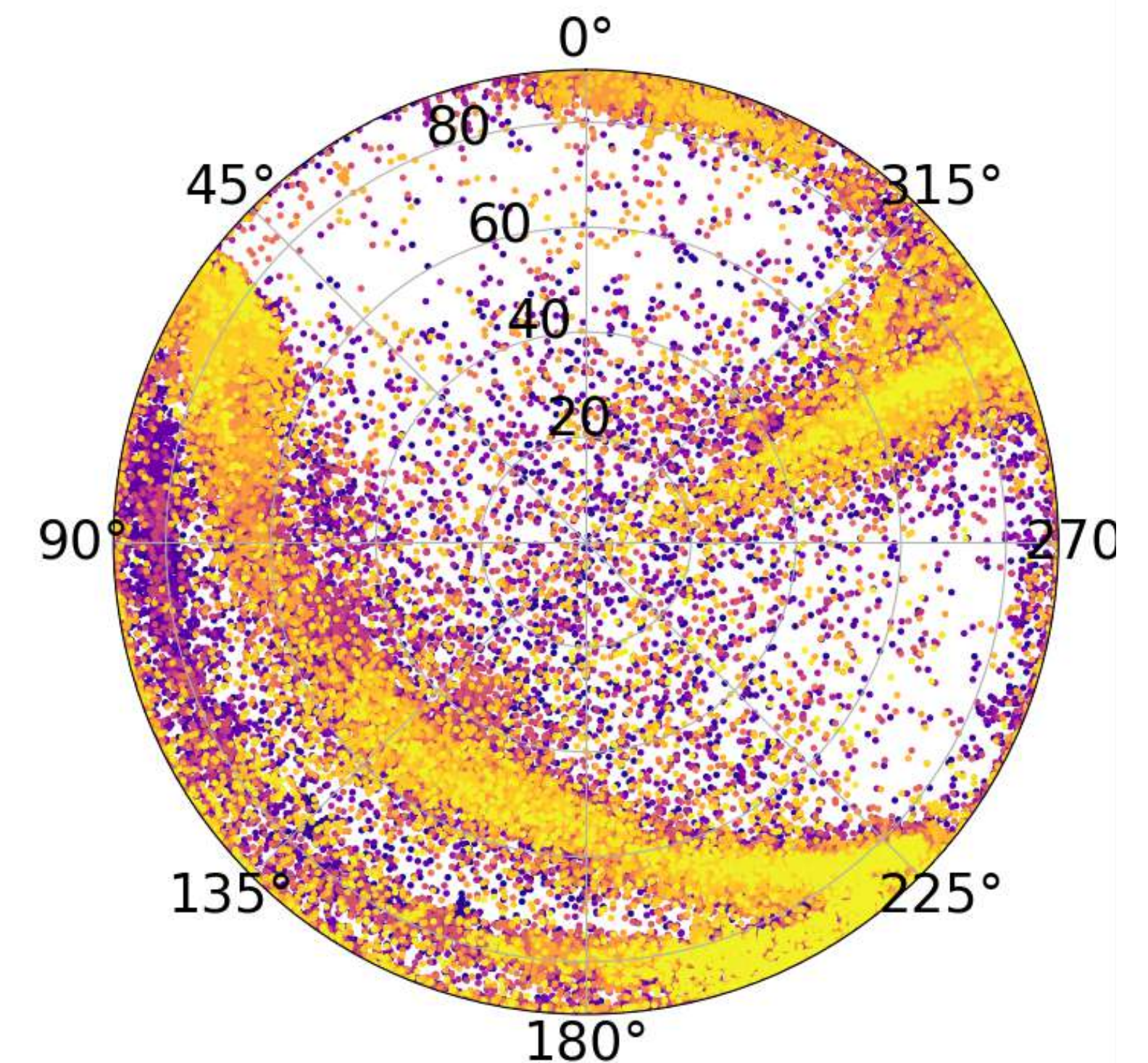
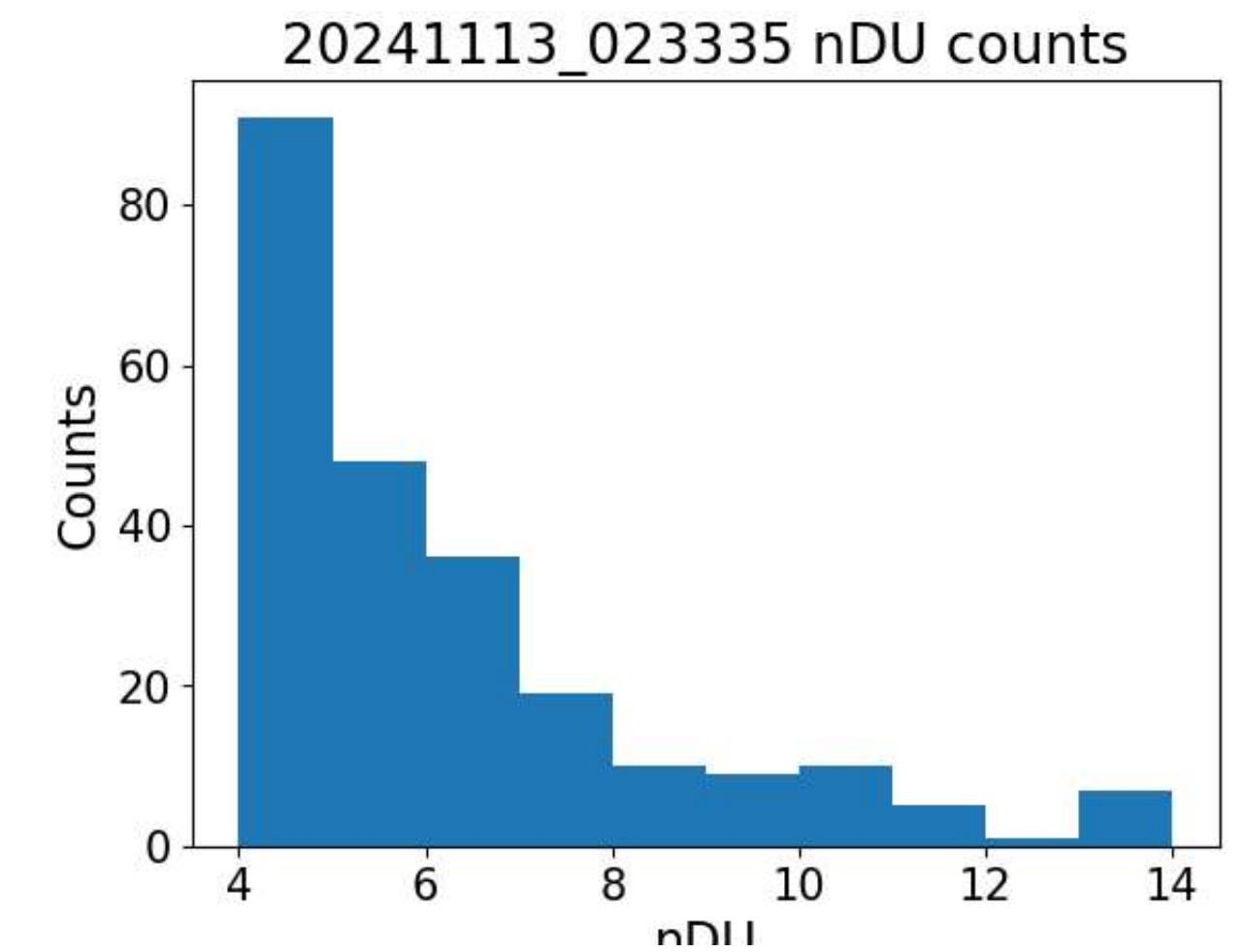


Cut methodologies in GP80

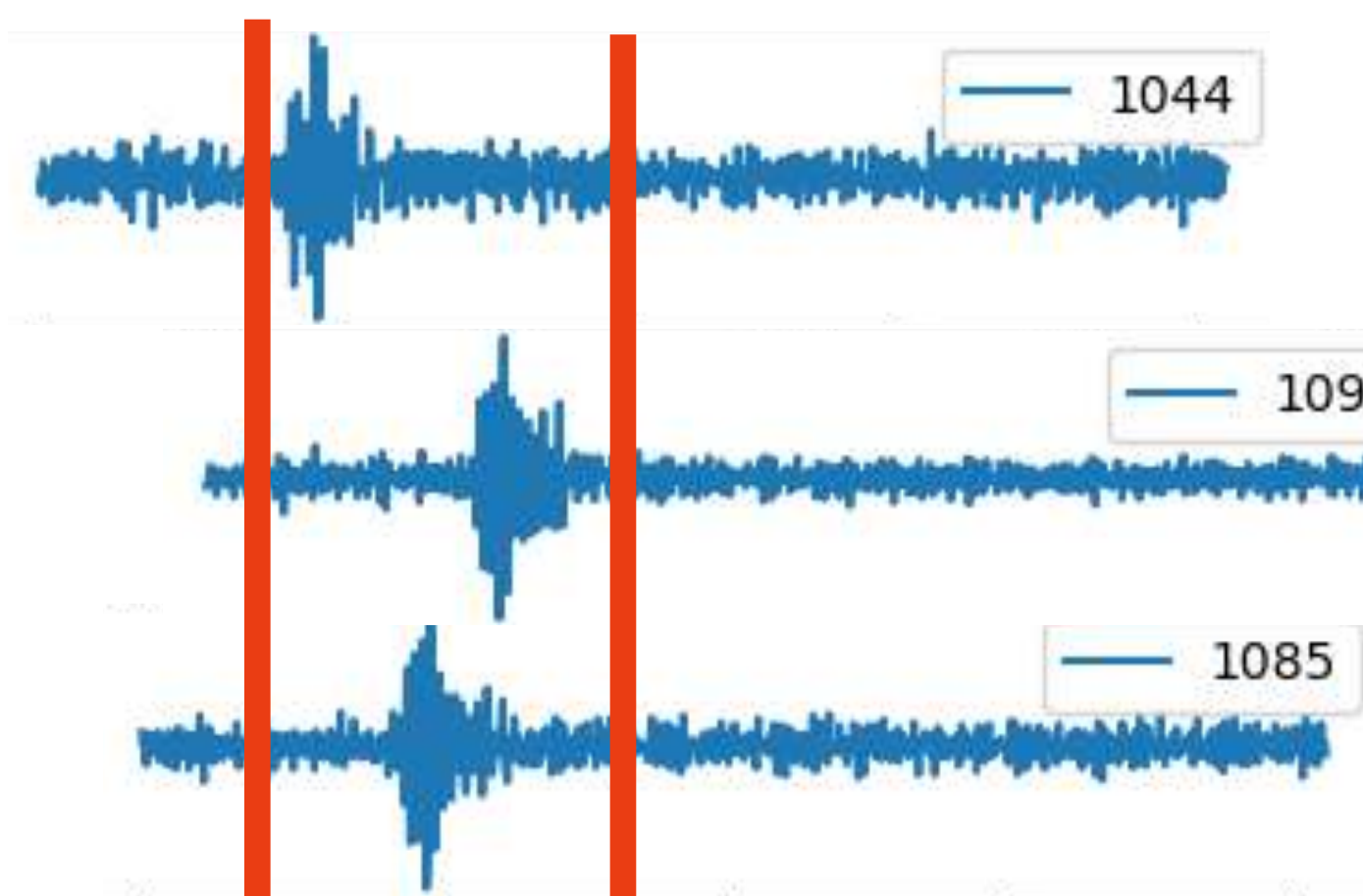
Pipeline for CR search

1. T3 coinc search ([Xishui's script](#), or CD format)
2. Direction reconstruction ([PWF Arsene's script](#)) | $\text{err_sup} = 0.5$
3. Time & space clustering | $(|t_{\text{ev1}} - t_{\text{ev2}}| < t_{\text{window}}) \ \&\& \ (|\delta_{\text{ev1}} - \delta_{\text{ev2}}| < \delta_{\text{window}})$
 - $t_{\text{window}} = 5 \text{ s}$, $\delta_{\text{window}} = 5 \text{ deg}$
4. Peak frequency in spectrum | between 120-150MHz (if $\text{max} > 3 \cdot \text{mean}$, over 3 ant)
5. Polarization (following [Chiche et al. 2022](#)) | $\text{Median}(\vec{V} \cdot \vec{B}) > \beta$ (with $\beta = 0.3 \ll 1$)
6. Number of antennas | $N_{\text{ant}} \geq 5$
7. Zenith cut | $\vartheta \geq 60 \text{ deg}$



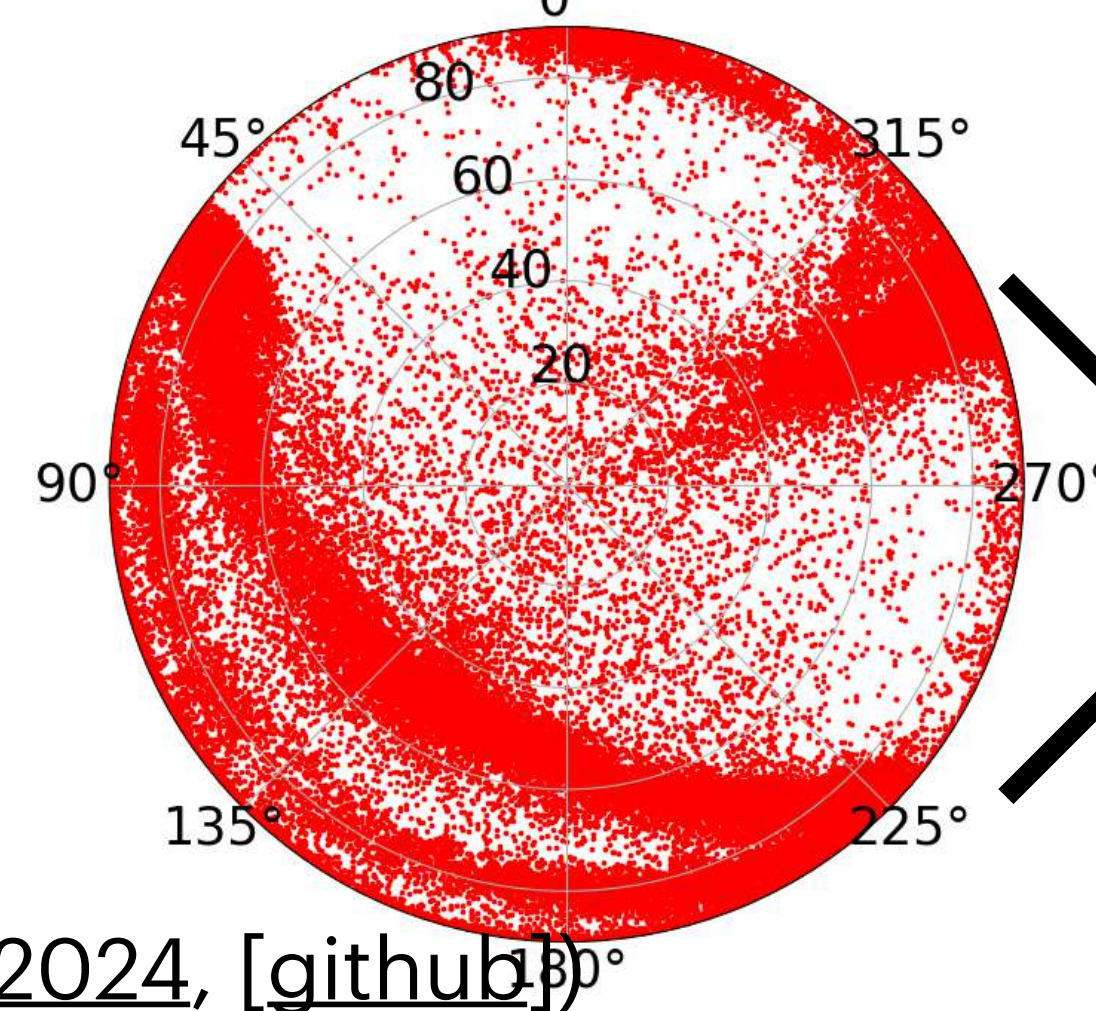
Pipeline overview

T3 coincidence search



(Xishui's script [github])

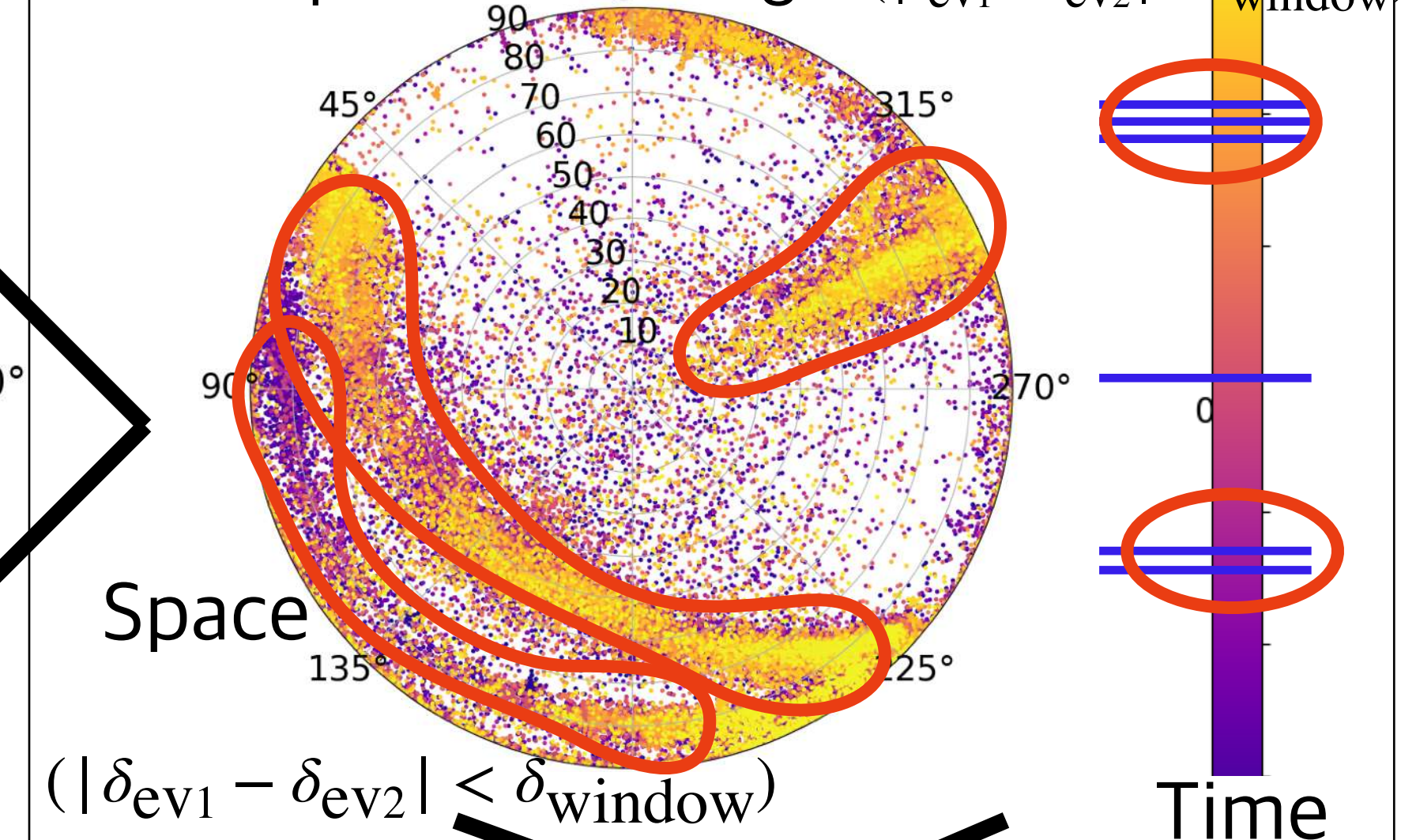
Plane Wave Front reconstruction



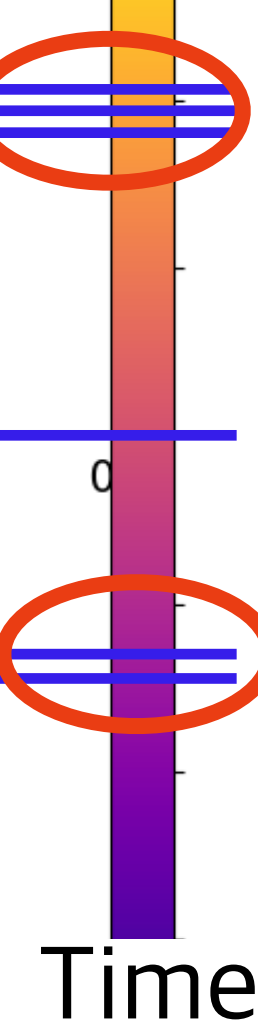
Result in
 θ and ϕ

(Ferriere et al. 2024, [github])

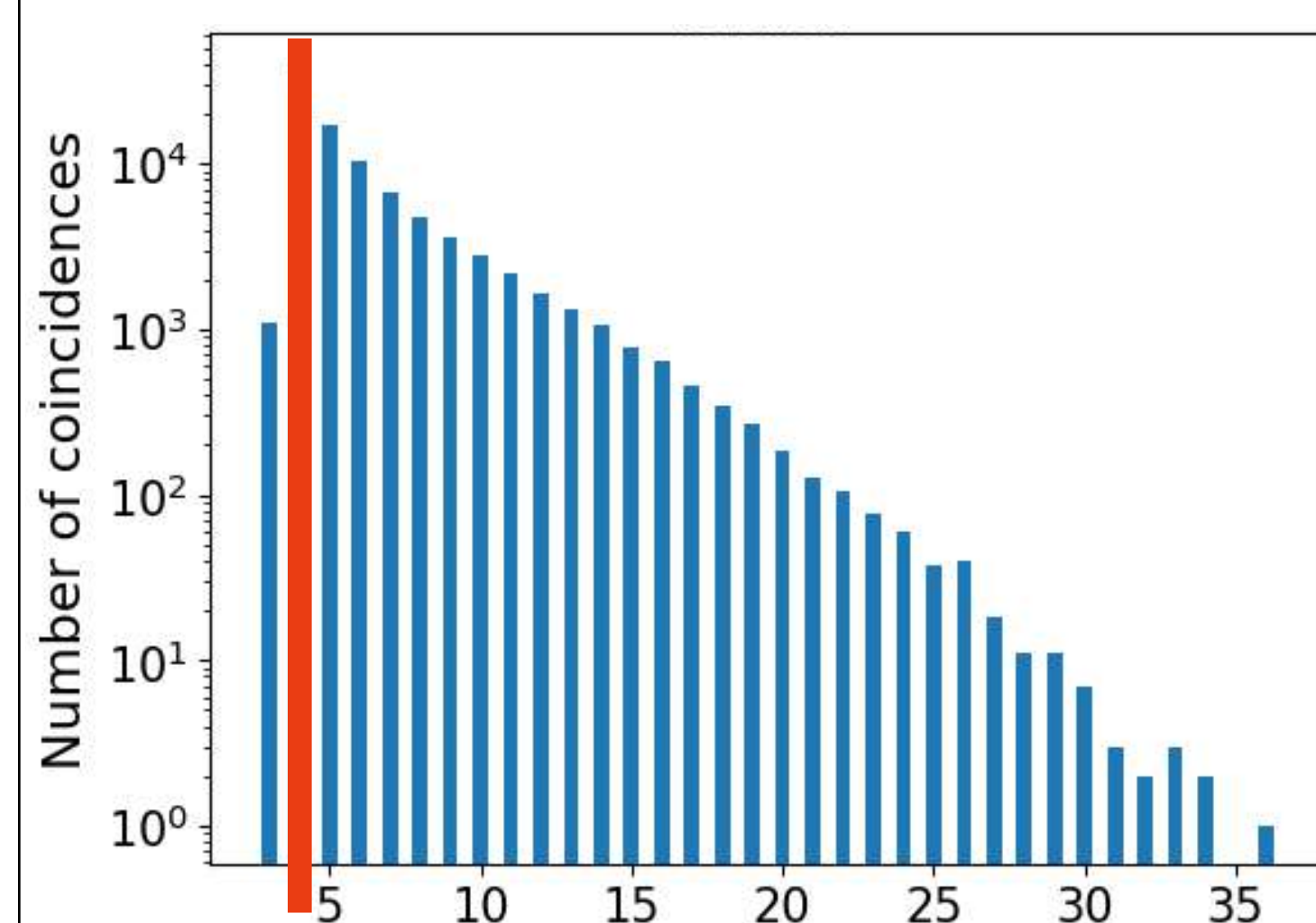
Time & space clustering



($|t_{ev1} - t_{ev2}| < t_{window}$)
($|\delta_{ev1} - \delta_{ev2}| < \delta_{window}$)

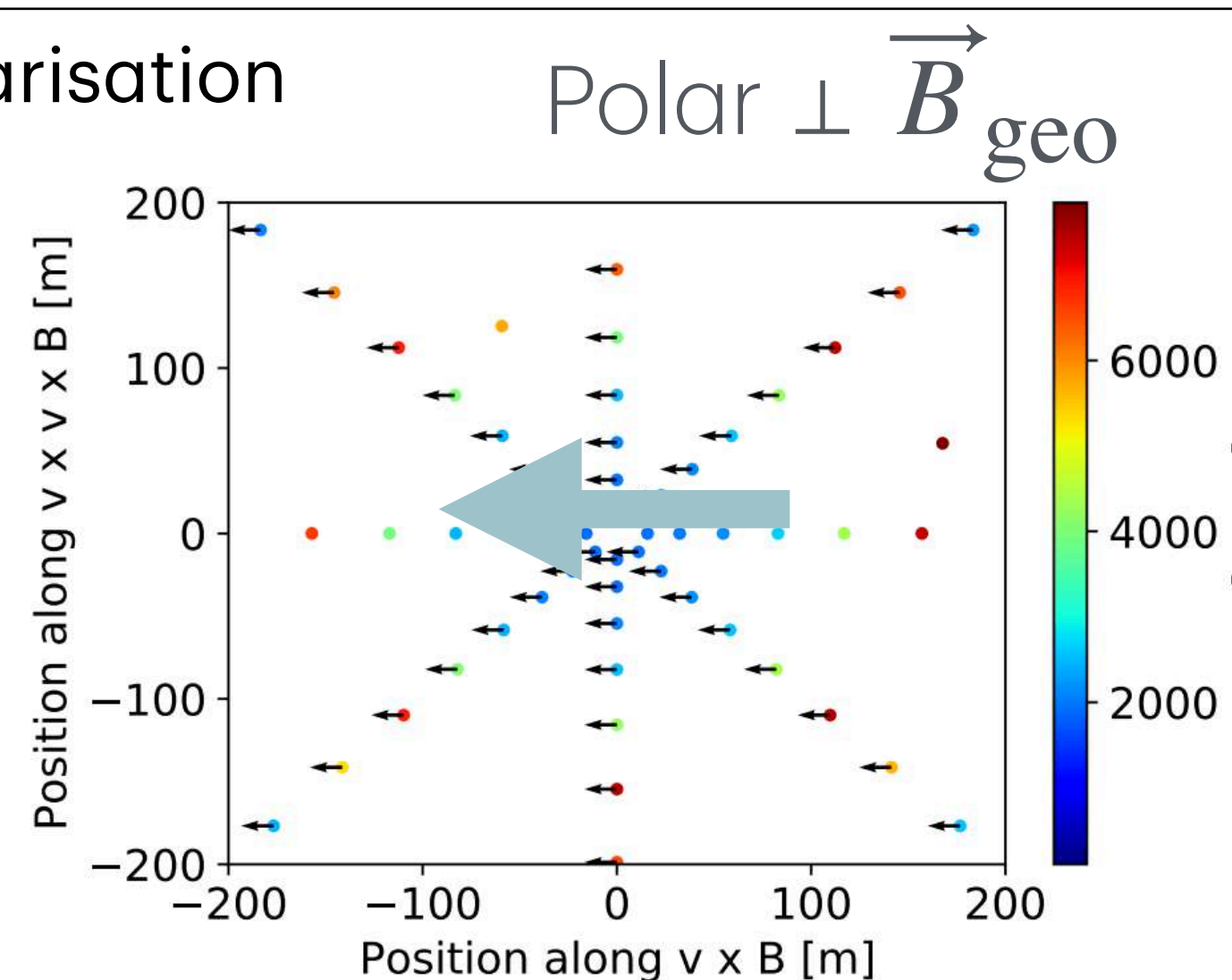


Number of antennas



**Footprint
too small**

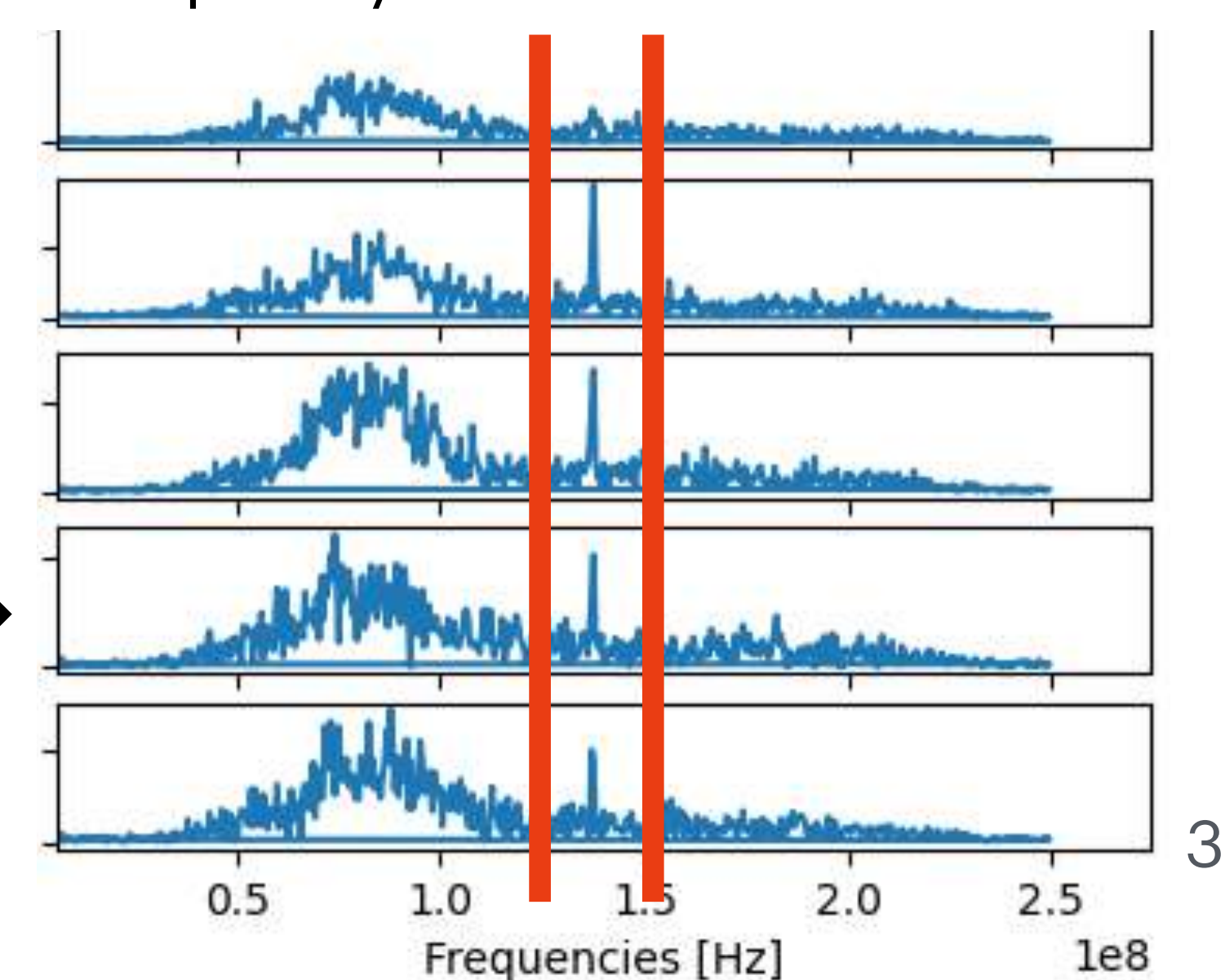
Polarisation



Polar $\perp \vec{B}_{geo}$

(Chiche et al. 2022)

Peak frequency cut



3

Overview of cut efficiency

Run 20241107_012929 and batch in january

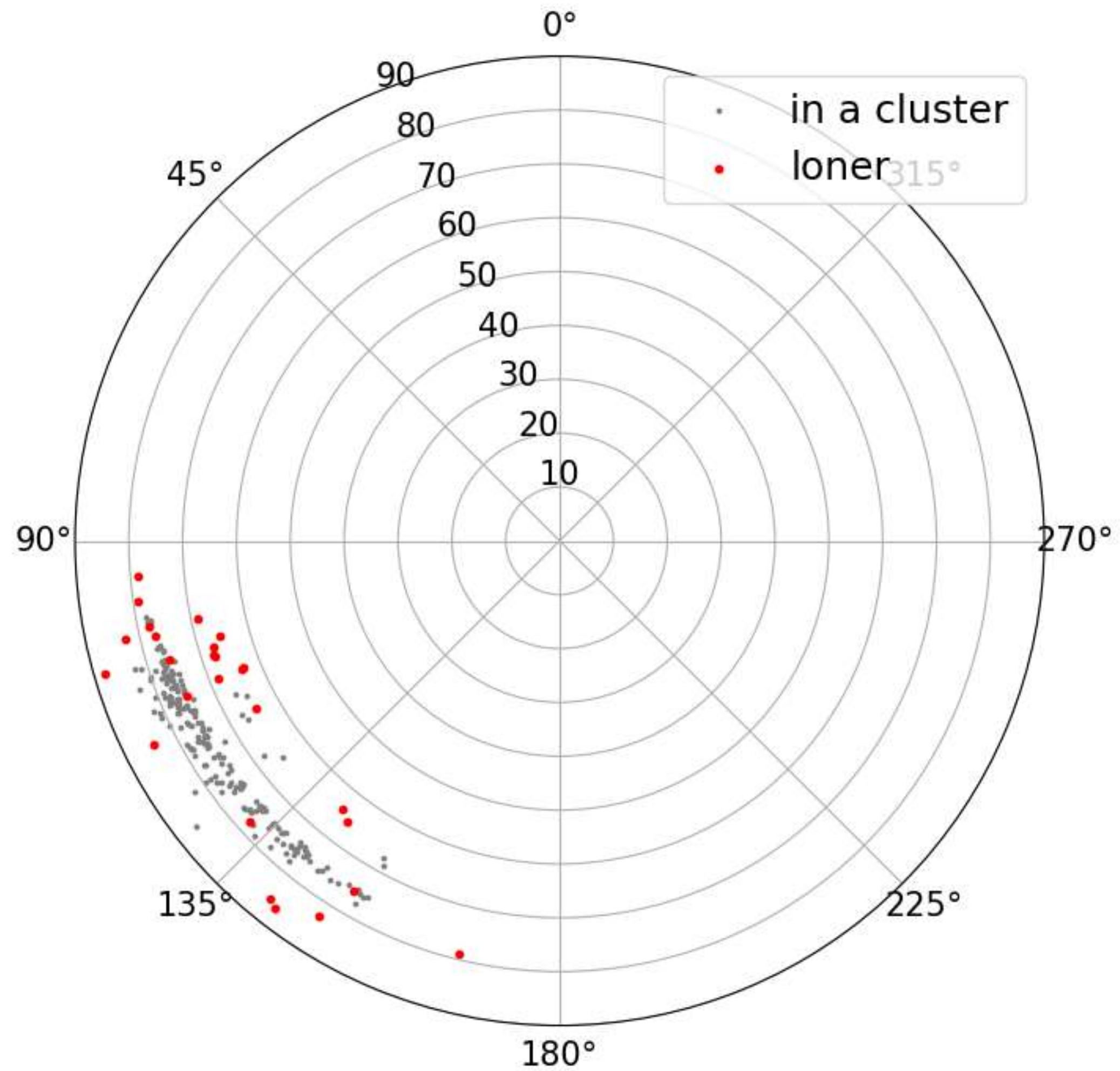
Procedure	Parameters
Witness	
PWF error	Err < 0.1
Time & Space clustering	5 s & 5 deg
Peak frequency	Peak in 120-150 MHz
Polarisation	Median (V.B) < 0.25
N_antennas	N_ant >= 5

Run 20241107_012929			
Single Method efficiency		Full pipeline	
N events left	Cut rate (%)	N events left	Cut rate (%)
224	0	224	0
215	4	215	4
26	88.4	12	94.6
68	69.6	4	98.2
177	20.9	3	98.7
88	60.7	1	99.6

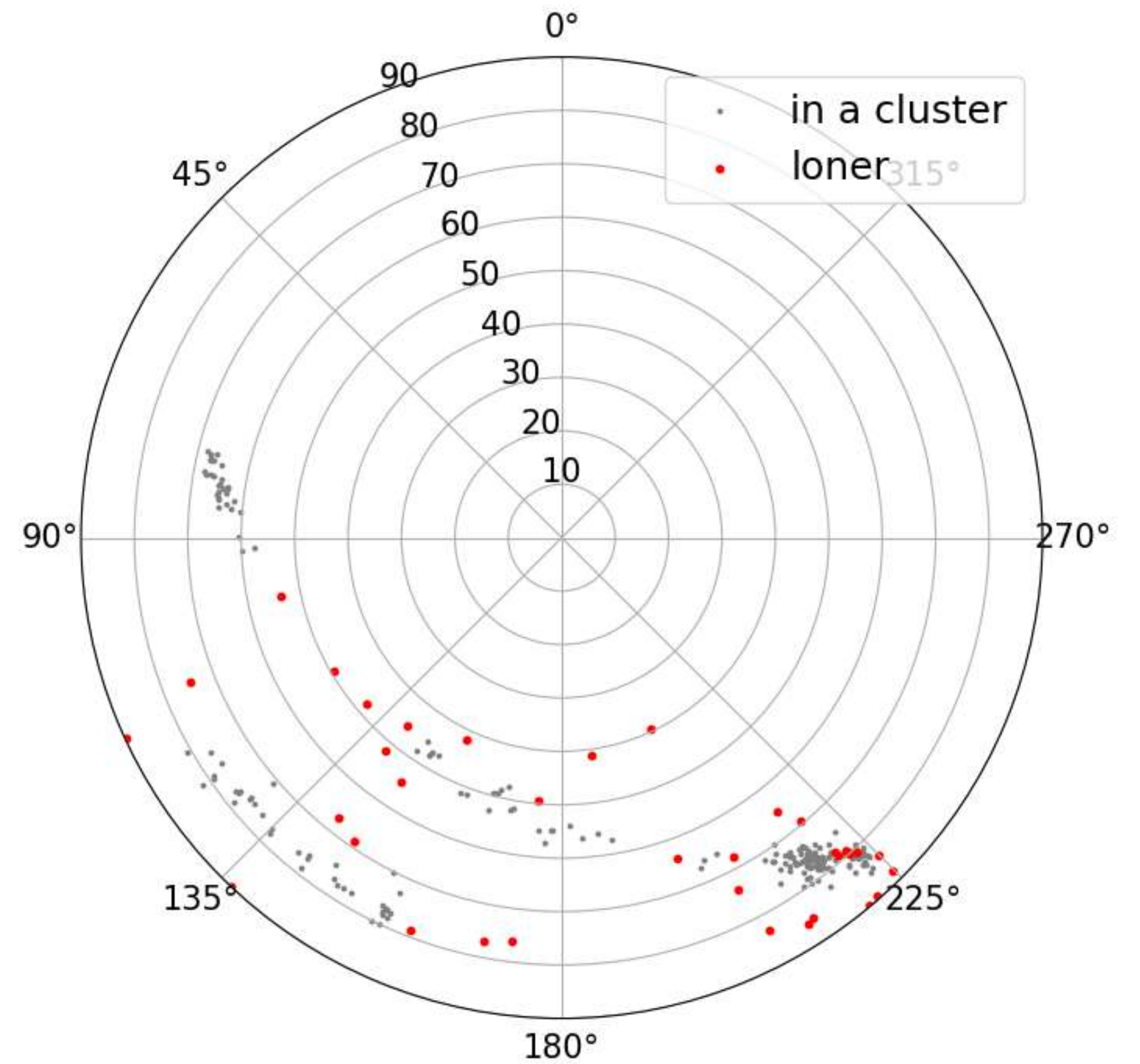
Batch of runs January 1st-21st data			
Single Method efficiency		Full pipeline	
N coinc left	Cut rate (%)	N coinc left	Cut rate (%)
92.4k	0	92.4k	0
35.8k	61.2	35.8k	61.2
65.2k	29.4	26.5k	71.3
27.1k	70.7	7595	91.8
55.0k	40.4	3283	96.4
55.4k	40.0	1873	98.0

Clustering cut

Run 20241107_012929



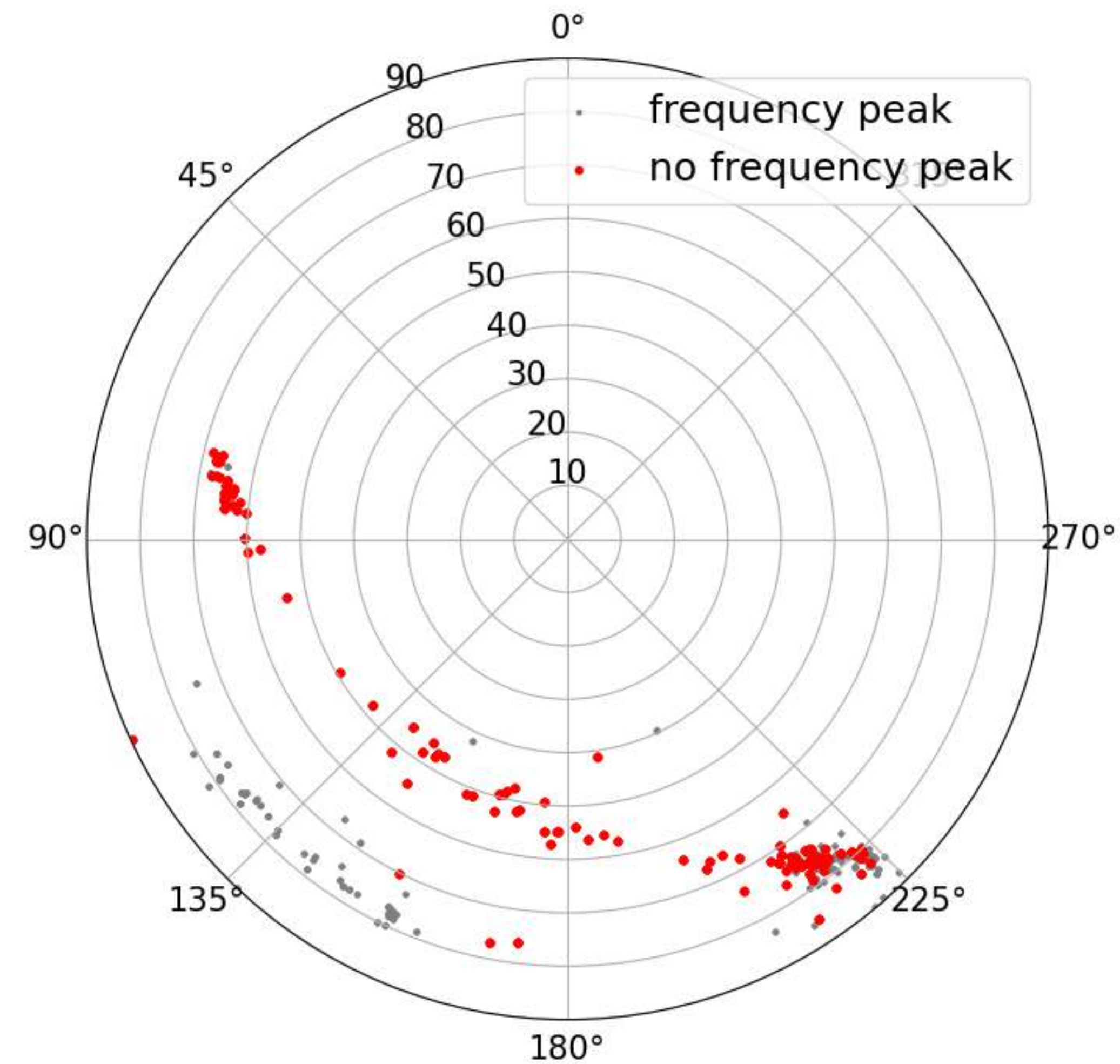
Run 20241113_023335 w/cluster cut



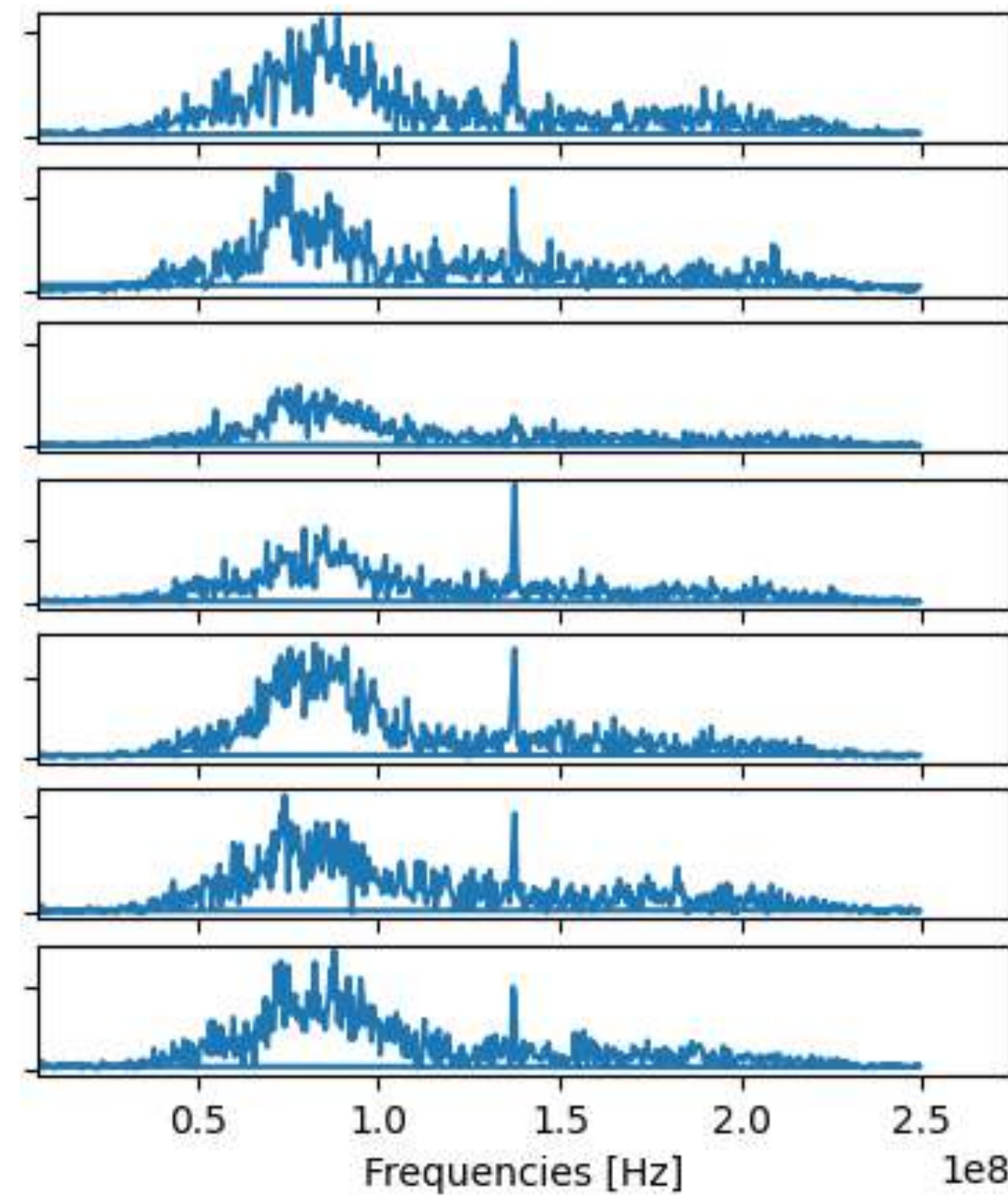
Peak frequency cut

Examples

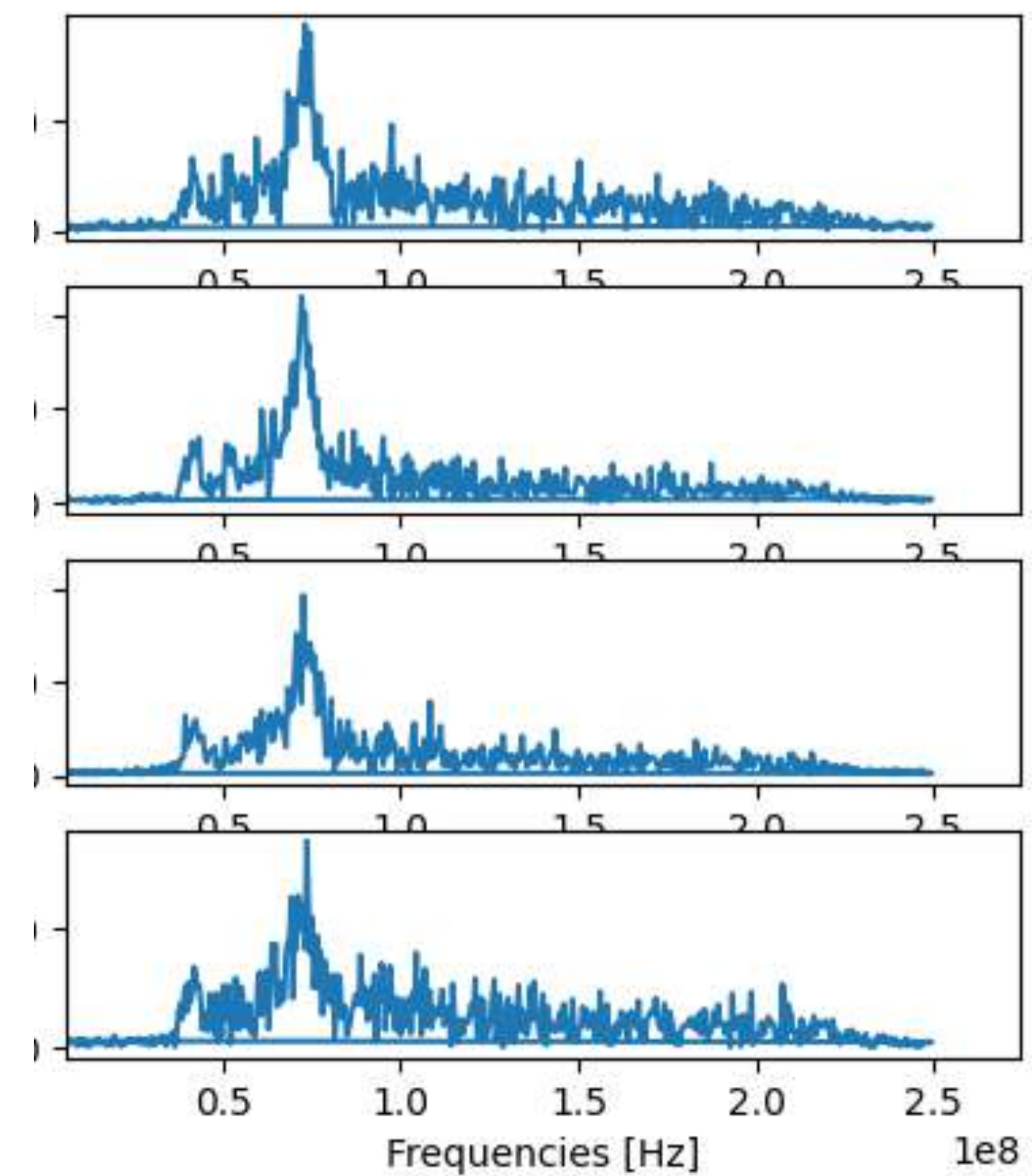
Run 20241113_023335



FFT of cut event
(with 7 DUs)



FFT of kept cut
(with 4 DUs)

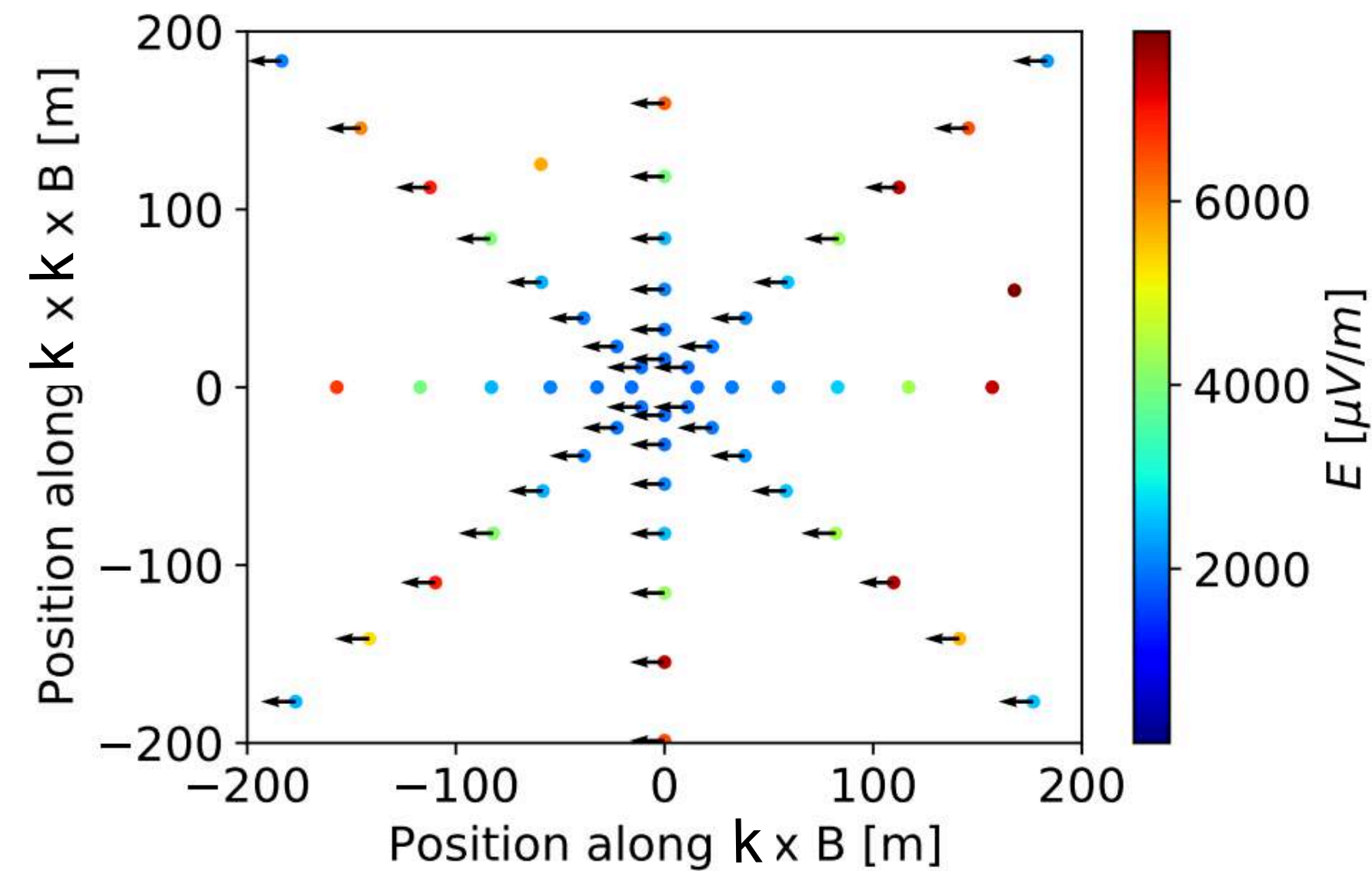


Polarization distribution expected for CRs

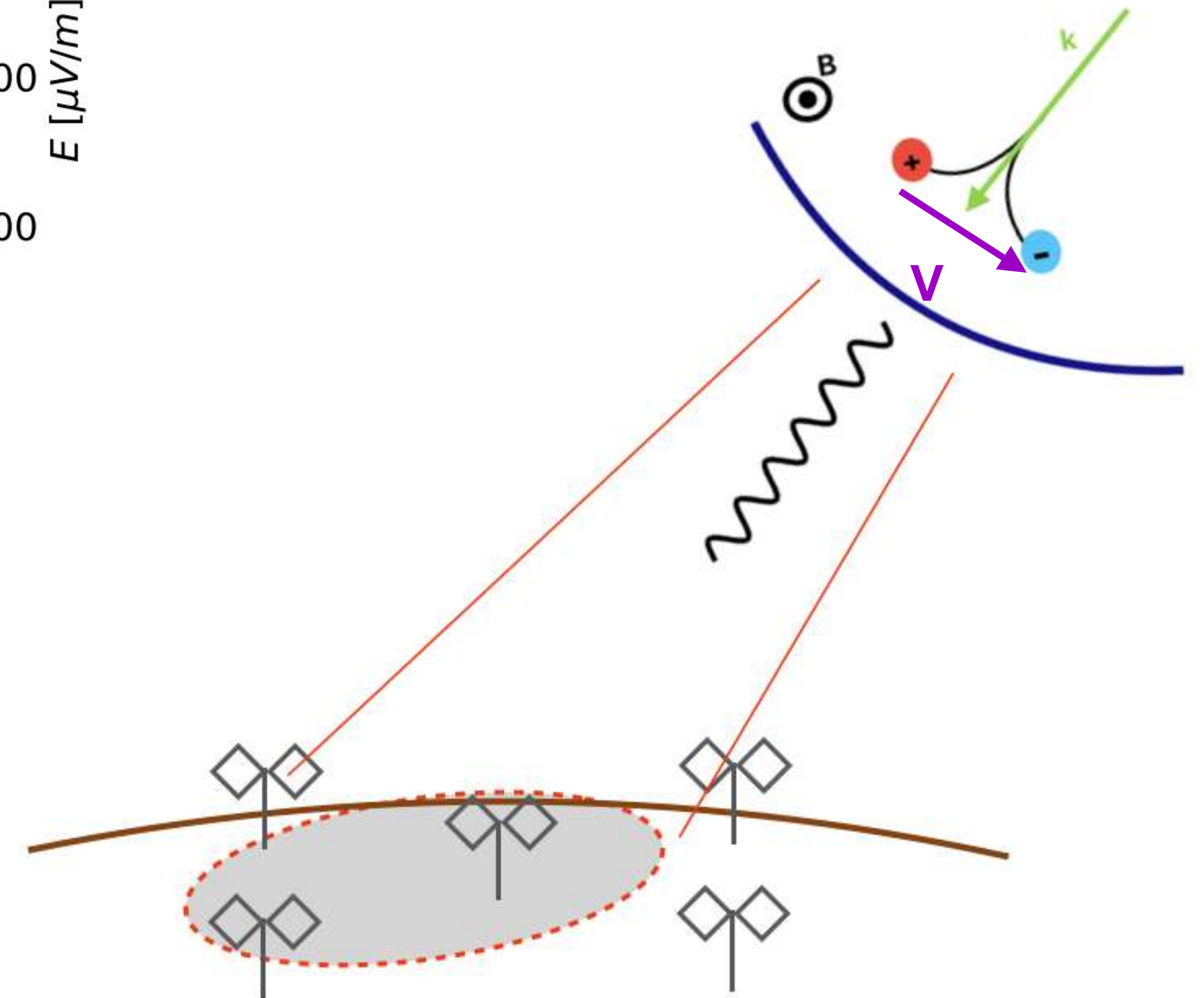
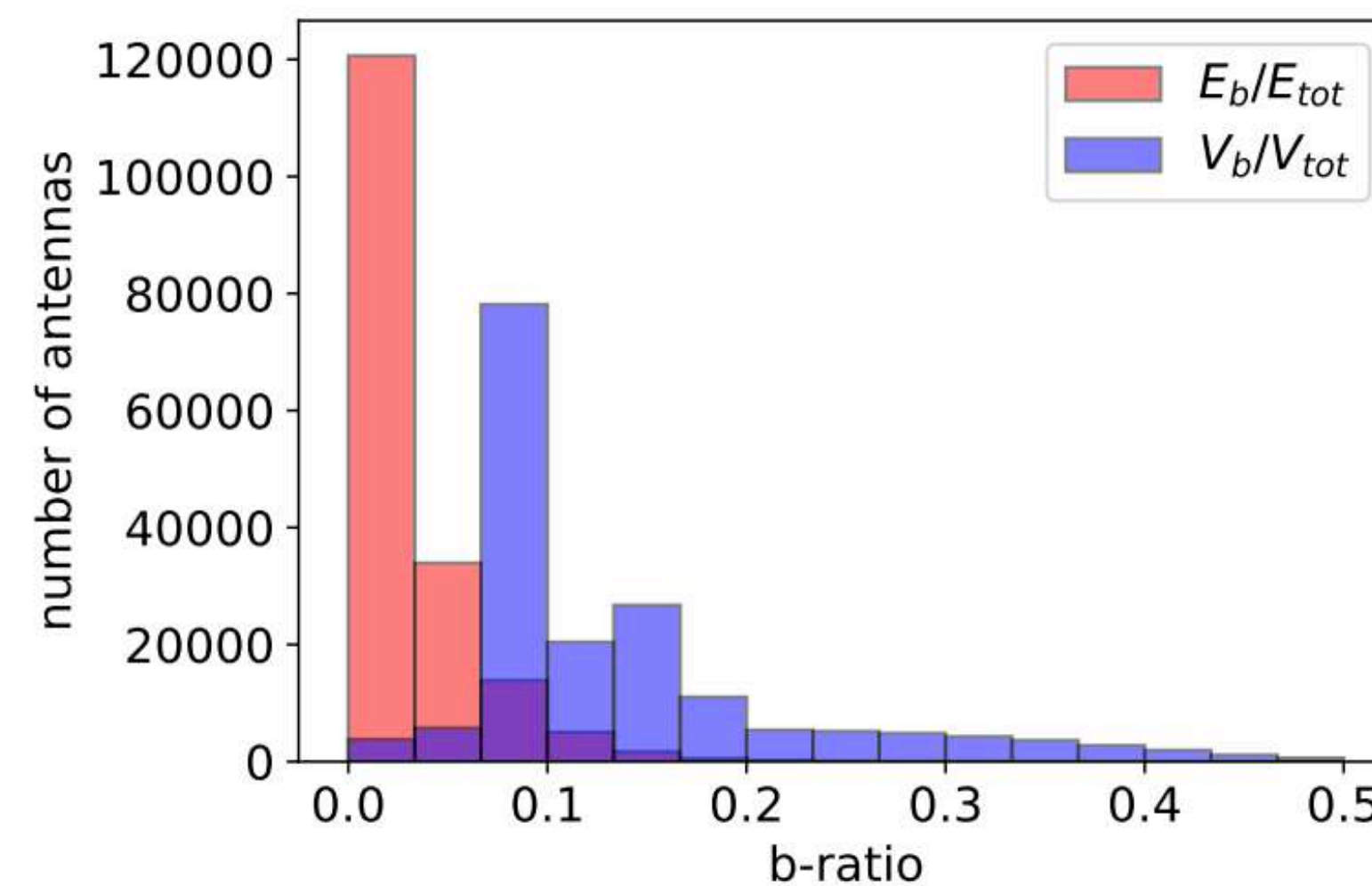
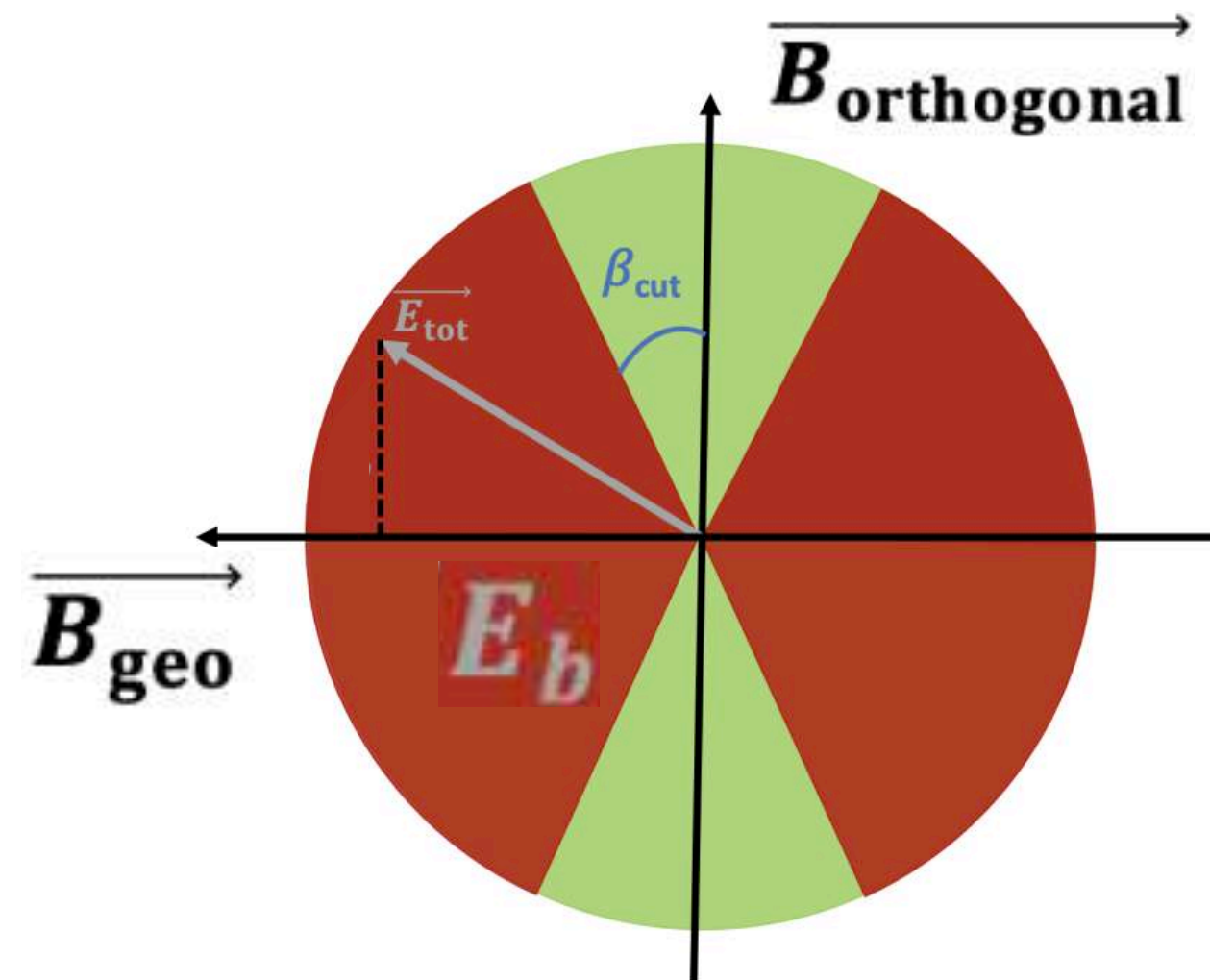
E-field amplitude and
direction of the
geomagnetic emission



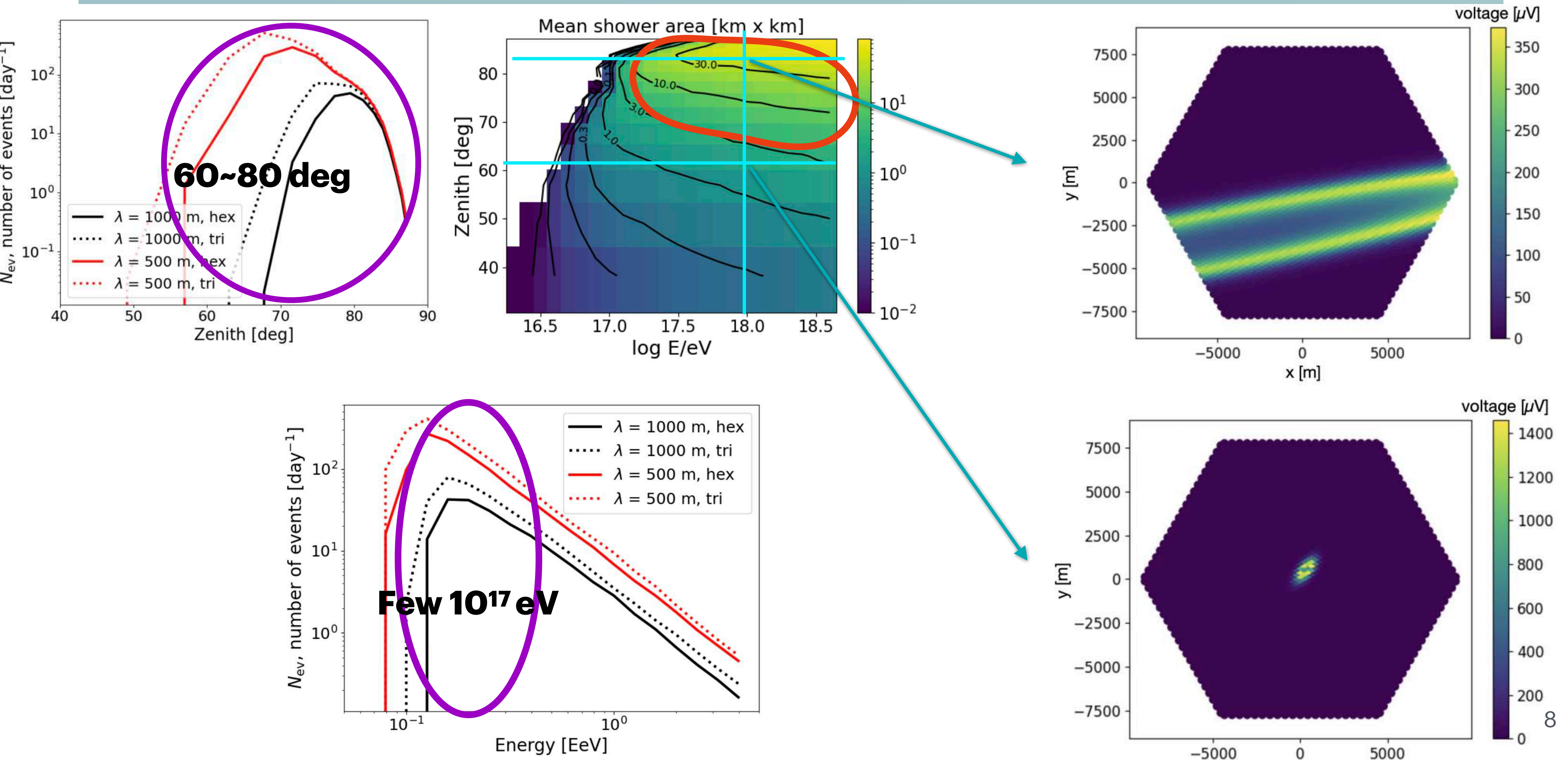
Geomagnetic effect



[Chiche et al., 2022](#)

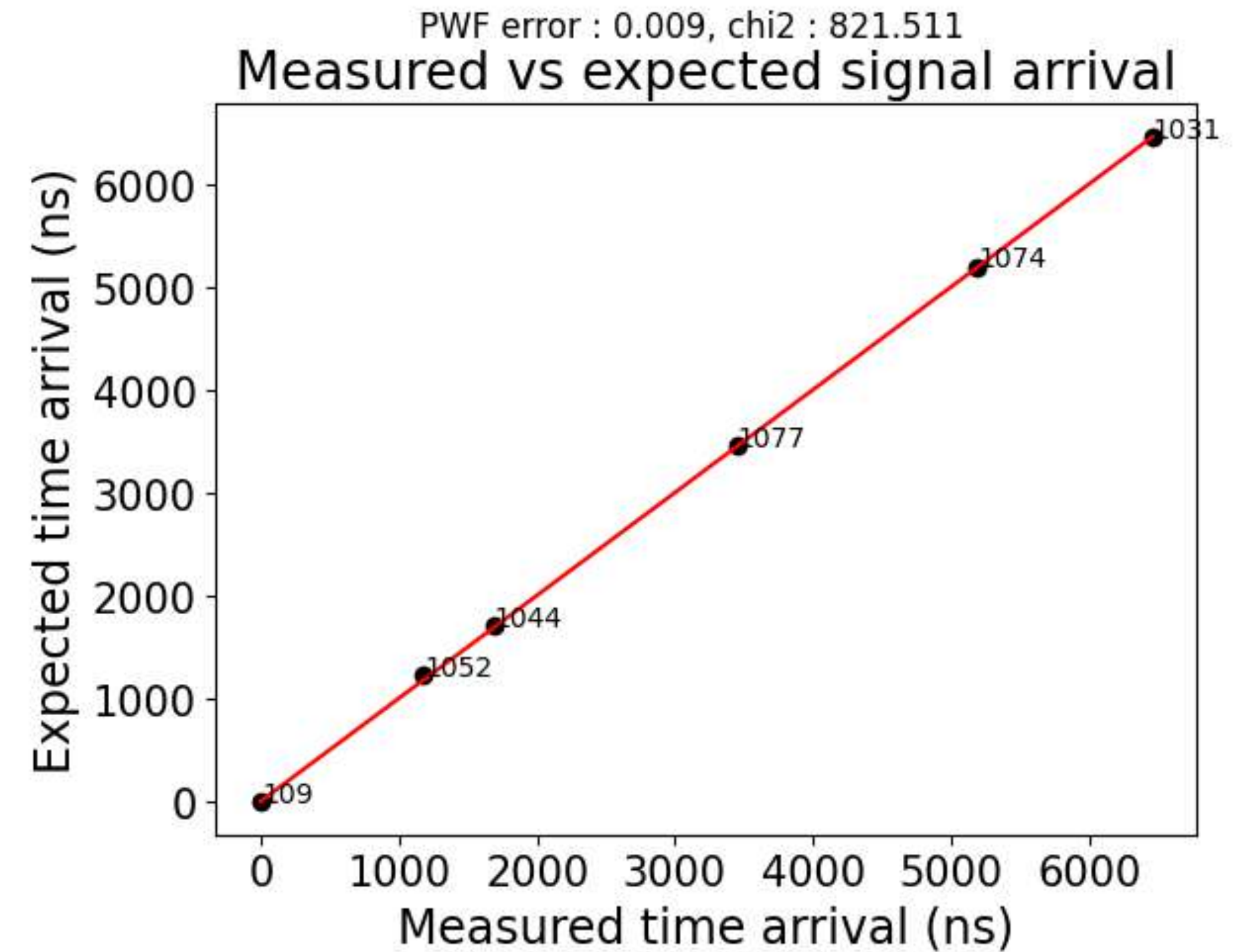
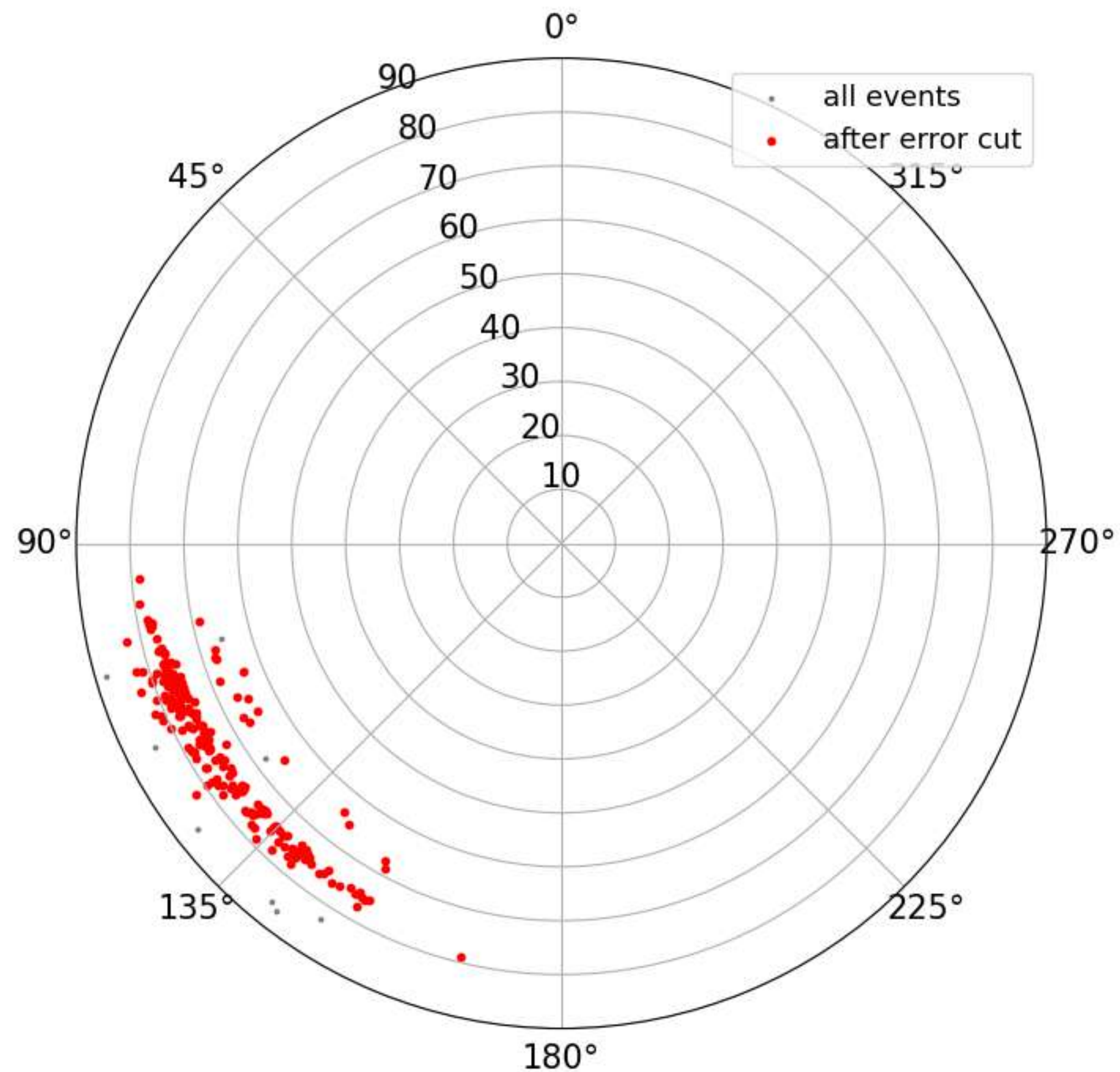


Number of antennas : estimator of size of footprint



PWF error reconstruction

Run 20241107_012929 with error cut

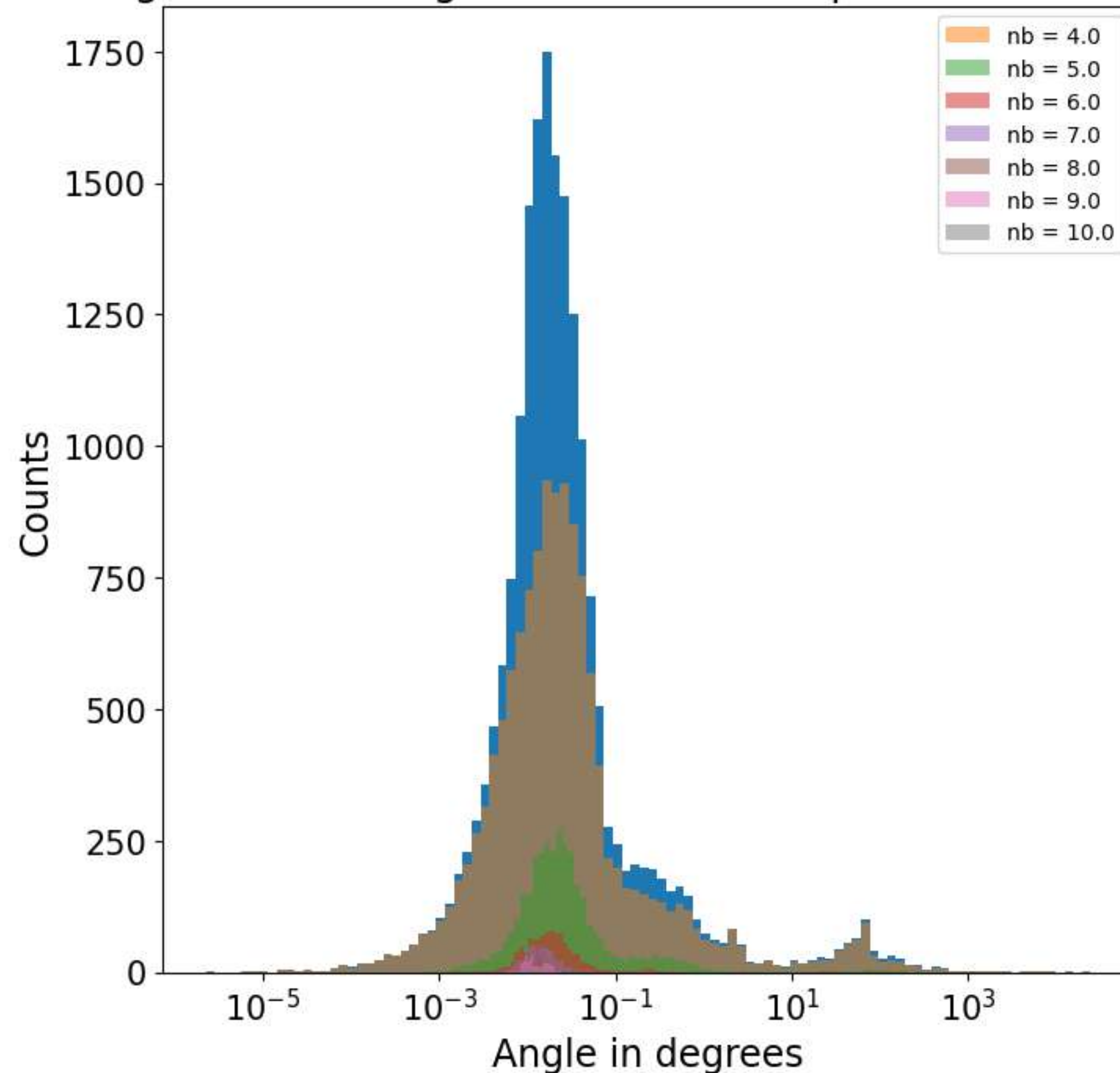


Error parameter

Based on September data

Distribution of the signal arrival angular error with respect to the number of triggered DUs

- $\text{err_sup} = 0.5$



Return