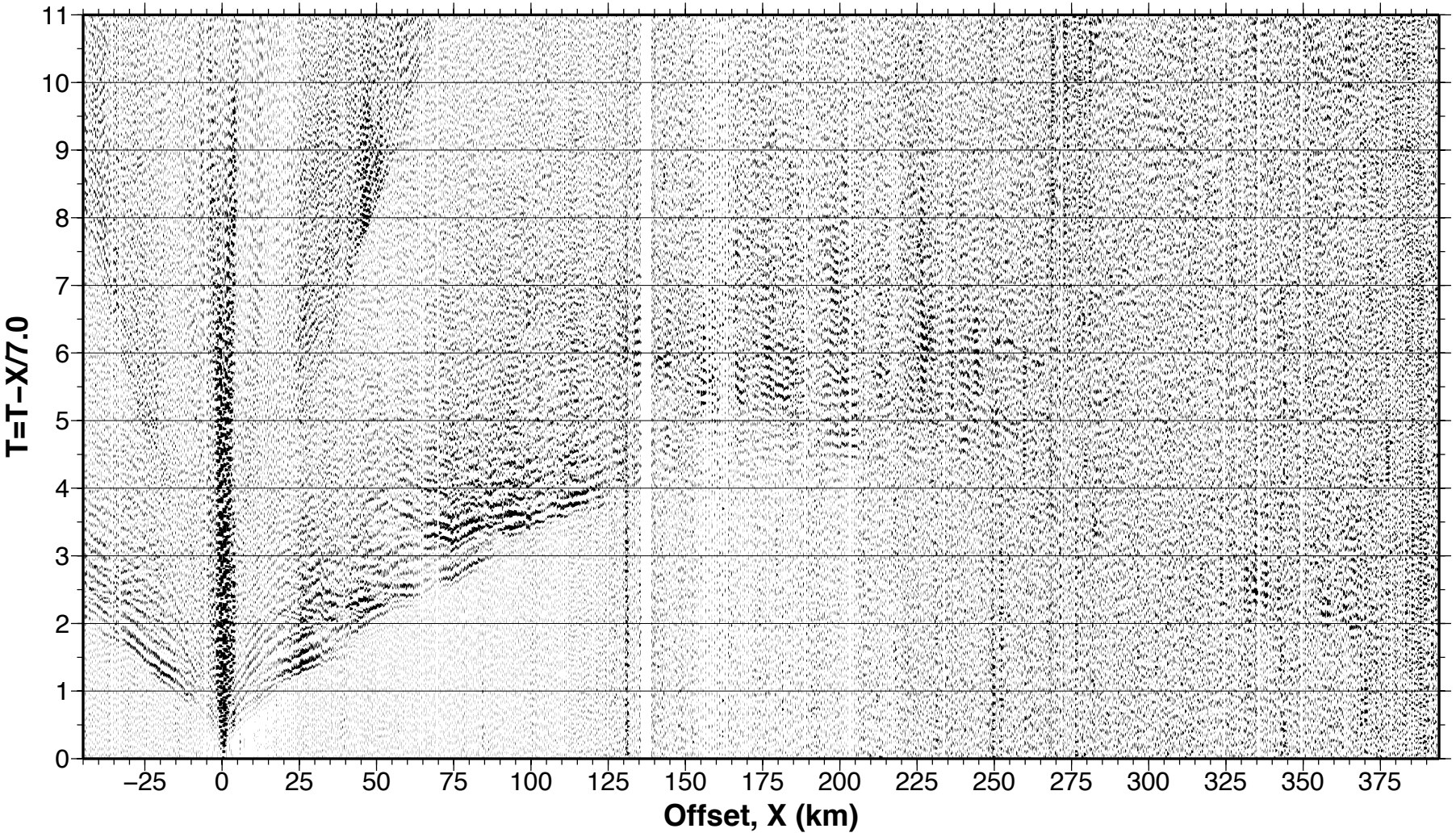

pride_12_r8_4–15mpdcZ.ps
T=T–X/7.0
11
10
9
8
7
6
5
4
3
2
1
0
–175
–150
–125
–100
–75
–50
–25
0
25
50
75
100
125
150
175
200
225
250
Offset, X (km)

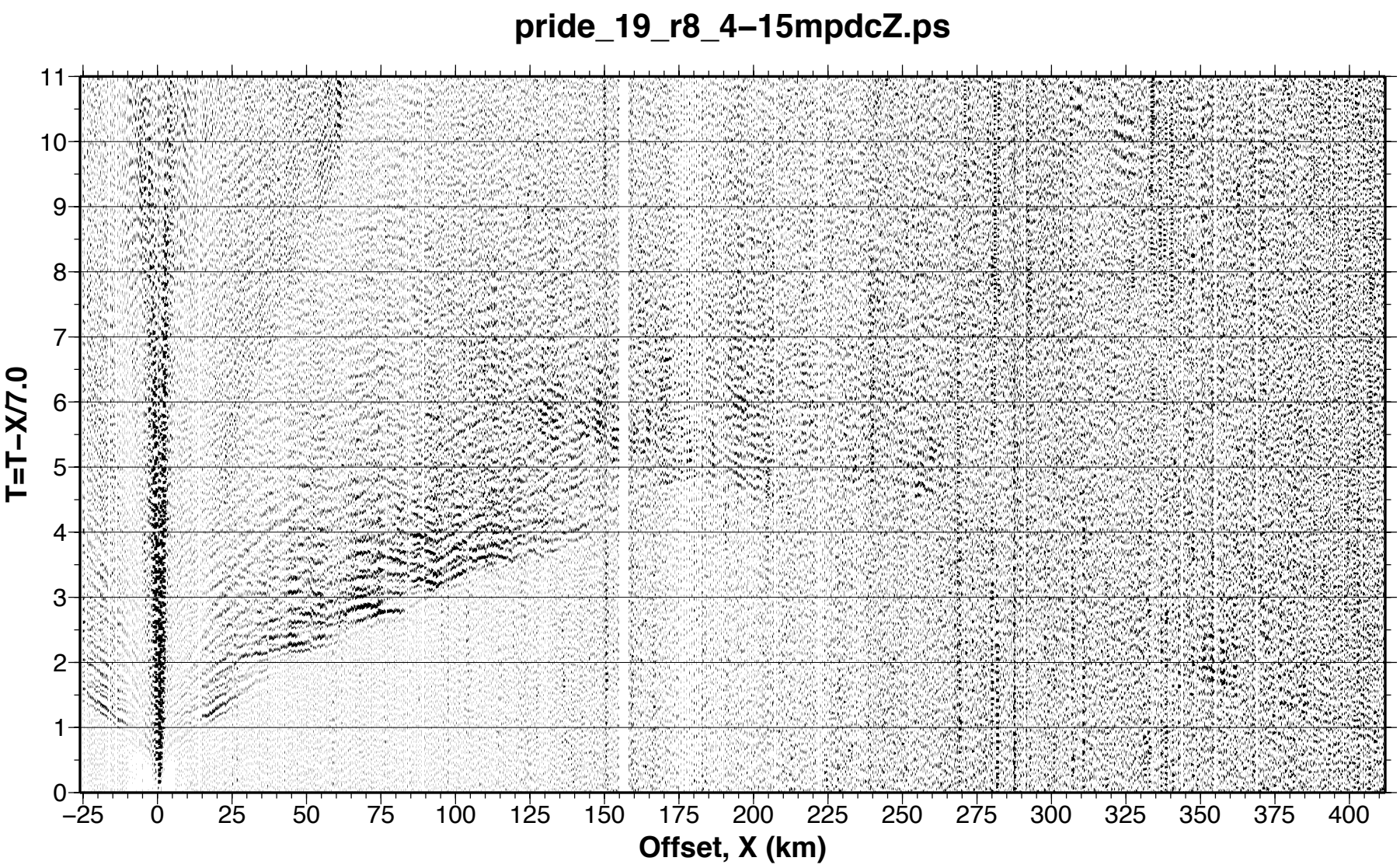

pride_13_r8_4–15mpdcZ.ps
T=T–X/7.0
11
10
9
8
7
6
5
4
3
2
1
0
–150
–125
–100
–75
–50
–25
0
25
50
75
100
125
150
175
200
225
250
275
Offset, X (km)

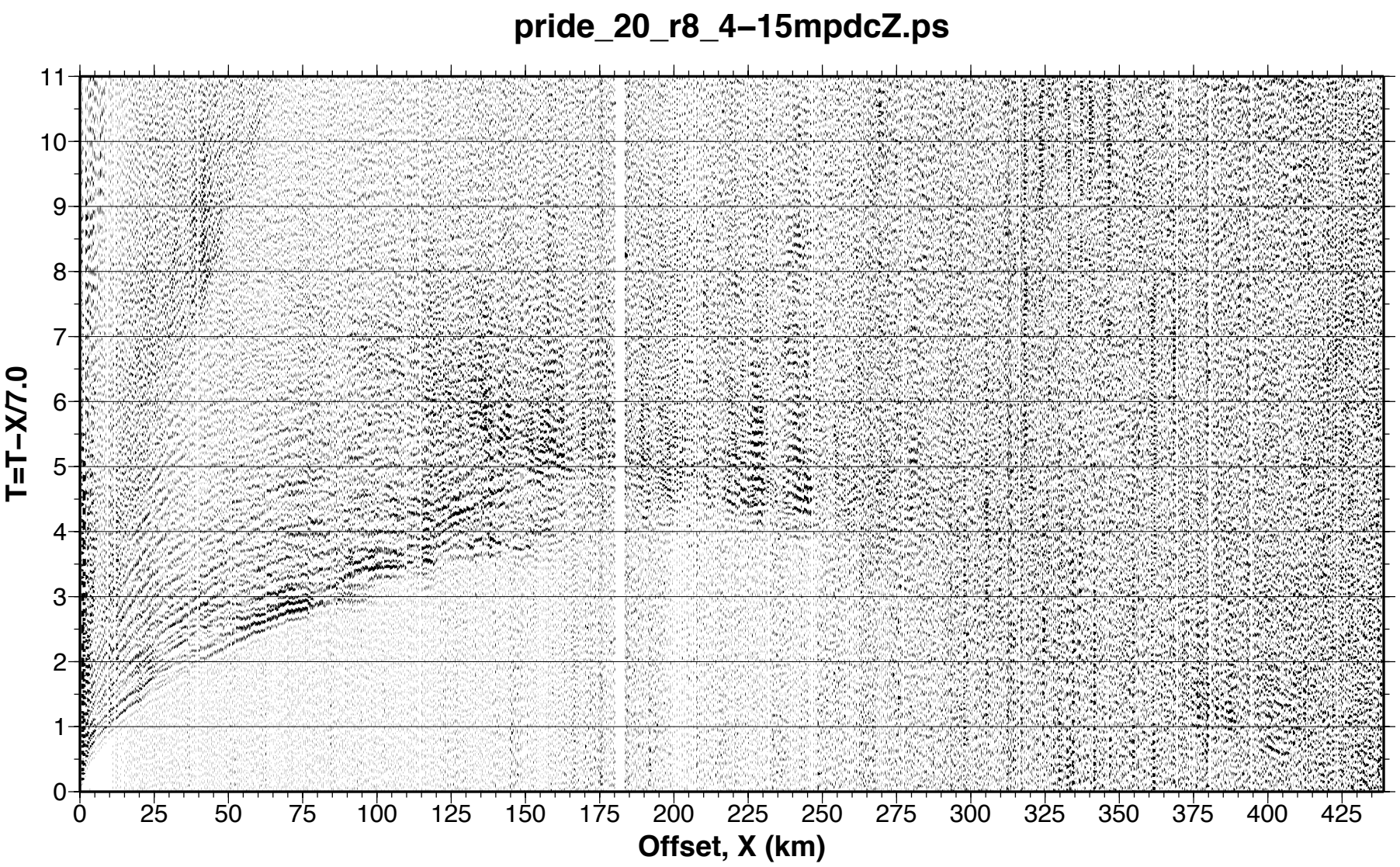

pride_14_r8_4–15mpdcZ.ps
T=T–X/7.0
11
10
9
8
7
6
5
4
3
2
1
0
–125
–100
–75
–50
–25
0
25
50
75
100
125
150
175
200
225
250
275
300
Offset, X (km)


pride_15_r8_4–15mpdcZ.ps
T=T–X/7.0
11
10
9
8
7
6
5
4
3
2
1
0
–100
–75
–50
–25
0
25
50
75
100
125
150
175
200
225
250
275
300
Offset, X (km)


pride_17_r8_4–15mpdcZ.ps
T=T–X/7.0
11
10
9
8
7
6
5
4
3
2
1
0
–50
–25
0
25
50
75
100
125
150
175
200
225
250
275
300
325
350
Offset, X (km)


pride_18_r8_4–15mpdcZ.ps
T=T–X/7.0
11
10
9
8
7
6
5
4
3
2
1
0
–25
0
25
50
75
100
125
150
175
200
225
250
275
300
325
350
375
Offset, X (km)


pride_19_r8_4–15mpdcZ.ps
T=T–X/7.0
11
10
9
8
7
6
5
4
3
2
1
0
–25
0
25
50
75
100
125
150
175
200
225
250
275
300
325
350
375
400
Offset, X (km)


pride_20_r8_4–15mpdcZ.ps
T=T–X/7.0
0
1
2
3
4
5
6
7
8
9
10
11
0
25
50
75
100
125
150
175
200
225
250
275
300
325
350
375
400
425
Offset, X (km)