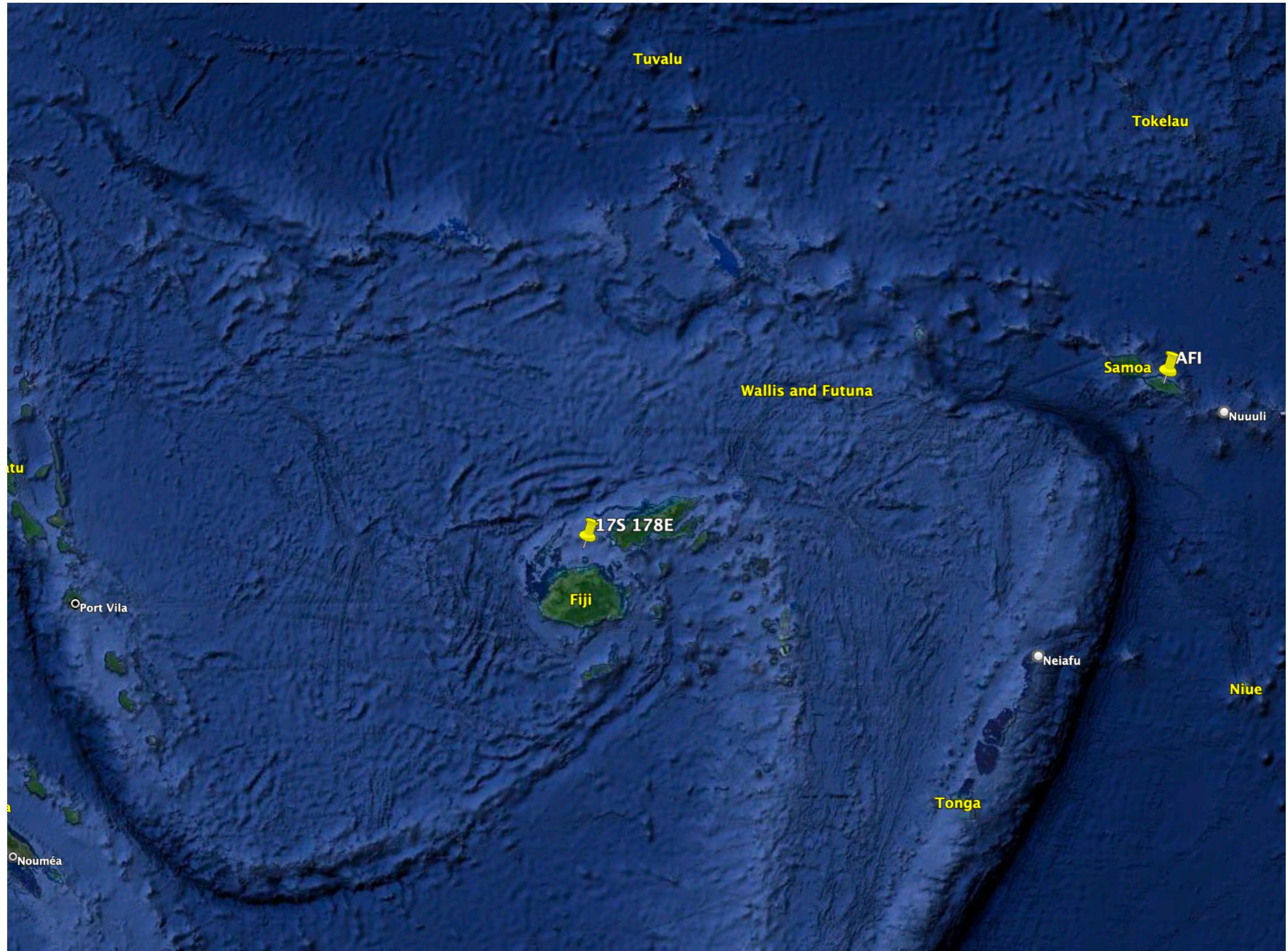


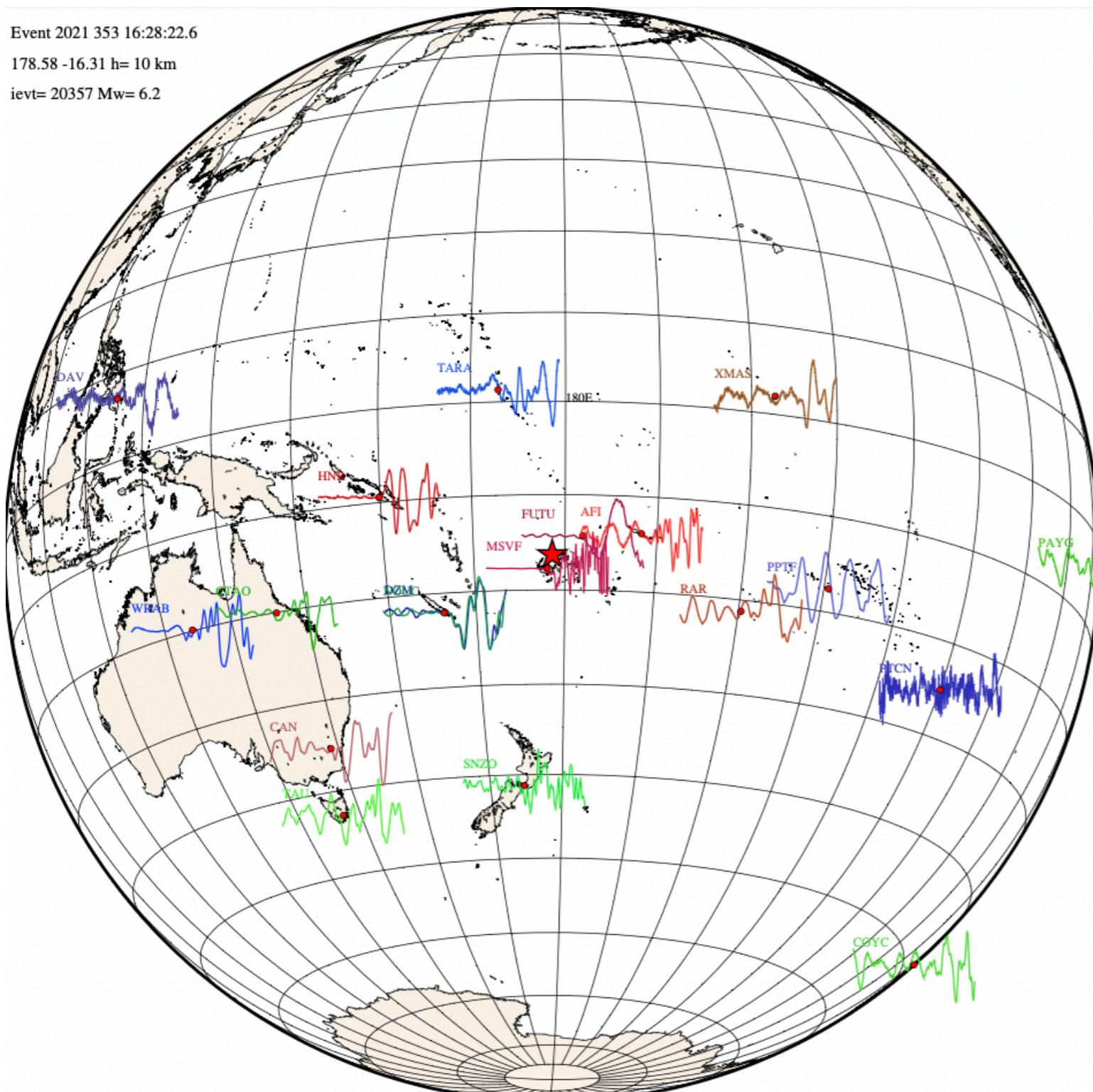
**CRUSTcluster #2 is around 17S, 178E near Fiji**



Event 2021 353 16:28:22.6

178.58 -16.31 h= 10 km

ievnt= 20357 Mw= 6.2



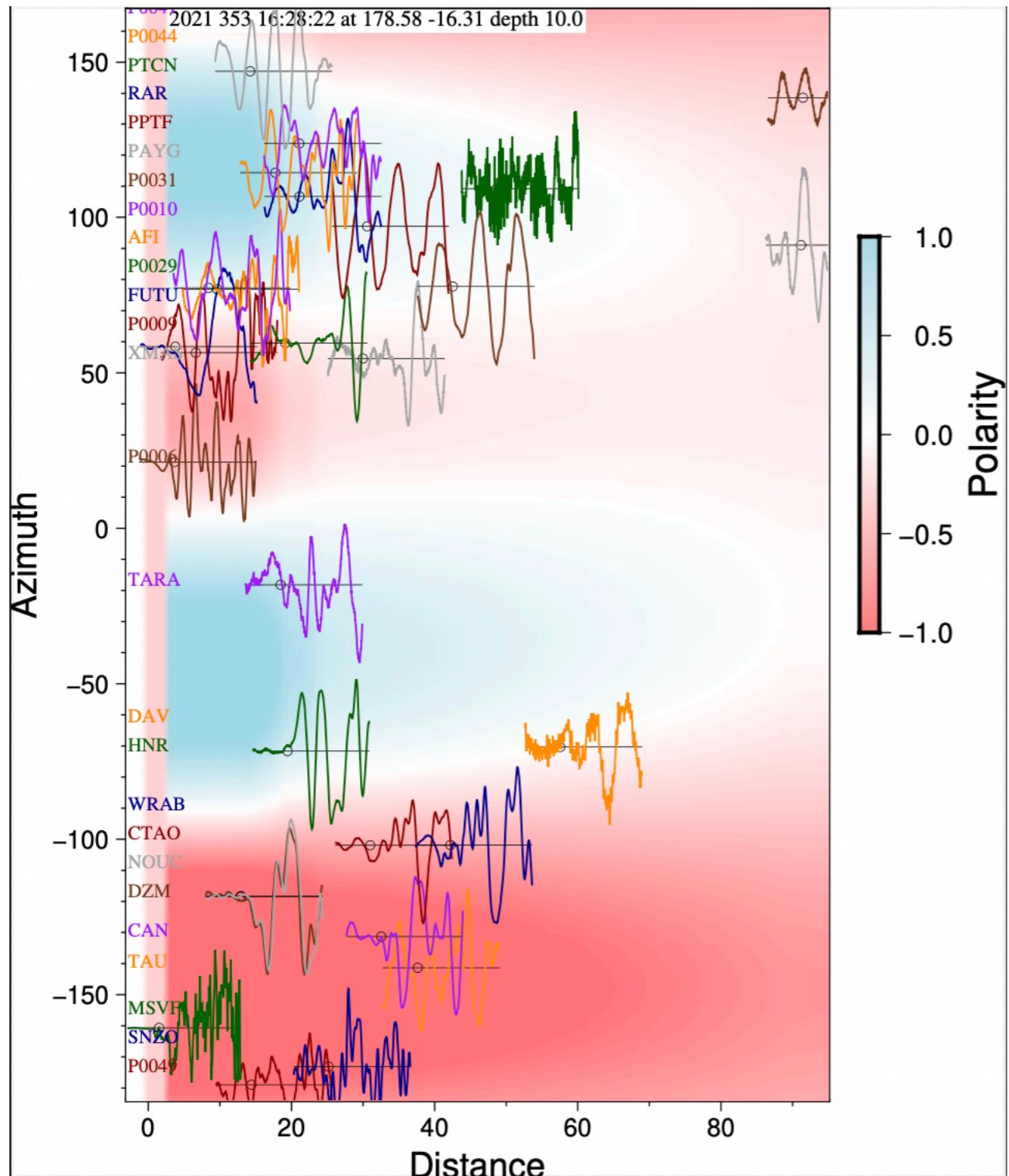
Dec 19, 2021, Mw 6.2, h=10 km

NEIC only 4 stations < 1000 km.

NEIC file 202151\_cat.isf:

Sta	Dist	EvAz	Phase	Time	Tres
MSVF	1.51	199.4	Pn	16:28:48.820	-0.9
My pick				16:28:48.71	
FUNA	7.76	4.5	Pn	16:30:11.530	-3.9
AFI	9.61	76.9	Pn	16:30:37.990	-2.7
SANVU	10.98	272.9	Pn	16:31:00.190	0.9
PINNC	12.22	237.4	Pn	16:31:17.980	1.7
DZM	12.81	241.6	Pn	16:31:24.640	0.2
My pick				16:31:26.35	
ONTNC	12.90	240.6	Pn	16:31:26.250	0.7
NFK	16.01	215.9	P	16:32:11.630	0.7
...					
HNR	19.40	288.3	P	16:32:47.110	-1.1
My pick				16:32:49.74	
RAR	21.06	106.7	P	16:33:06.950	0.7
SNZD	25.13	186.9	P	16:33:47.130	0.0
CTAO	30.91	258.0	P	16:34:38.970	0.2
TAU	37.58	218.7	P	16:35:37.410	0.8

Big difference between my  
Picks and NEIC for DZM  
And HNR



No stf.pdf -> polarity is from low frequency CMT,

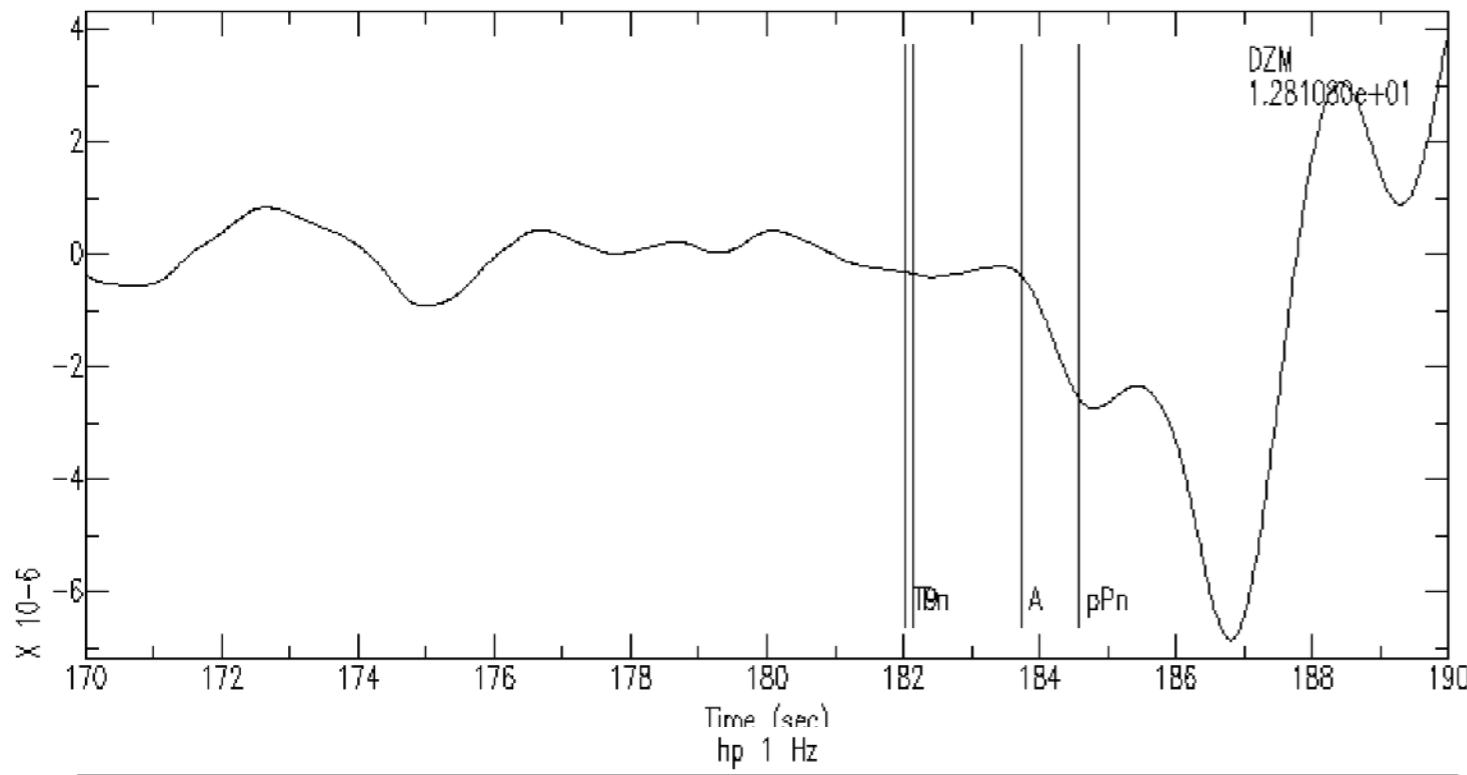
-> take care near nodal zones

HNR expected UP  
DZM expected DOWN

P49, P06 and perhaps P09 are in DOWN territory

Other Mermaids (10,29,31,41,44) are UP but close to node...

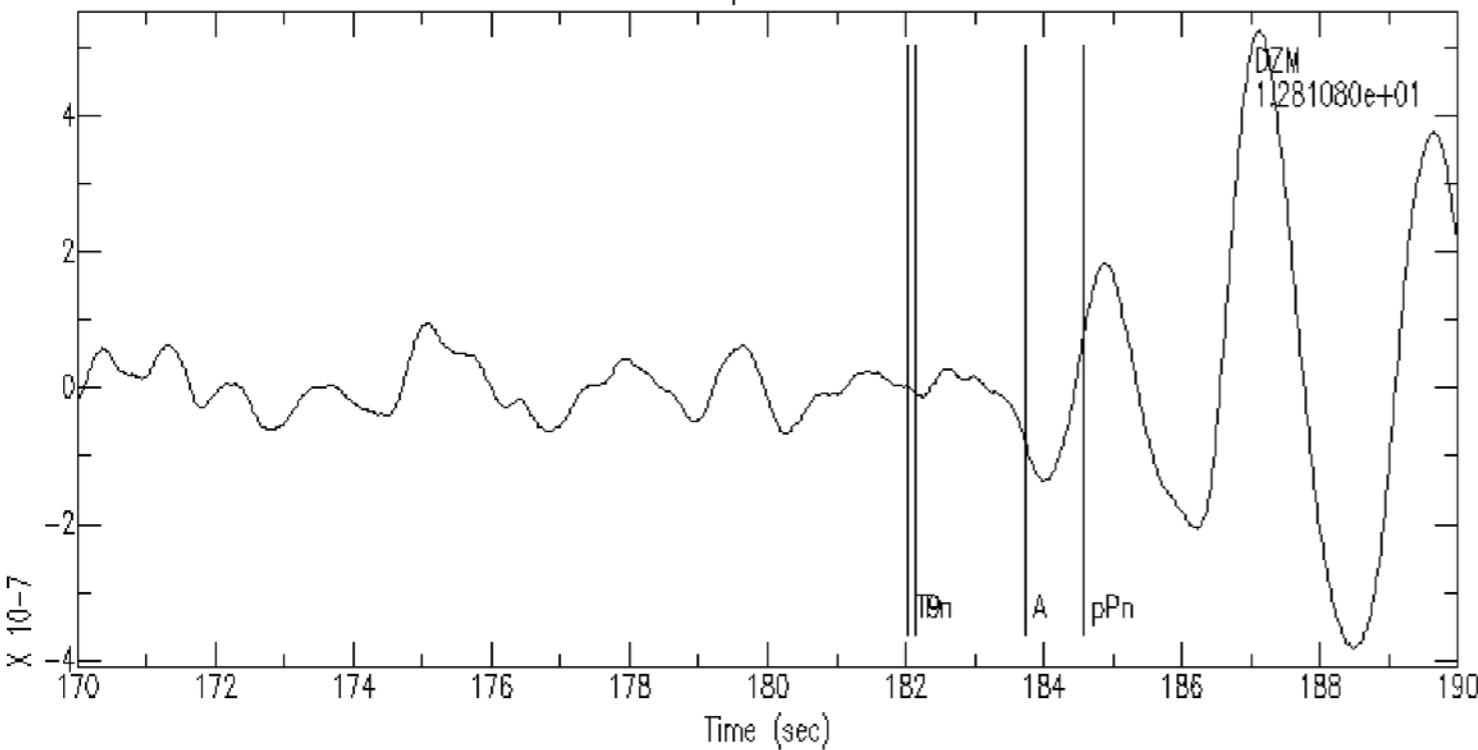
Also: depth 10 km (a default value) will give pP just a few seconds after P -> DANGER



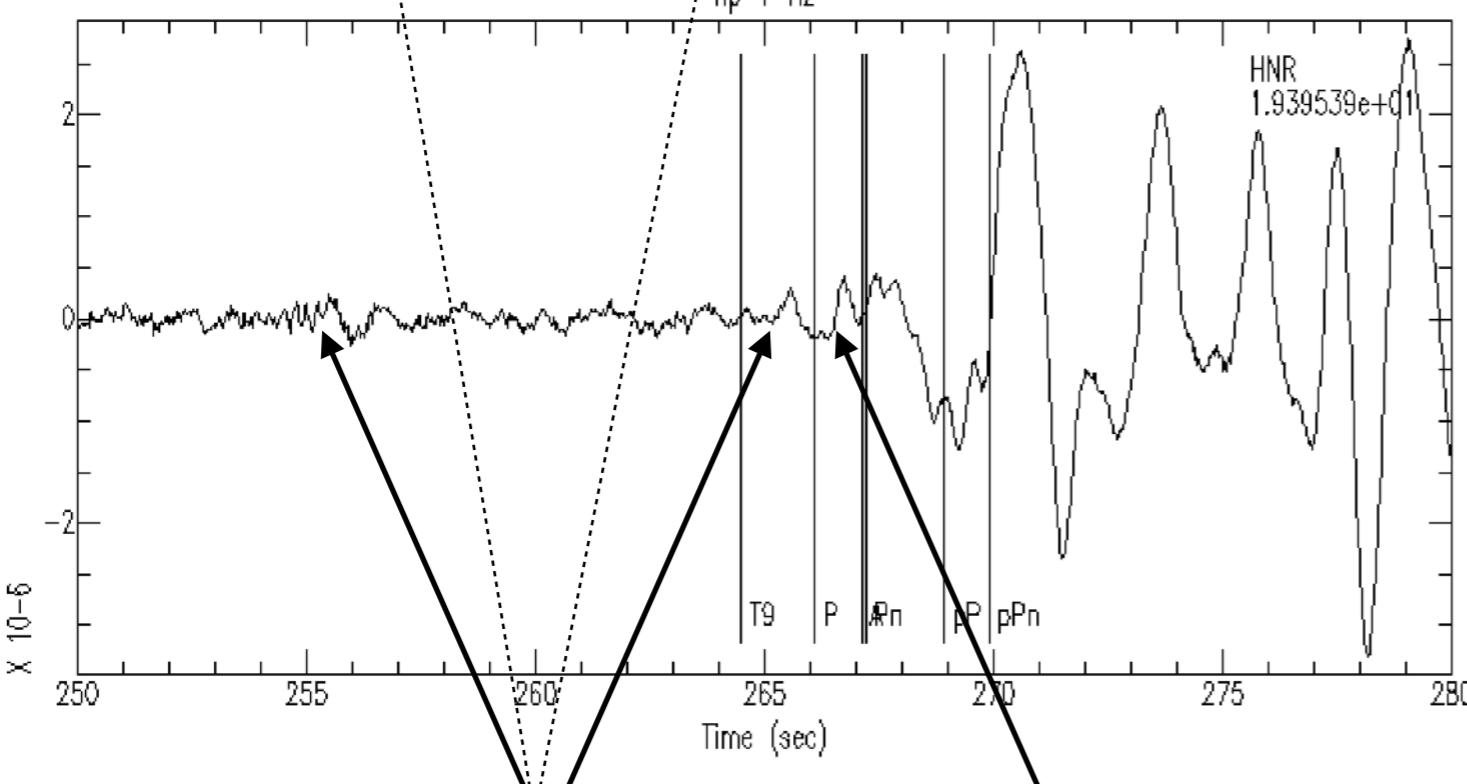
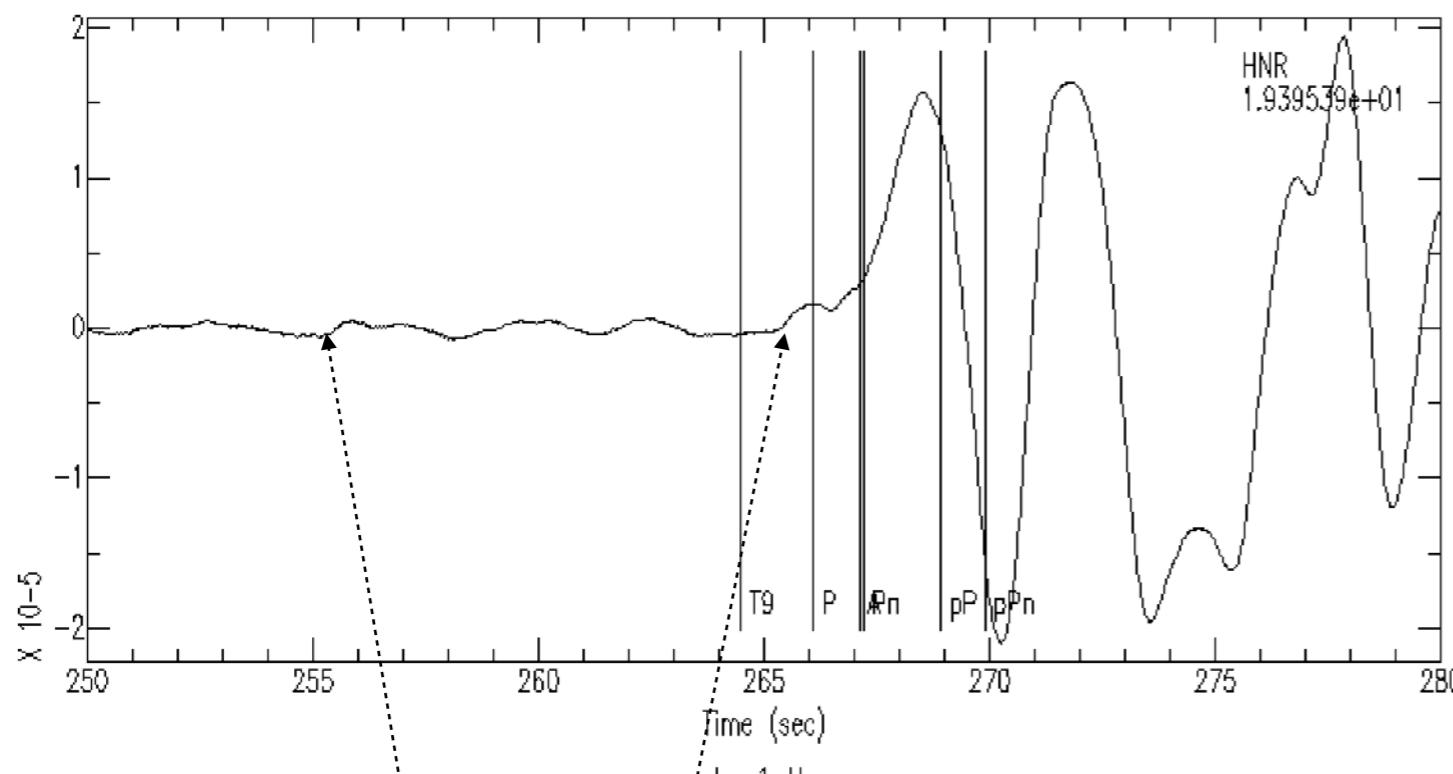
Station DZM is indeed clearly DOWN

A is my Pick

T9 is NEIC (overlaps with AK135 P)



After 1 Hz high pass I might have picked  
0.2s earlier, but not even near NEIC



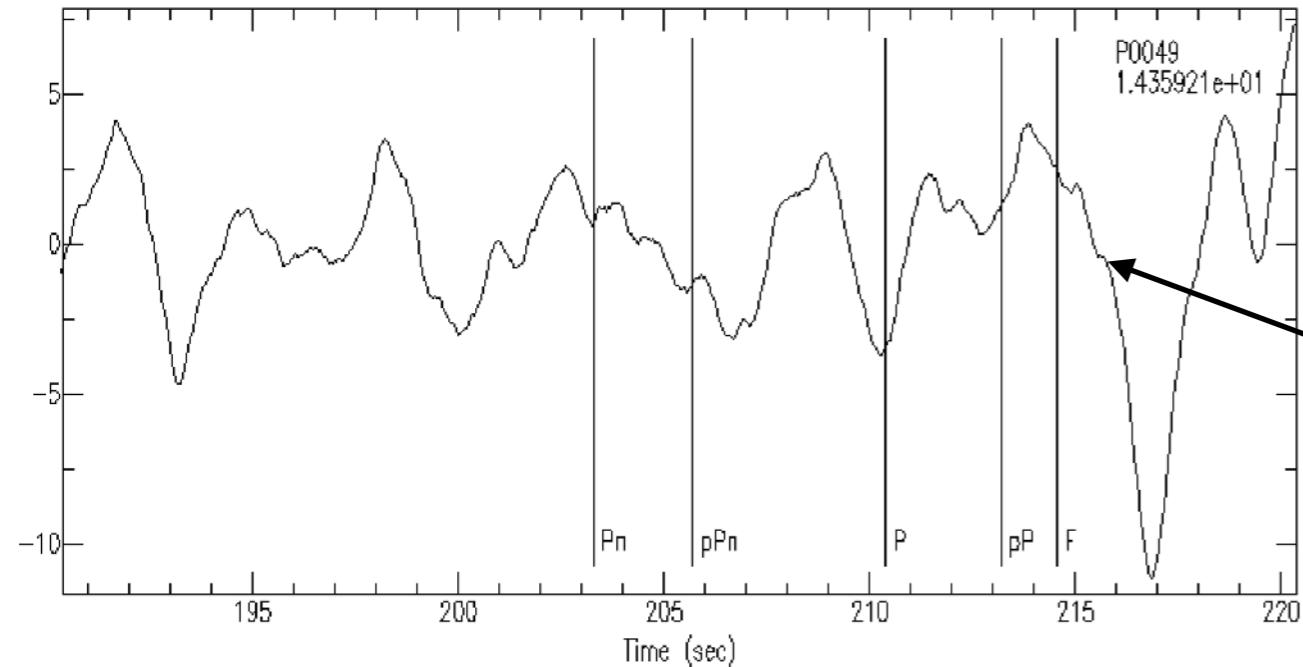
This is where I would pick on 'second thoughts'

This kind of slope could just as well be noise

Station HNR is UP, but where?

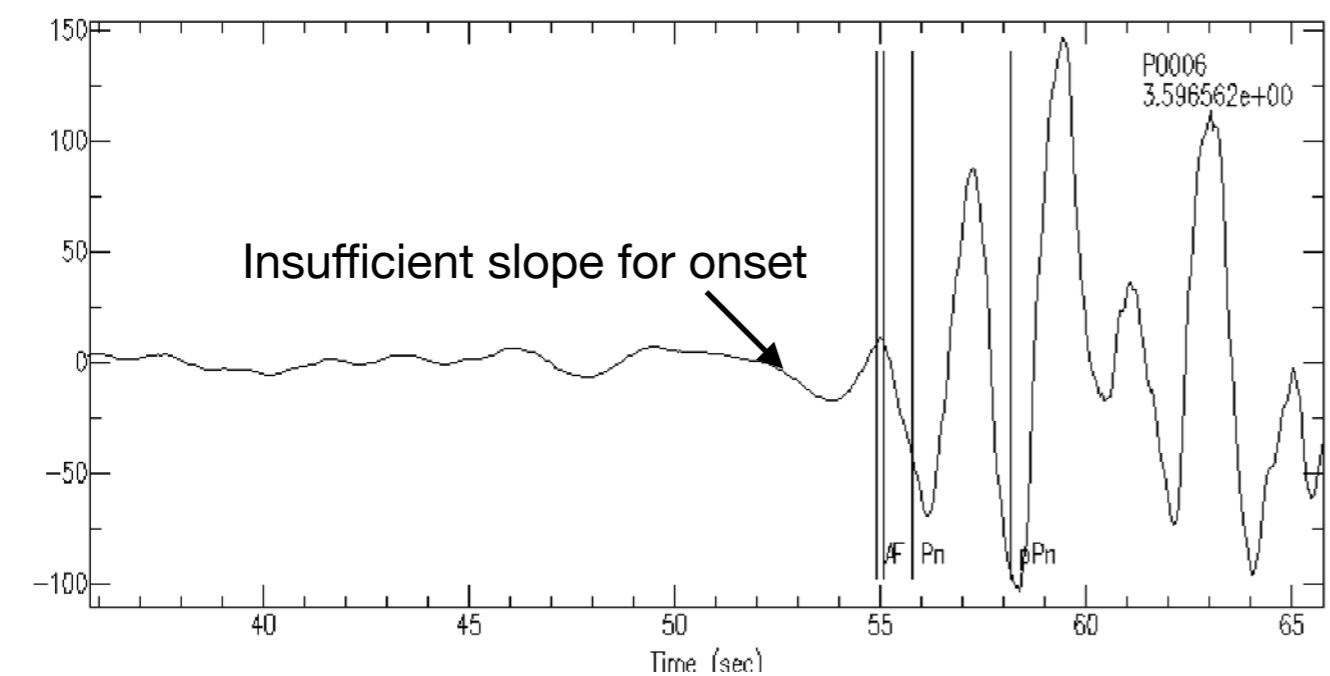
A is my Pick  
T9 is NEIC

High pass does not help much, but I picked probably too late and NEIC picked too early

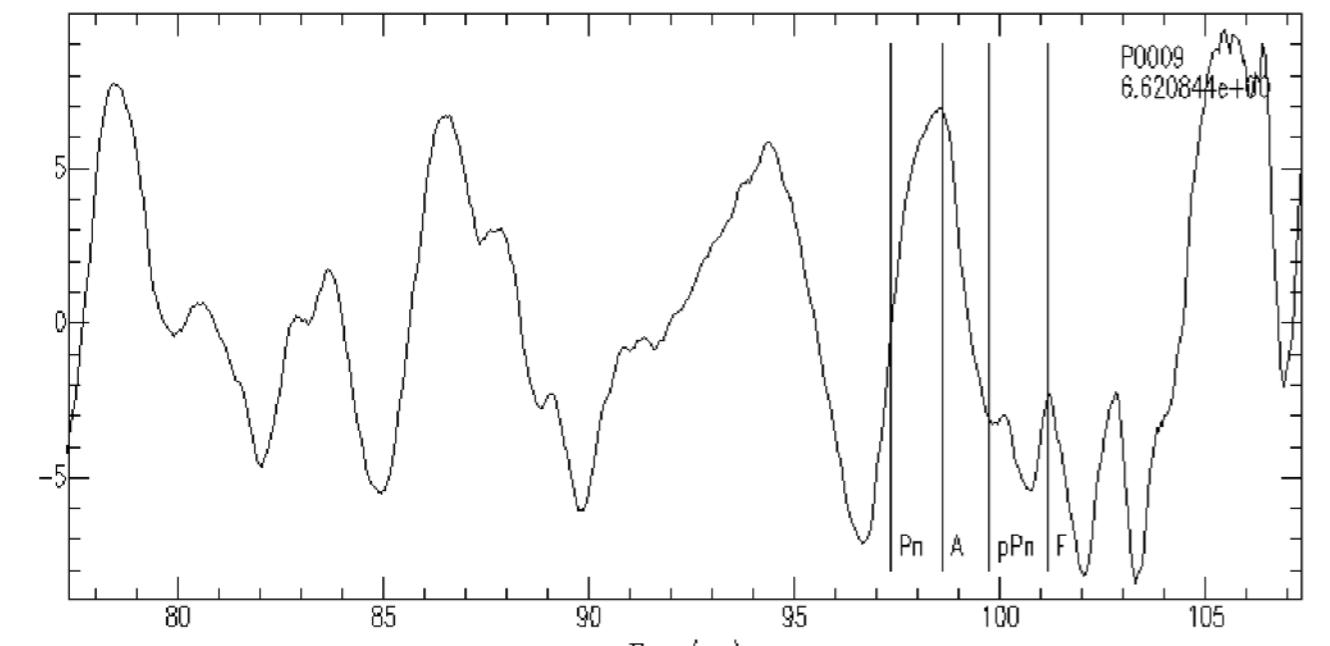


P49, P06 and perhaps P09 are in DOWN territory

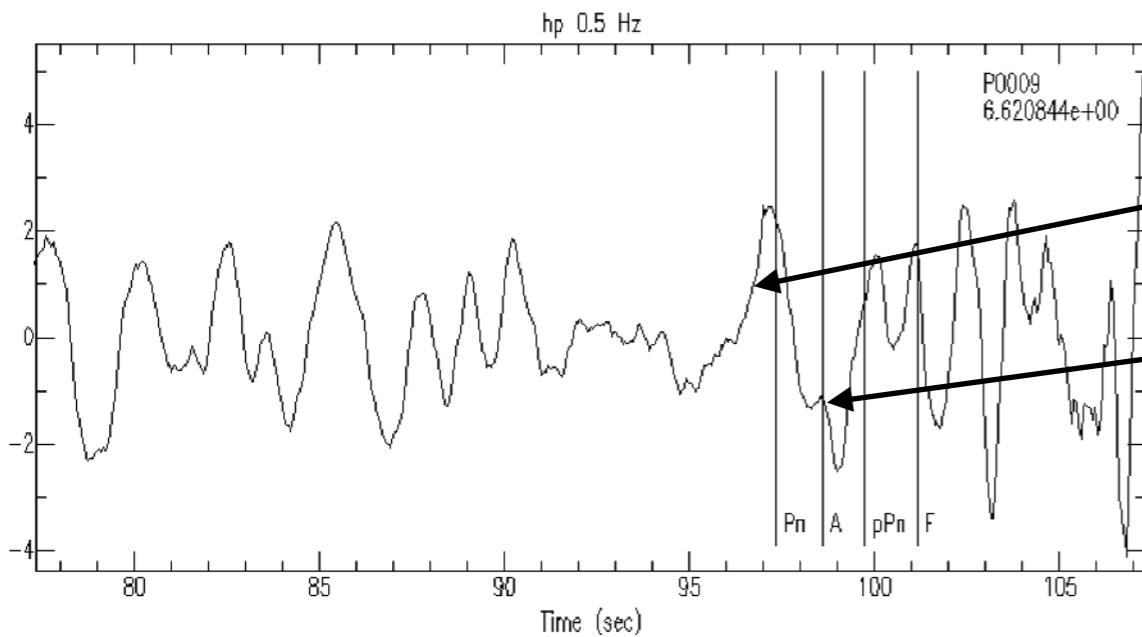
P49 shows a down, but too late for first arrival Pn  
so I did not pick



P06 shows a down near F and near the AK135 Pn



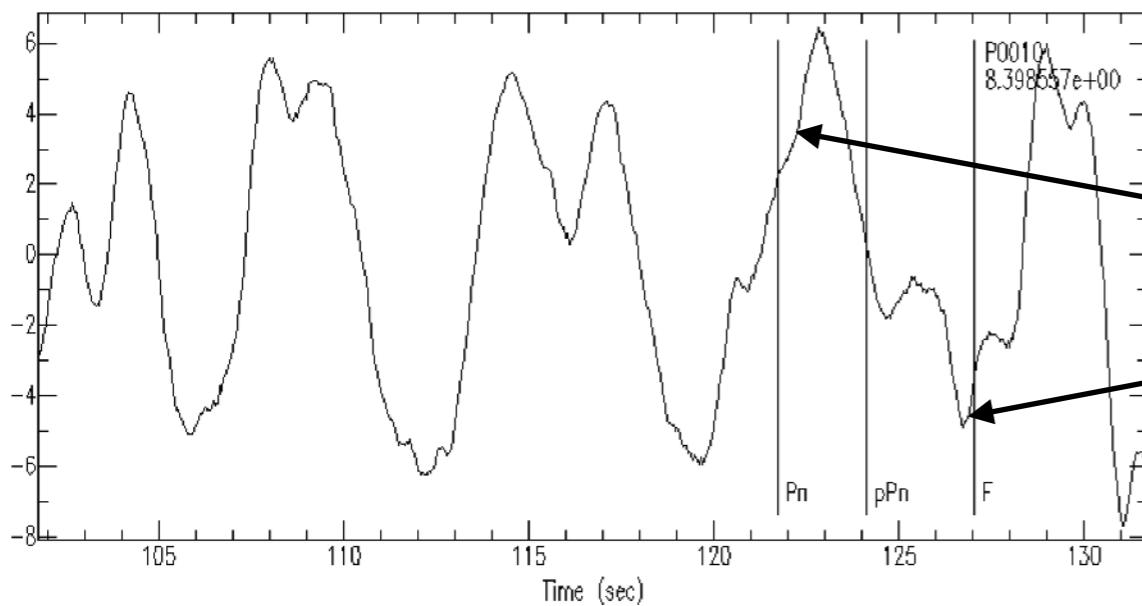
I pick P09 at the steep slope, but it is a bit of a gamble  
perhaps a high pass will help confirm it



P09 (again), but after hp 0.5 Hz

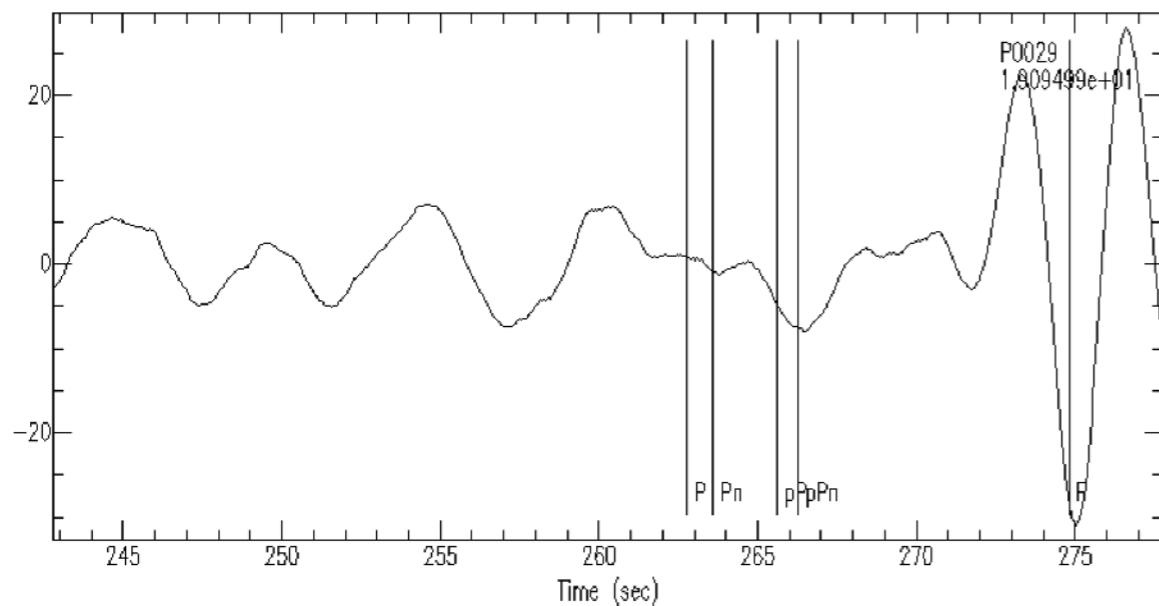
Alternative UP pick?

My DOWN pick - which I prefer because of its somewhat higher frequency  
Also - if it is in error the error is acceptable (~1s)

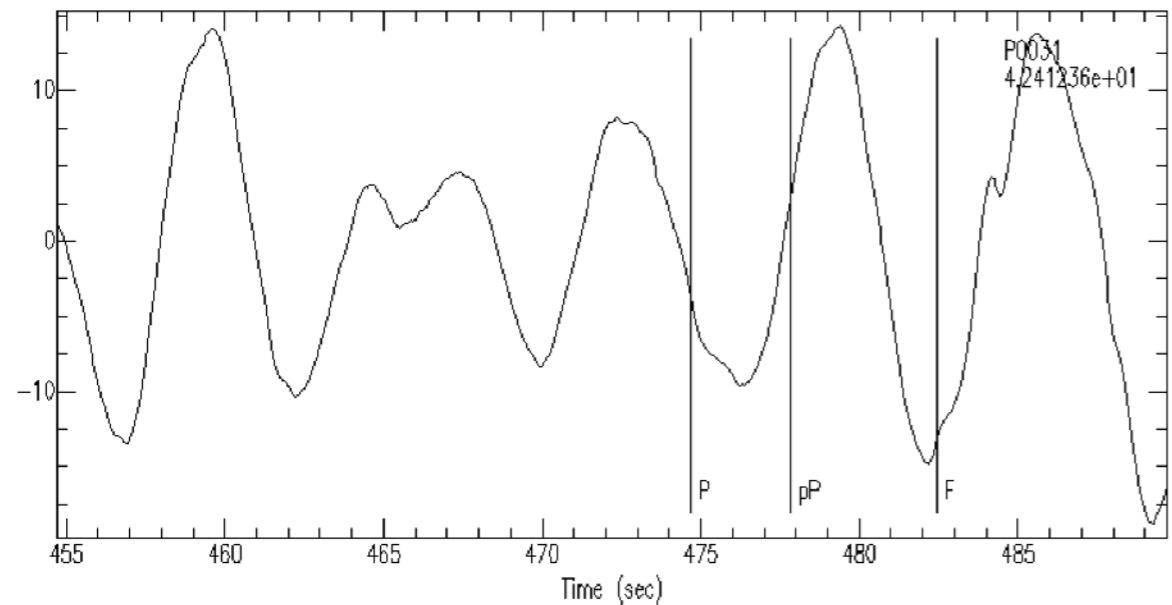


P10 - UP but near node...

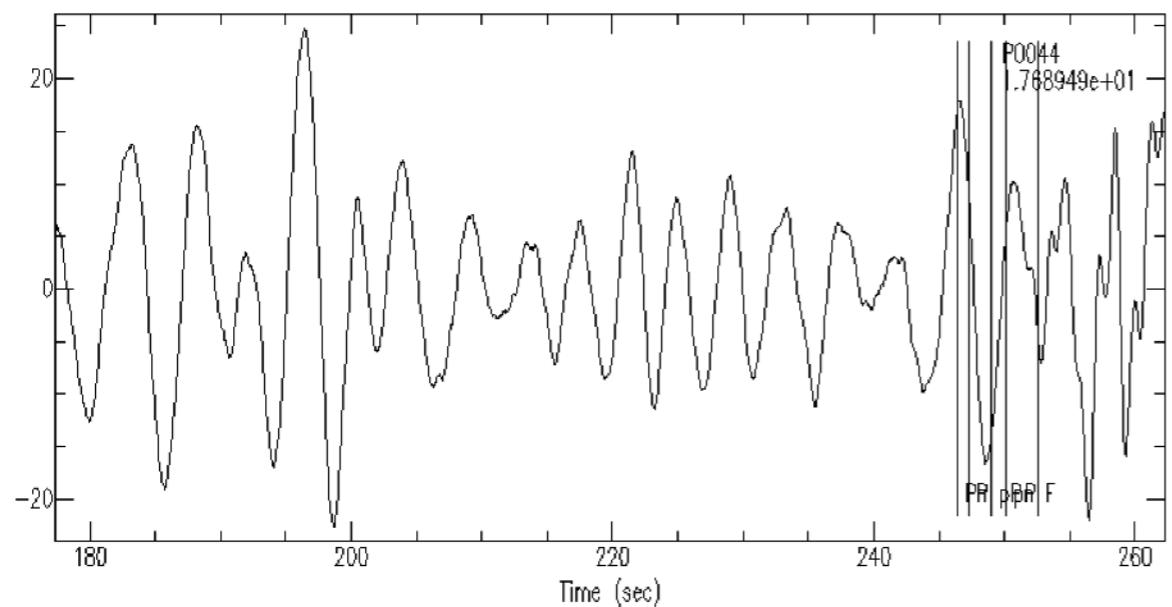
I considered picking here, but slope is not impressive  
And this risks picking pPn instead of Pn, with large error, so I did not pick



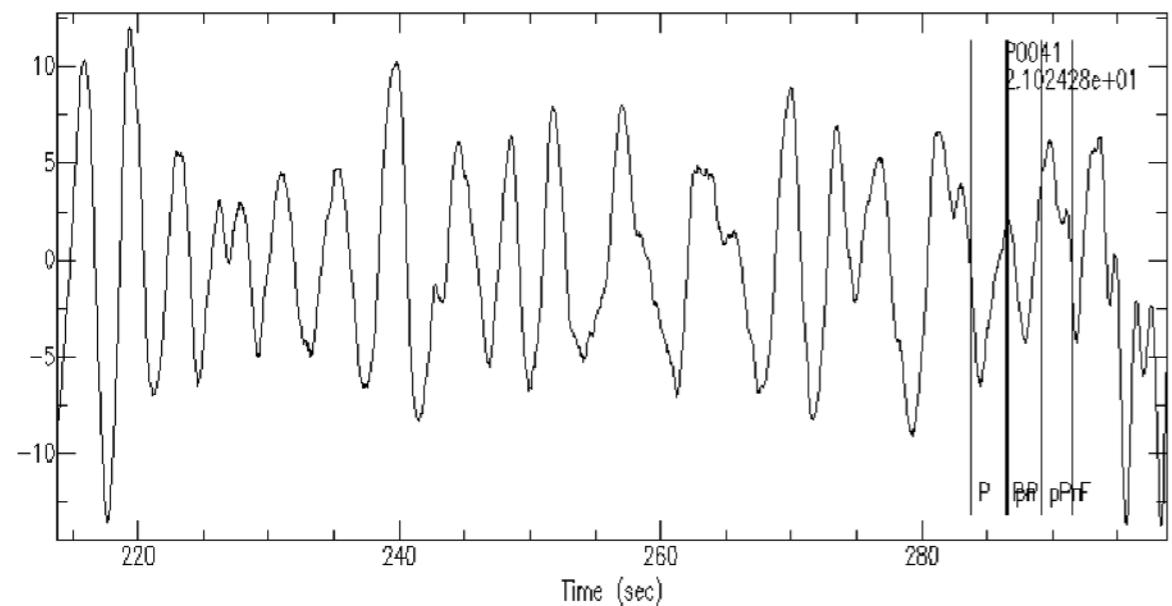
P29 - is near node..., something happens near F but it is far too late, so I reject this one



P31 is far ( $\Delta$  42 deg), no clear onset. F residual is too large (~7s)

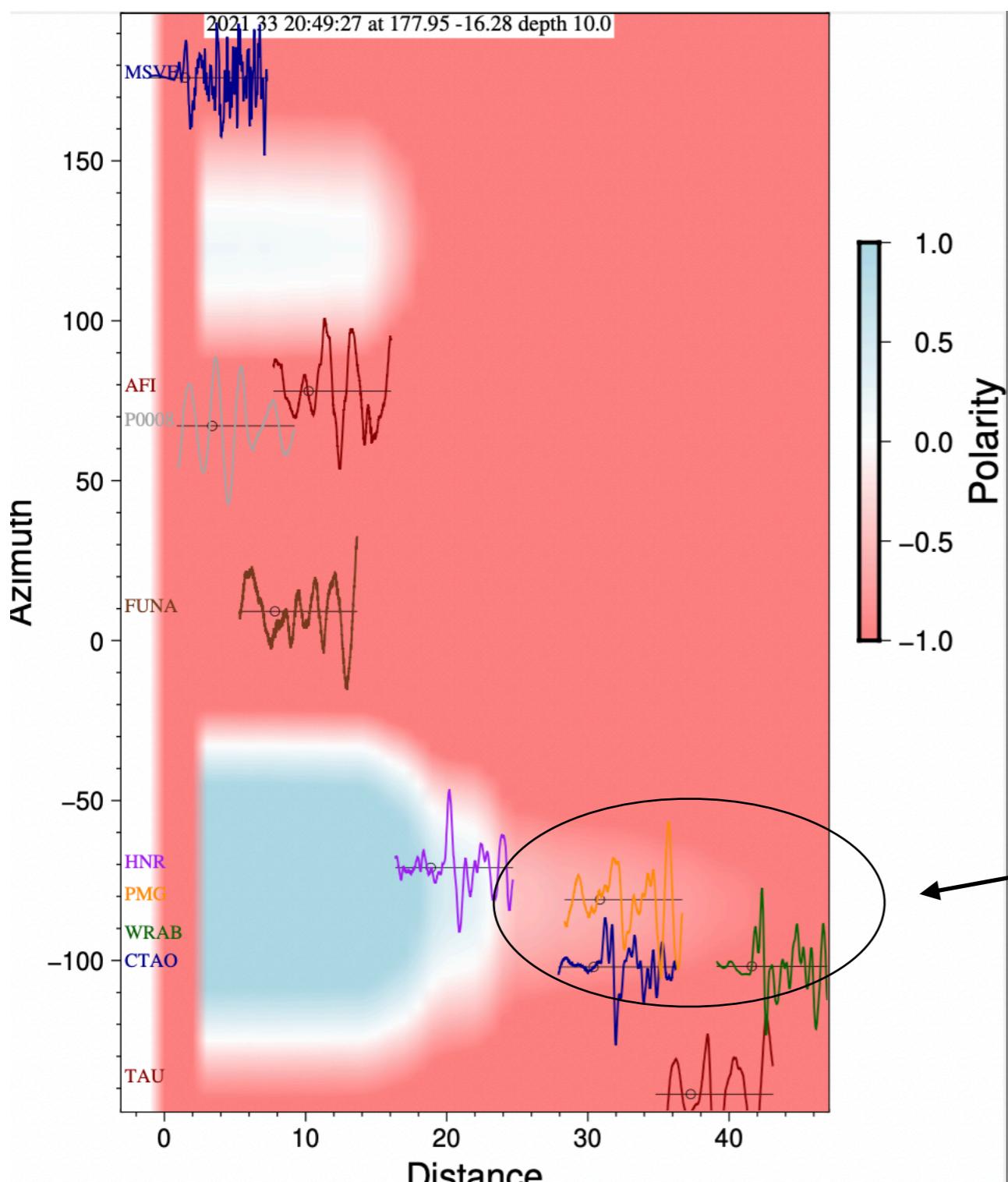


P44 should go UP, possibly just before AK135 P  
but I did not dare since a wider plot shows  
equally large noise near 200s



And similar for P41

Feb 2, 2021 (M 5.8, h=10 km)

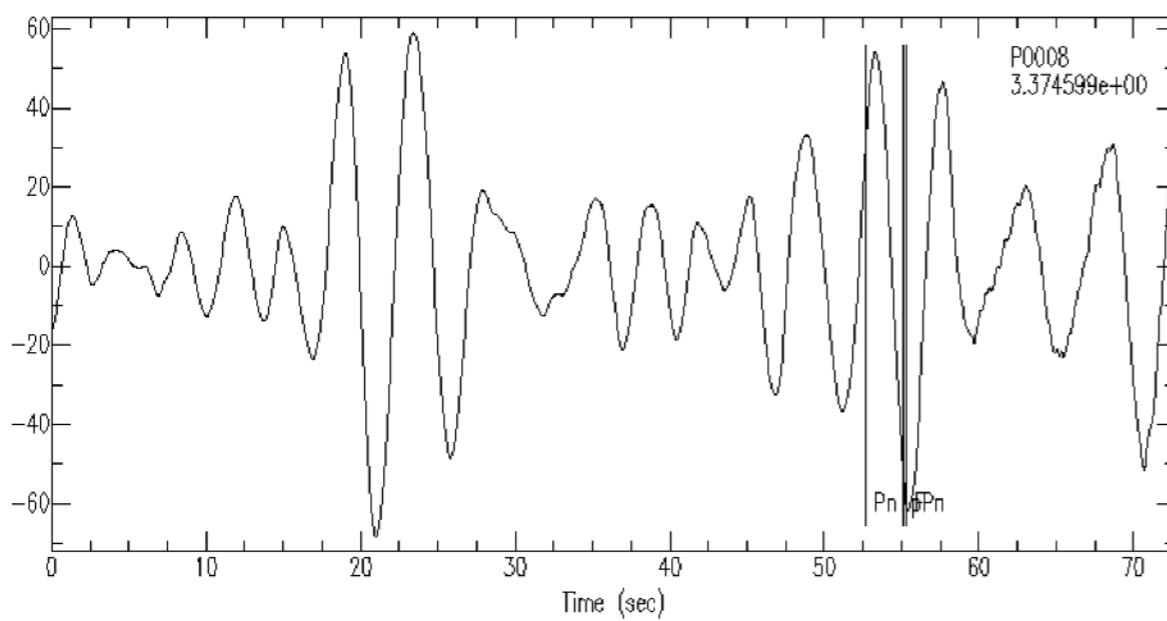


No file sty.pdf -> Polarity predictions from CMT

In this case polarity is clearly wrong -> ignore

Predicted DOWN but  
UP is observed

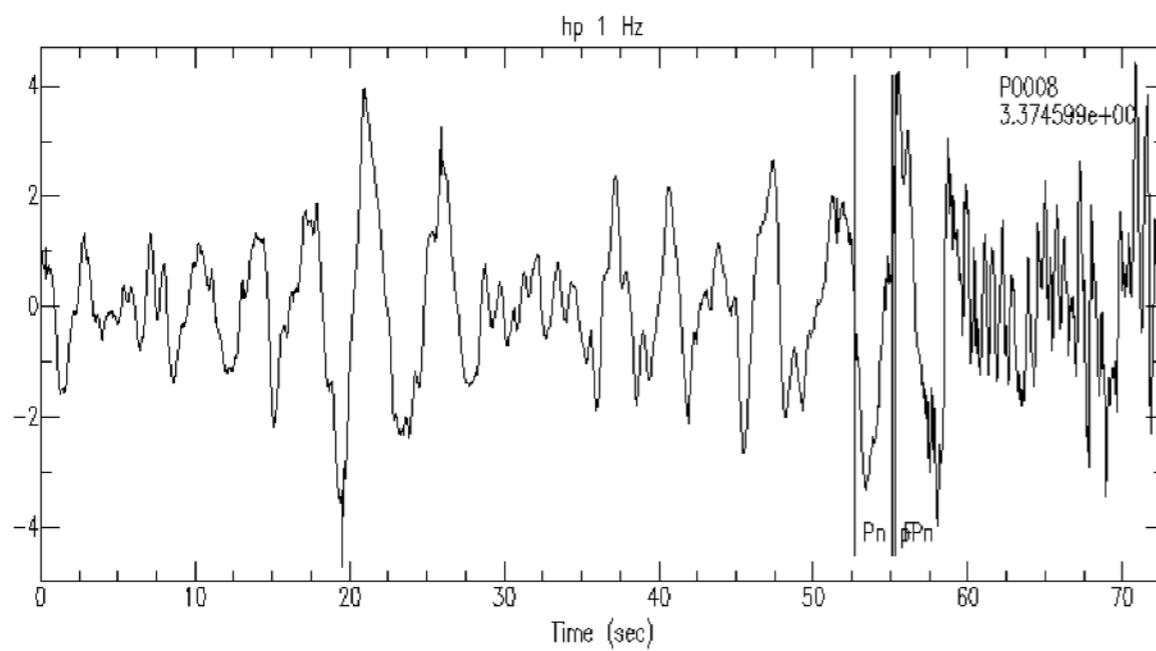
**Feb 2, 2021 (M 5.8, h=10 km)**



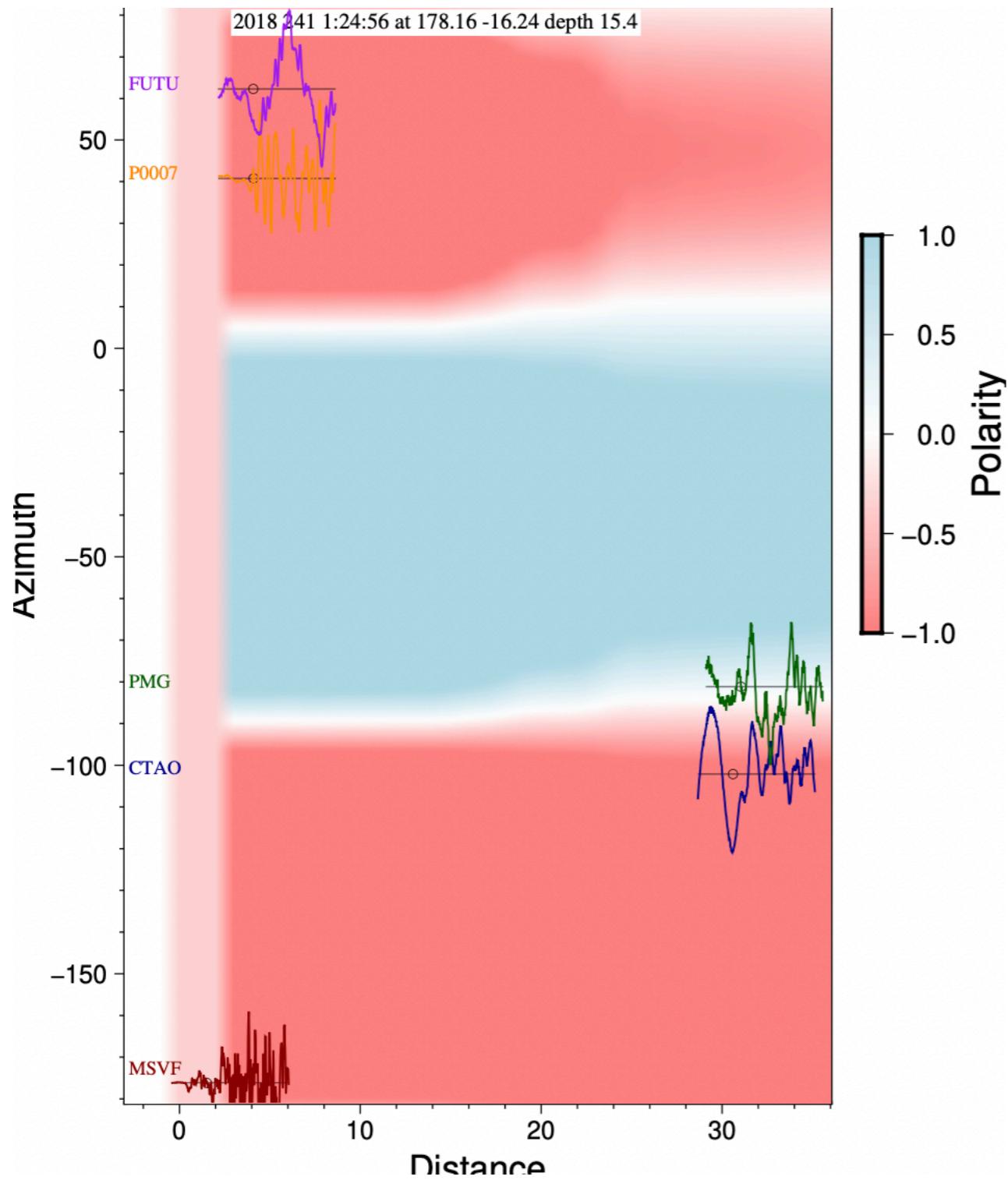
The only Mermaid is P06

But no onset visible on unfiltered  
nor filtered record

No Mermaid -> REJECT event

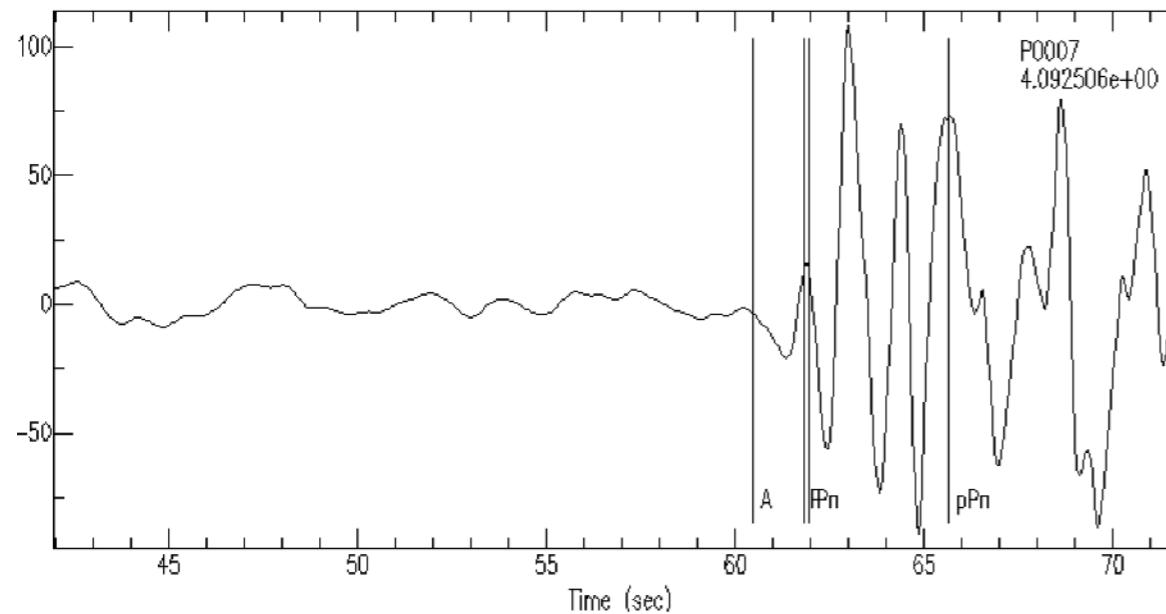


August 29, 2018

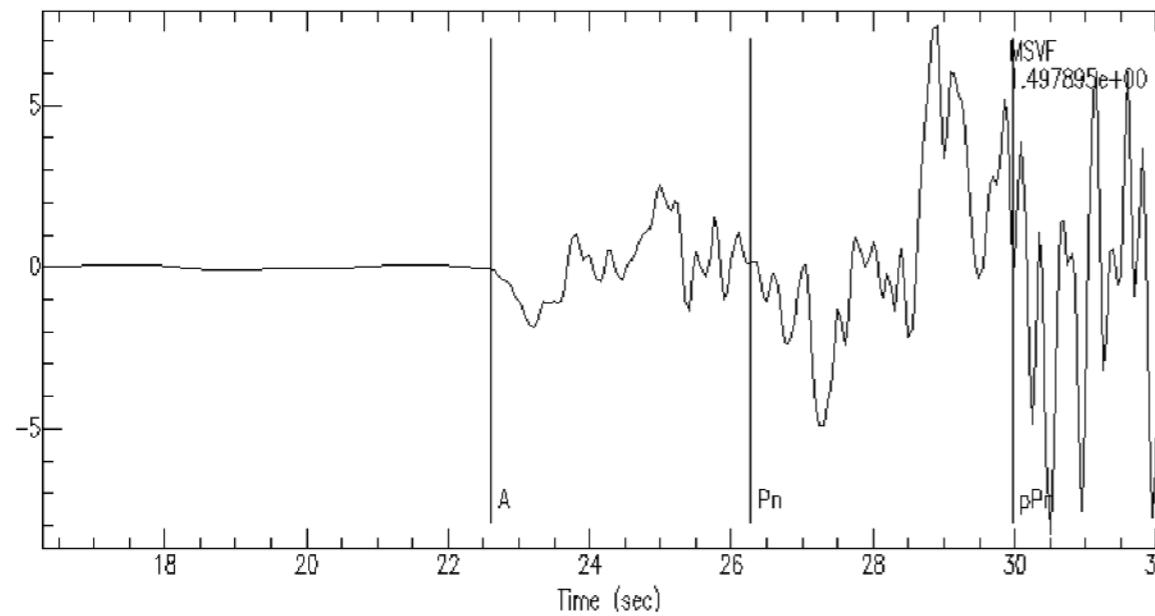


Polarity looks OK  
-> all DOWN except PMG

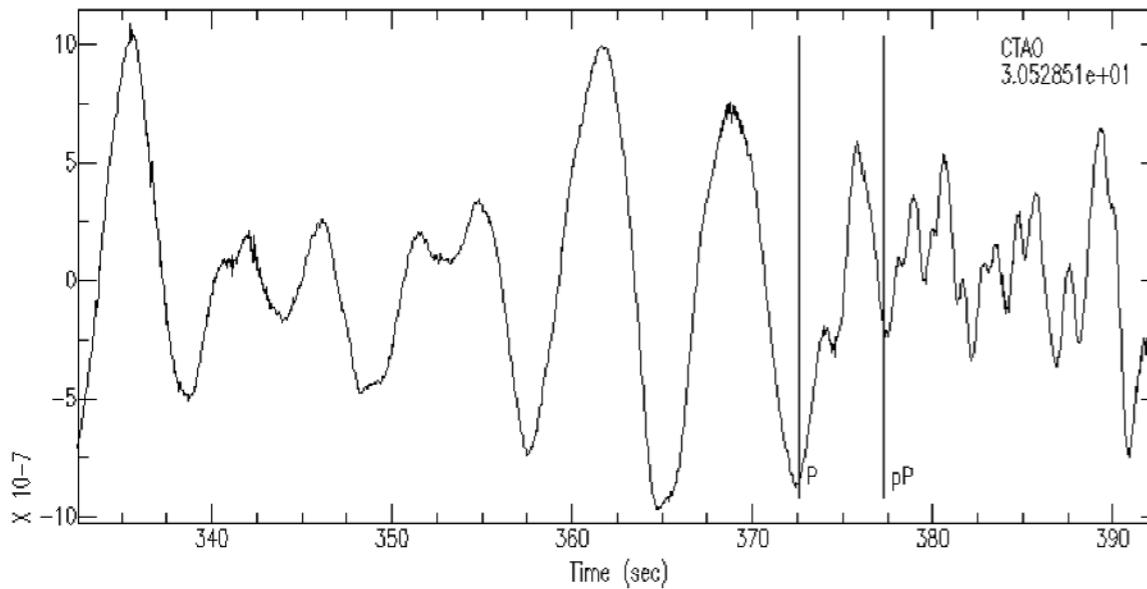
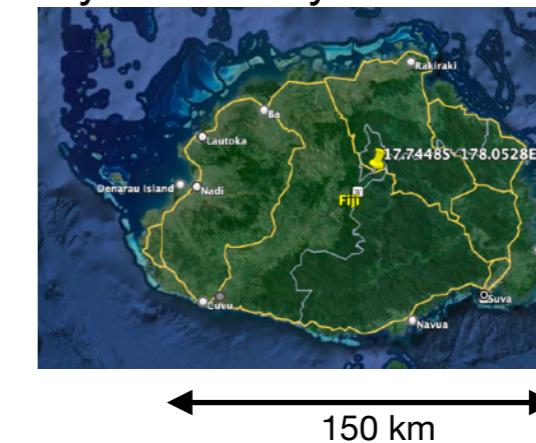
August 29, 2018



P07 is emergent but clearly DOWN



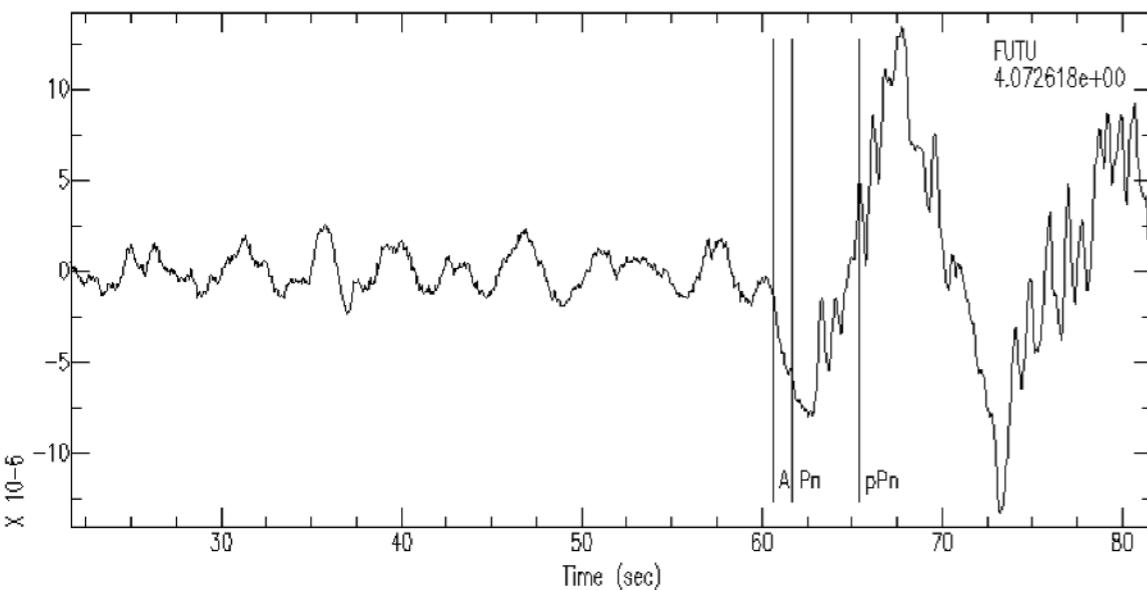
MSVF (Fiji) is easy since very low noise



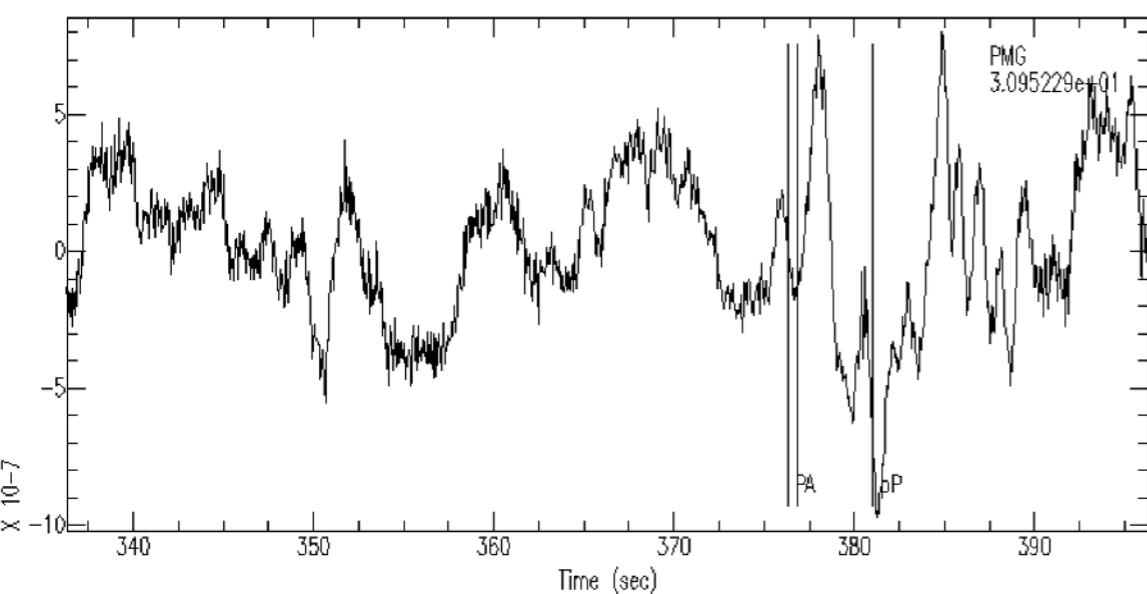
But CTAO is at larger distance, and it is ambiguous. I did not pick it.

Since island stations remain in place, there is no need to put effort in trying to extract an onset. Other events will provide the necessary delay information from less noisy records.

August 29, 2018

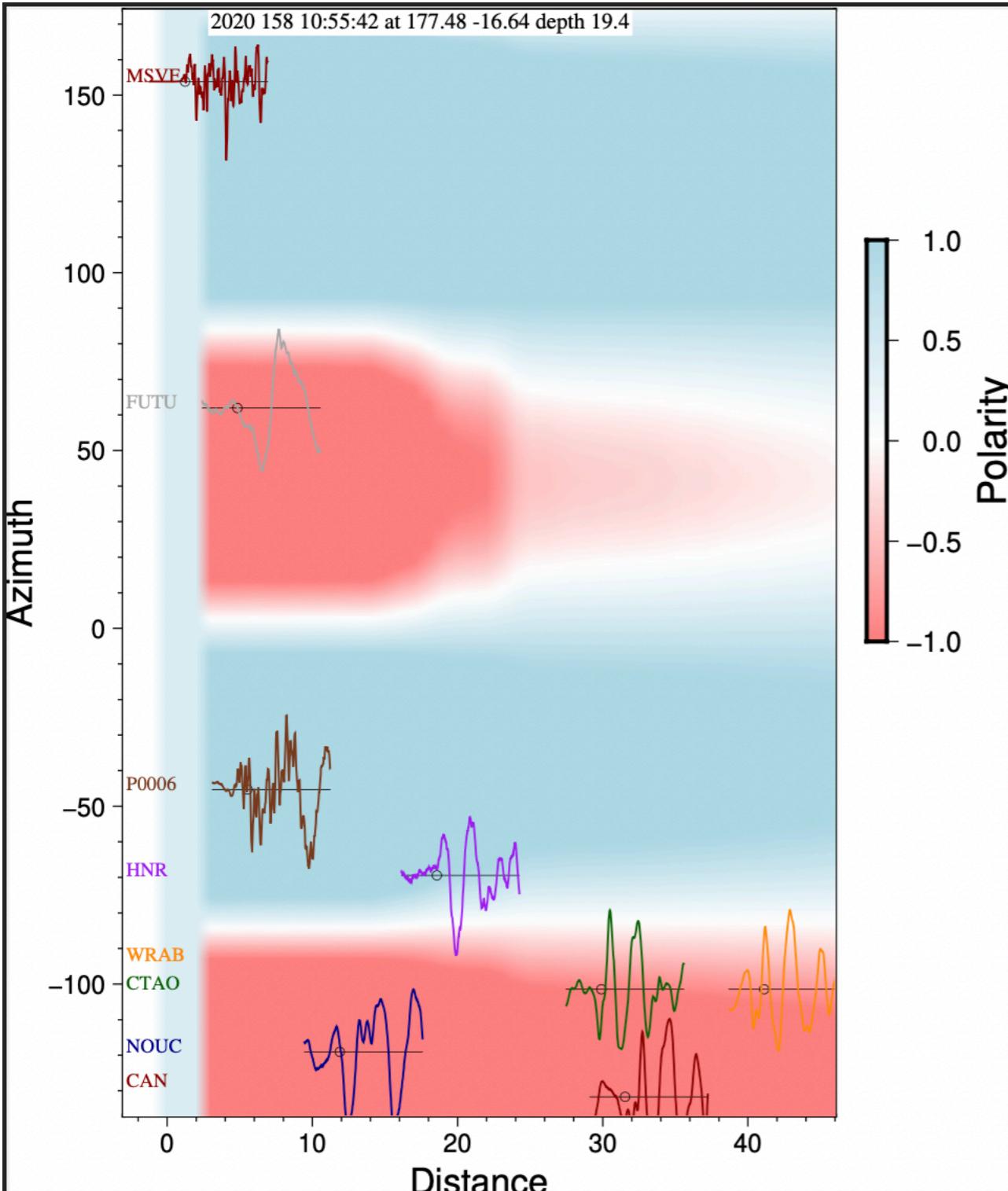


FUTU is noisier than MSVF but onset is clear



PMG: waveform is clearly different after AK135 P,  
pP follows P as predicted,  
prediction & onset is UP -> pickable

**June 6, 2020 M=5.7 h=19 km**

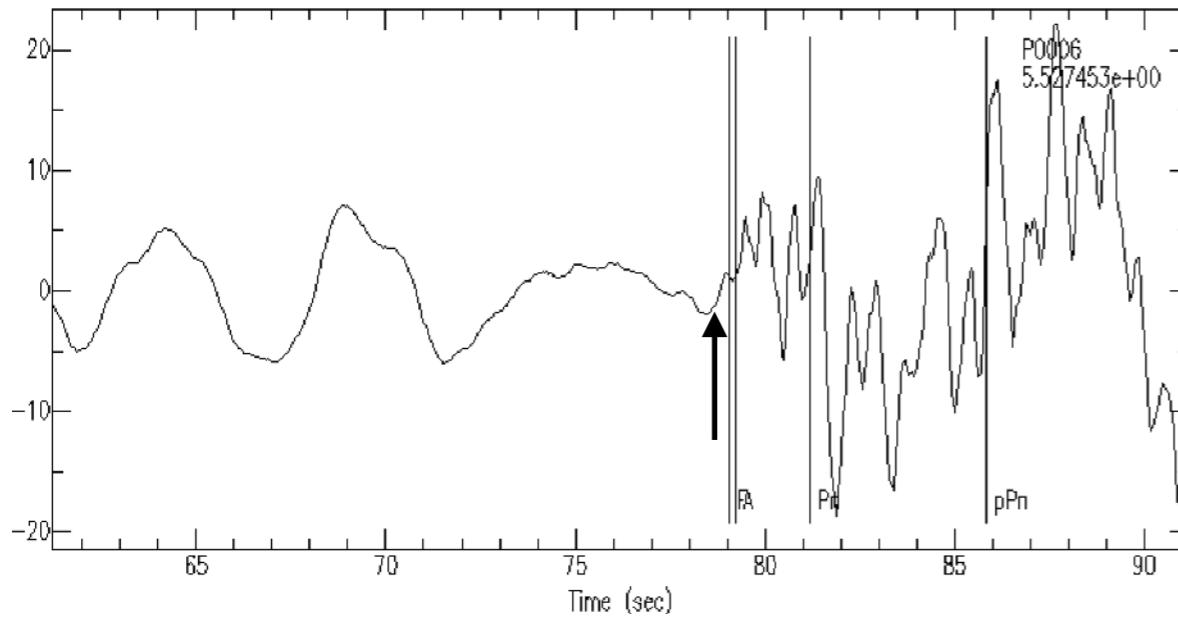


Polarities look OK

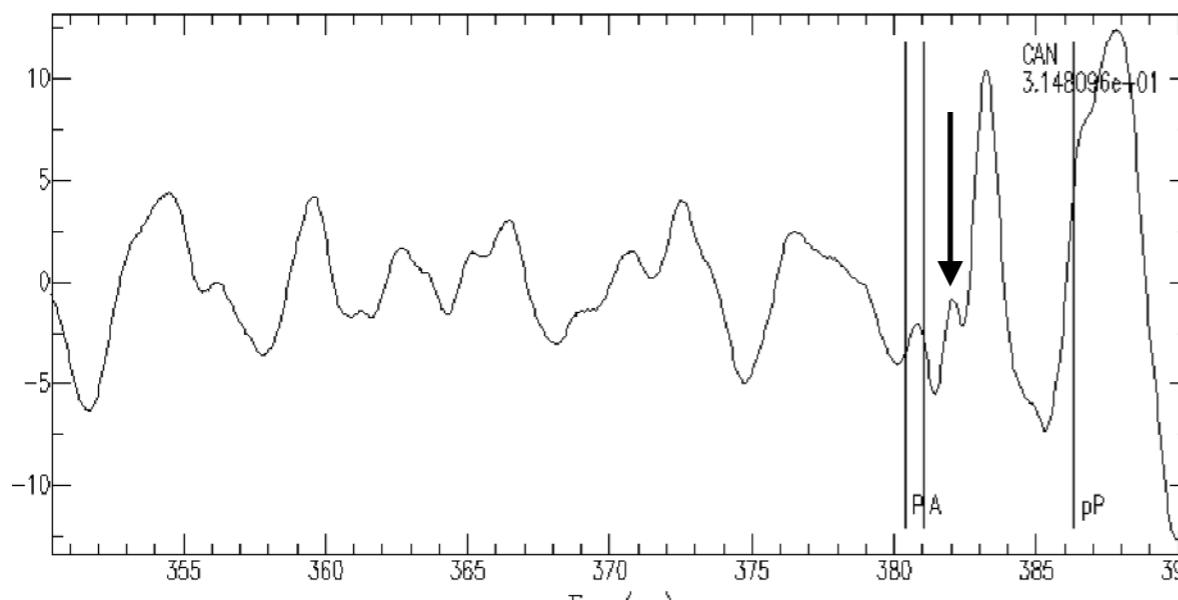
MSVF, P06 & HNR: UP

Others: DOWN

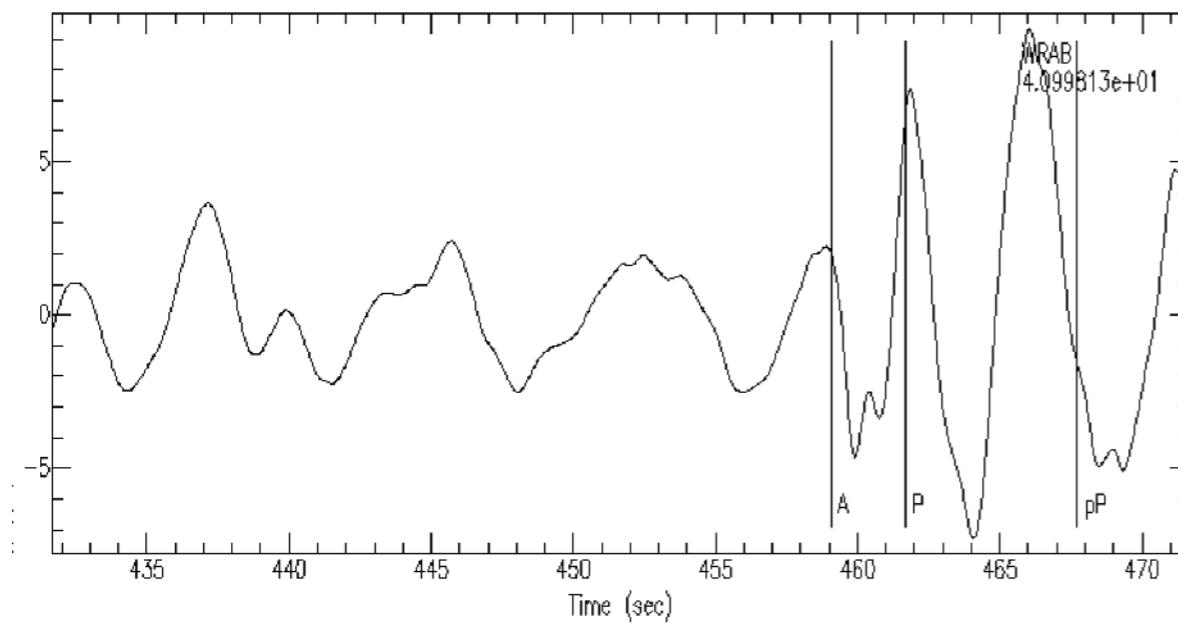
June 6, 2020 M=5.7 h=19 km



P06 must be UP: I picked when waveform clearly changes, in this case right after F. But usually F is a fraction of a second *late*, so probably I should have picked at the arrow, 0.6s earlier

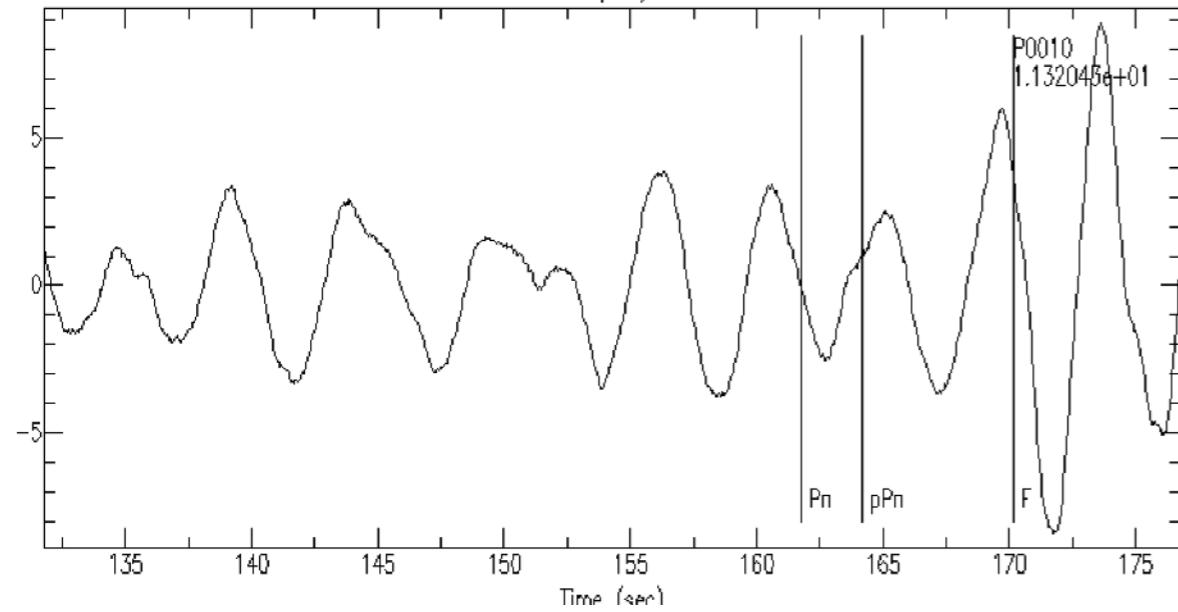


CAN: I pick the first DOWN after P. There is a second very small down 1s later (arrow) but I prefer A, it is where higher frequency enters the signal



WRAB: the sudden change of slope DOWN indicates the onset

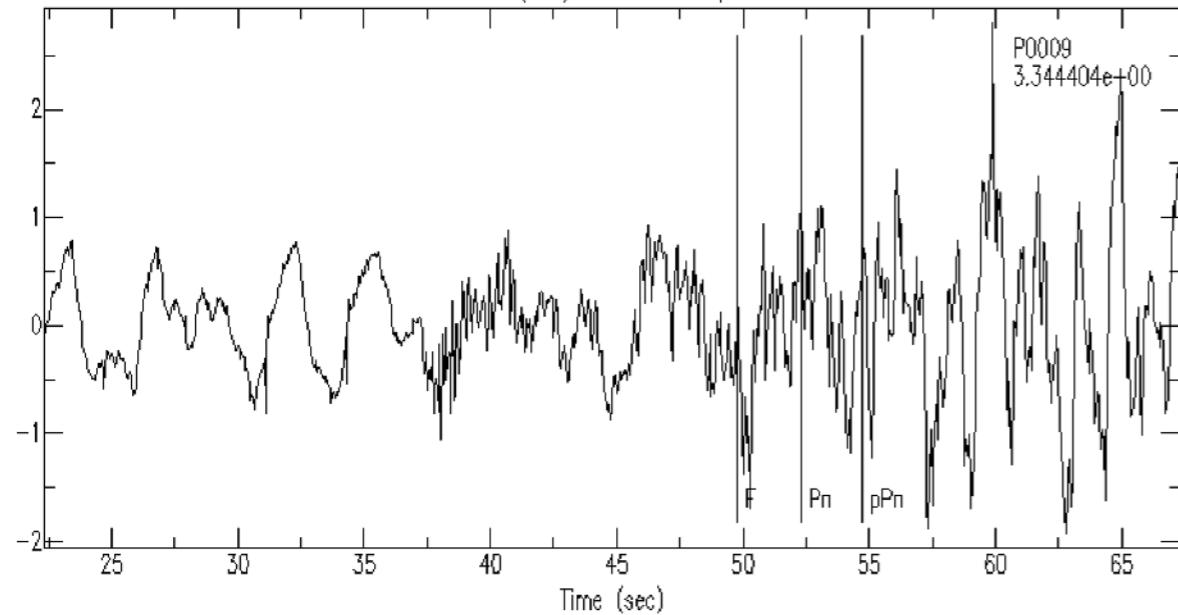
NOV 24 (328), 2021



### Rejected Events (for lack of Mermaid onsets)

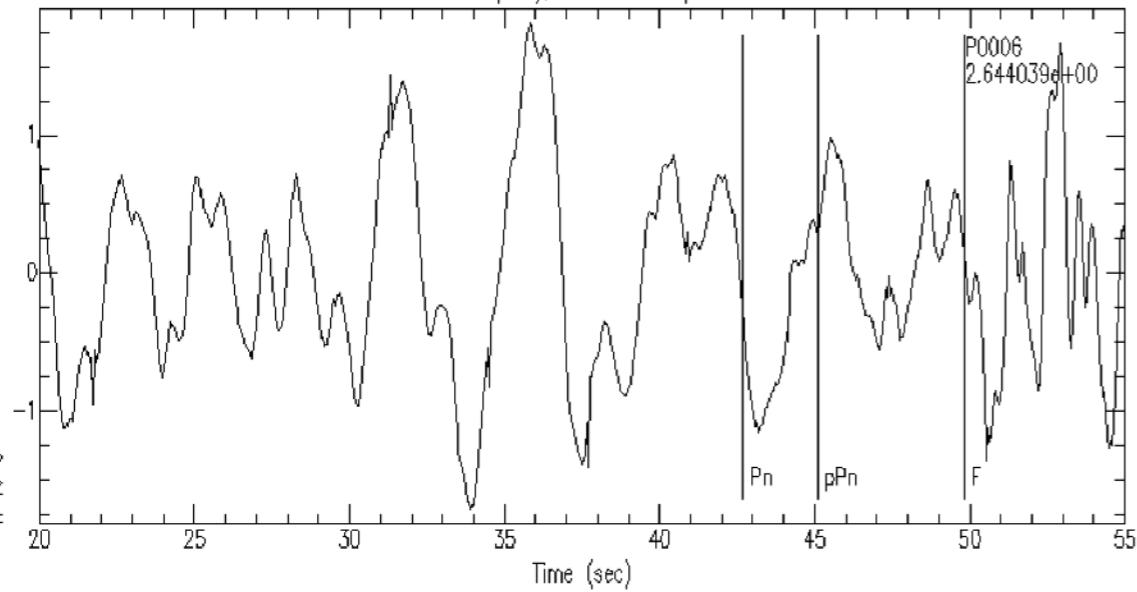
24/11/21: P10 is ambiguous so I reject it, and since it is the only Mermaid for 20211124 I reject this event altogether

OCT 09 (282), 2022 after hp 1 Hz

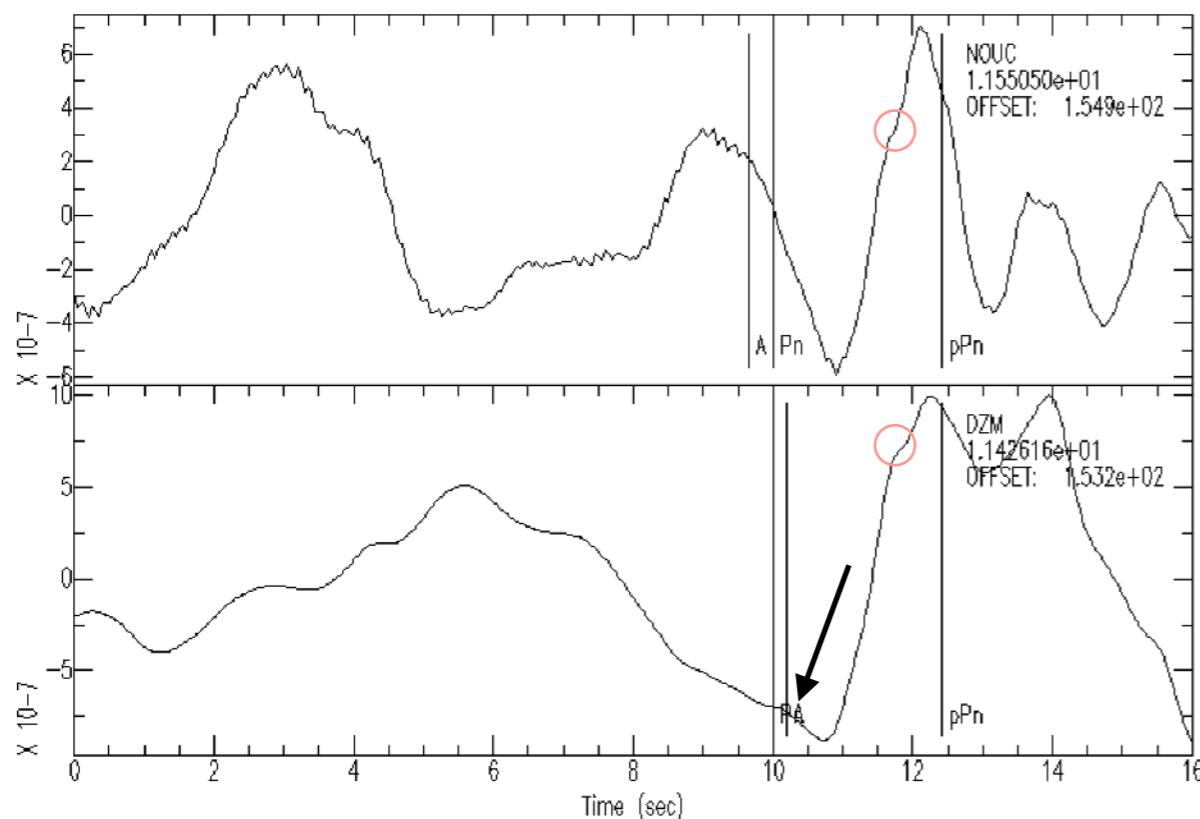
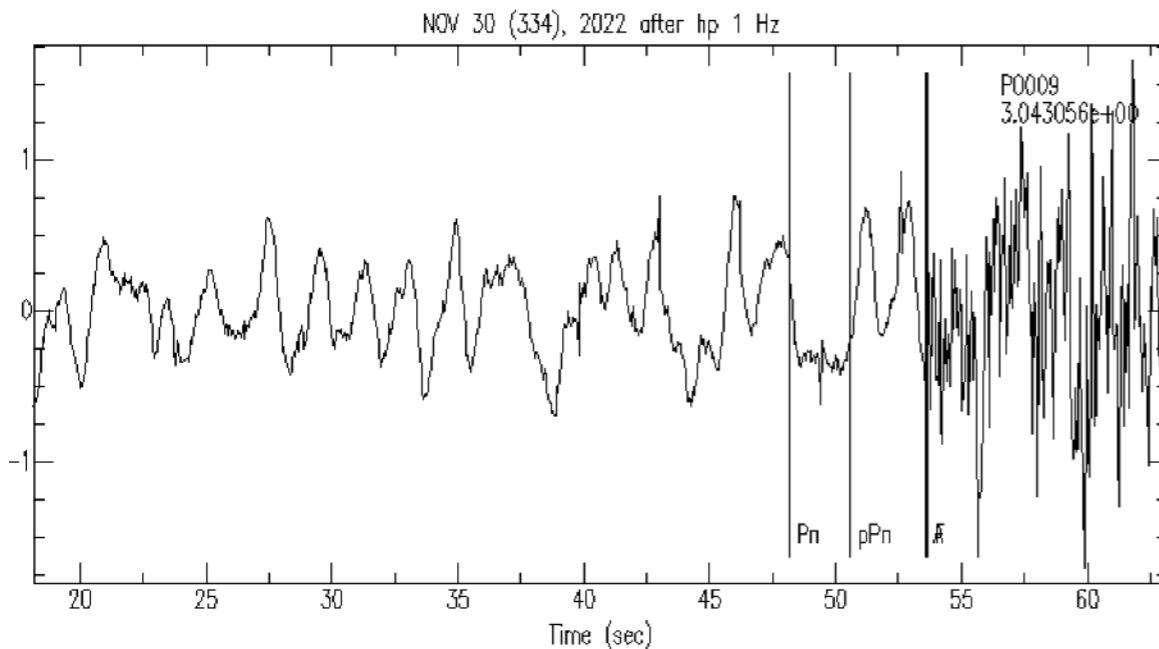


09/10/2022: P09 has high freq coming in 15s before AK135 P which is excessive so I did not dare pick that. It is the only Mermaid for 20221009: I reject this event

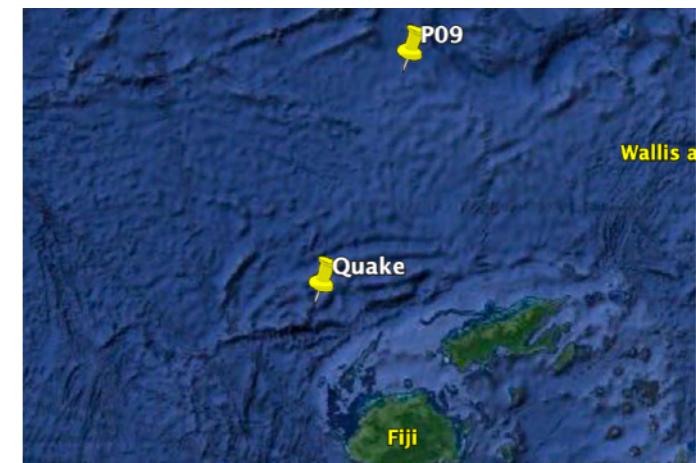
DEC 13 (347), 2018 after hp 1 Hz



13/12/2018: P06: higher freq arrives near F, but onset not clear. Reject



20221130: P09 has clear start of very high frequency (near F), highlighted by hipass filter



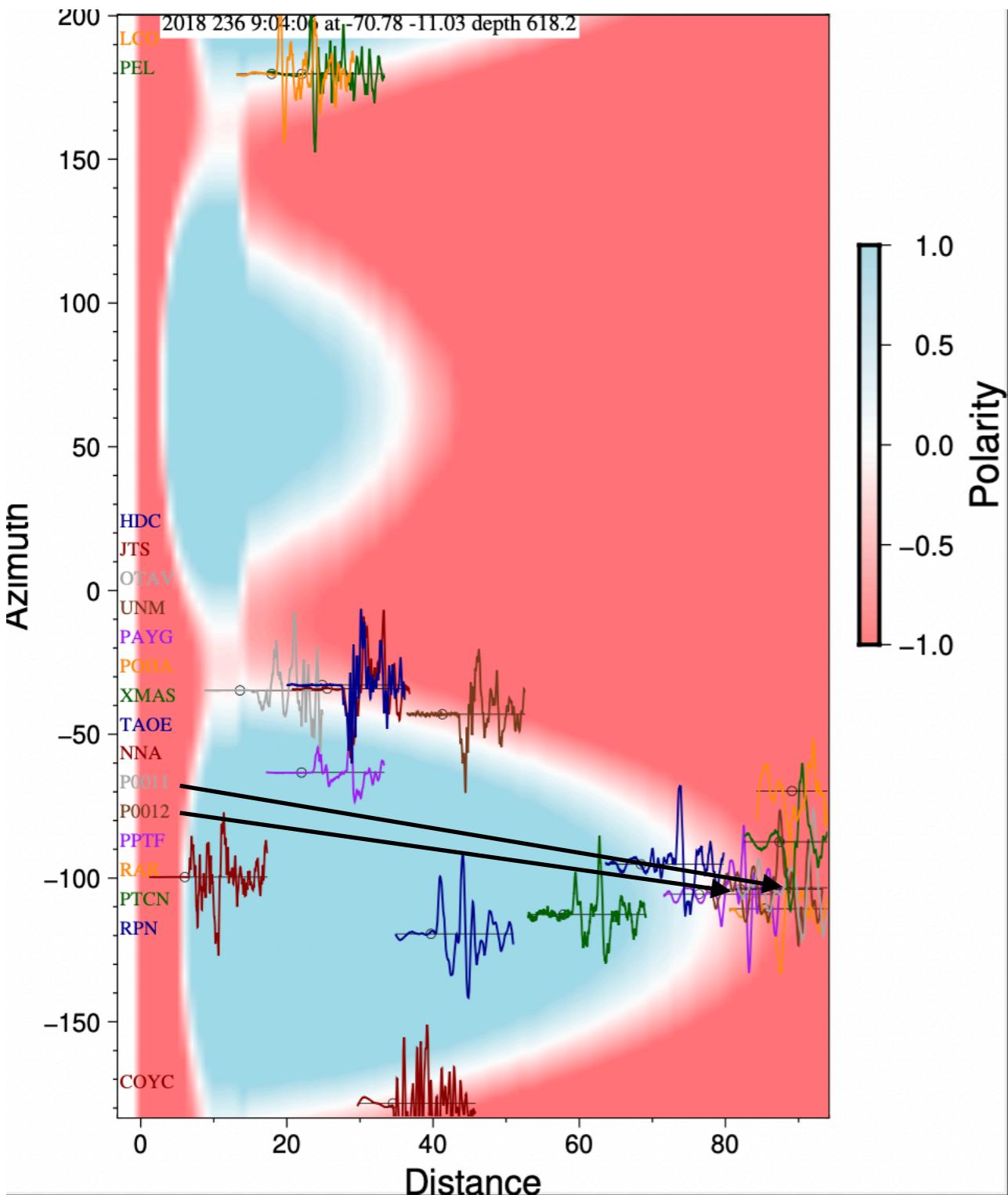
Same event: In NOUC I was initially not planning to pick

But then I saw that Pn in DZM was also followed by a (small) DOWN (arrow) followed by a large positive peak just before pPn.  
They even share a small inflection (circles)  
I therefore decided to pick them both on the DOWN swing.  
(Plotted with <P1 rel> so the time axis is relative)

**DEEP cluster #13 is around 9S, 71W - rays to SPPIIM dive and do not sense the slab**



August 24, 2018



Polarity predictions seem correct

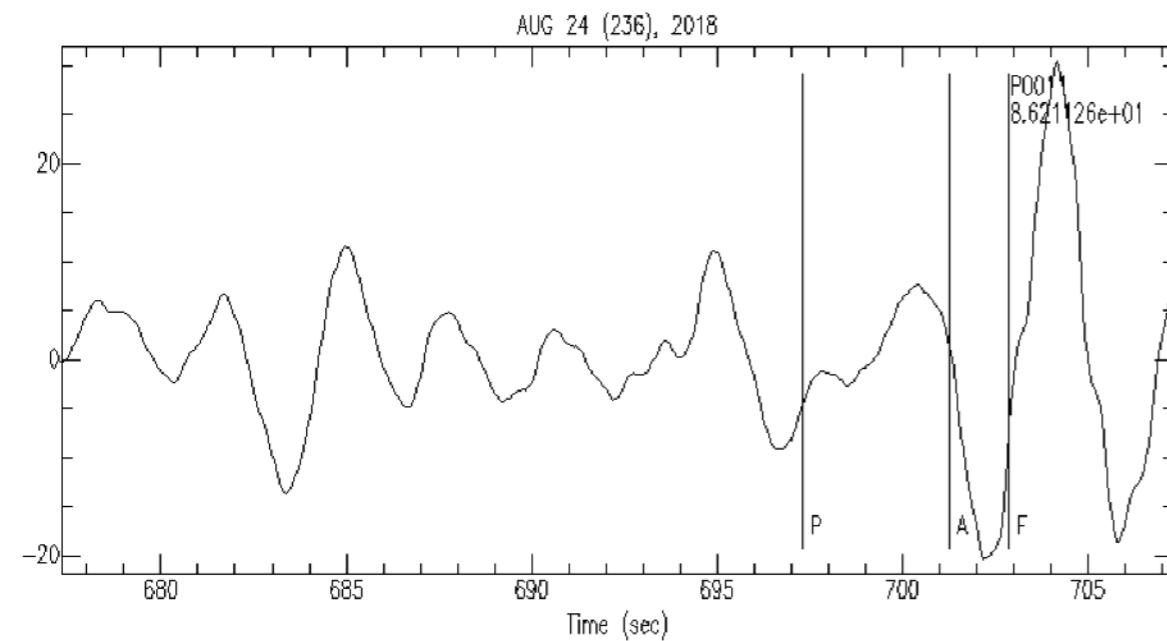
P11 is predicted DOWN, but  
P12 is in the nodal zone

**Note:** the predicted P time is at the small circle, and that circle is plotted at the distance/event-azimuth of the station.

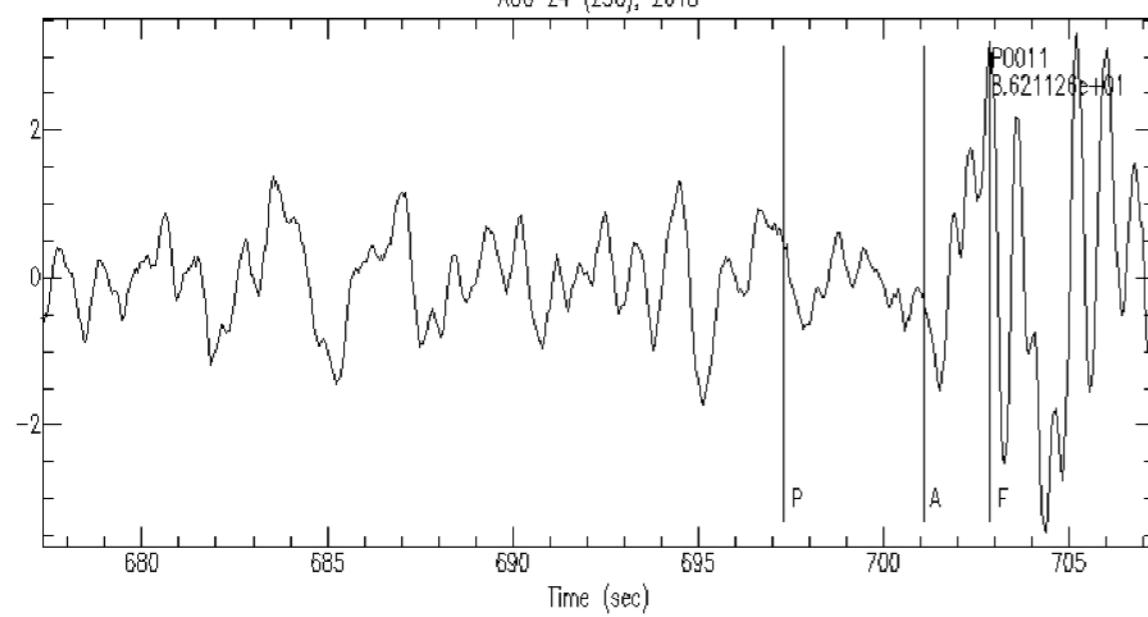
The station labels are coloured same as the seismograms, but their place on the vertical axis does generally not correspond to the azimuth (so as to avoid overlap of the text)

It may happen that labels are outside of the plot limits and become invisible.  
Distance and azimuth are printed in the ppk plots.

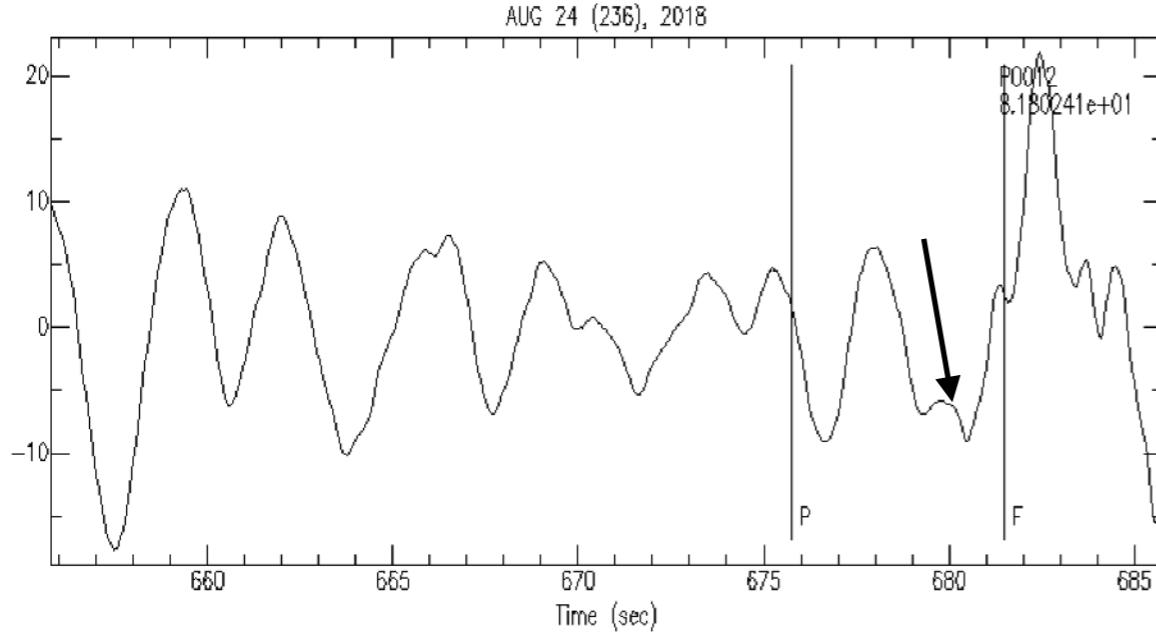
You can also consult the ppk\*.pdf plots for the station's distance/azimuth and compare signals that overlap here.



P11 is near the node, here it looks as if it is DOWN, followed by large amplitudes

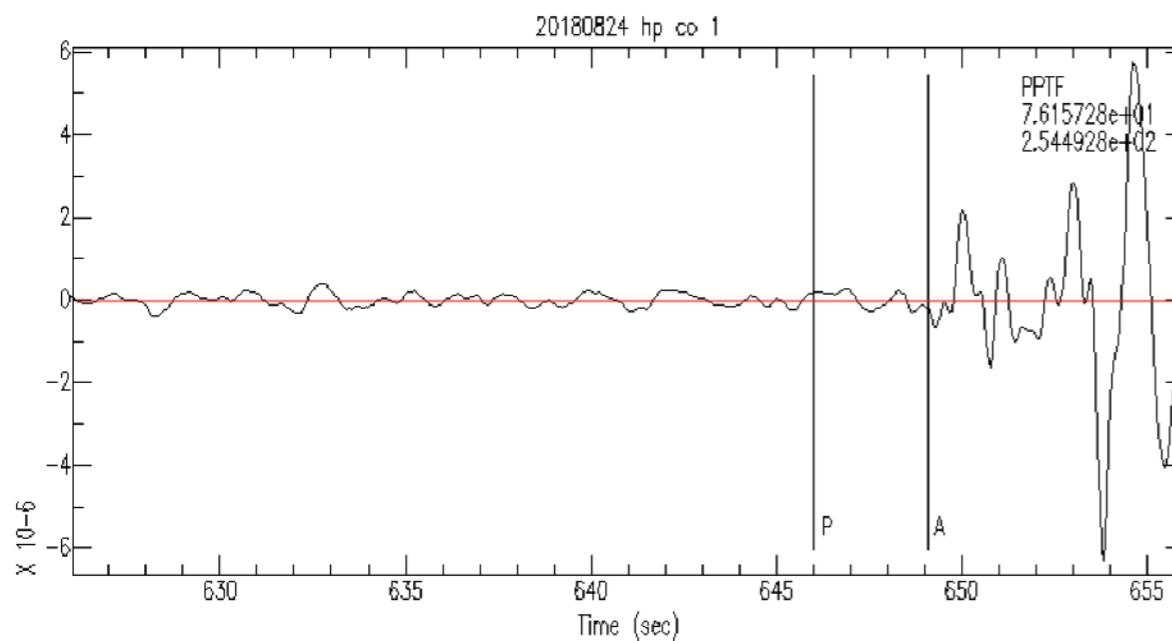


But P11 onset was easier to pick from hp

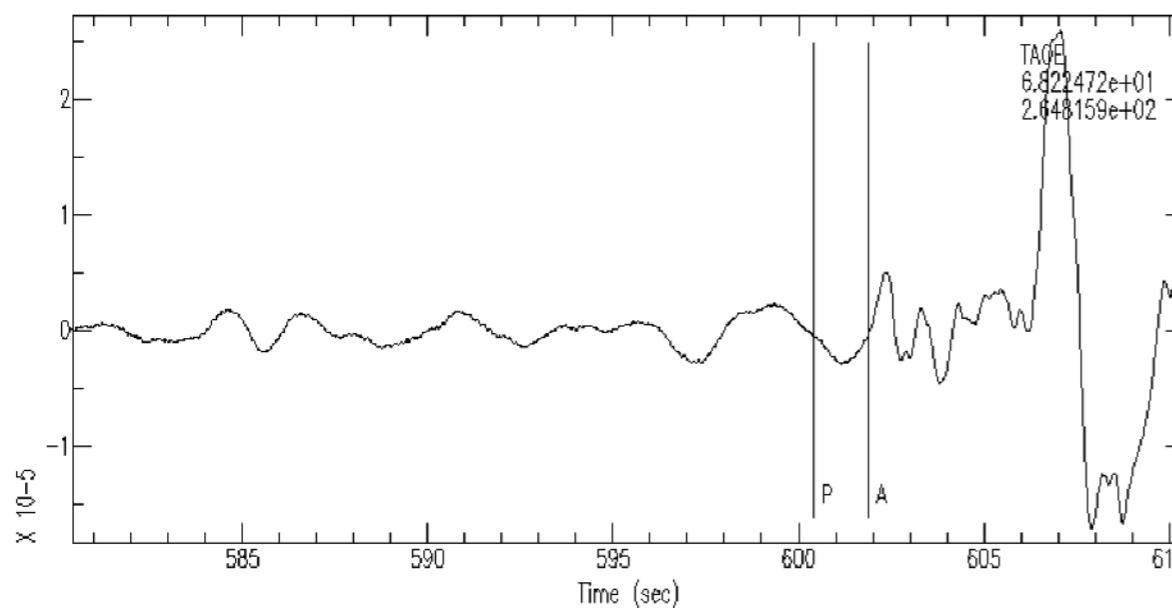


P12 does not have a clear onset, though one could argue for the arrow after comparison with P11 which is not too far away and at same azimuth of -103 deg

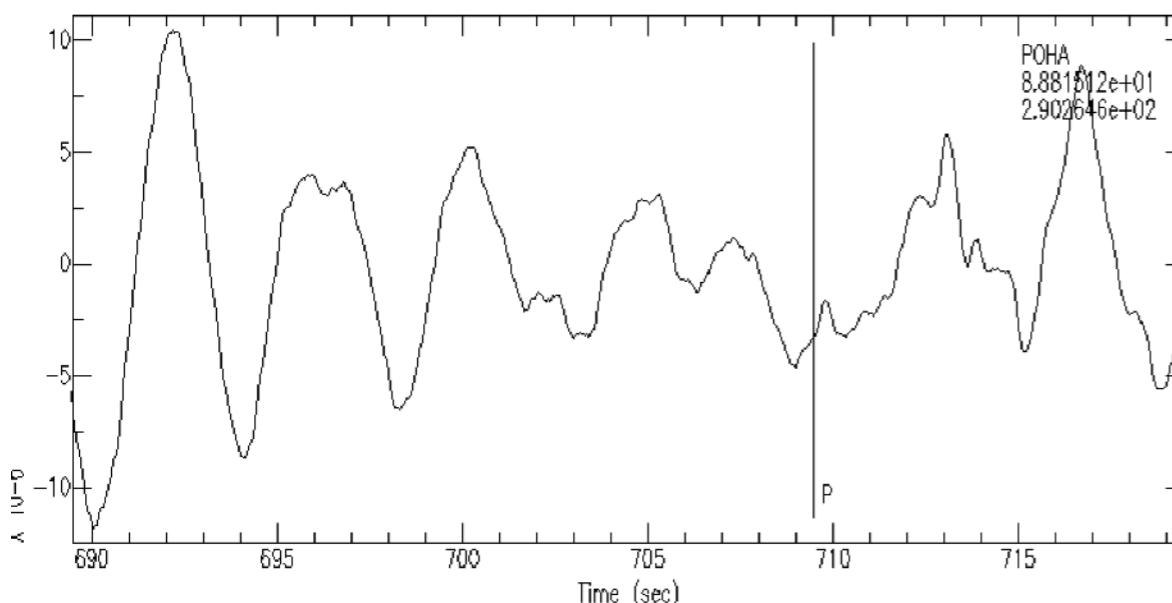
**August 20, 2018**



PPTF (gcarc 76, azi -106) is in nodal zone but after hp I decided on the small DOWN followed by larger UP.

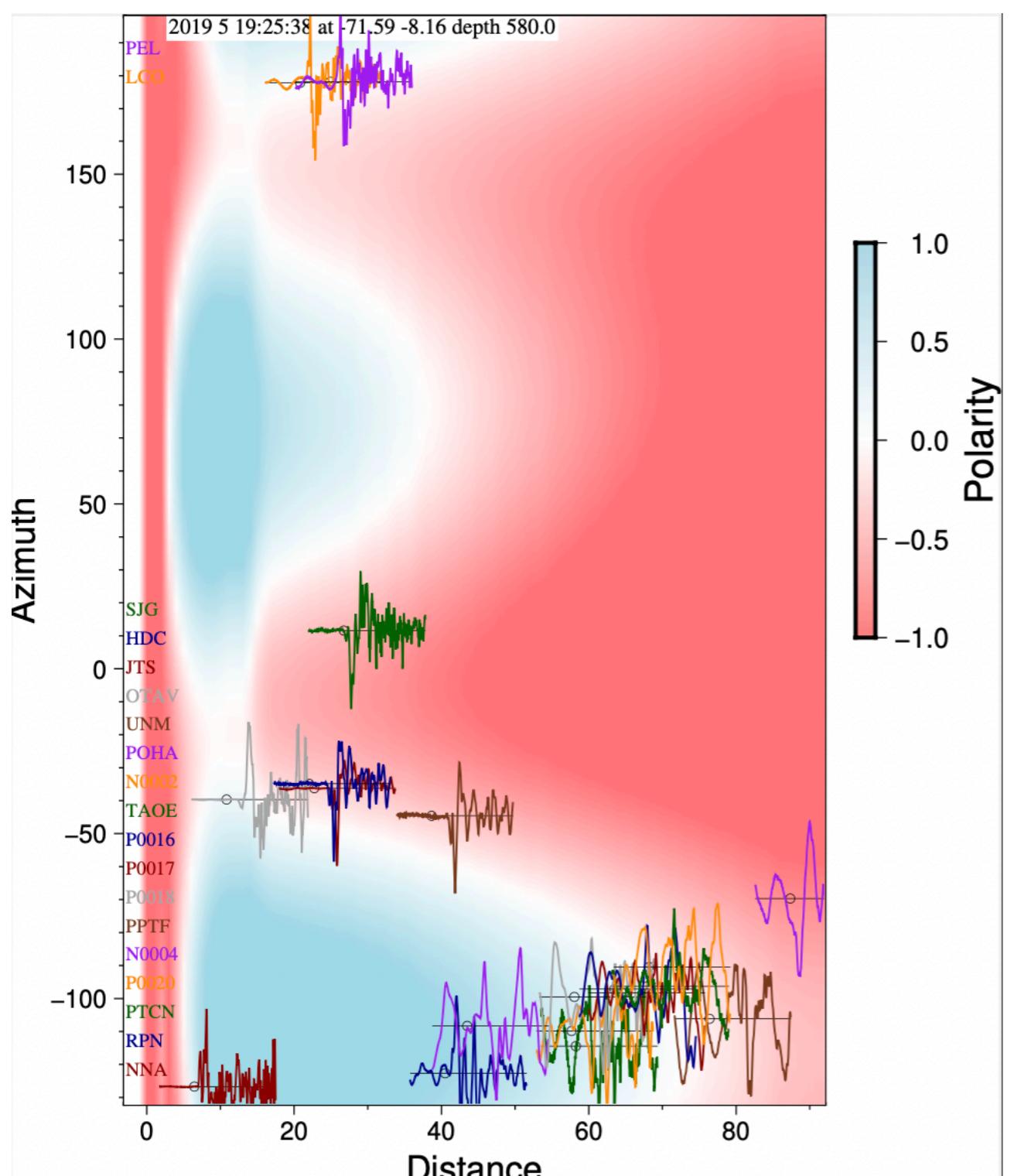


TAOE (gcarc 68, azi -95) is predicted UP



POHA (gcarc 89, azi -70) is too ambiguous to pick

January 5, 2019

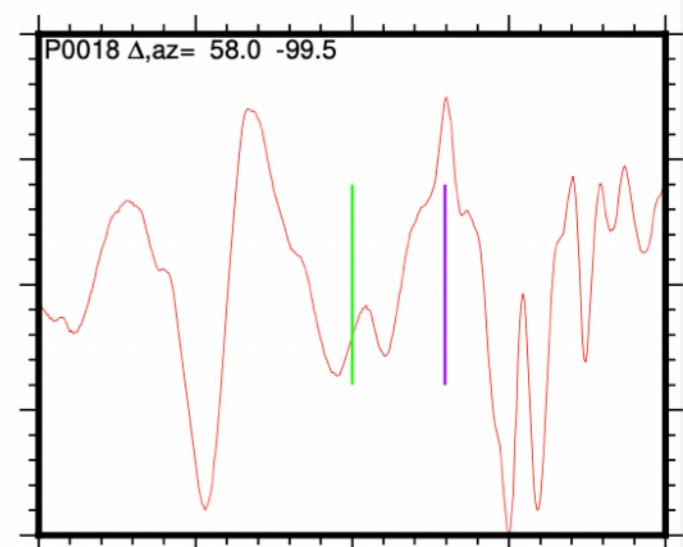
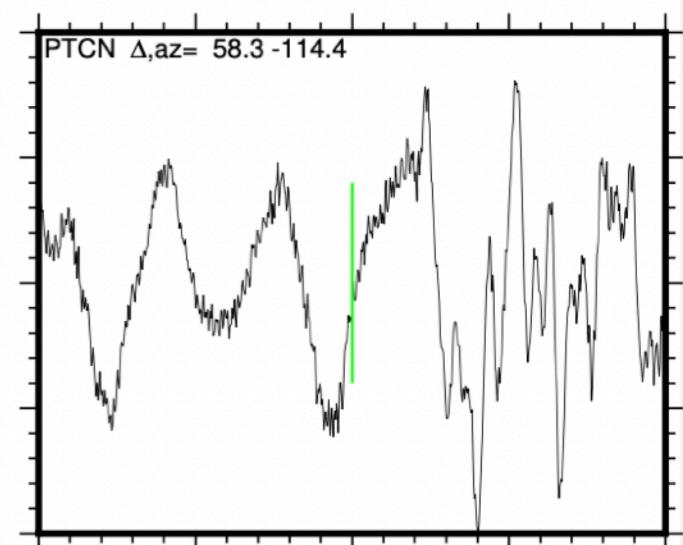
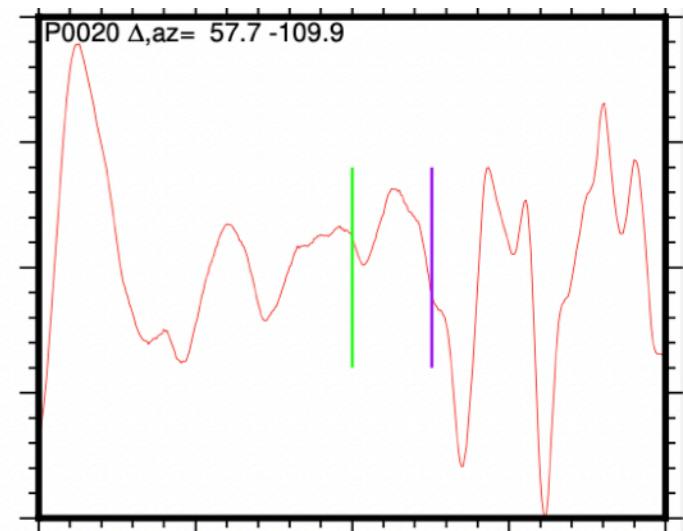


Polarities seem reliable

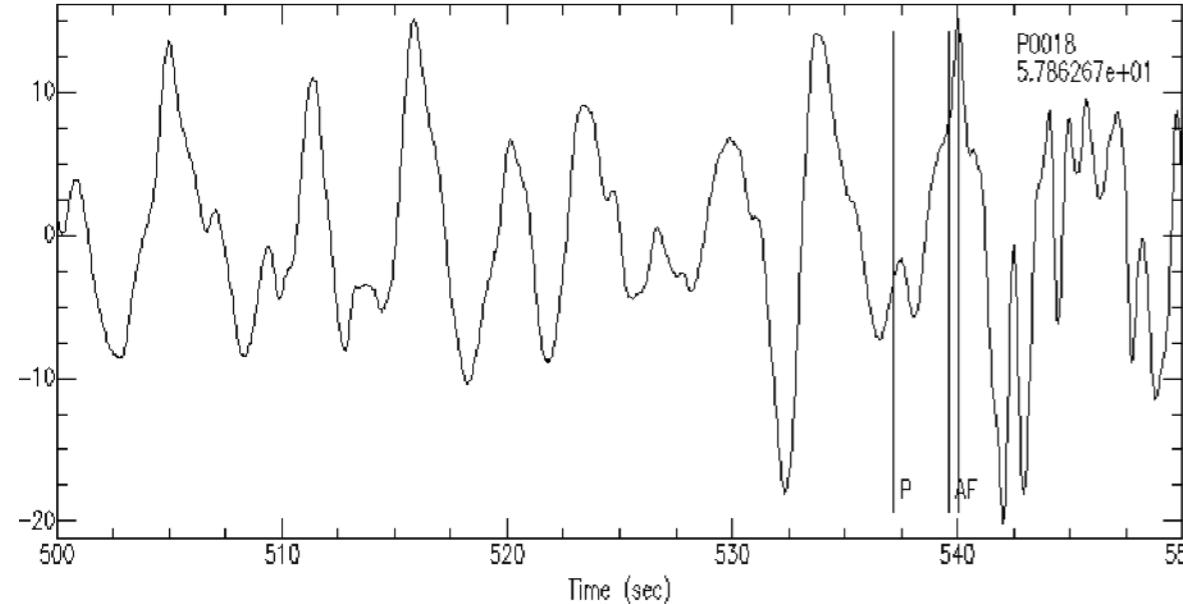
Predictions:

$\Delta$	azi		
N04	43	-108	U
P20	58	-110	U
P18	58	-100	U
P16	63	-97	node
P17	65	-98	node
N02	68	-90	D

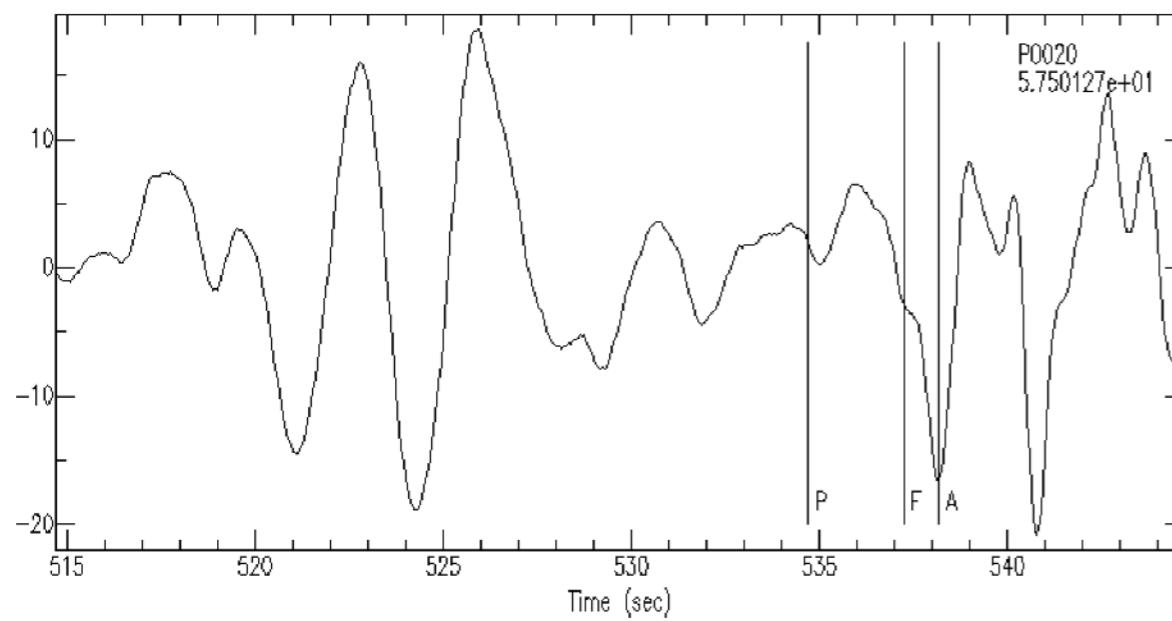
Why is P20 not UP? Its azimuth is between that of PTCN and P18, both UP



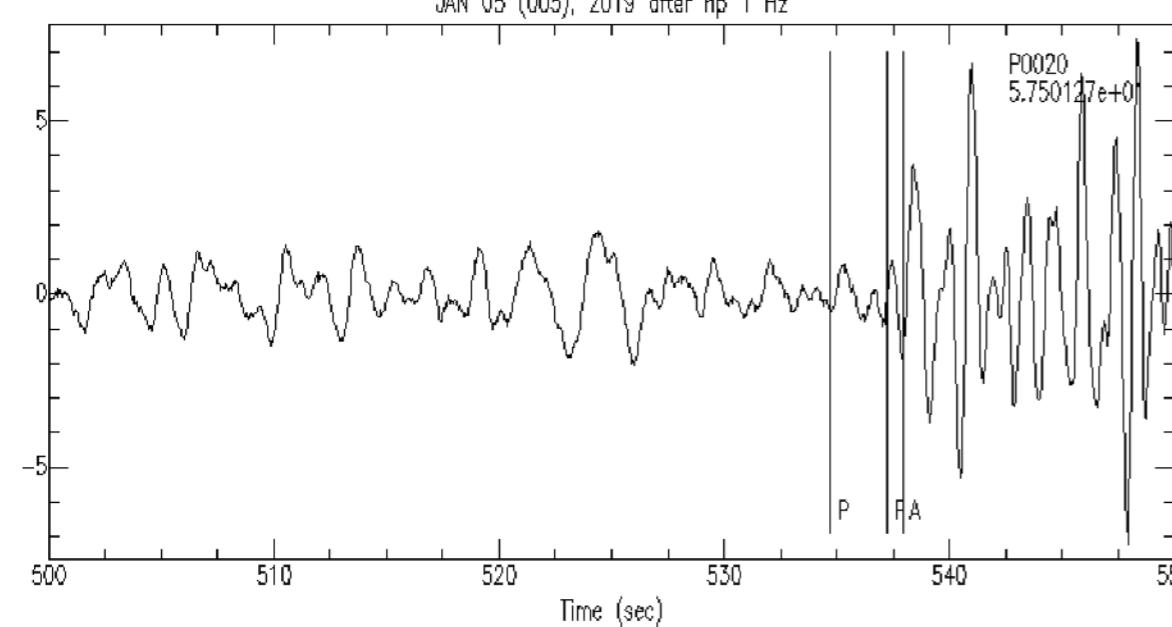
**January 5, 2019**



P18: clear UP as predicted

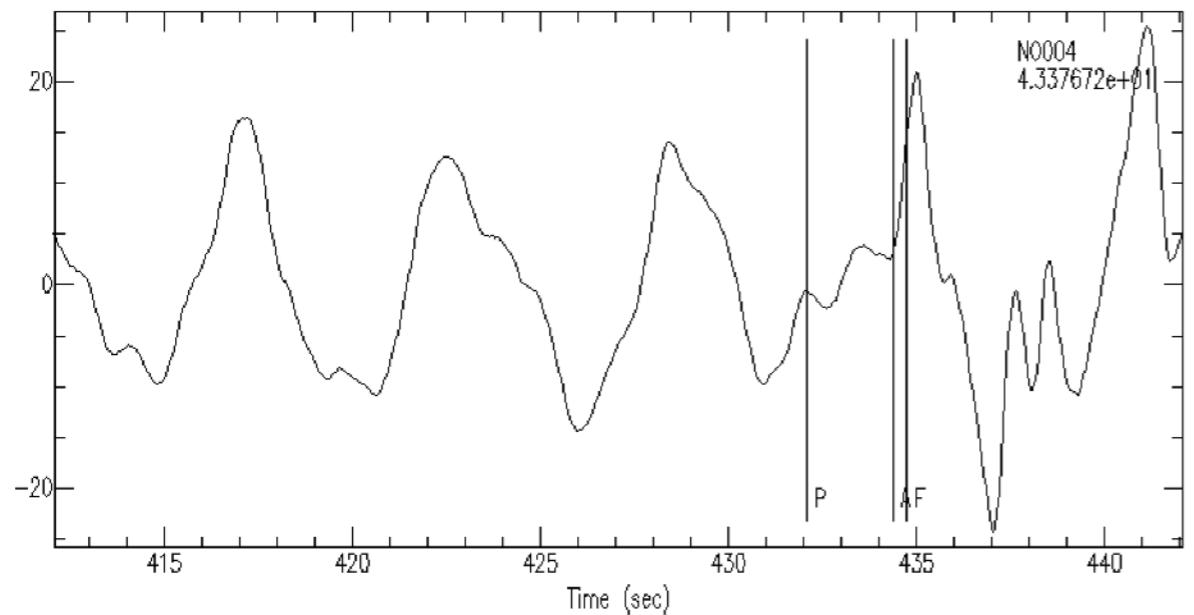


P20: going down, against prediction  
and comparison with nearby P18  
and PTCN...  
In the noise before P, there are  
however a few similar downswings  
(outside of plot shown here).

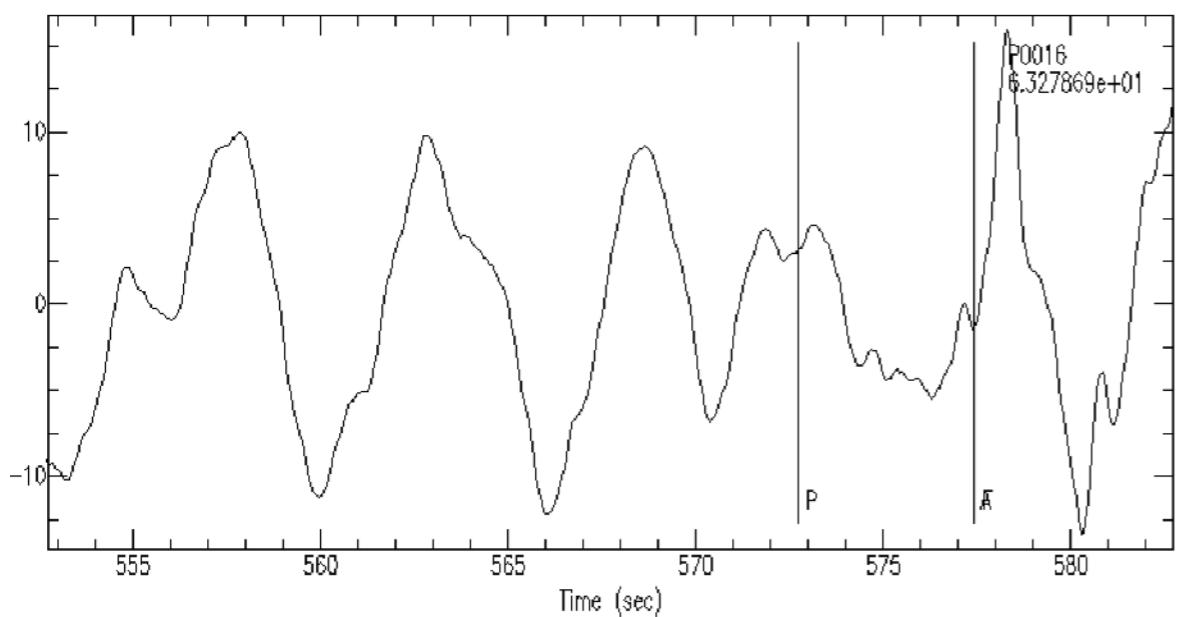


P20 *after high pass 1 Hz*: pickable UP  
as predicted.  
F is 0.7s earlier, and also a possibility,  
but has rather low amplitude.

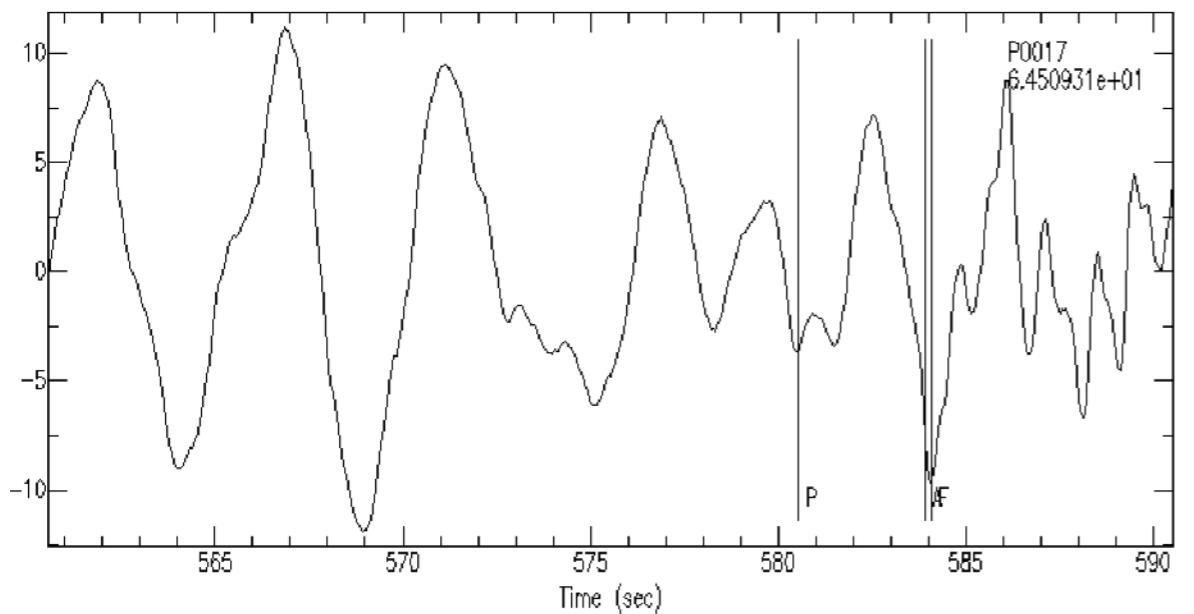
**January 5, 2019**



N04: unambiguous UP

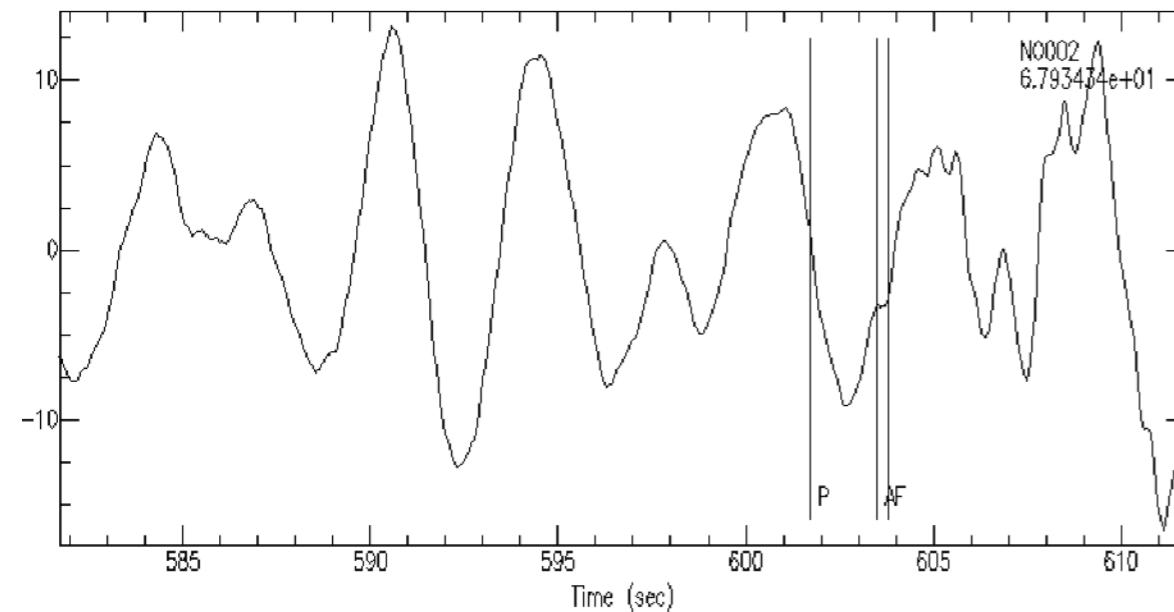


P16: unambiguous UP, A and F coincide  
(was predicted in nodal zone)

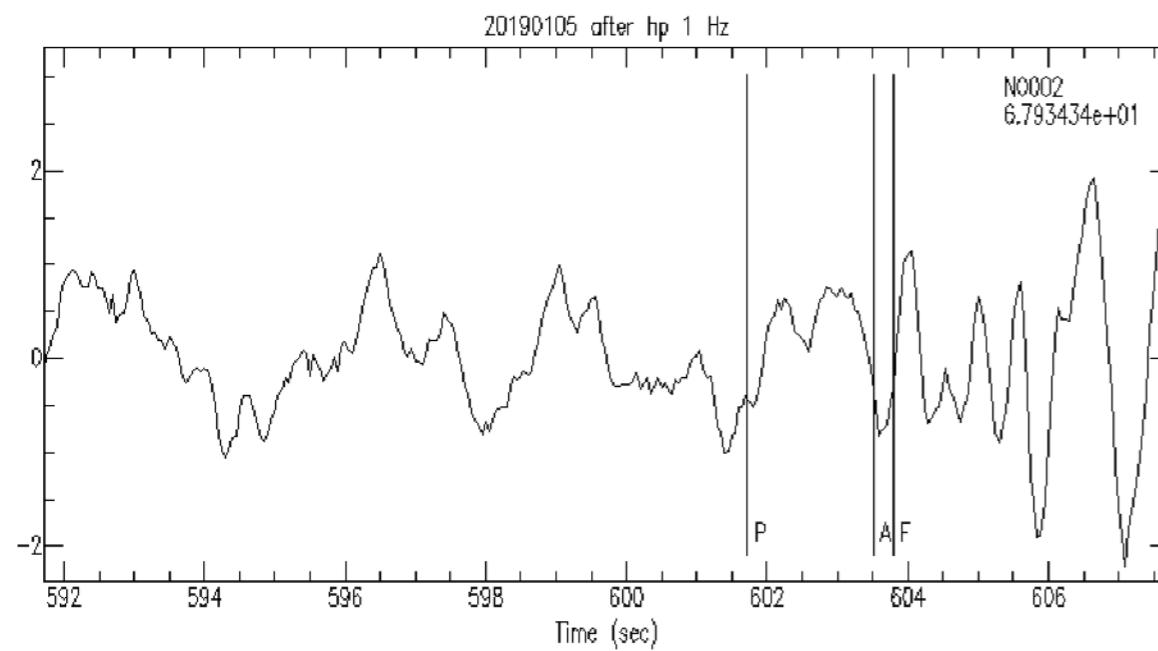


P17 (also nodal): it looks like onset is DOWN

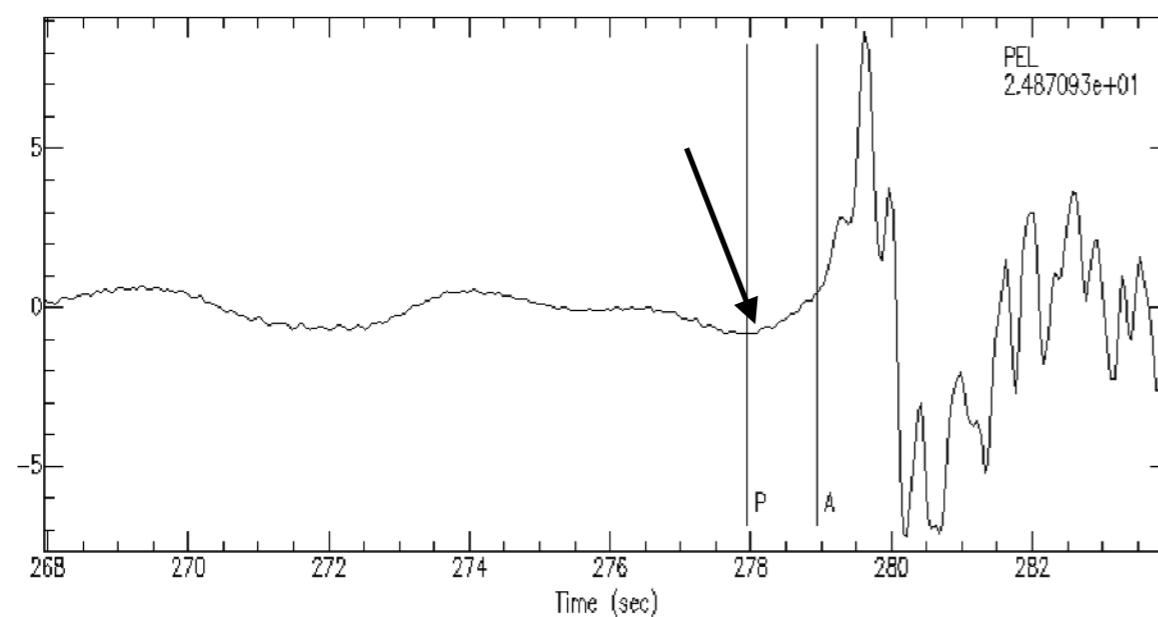
January 5, 2019



N02: predicted DOWN, though near node



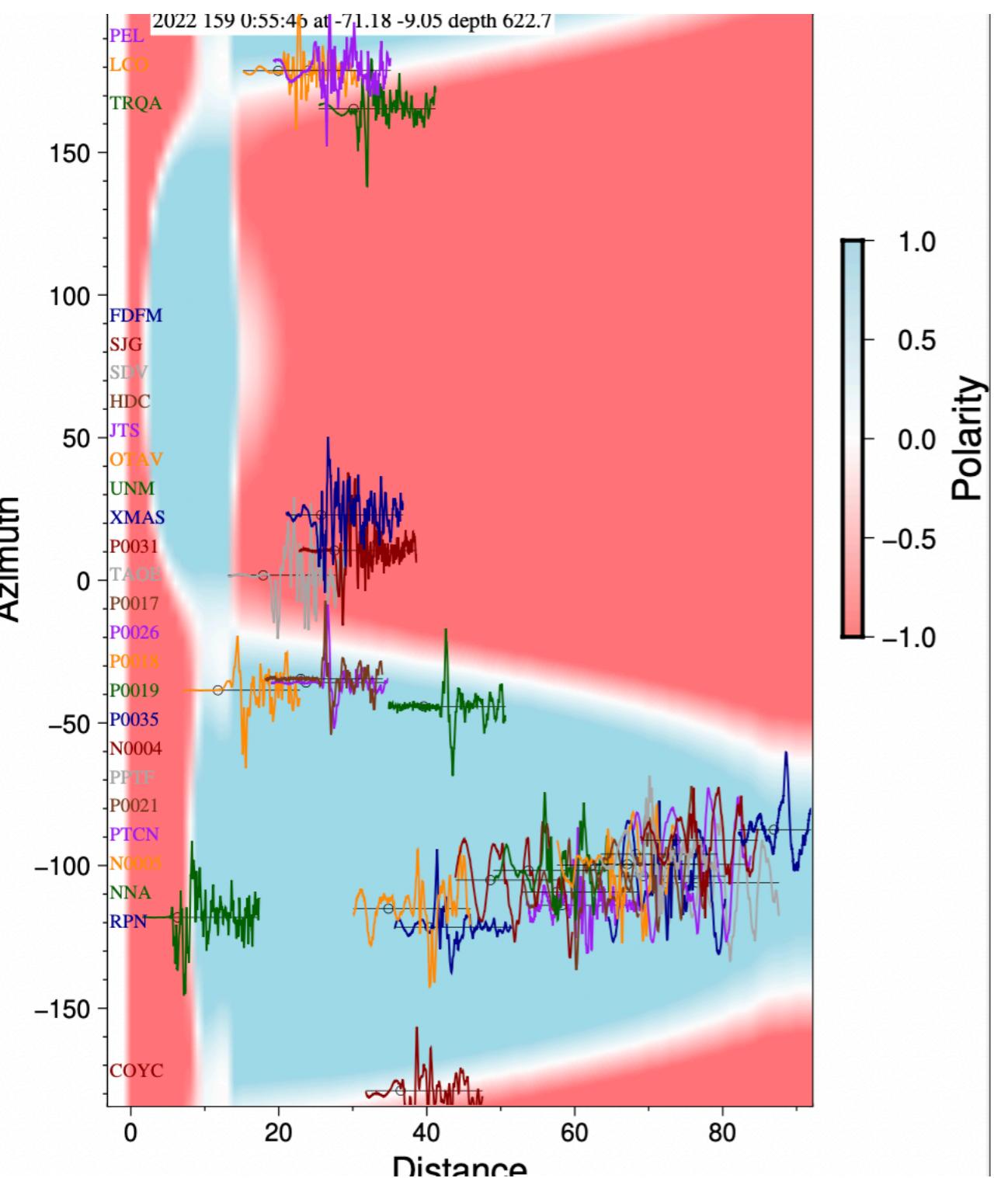
N02: After hp, and seeing change of wave character after  $t=603$  I decided on the DOWN onset just before F  
But this is a bit of a gamble, I only dare do it because I think that the onset must be near, if not at, A



PEL: Why do I not pick at the arrow?

Inspection of pre-P noise shows that these kind of slopes are seen earlier.

June 8, 2022

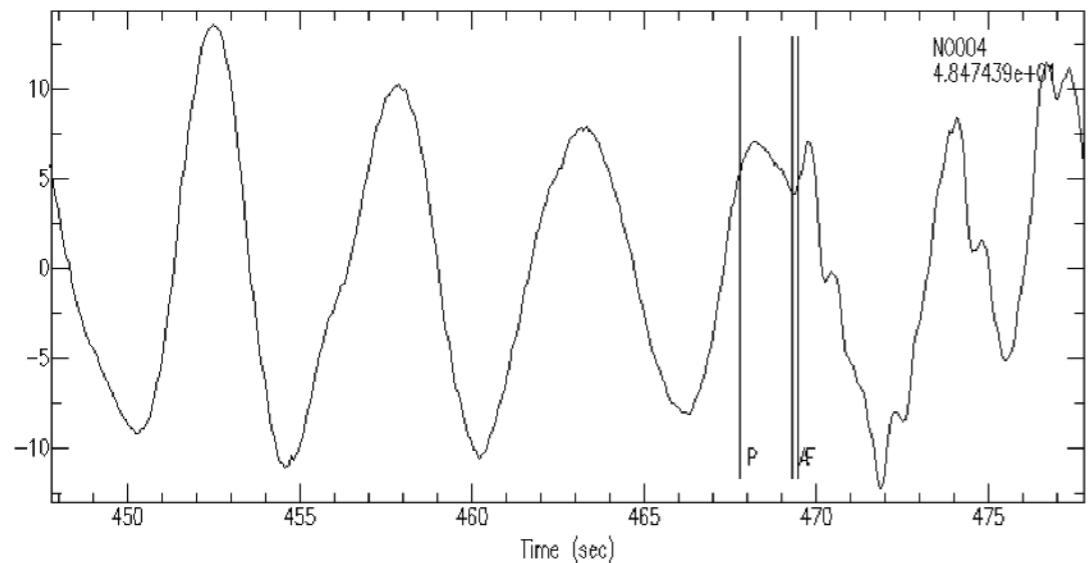


Polarities seem reliable  
All Mermaids predicted UP

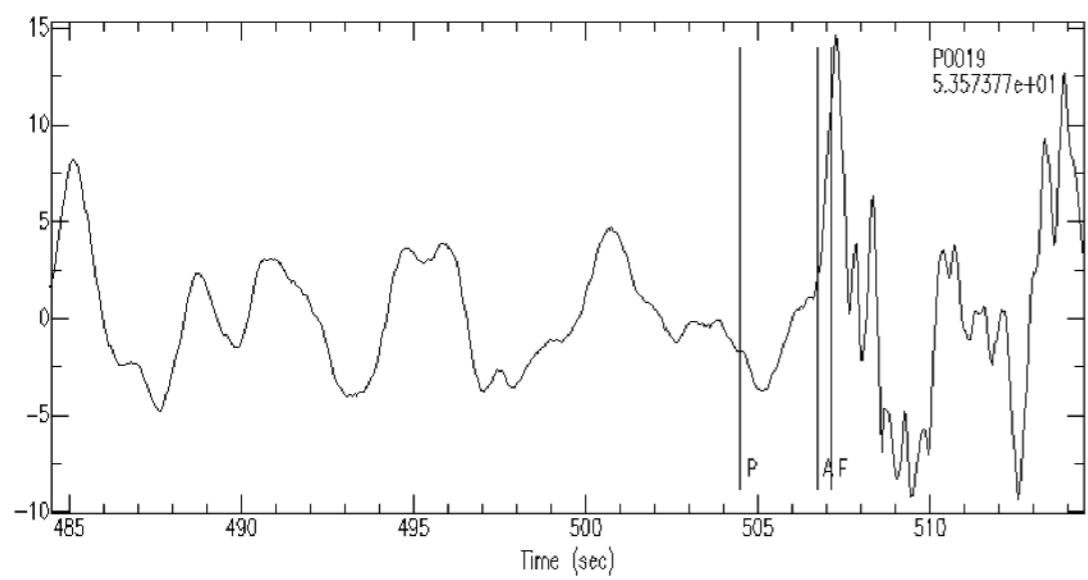
Predictions:

$\Delta$  azi  
N04 49 -105 U  
P21 58 -109 U  
P18 62 -100 U  
P17 63 -99 U  
P26 73 -100 U  
P35 69 -104 U  
P31 74. -91 U

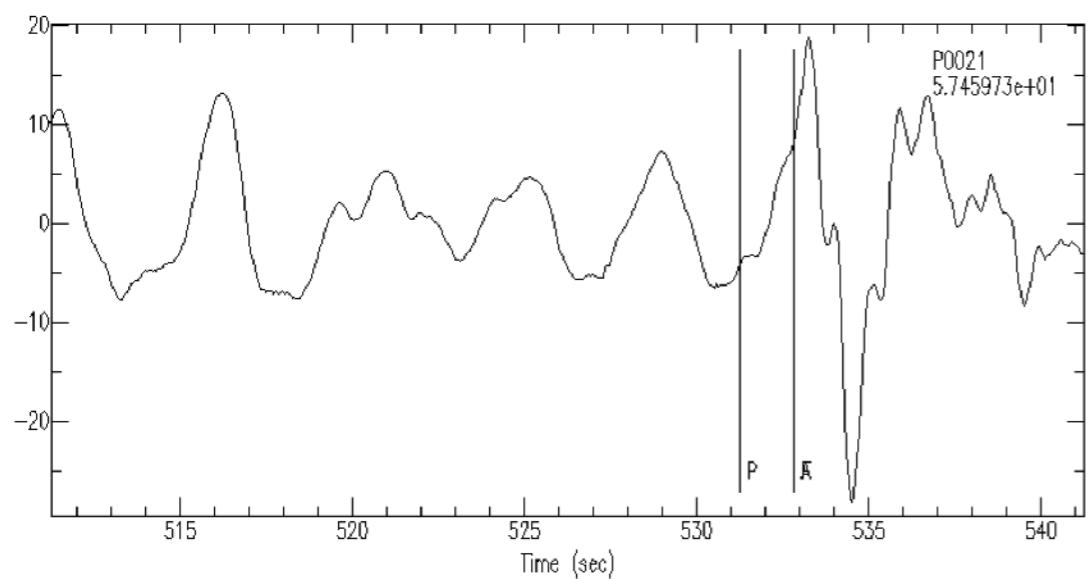
**June 8, 2022**



N04 clearly UP

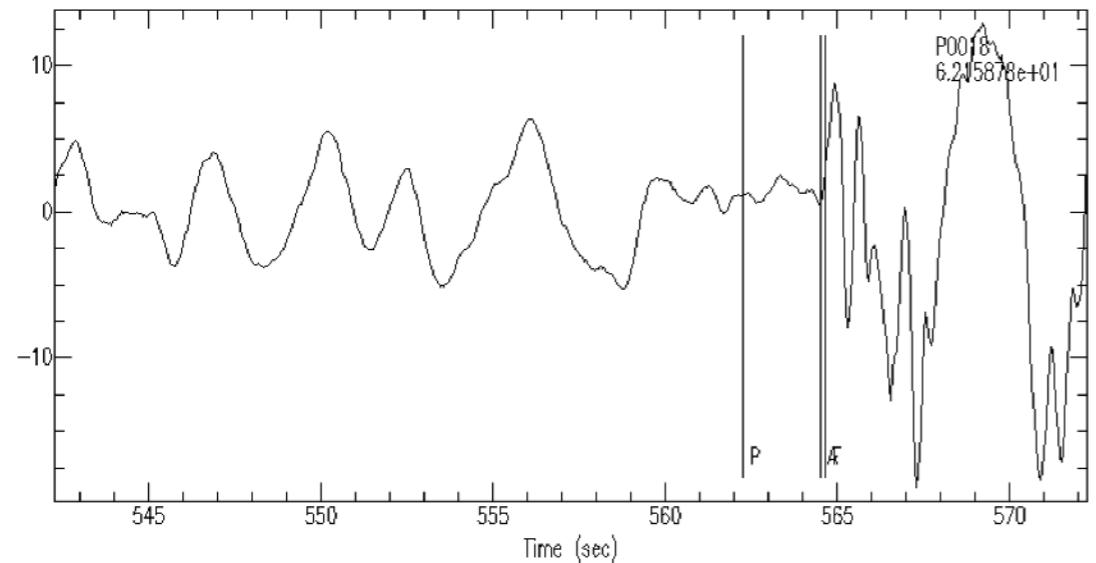


P19 clearly UP

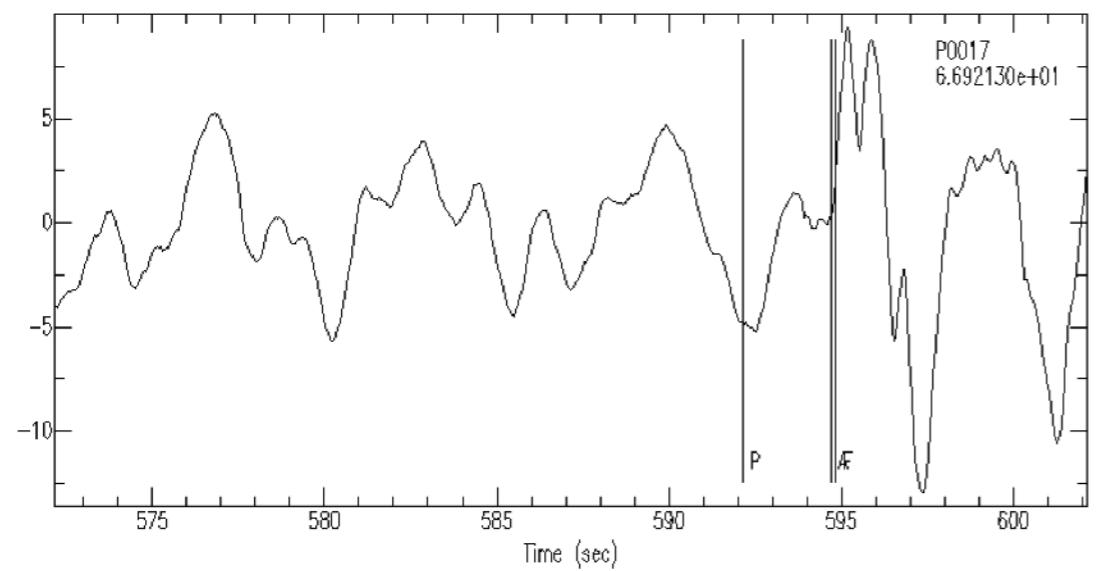


P21 clearly UP

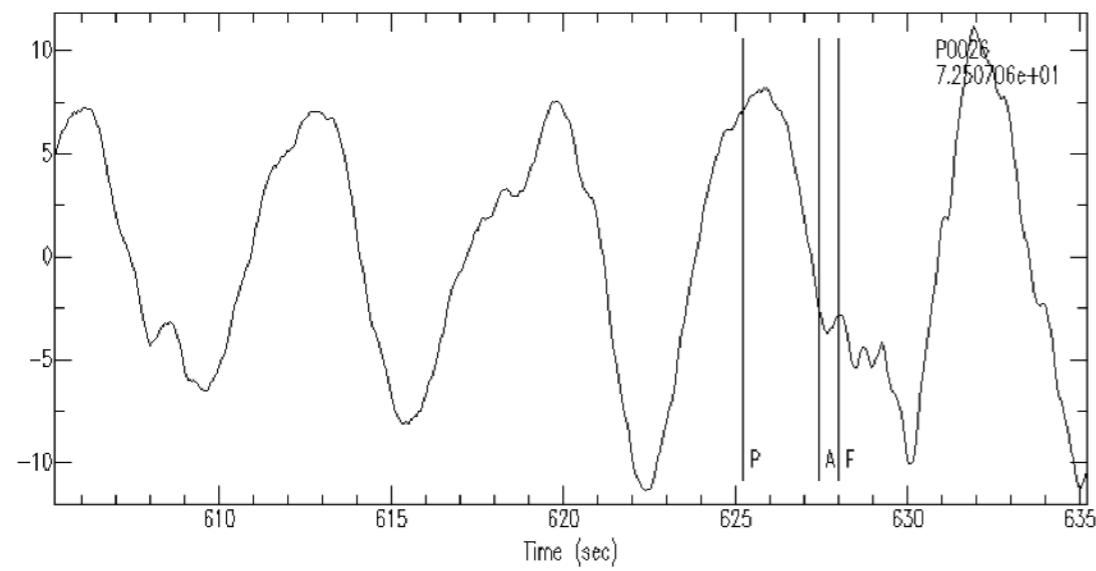
**June 8, 2022**



P18 clearly UP

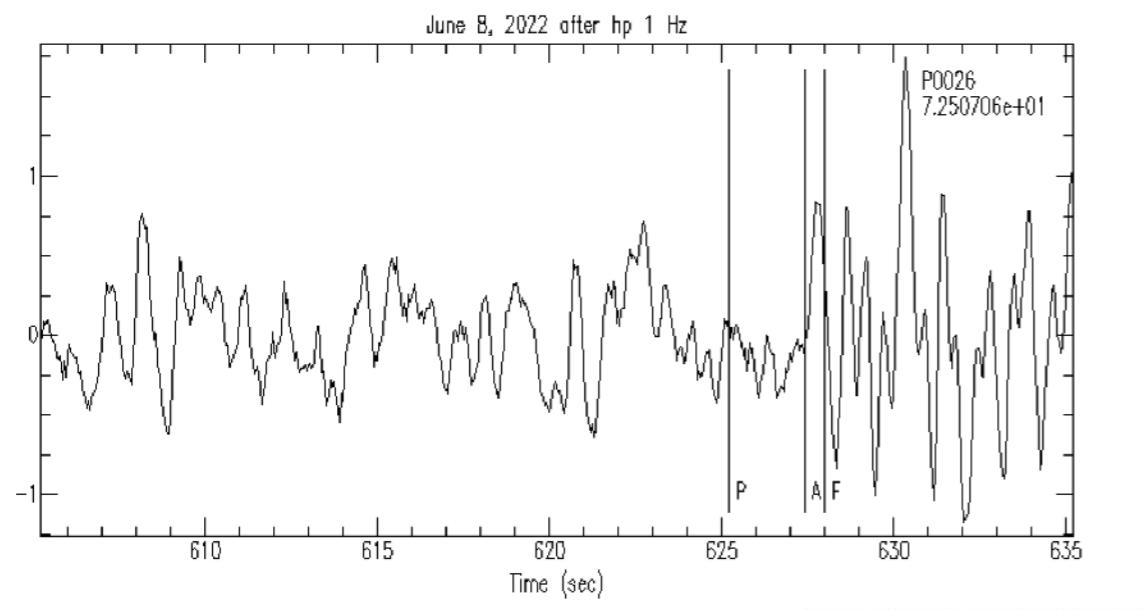


P18 clearly UP

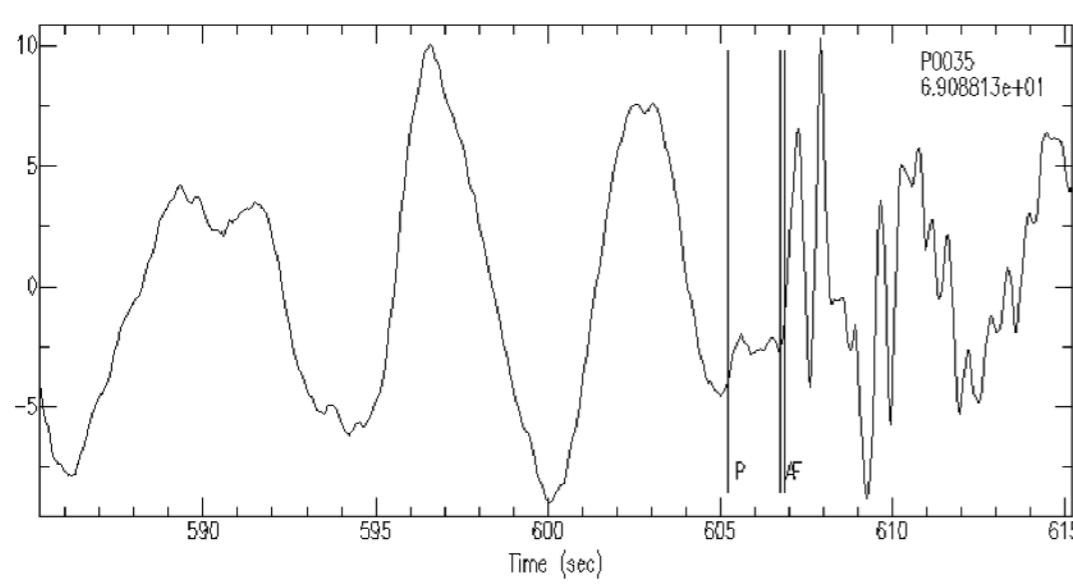


But P26 ??

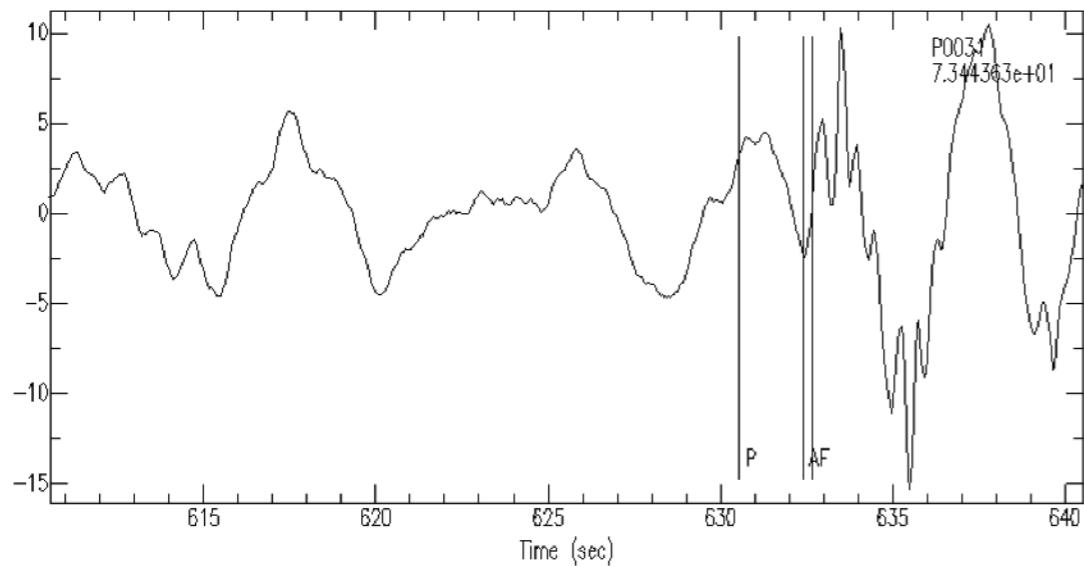
**June 8, 2022**



After high pass 1 Hz P26 is also UP, as predicted



P35 clearly UP



P31 is also picked at UP



