ProtoDUNE commissioning

ProtoDUNE sim/reco

David Adams

BNL

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Bad channels

Bad channels

I looked at bad channels

- List from BNL CE group checked all 15360 channels with pulser data
- I have started checked these with recent artDAQ data
  - Summarized in table below
    - 38 + 1 put in bad channels list
    - 5 appeared to be OK and are not marked bad

BNL CE label	# ch	# bad	# sticky	# good
Inactive FE	4	3	0	1
Inverted gain	2	0	0	2
Broken connection pre FE	34	34	0	0
Significant stuck bits	45		1	1
ENC > 2000e	3	1	1	1
ENV < 2000 e	many	1		

Bad channels (2)

Bad channels are in dunetpc

- ChannelStatusService will return them
- Recorded in fcl that is part of dunetpc
- Changes will be in this week's release (a very few last week)

Like to get feedback from higher-level reco

- Does this list help?
- Are there additional bad channels?
  - I will do more comprehensive search as I look for sticky codes

Dataprep handling

- Right now dataprep treats these like any other channels

Sticky codes

Sticky codes

Well known that we have sticky codes

- ADC output jumps to these codes where we do not expect it for a smooth variation with tick
- Big variation from channel to channel
- And different sticky codes for different channels
- Major emphasis of BNL ADC testing was to try to identify and discard ADC chips with lots of stickiness

Some code now in place to address the problem

- Tool FclStickyCodeFlagger provides means to flag sticky codes
  - List of sticky codes for each channel stored in fcl
- Tool AdcCodeMitigator replaces signal for flagged ticks with either
  - A fixed value or
  - Interpolation between nearest non-sticky neighbors (preferred)
- Now need to find the sticky codes
  - Do this separately near and away from pedestal

Run 5152 raw
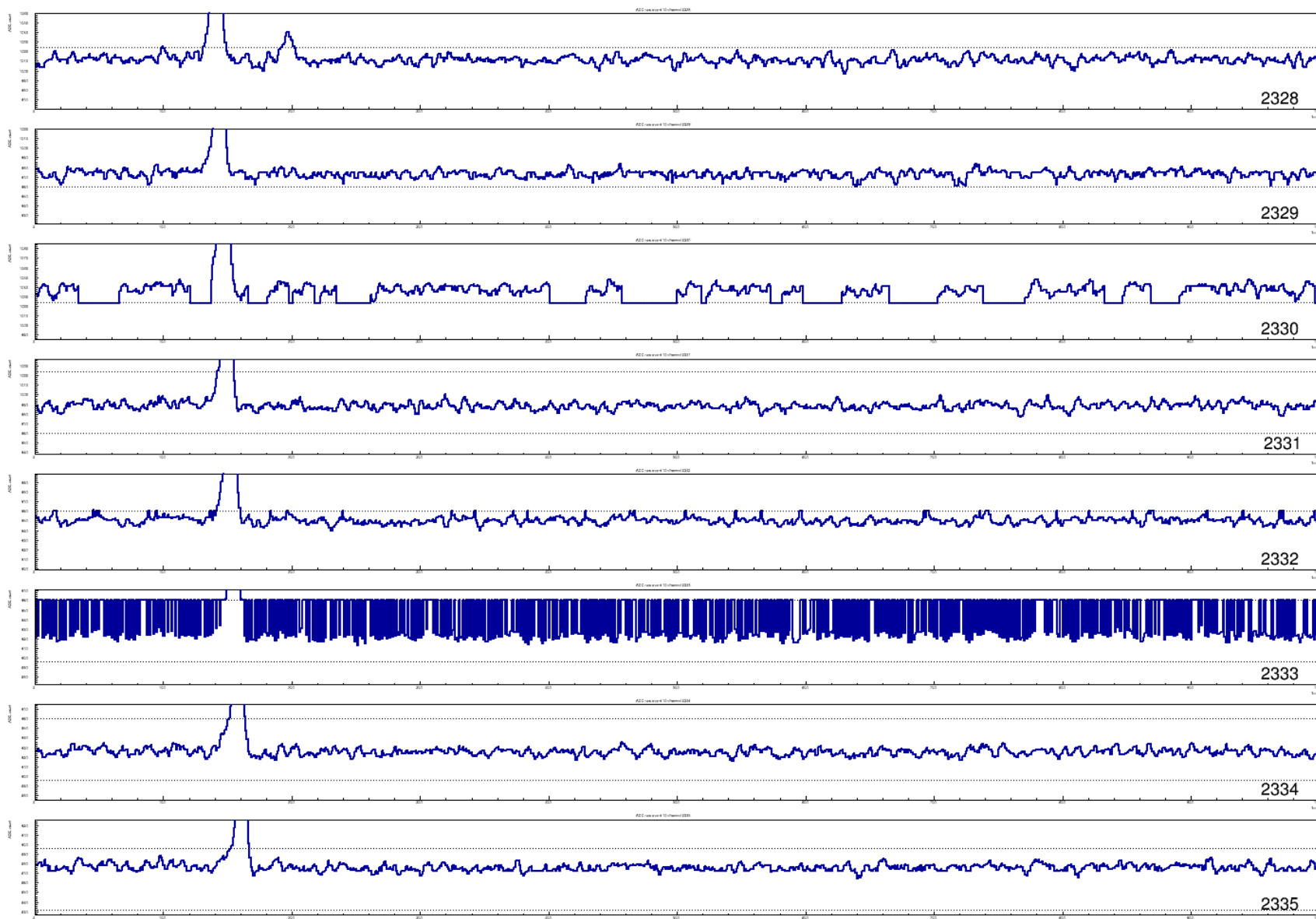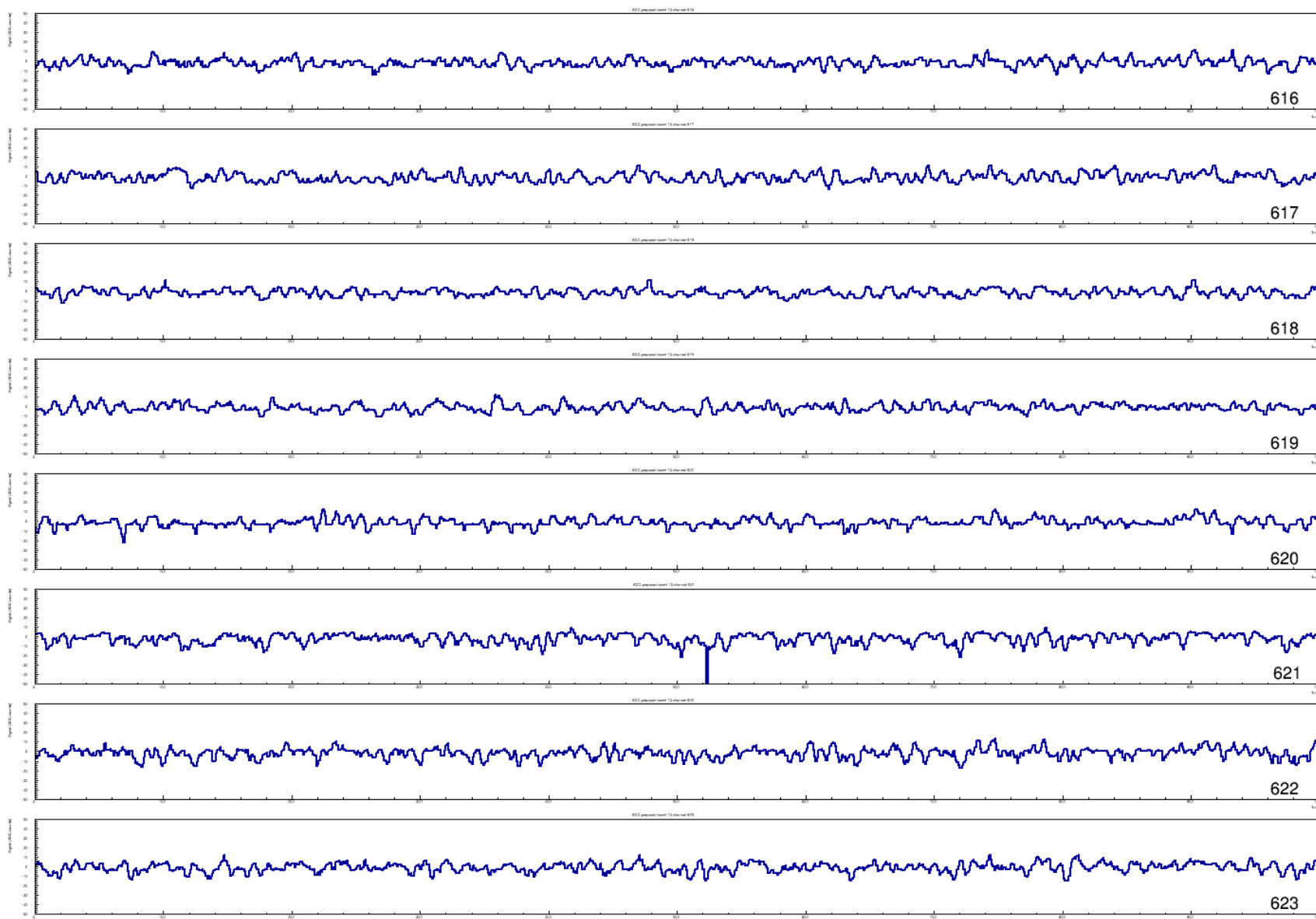
Run 5308 raw
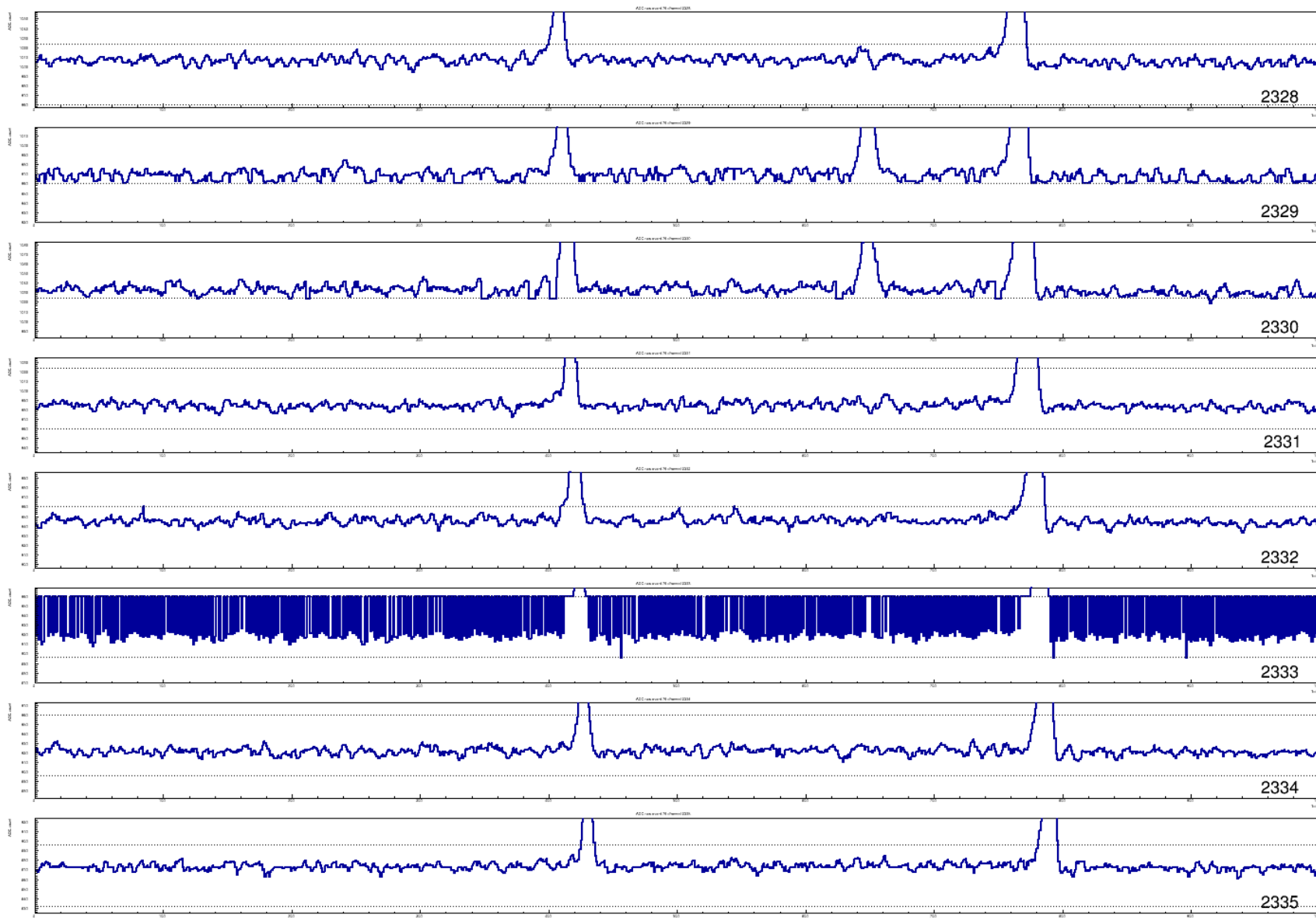
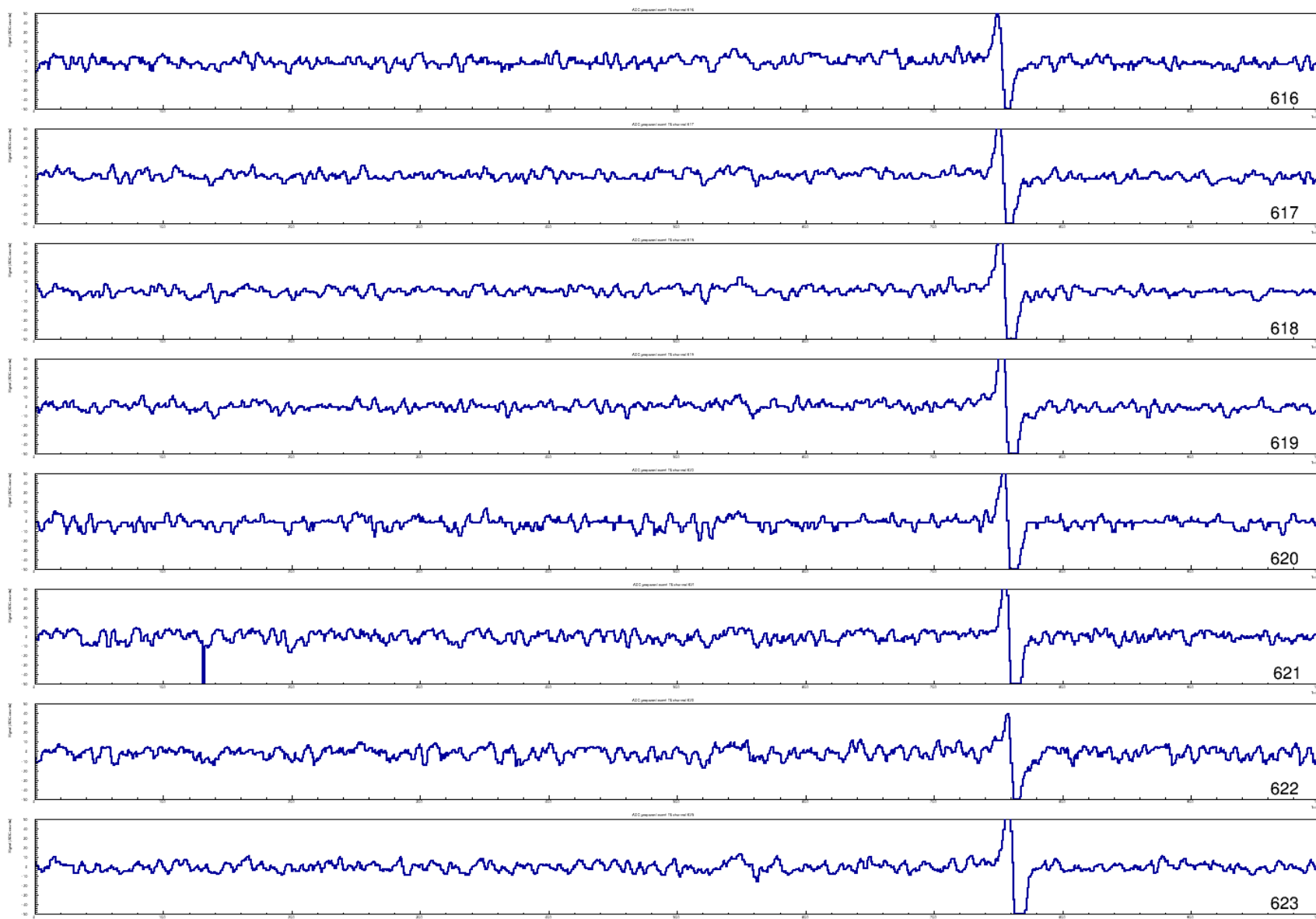# Run 5308 mitigated
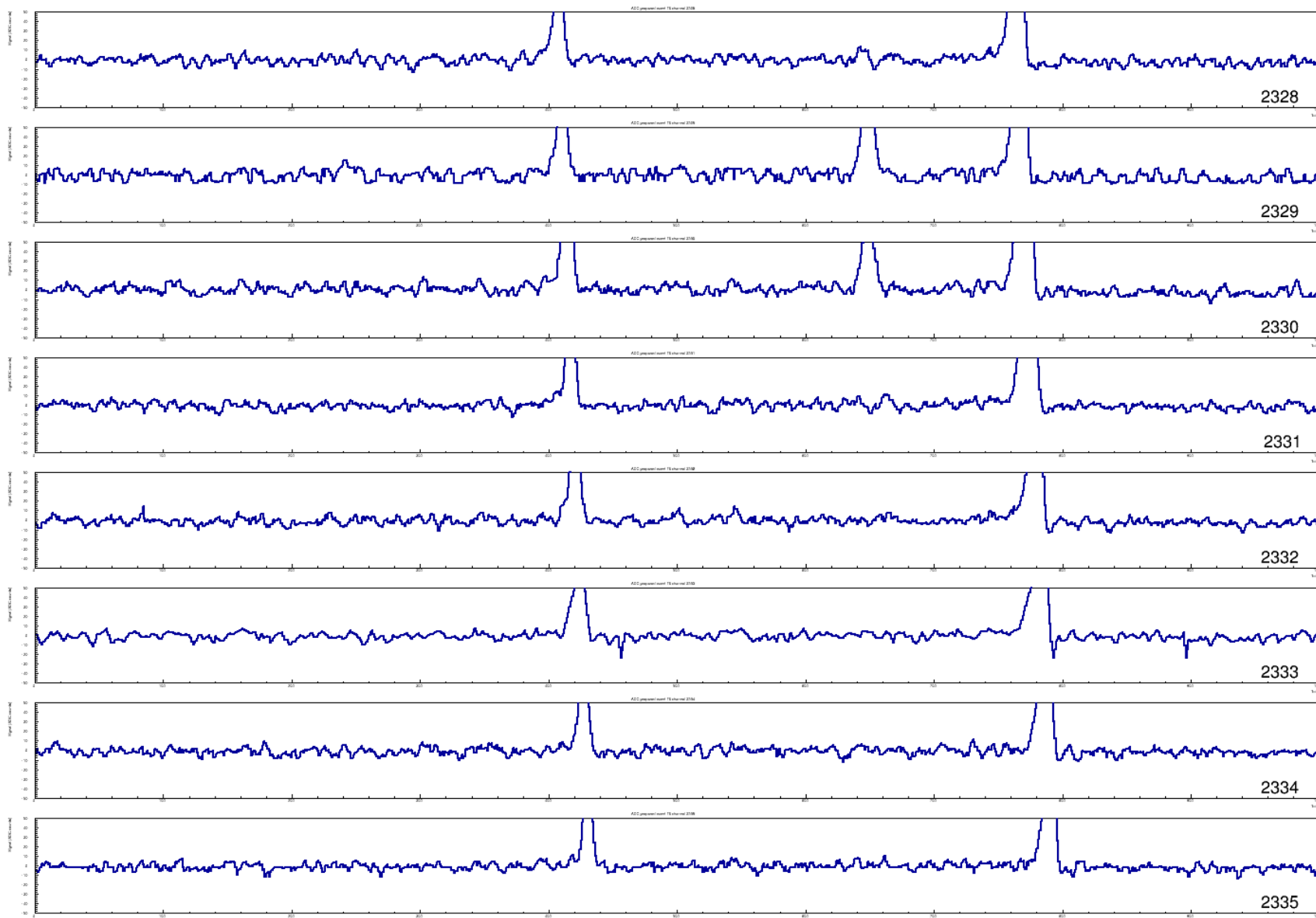
Run 5308 raw
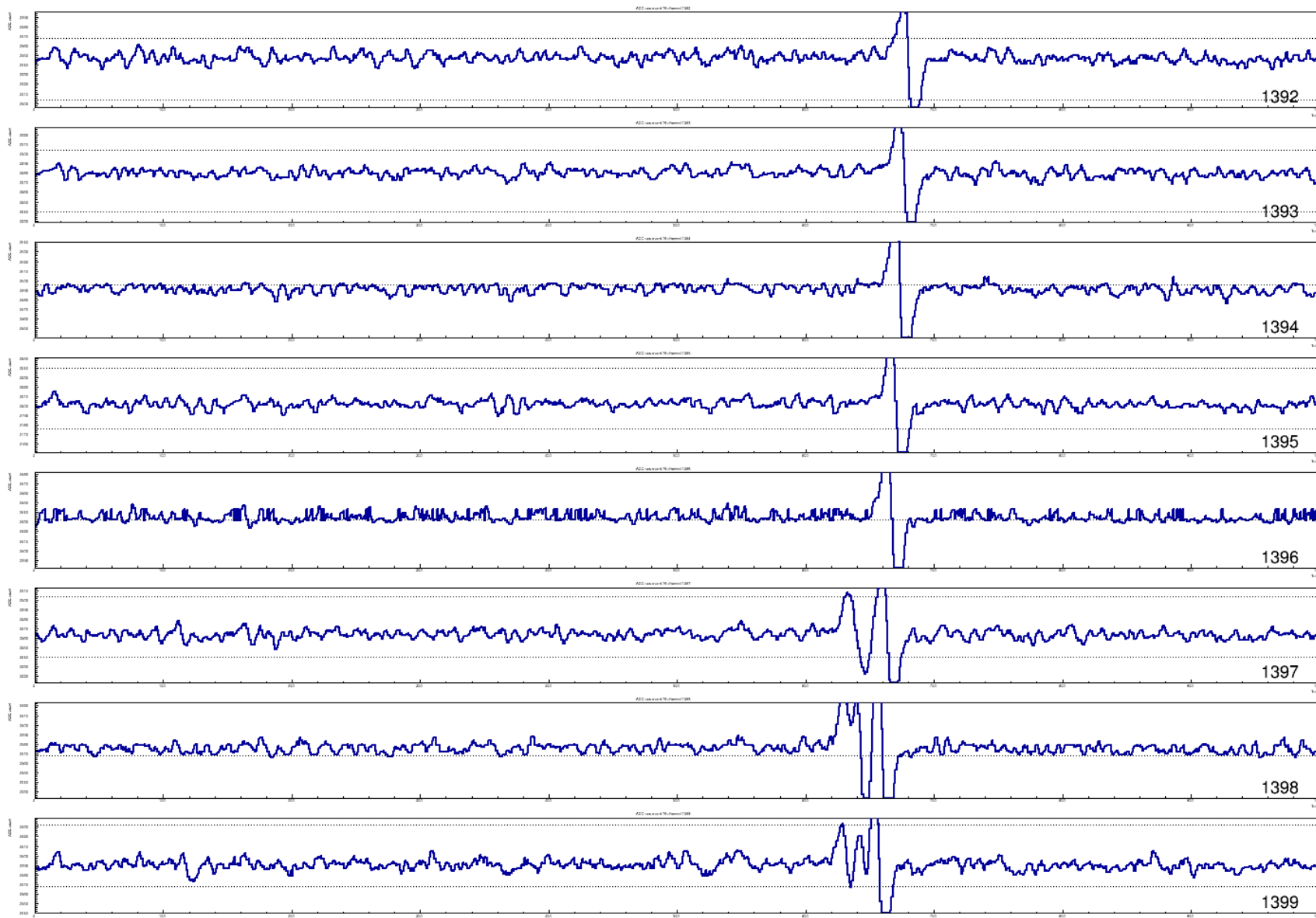
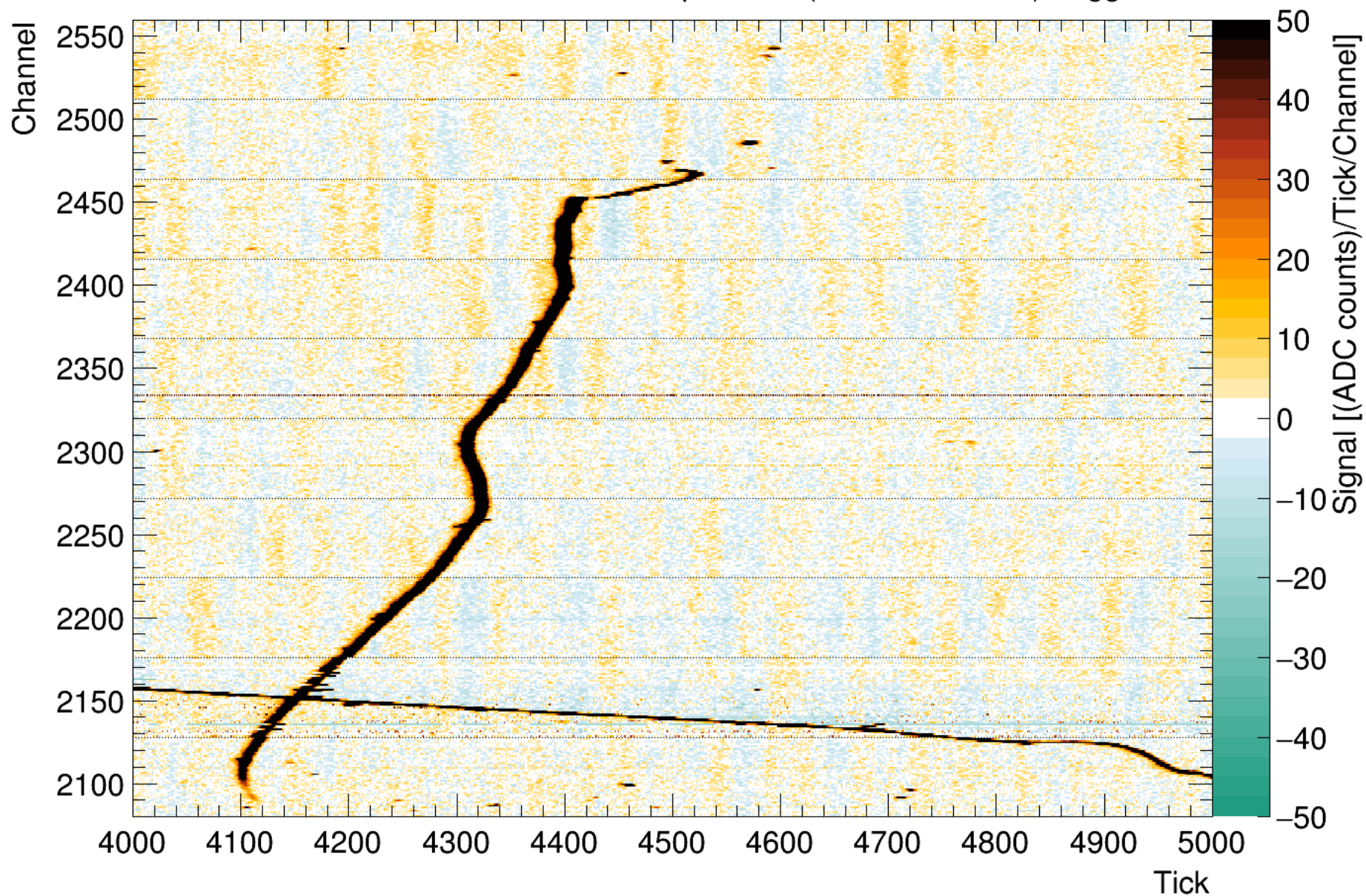# Run 5308 mitigated
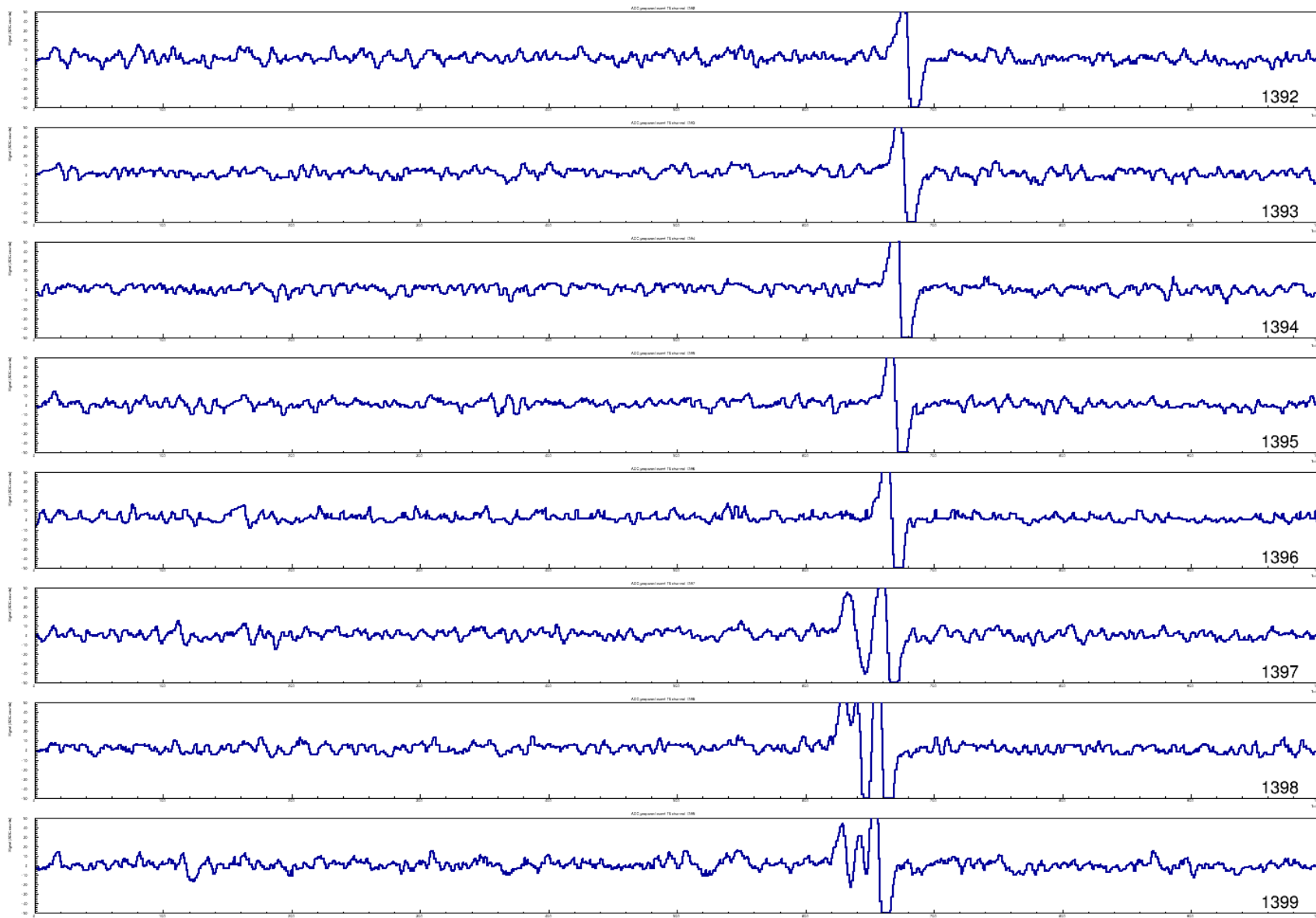
Run 5152 raw
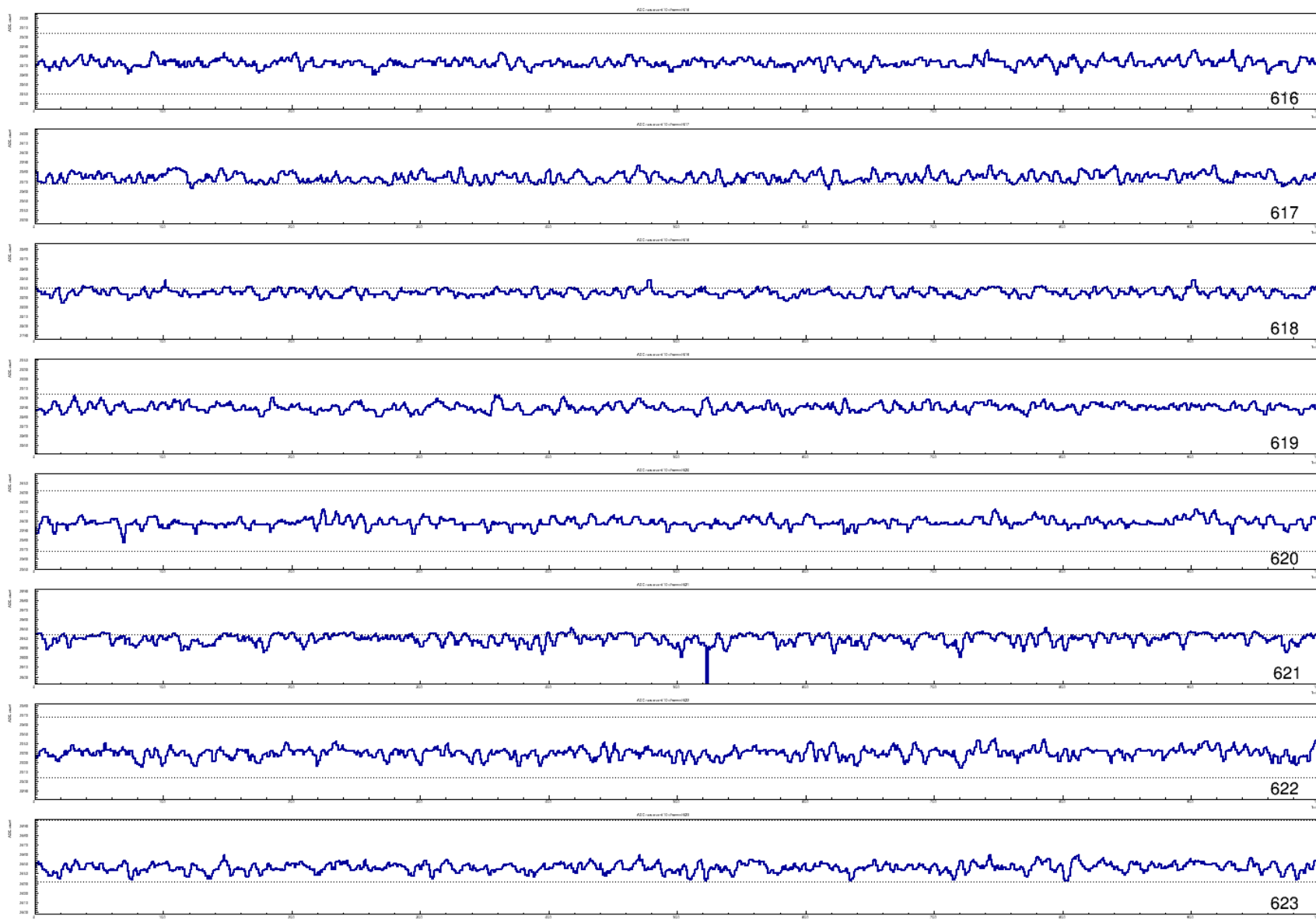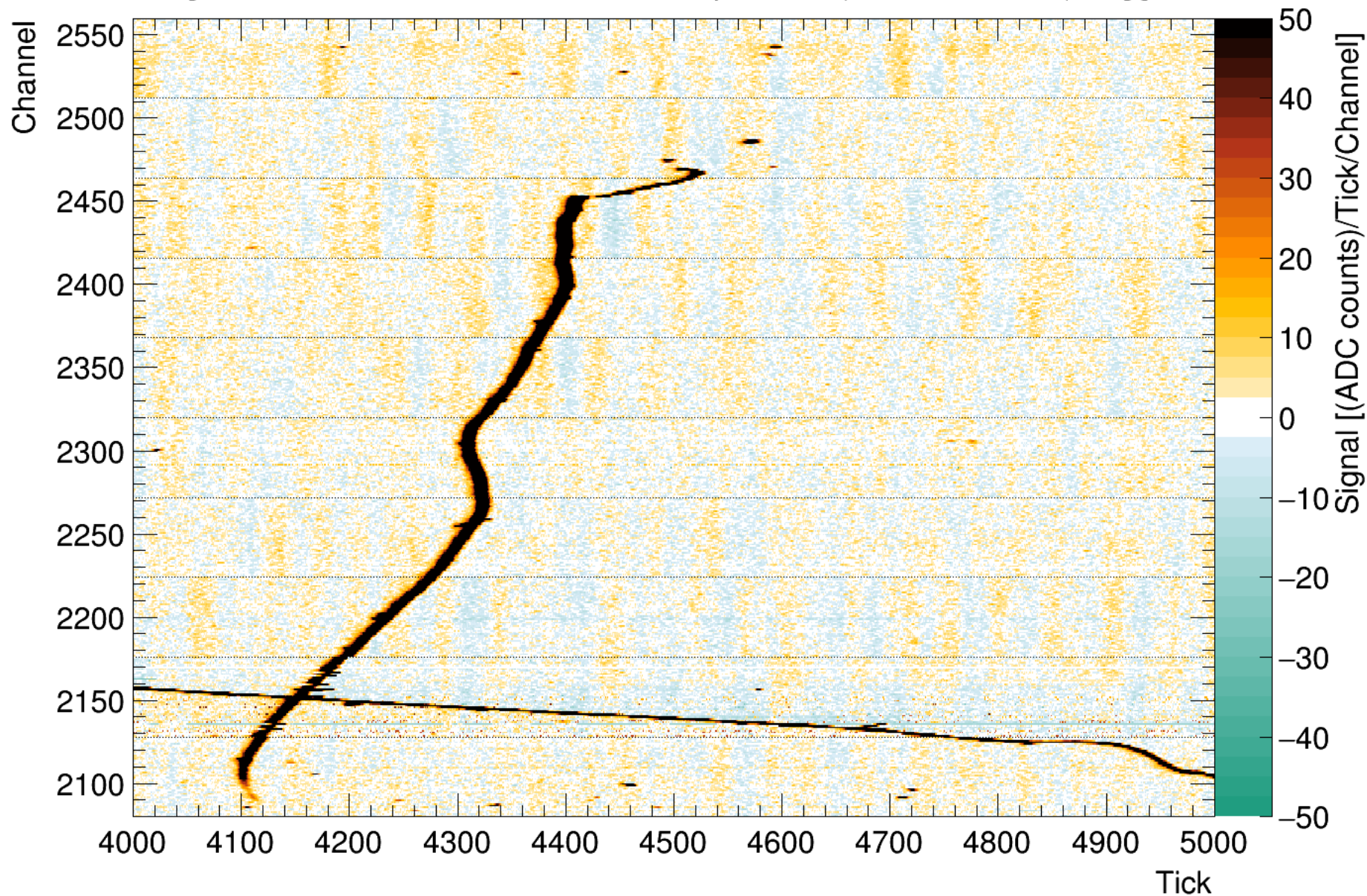
Run 5152 mitigated

Run 5308 mitigated

Raw ADC for run 5308 event 76 TPC plane 0z (APA 3: US-RaS) Trigger 8
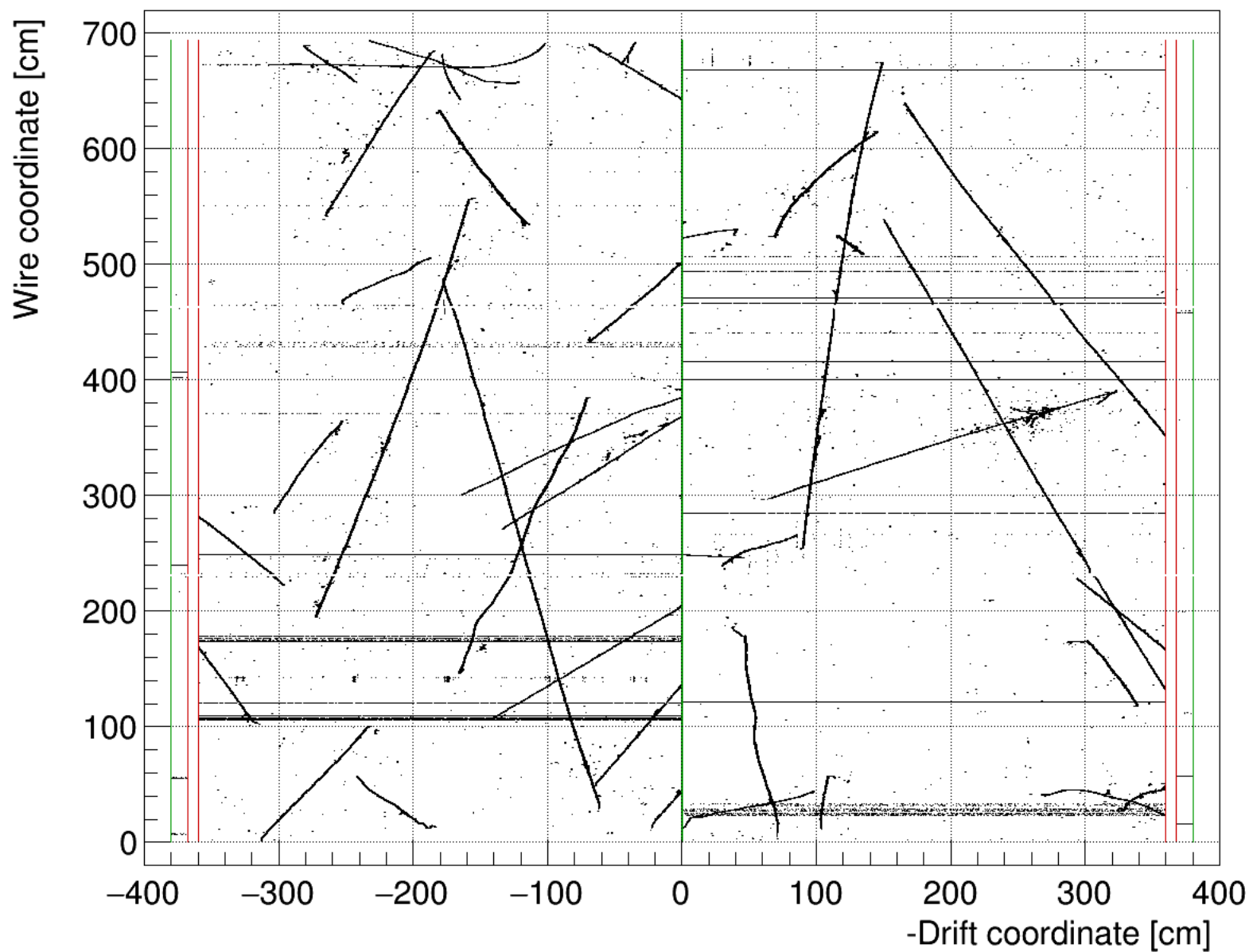
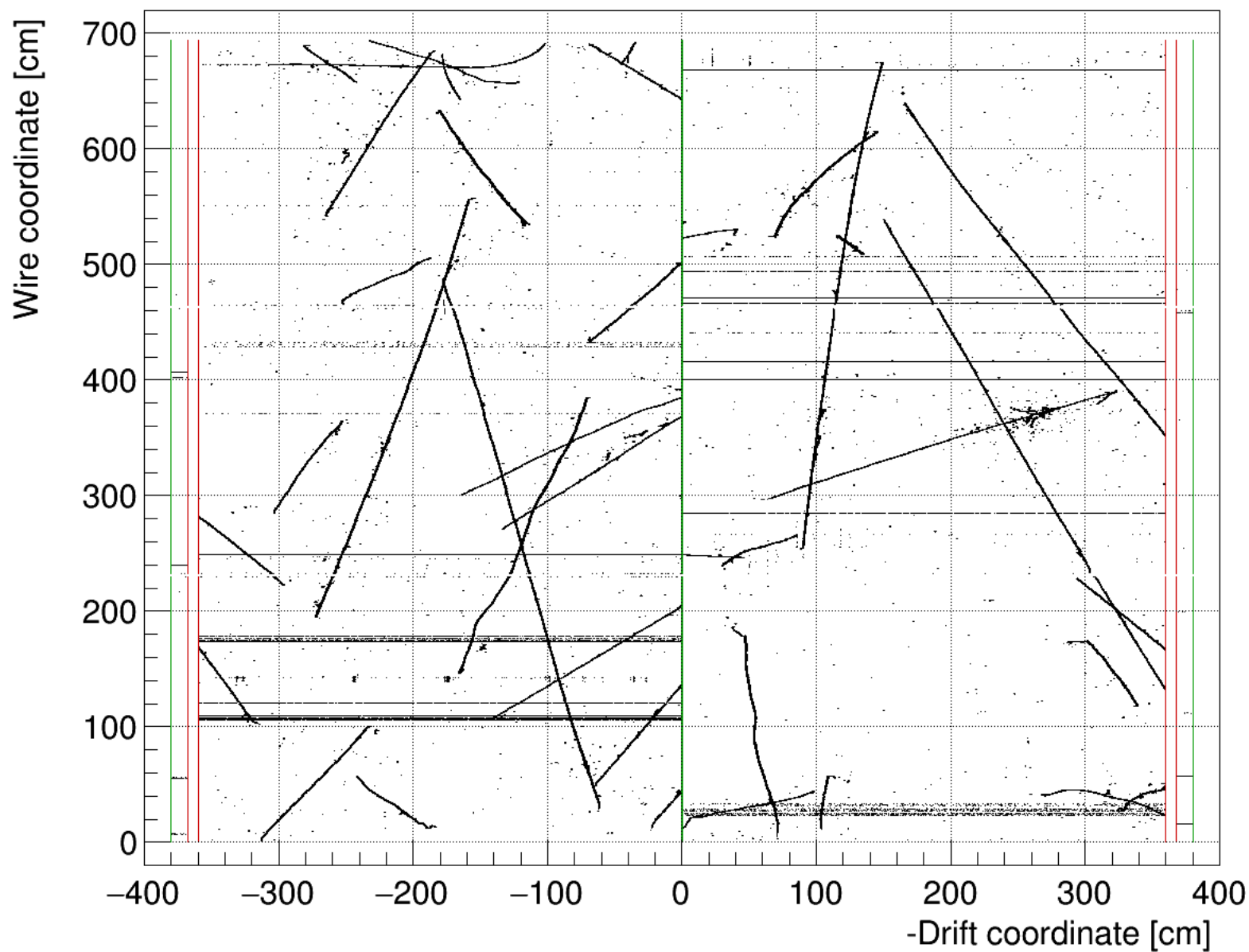# Mitigated ADC for run 5308 event 76 TPC plane 0z (APA 3: US-RaS) Trigger 8

Raw ADC collection view. Run 5308, event 76. Trigger 8.

# Mitigated ADC collection view. Run 5308, event 76. Trigger 8.

Looking for beam

Finding the beam

Often want to check we have beam related events

- Remember trigger flag is set to 12 for beam triggers

- I like to look at APA3z displays

  o Increase range to 400 ADC counts to better see signal

  o Example plots for run 5308 follow

    – This run has beam trigger that suppresses electrons
    – I draw line where beam tracks appear to start
      » Offset due to space charge
      » Varies from run to run (and within run?)

  o Full set (including random trigger) at

    http://home.fnal.gov/~dladams/protodune/apa3zAdc/run005308/plots.html

  o Selected events 0-699

    – 116 events
    – 36 have trigger 12
    – Maybe 24 are consistent with my beam position

Raw ADC for run 5308 event 37 TPC plane 0z (APA 3: US-RaS) Trigger 12
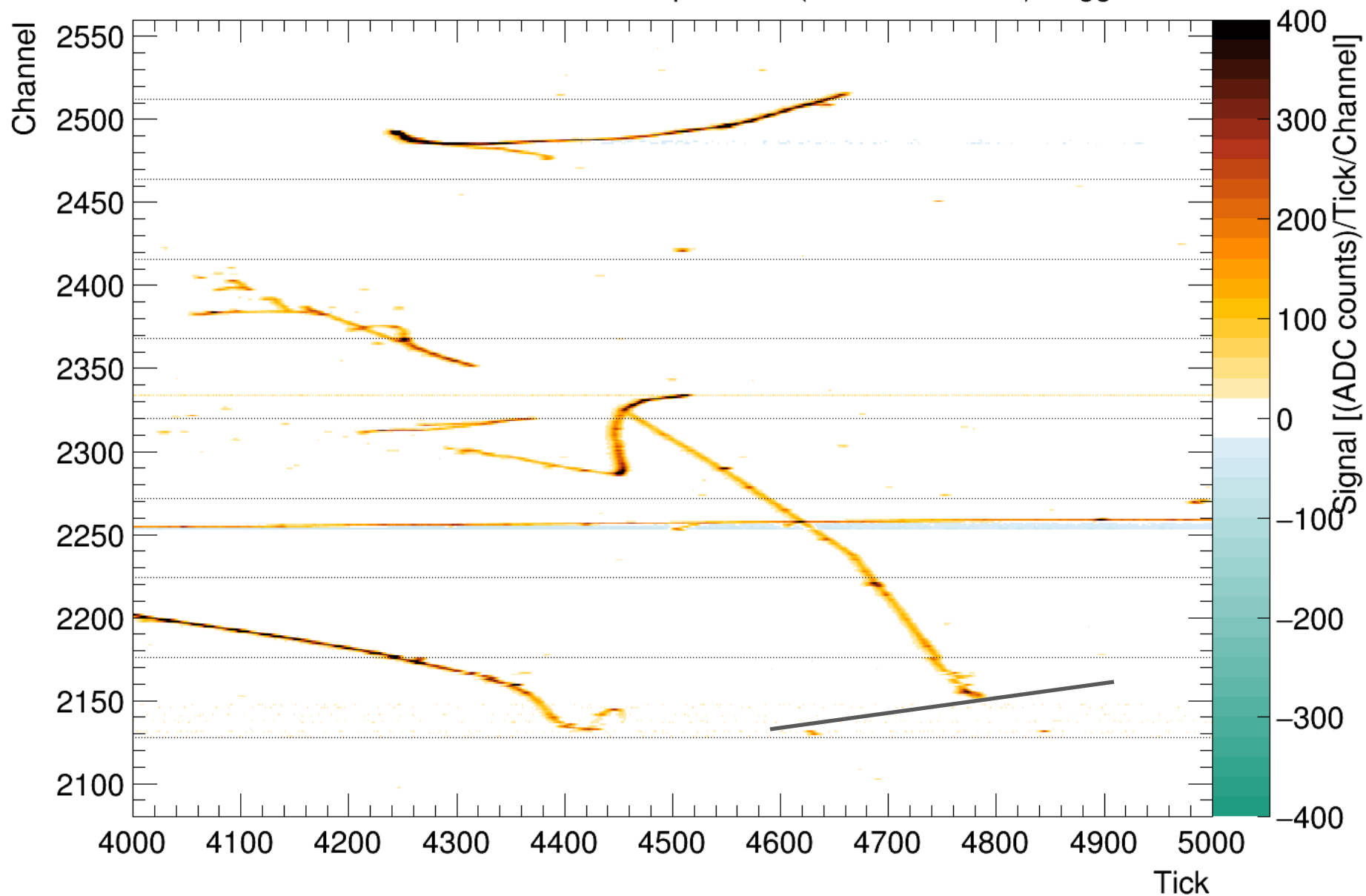
Raw ADC for run 5308 event 40 TPC plane 0z (APA 3: US-RaS) Trigger 12
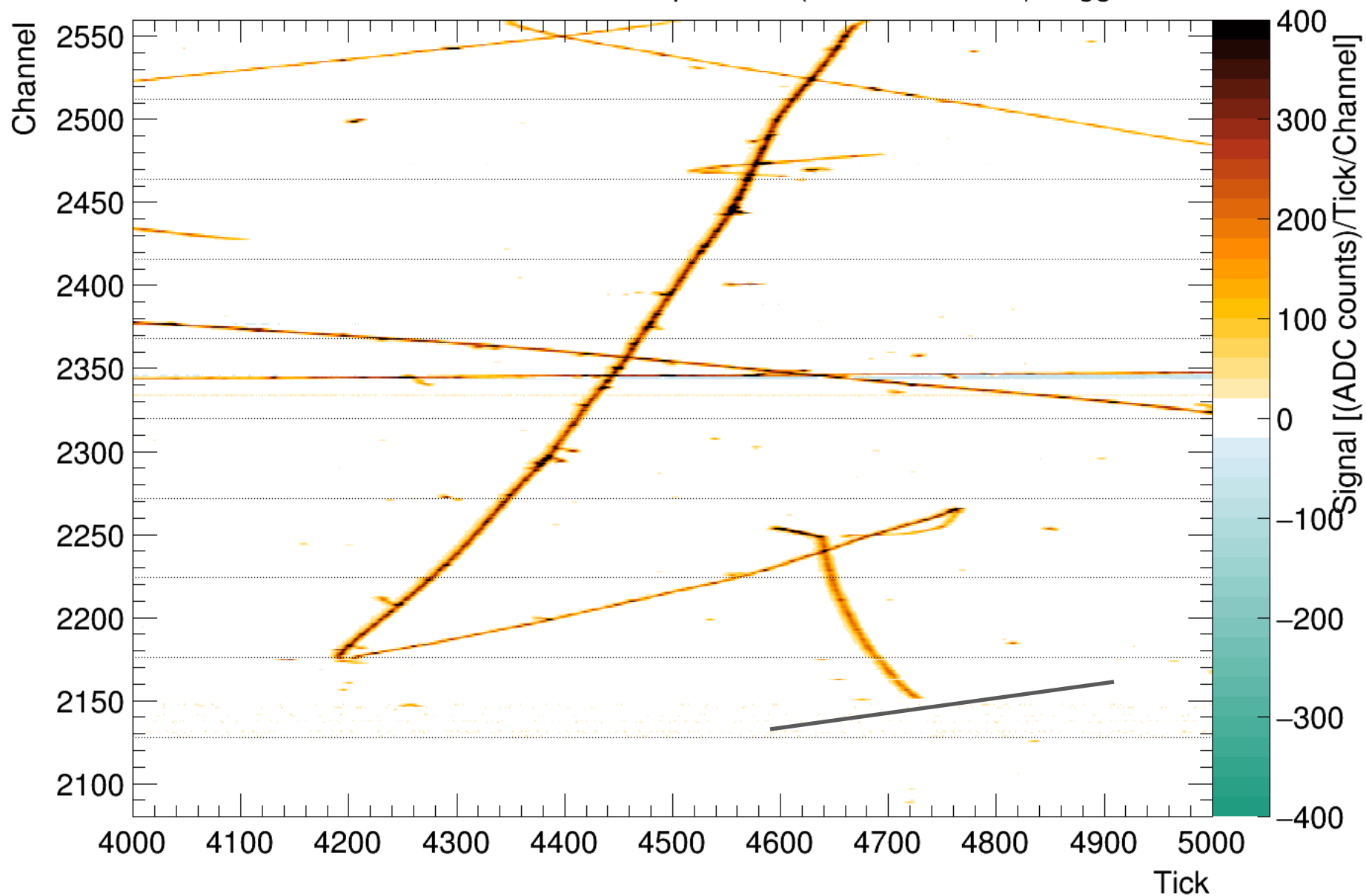
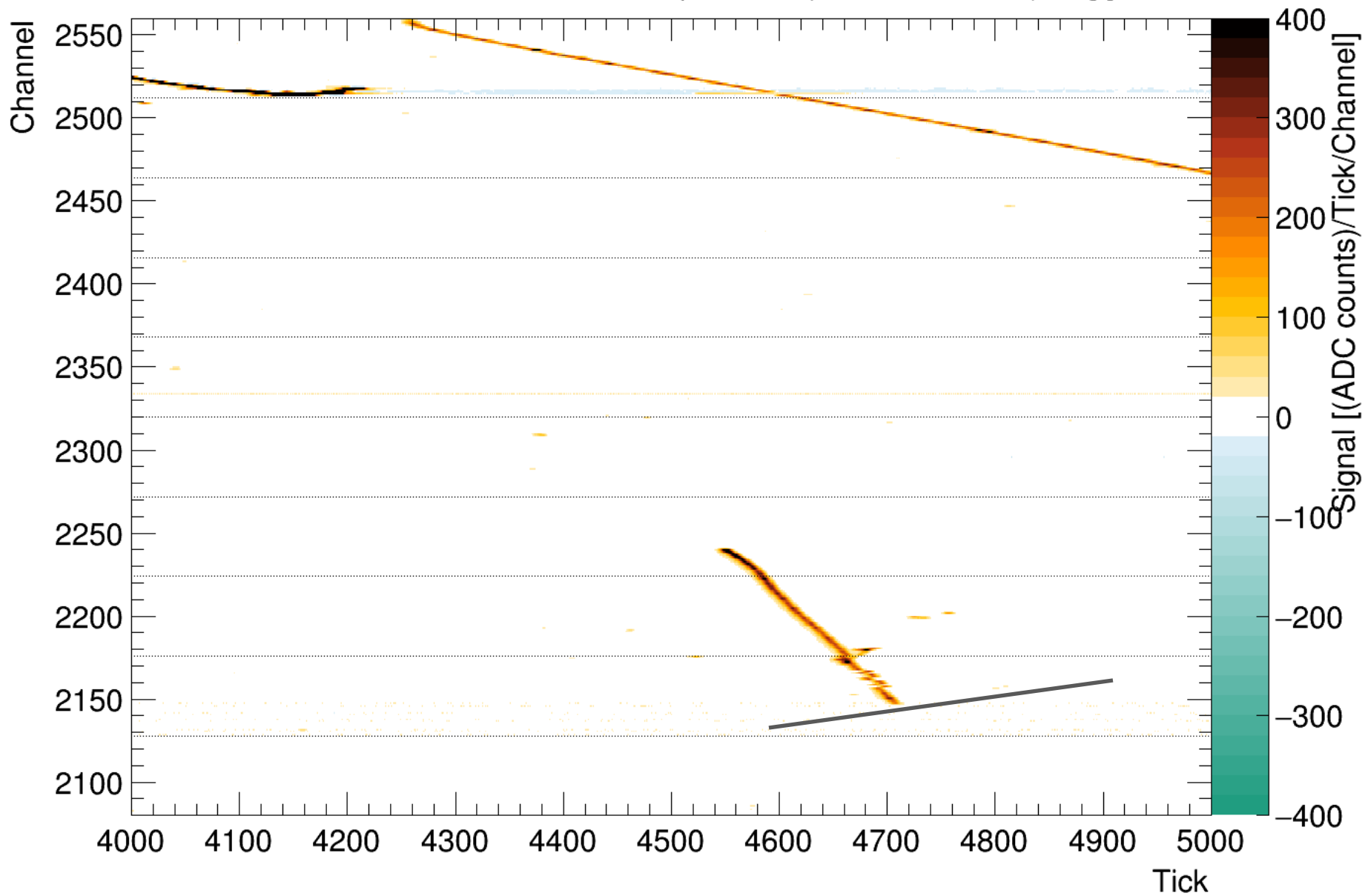Raw ADC for run 5308 event 48 TPC plane 0z (APA 3: US-RaS) Trigger 12
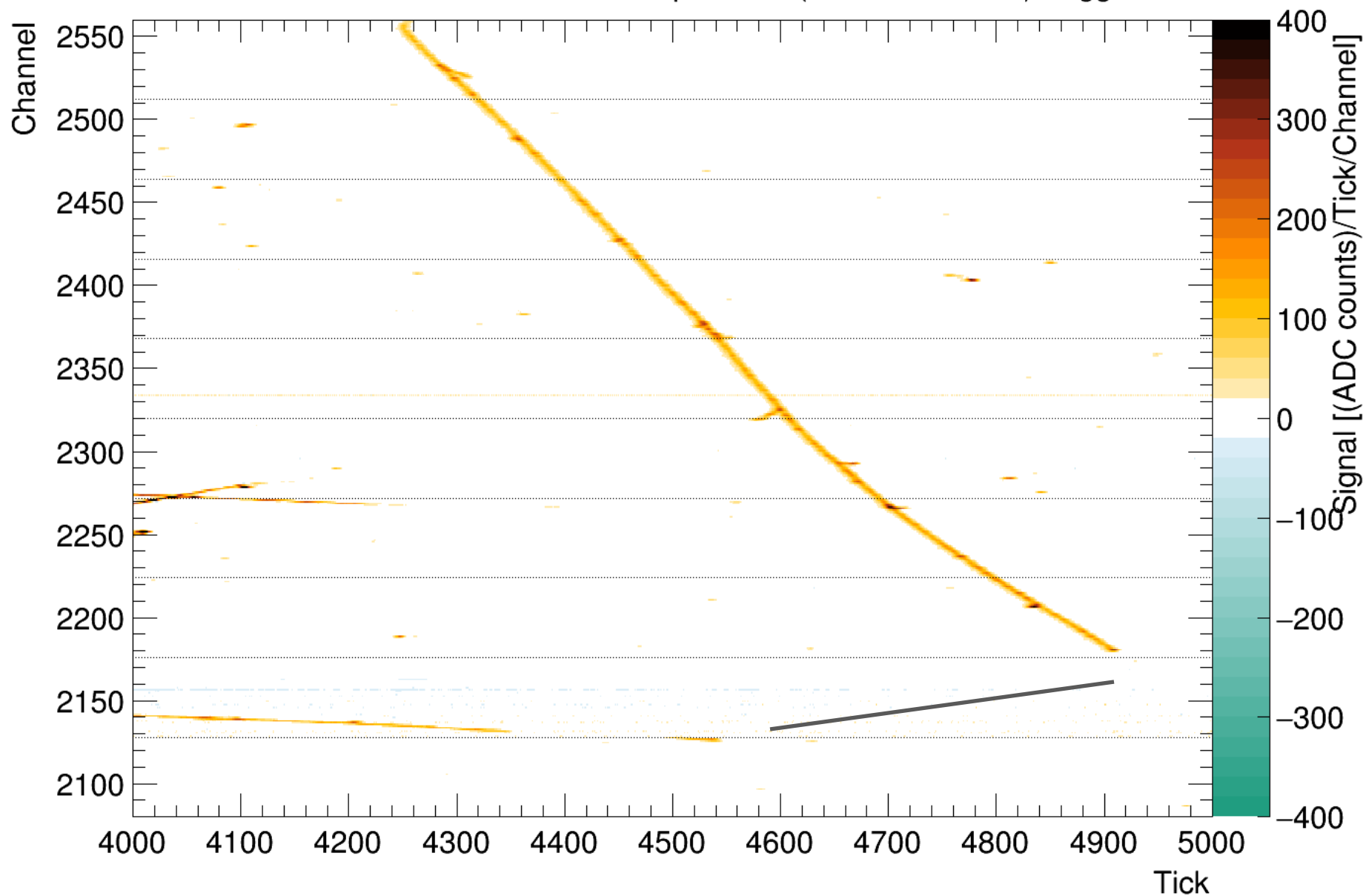
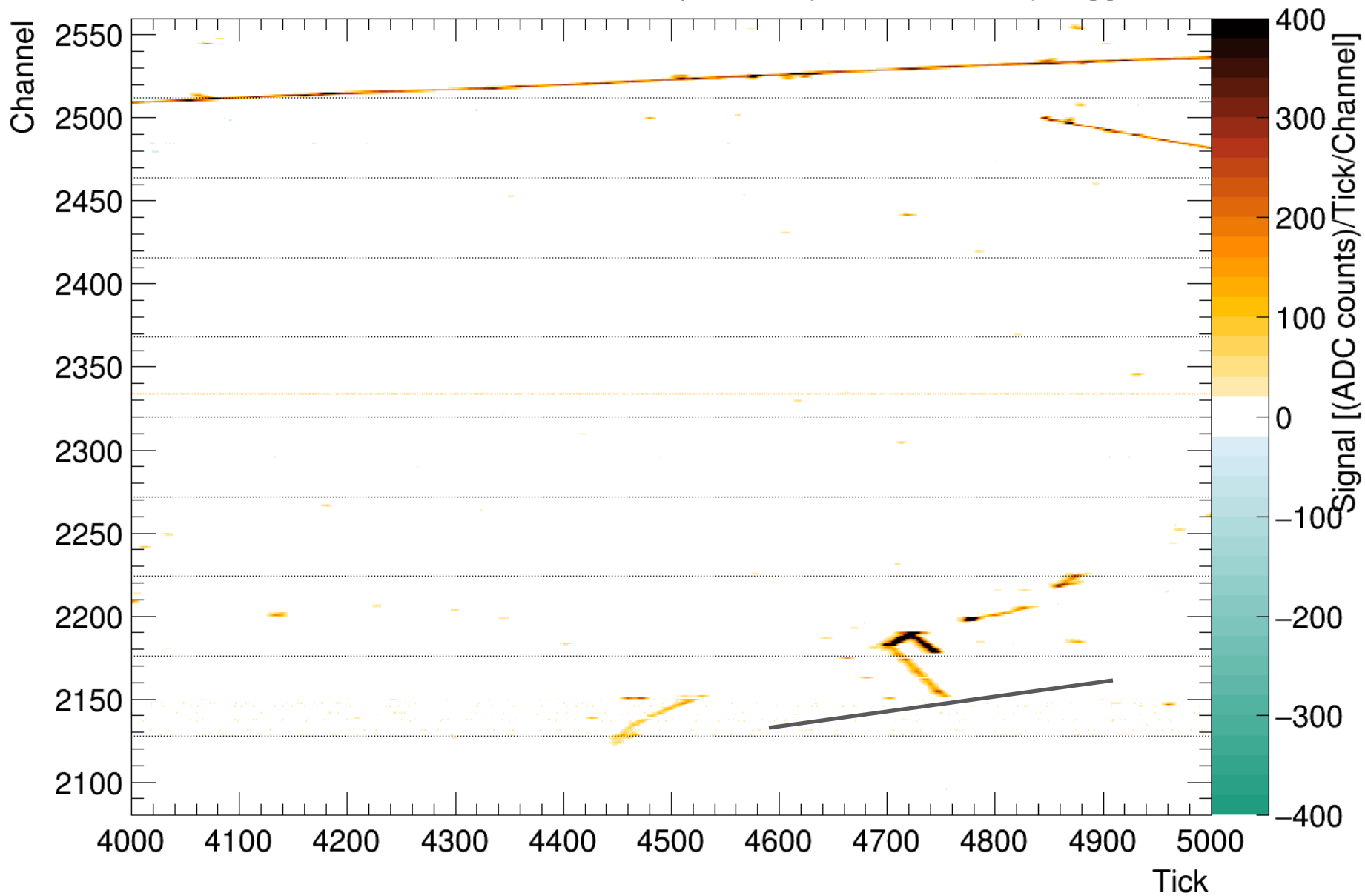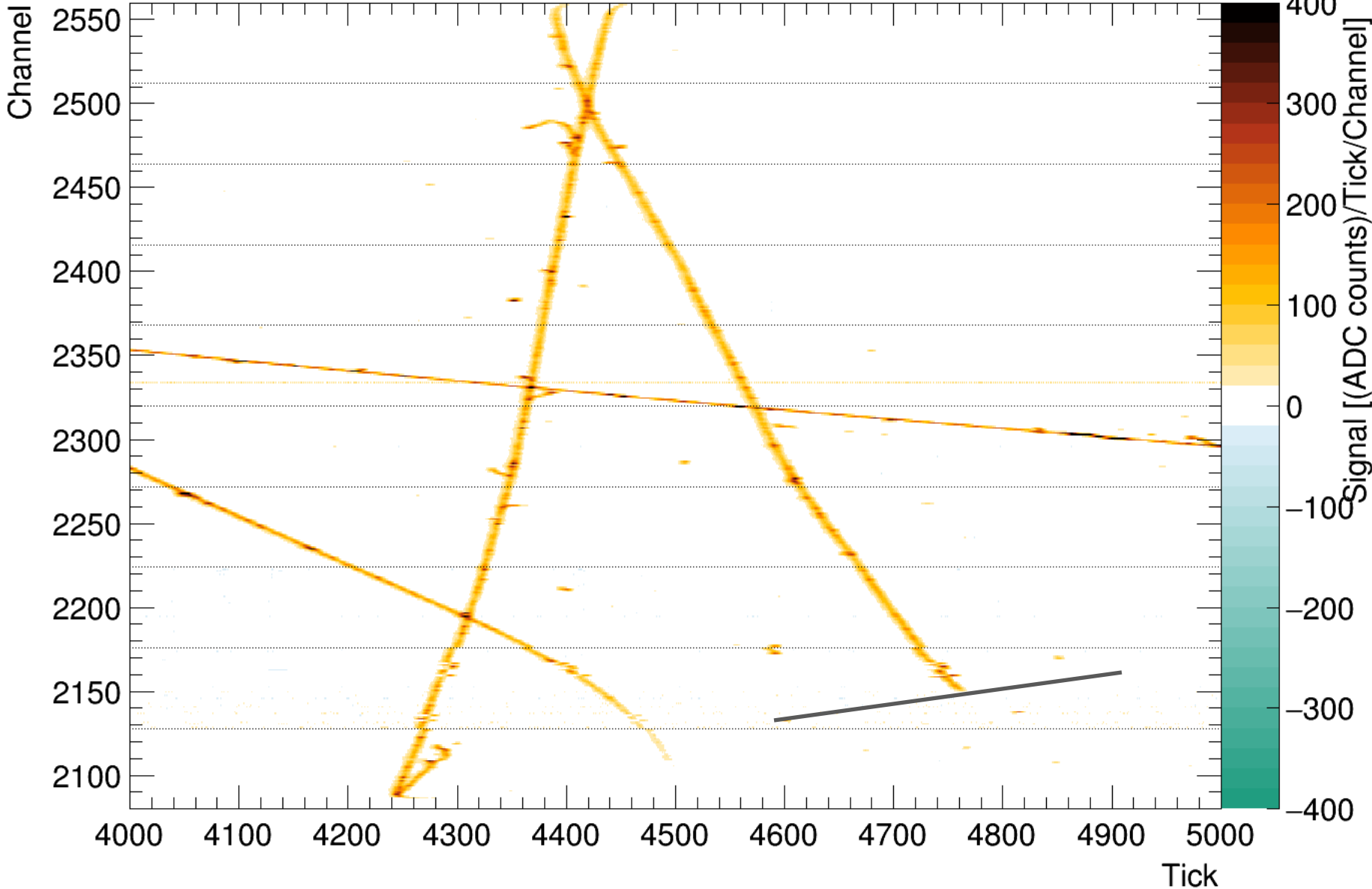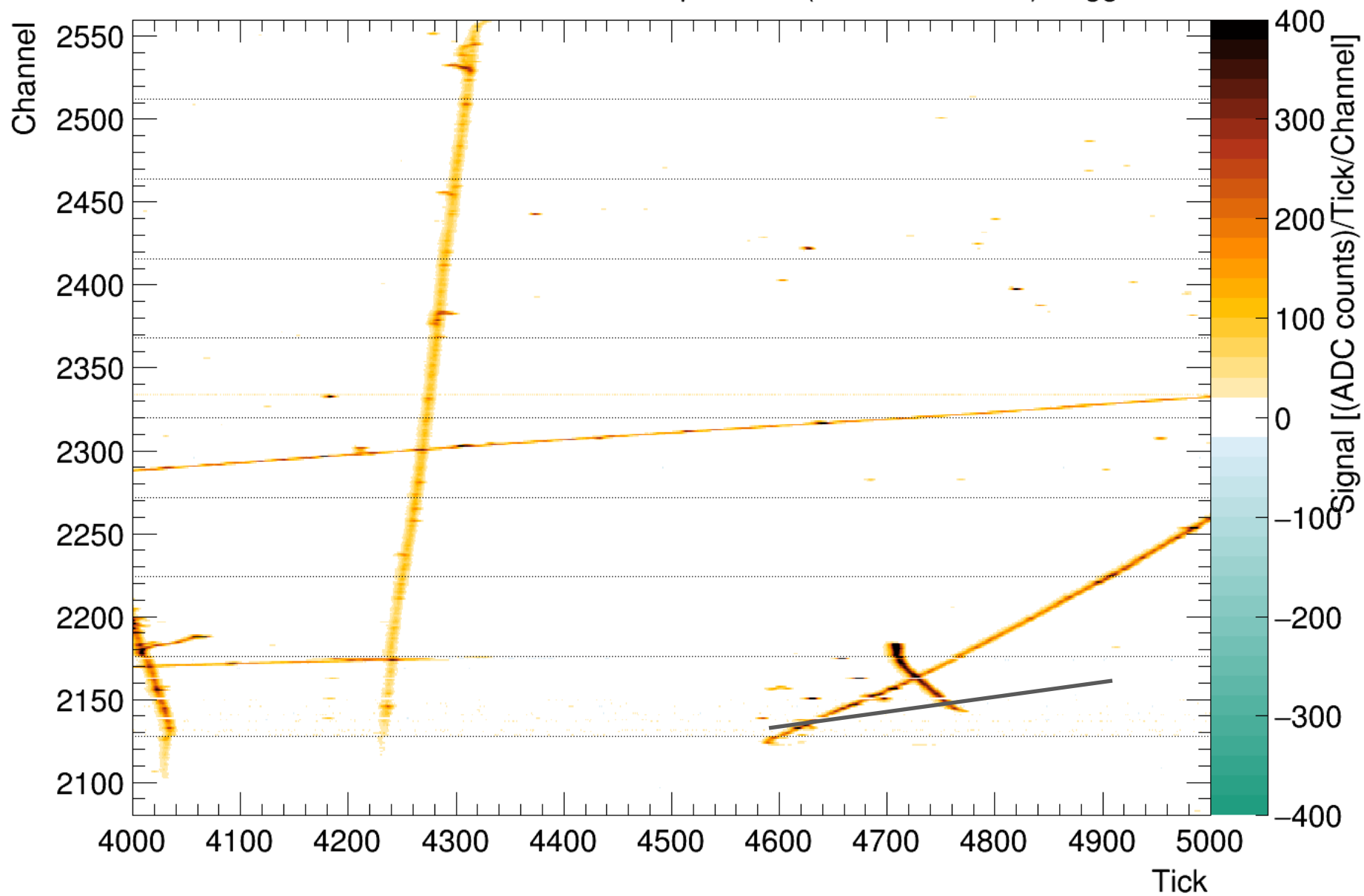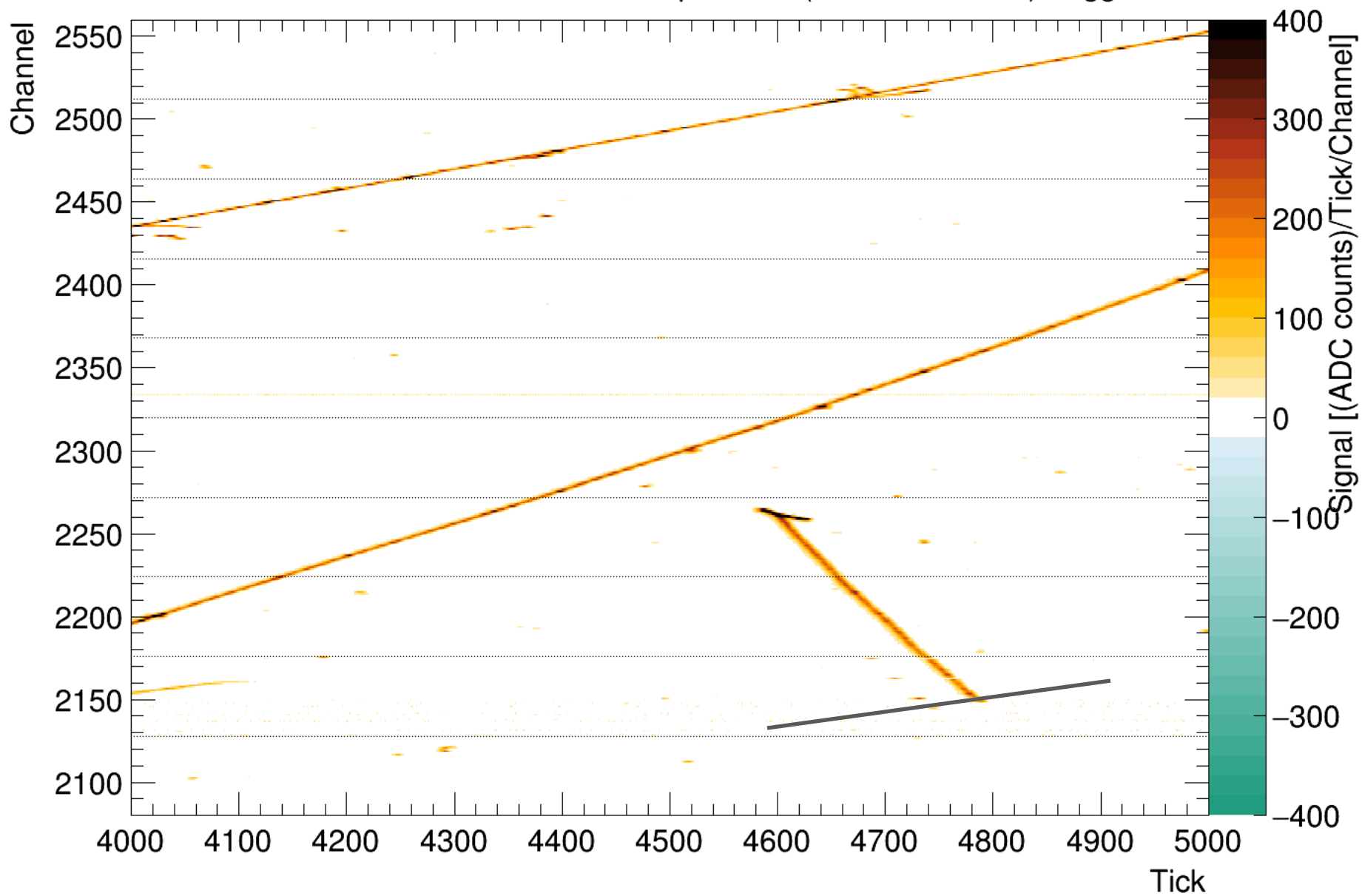Raw ADC for run 5308 event 101 TPC plane 0z (APA 3: US-RaS) Trigger 12
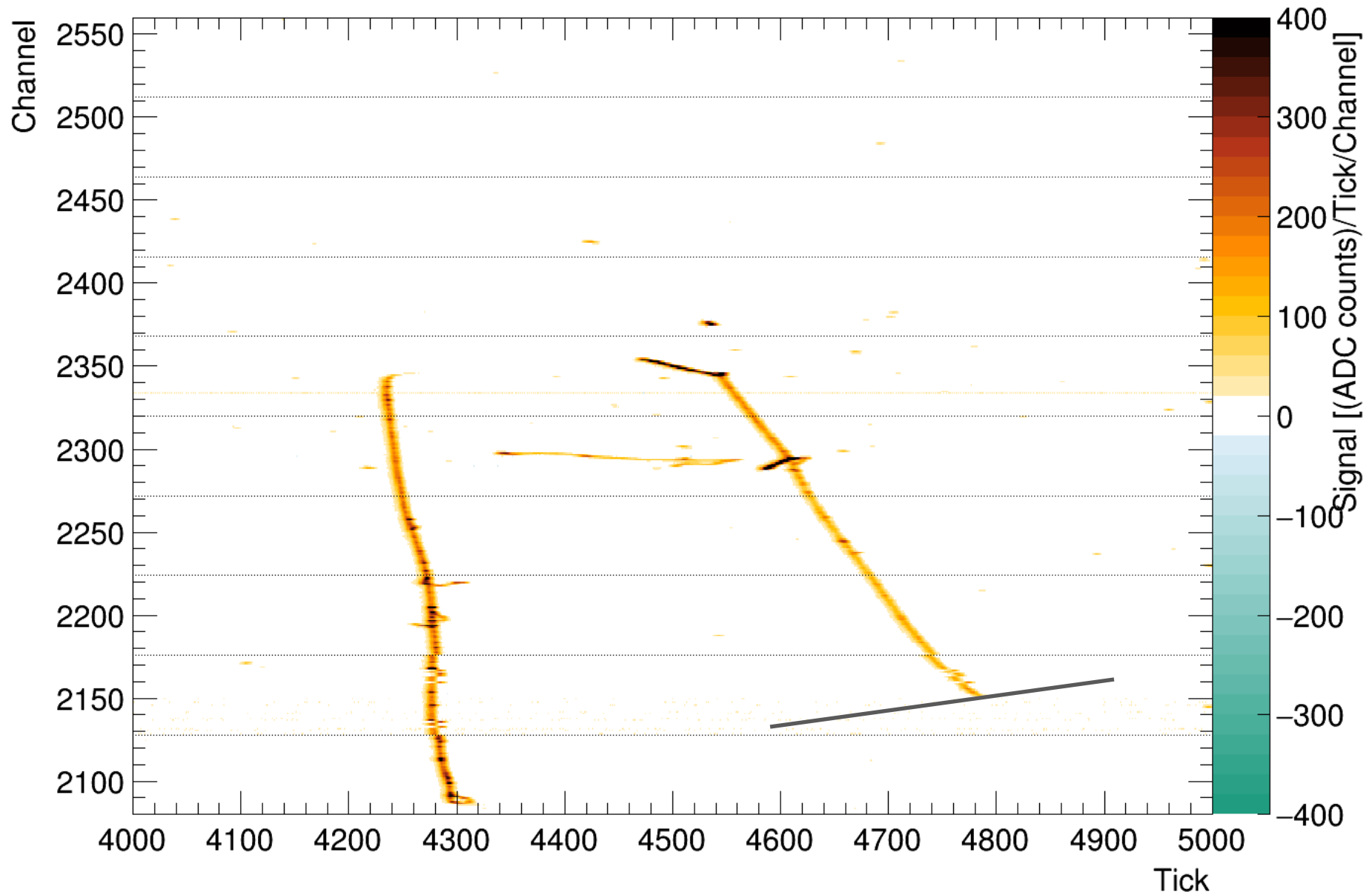
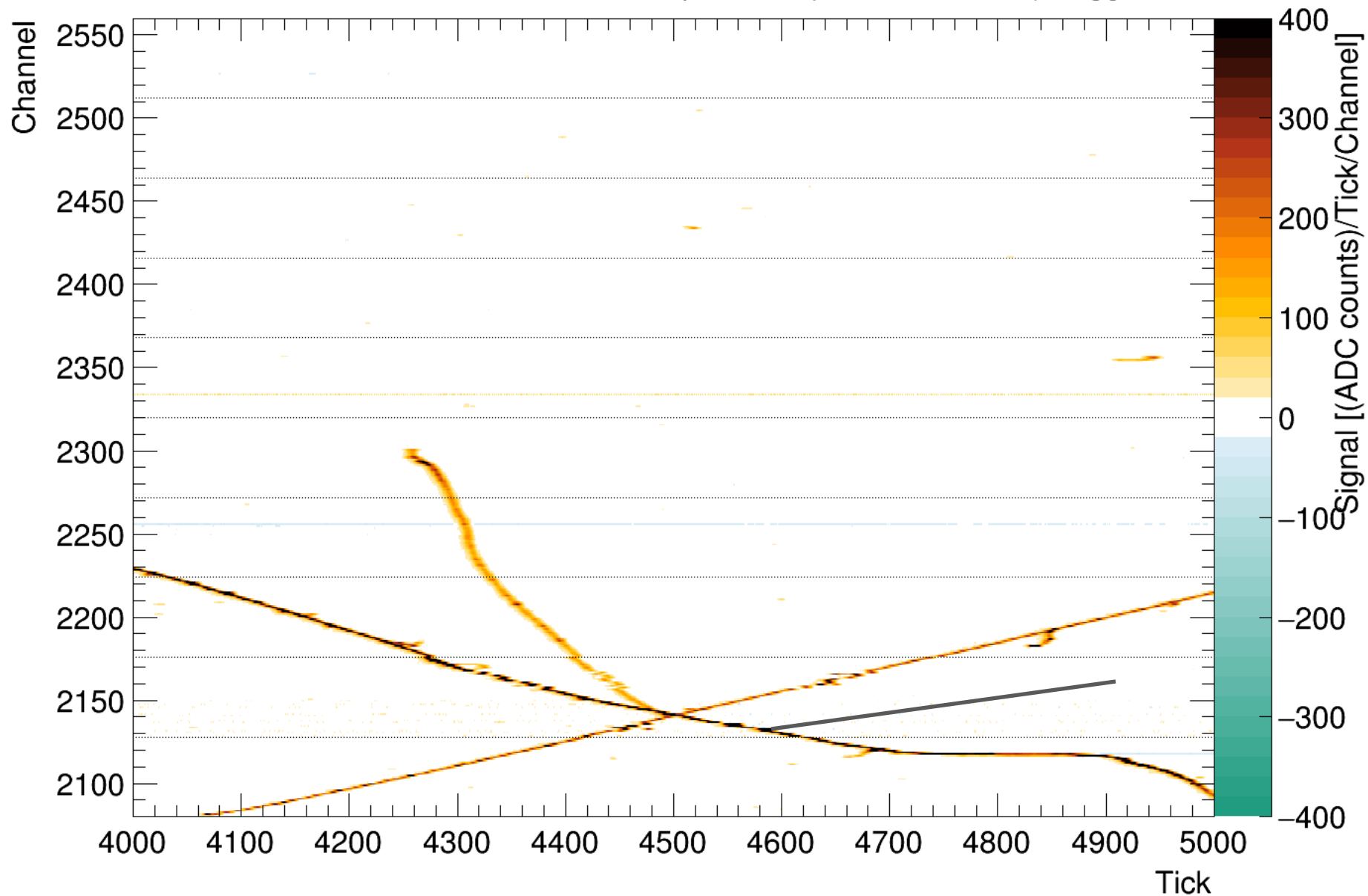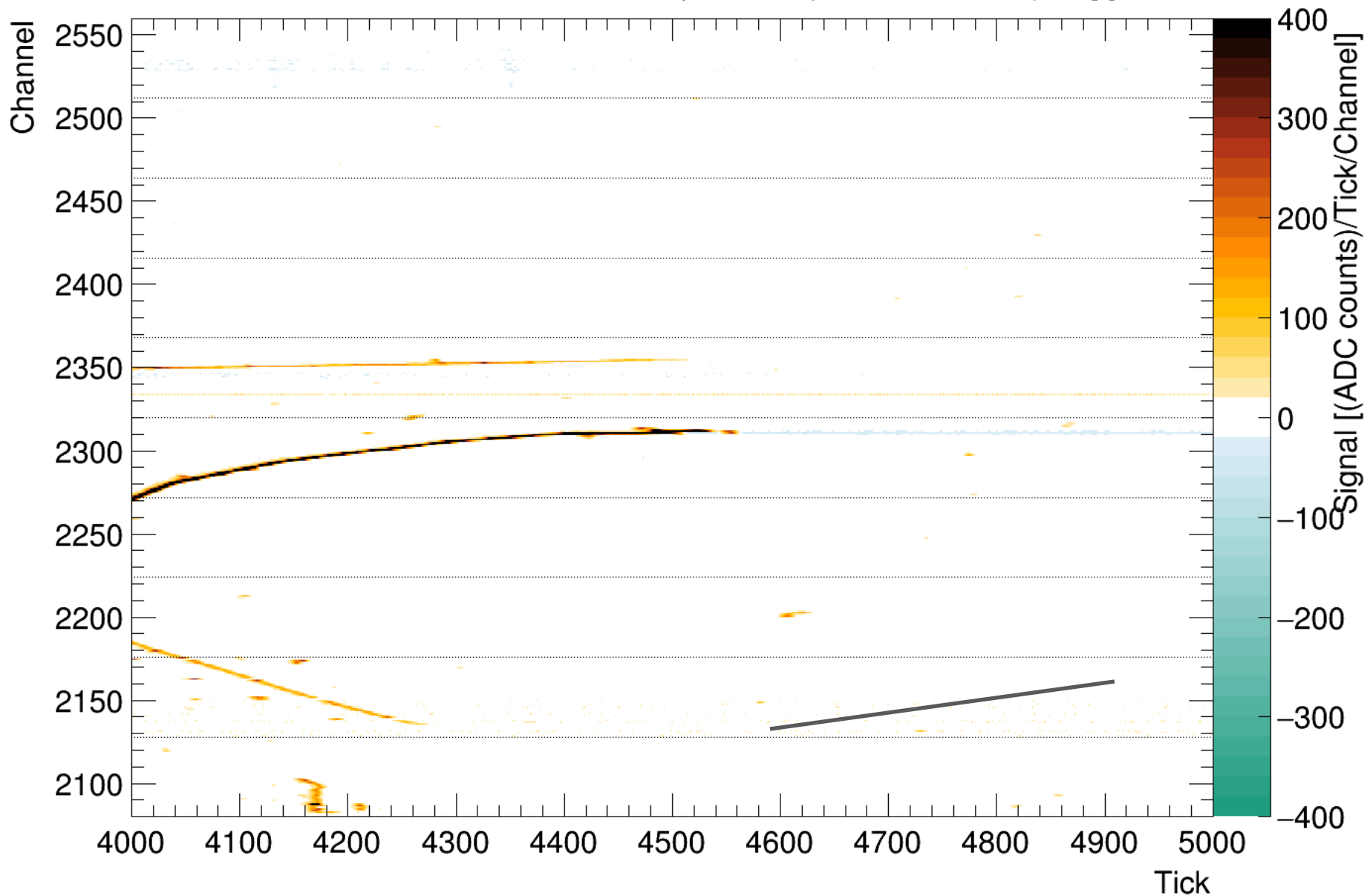Raw ADC for run 5308 event 106 TPC plane 0z (APA 3: US-RaS) Trigger 12

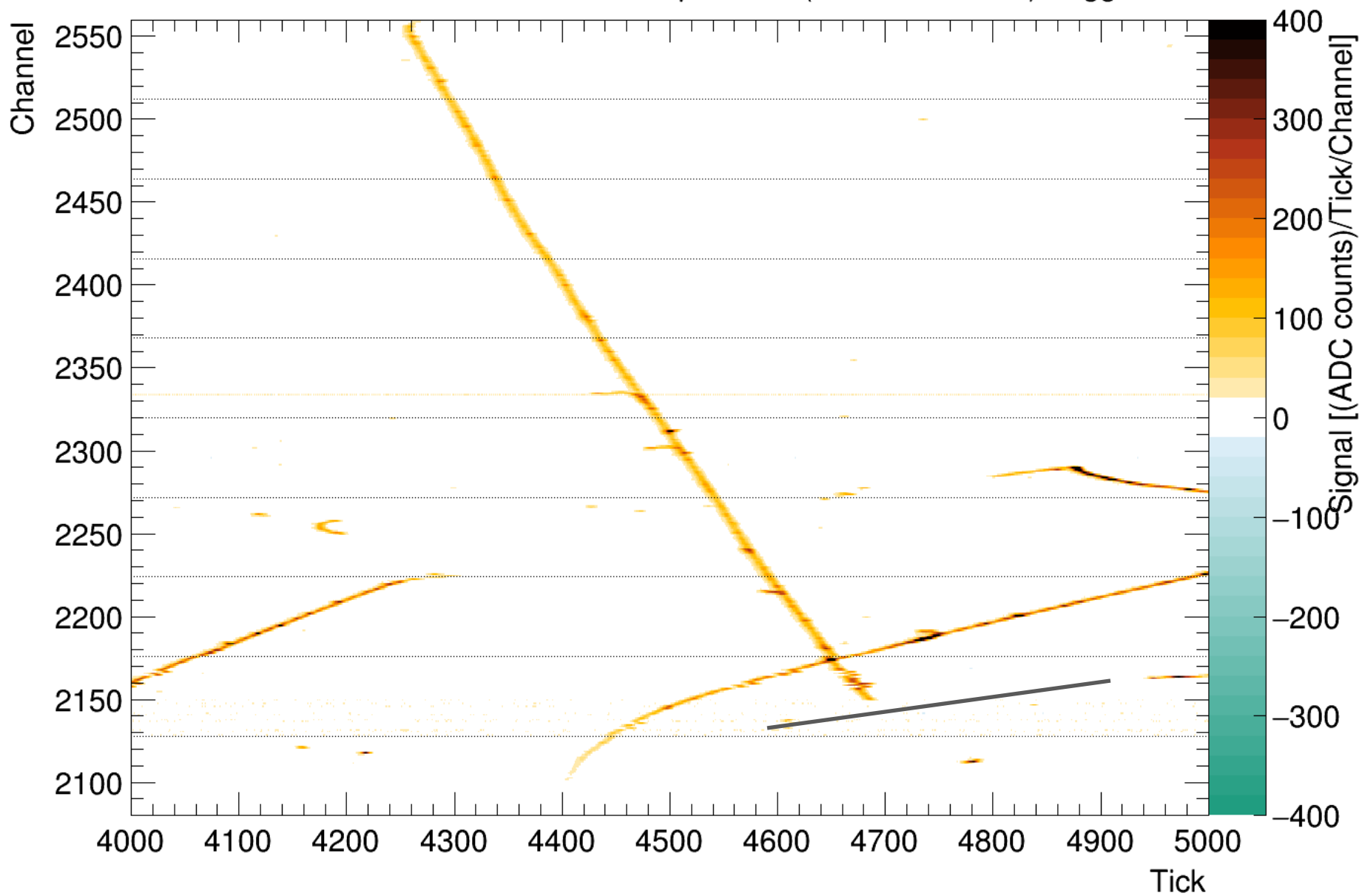Raw ADC for run 5308 event 121 TPC plane 0z (APA 3: US-RaS) Trigger 12

Raw ADC for run 5308 event 201 TPC plane 0z (APA 3: US-RaS) Trigger 12

Raw ADC for run 5308 event 253 TPC plane 0z (APA 3: US-RaS) Trigger 12

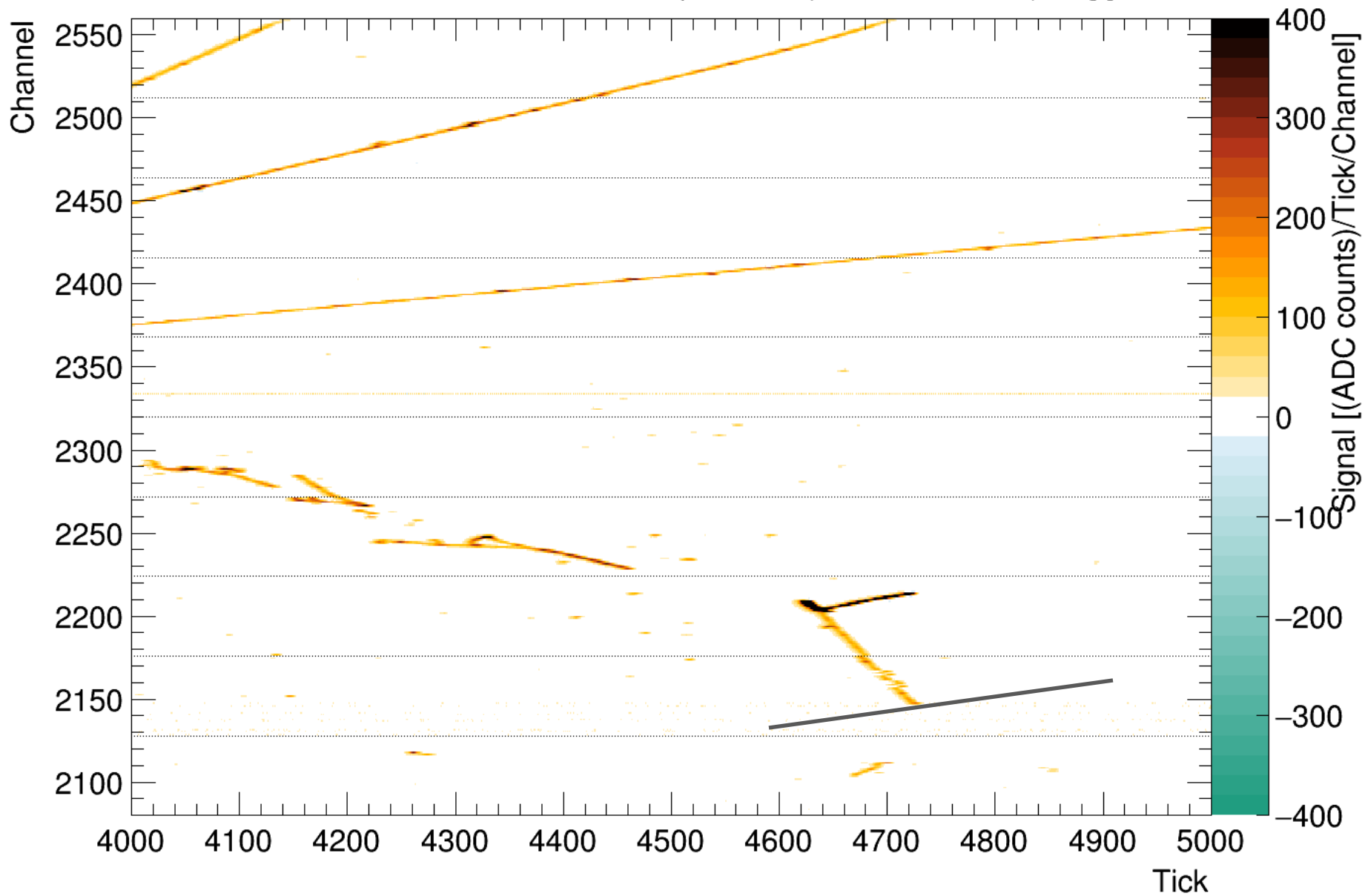# Raw ADC for run 5308 event 257 TPC plane 0z (APA 3: US-RaS) Trigger 12

Raw ADC for run 5308 event 258 TPC plane 0z (APA 3: US-RaS) Trigger 12

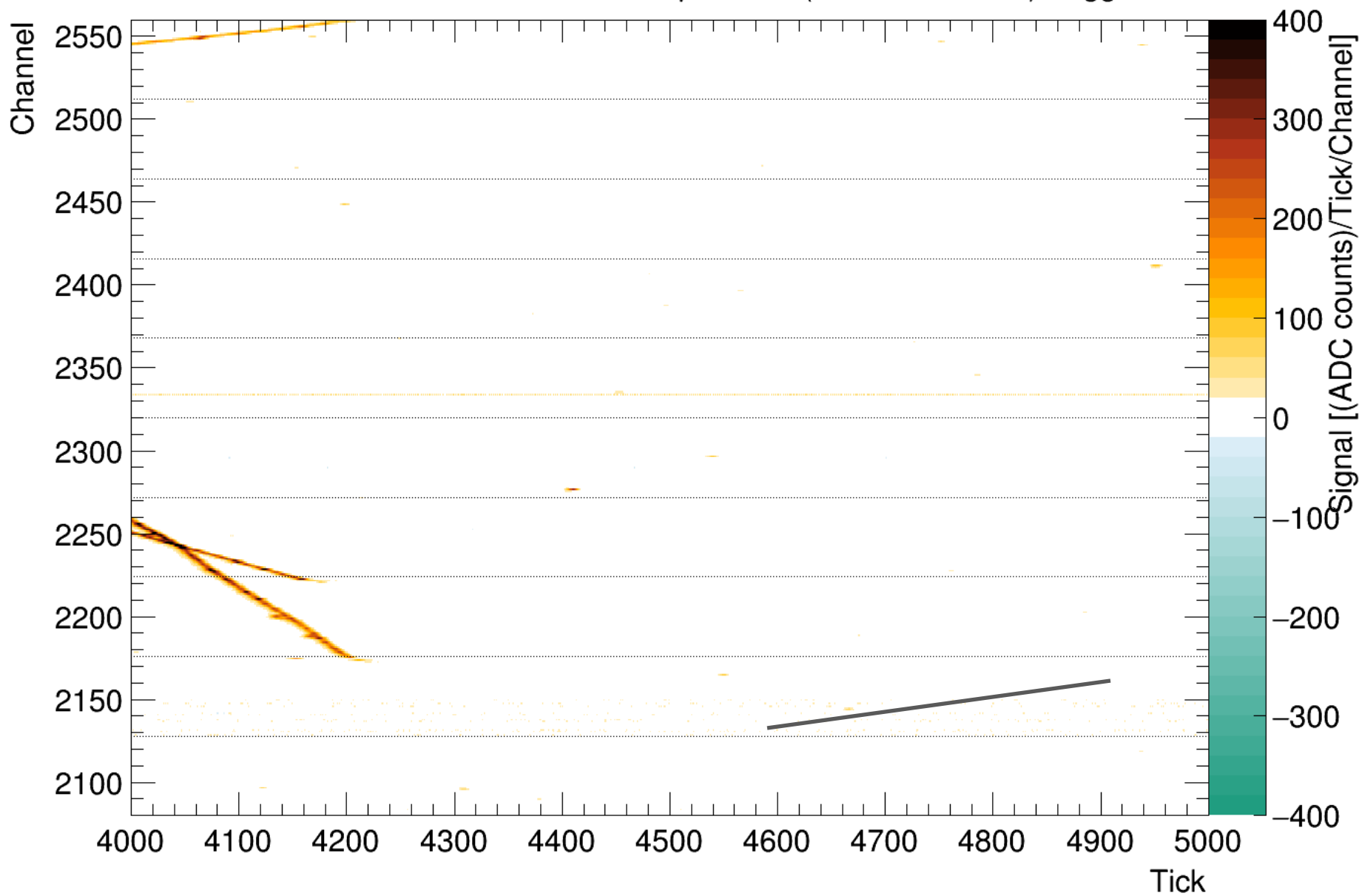Raw ADC for run 5308 event 259 TPC plane 0z (APA 3: US-RaS) Trigger 12

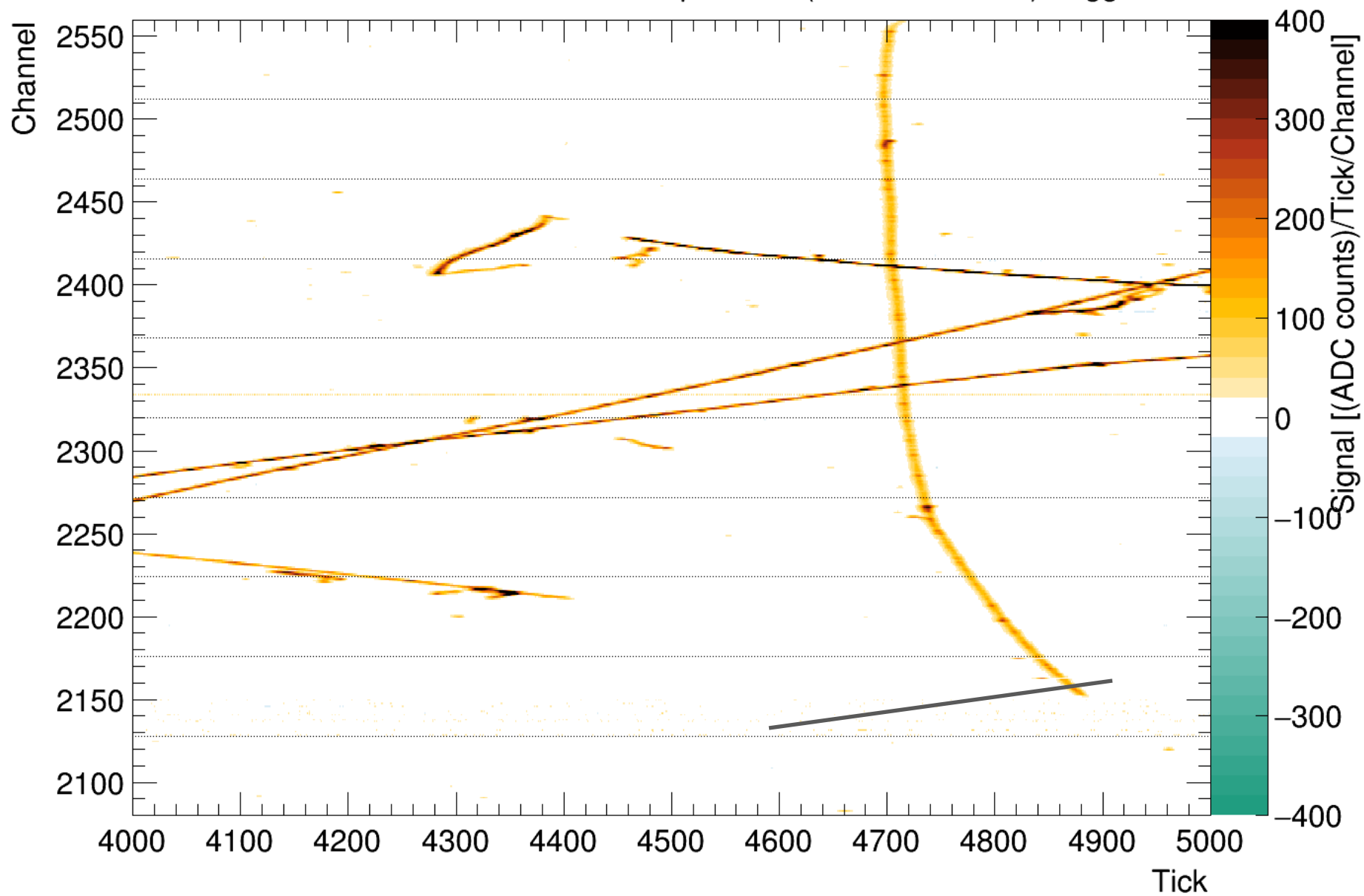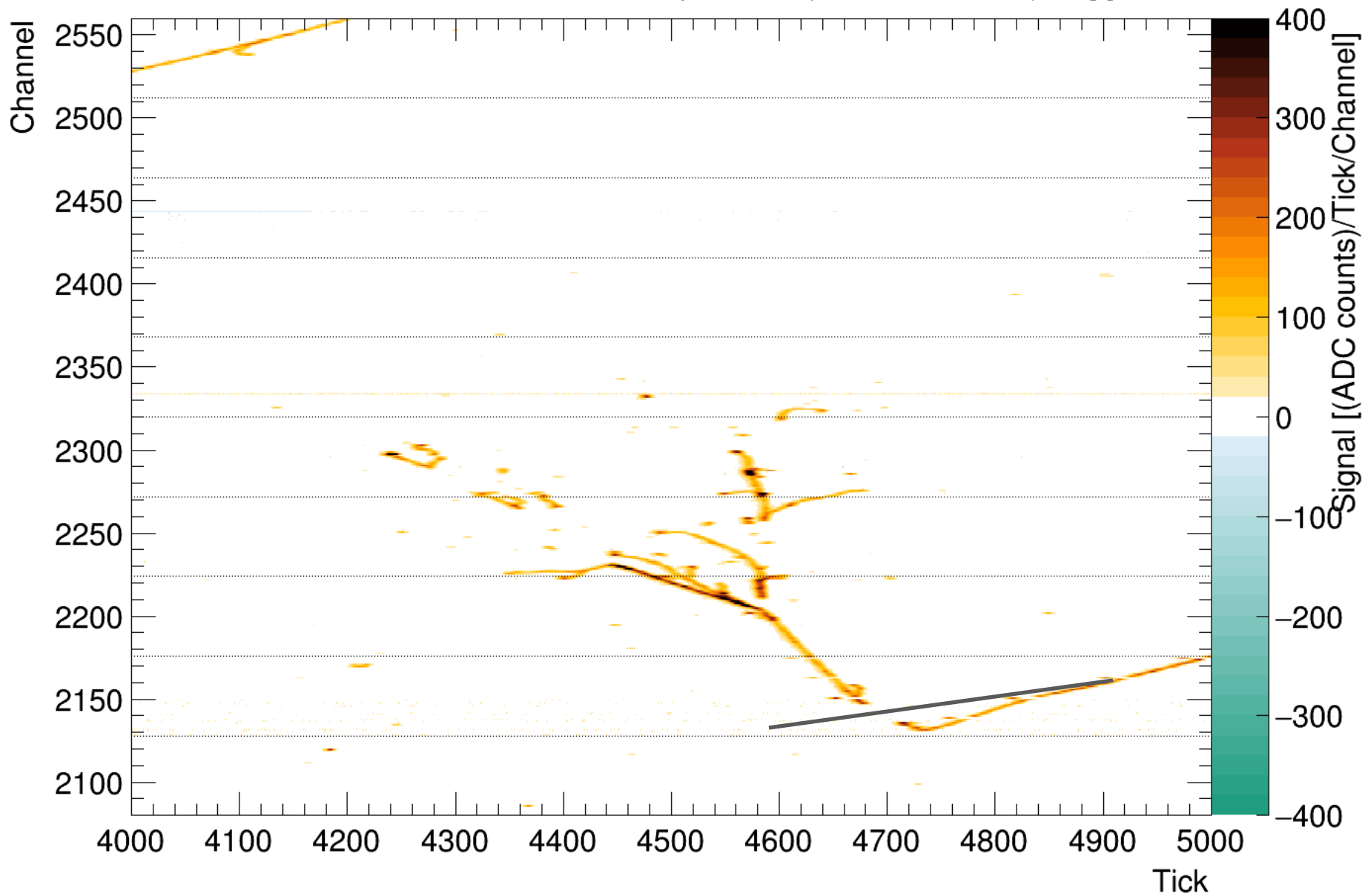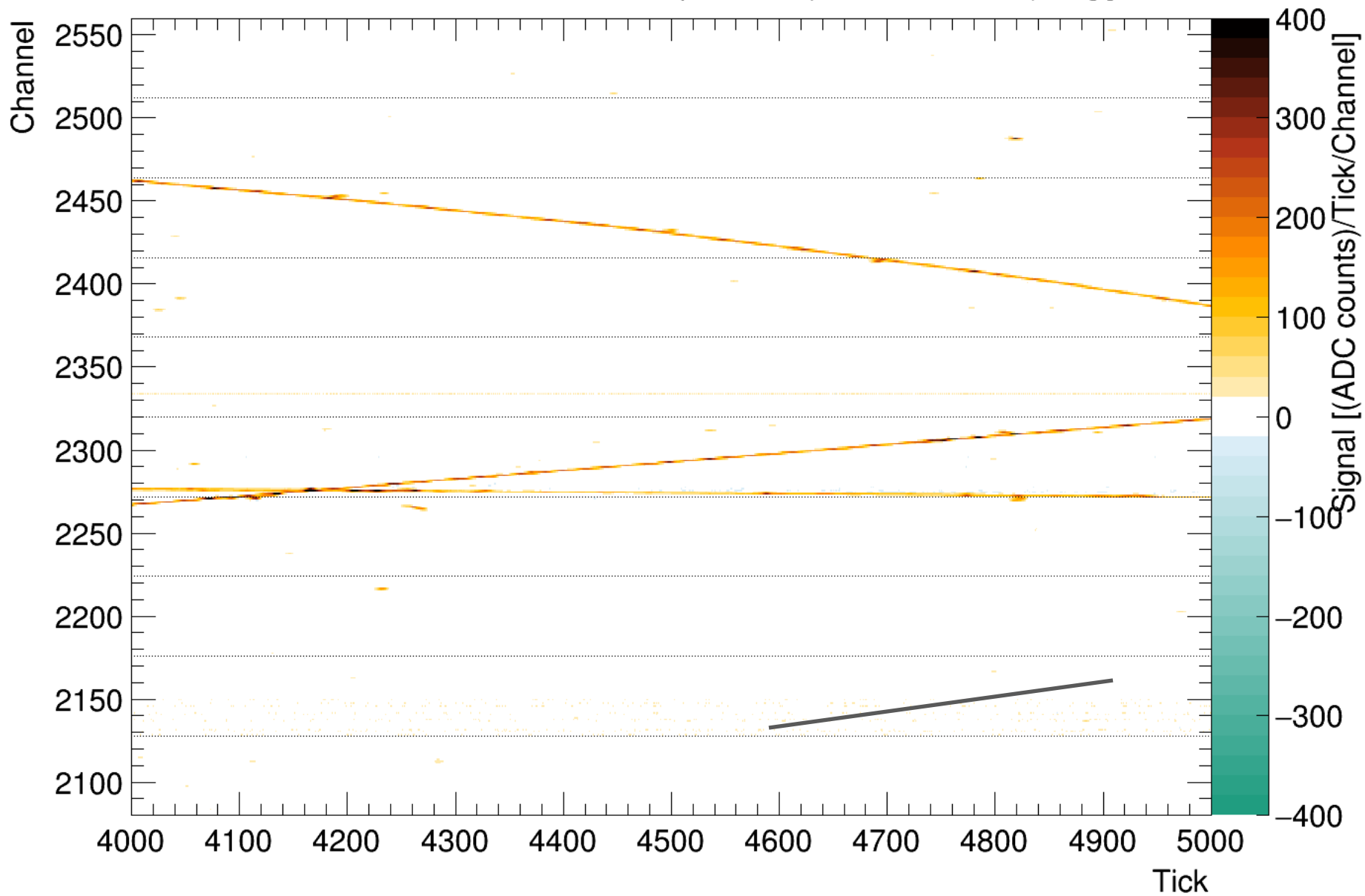# Raw ADC for run 5308 event 262 TPC plane 0z (APA 3: US-RaS) Trigger 12

Raw ADC for run 5308 event 264 TPC plane 0z (APA 3: US-RaS) Trigger 12

Raw ADC for run 5308 event 365 TPC plane 0z (APA 3: US-RaS) Trigger 12

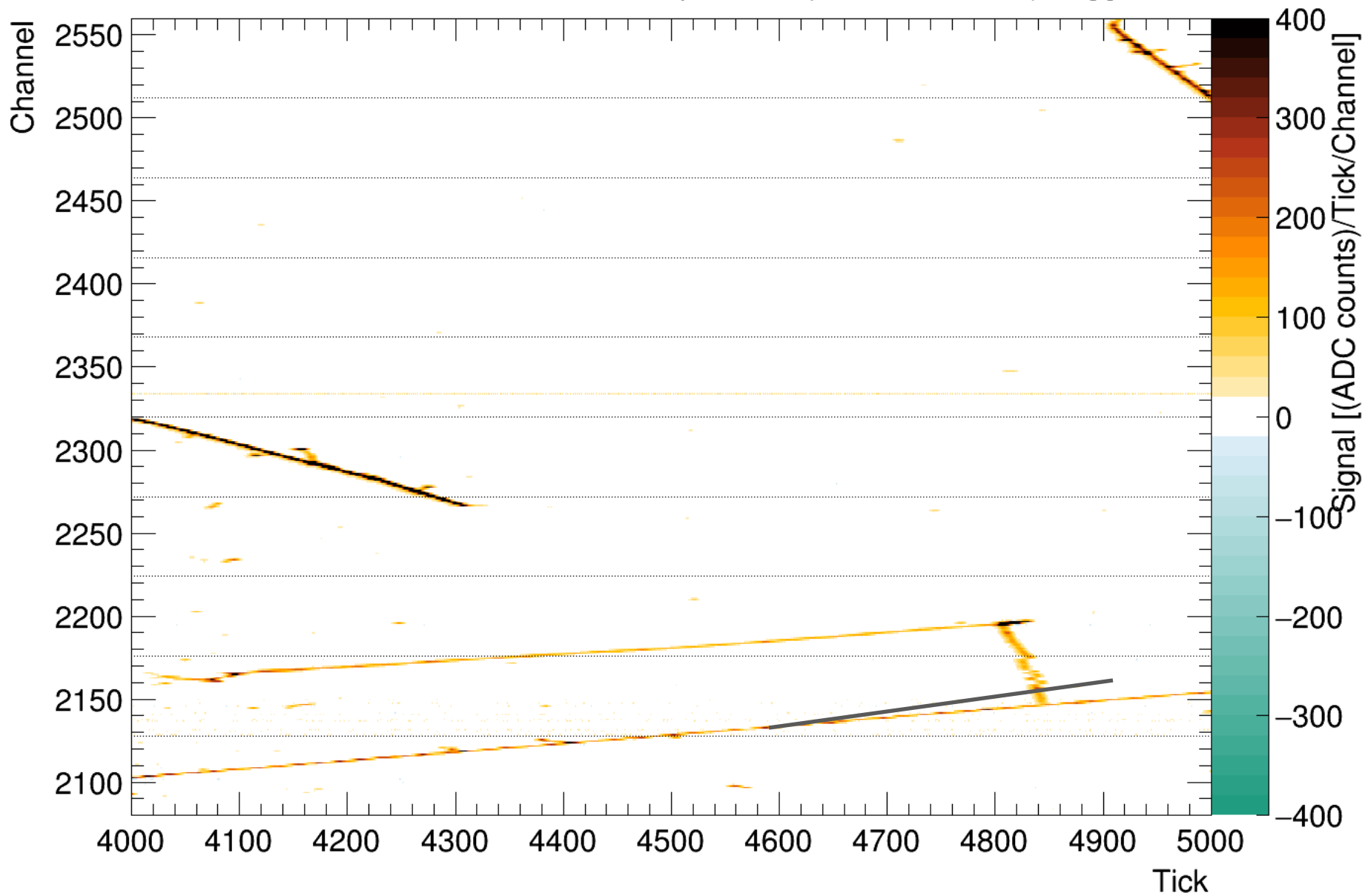# Raw ADC for run 5308 event 265 TPC plane 0z (APA 3: US-RaS) Trigger 12

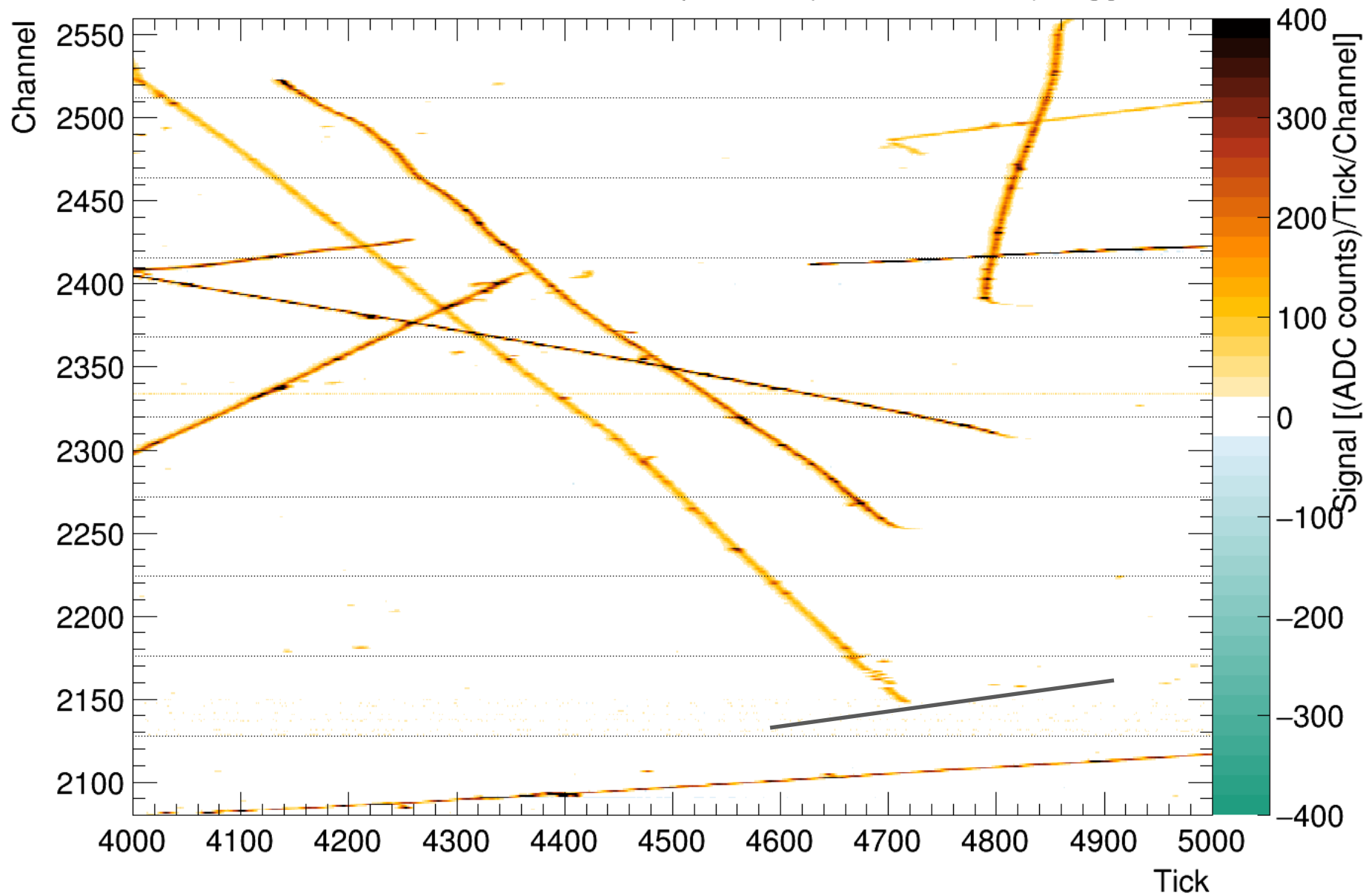Raw ADC for run 5308 event 267 TPC plane 0z (APA 3: US-RaS) Trigger 12

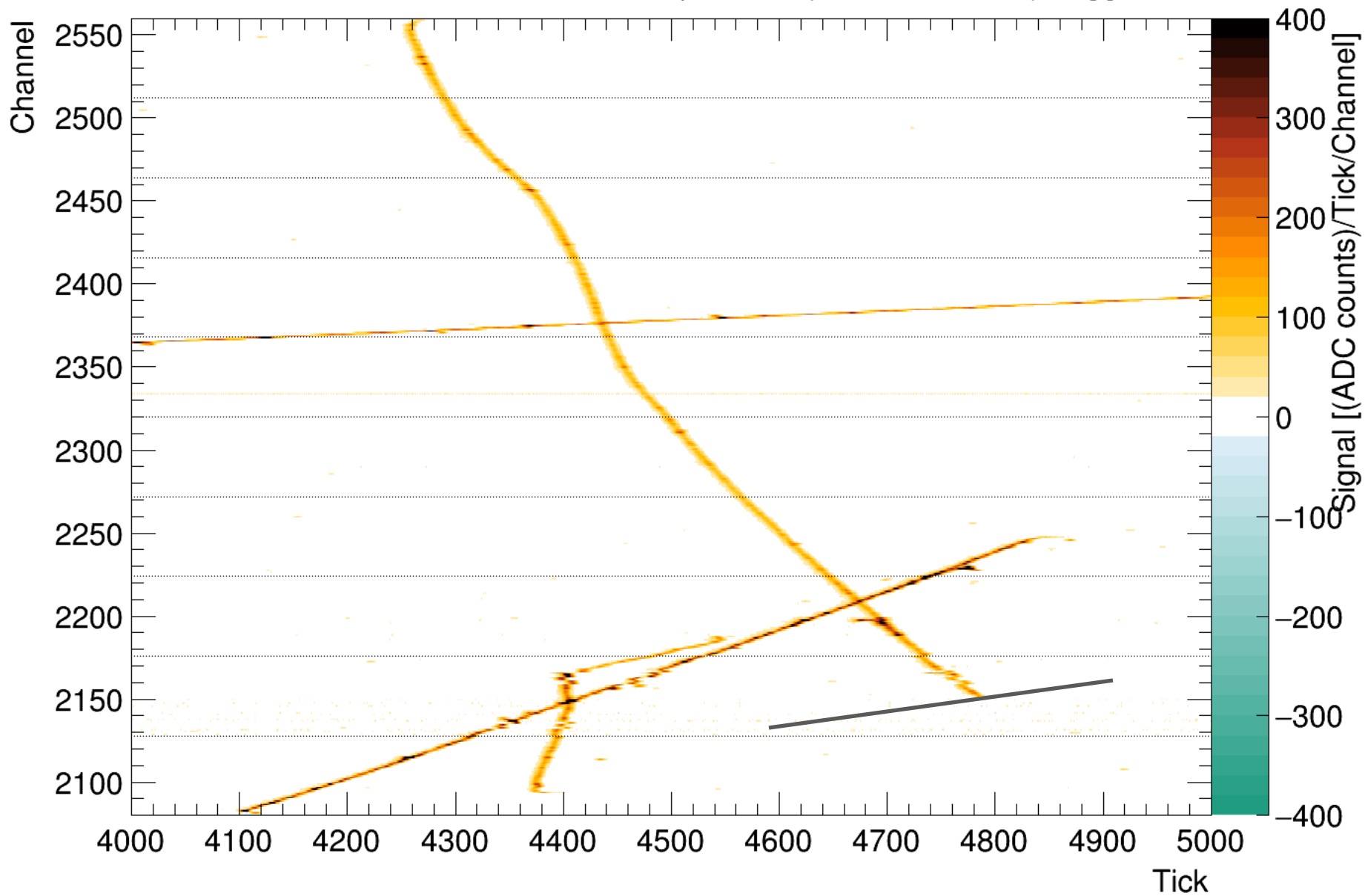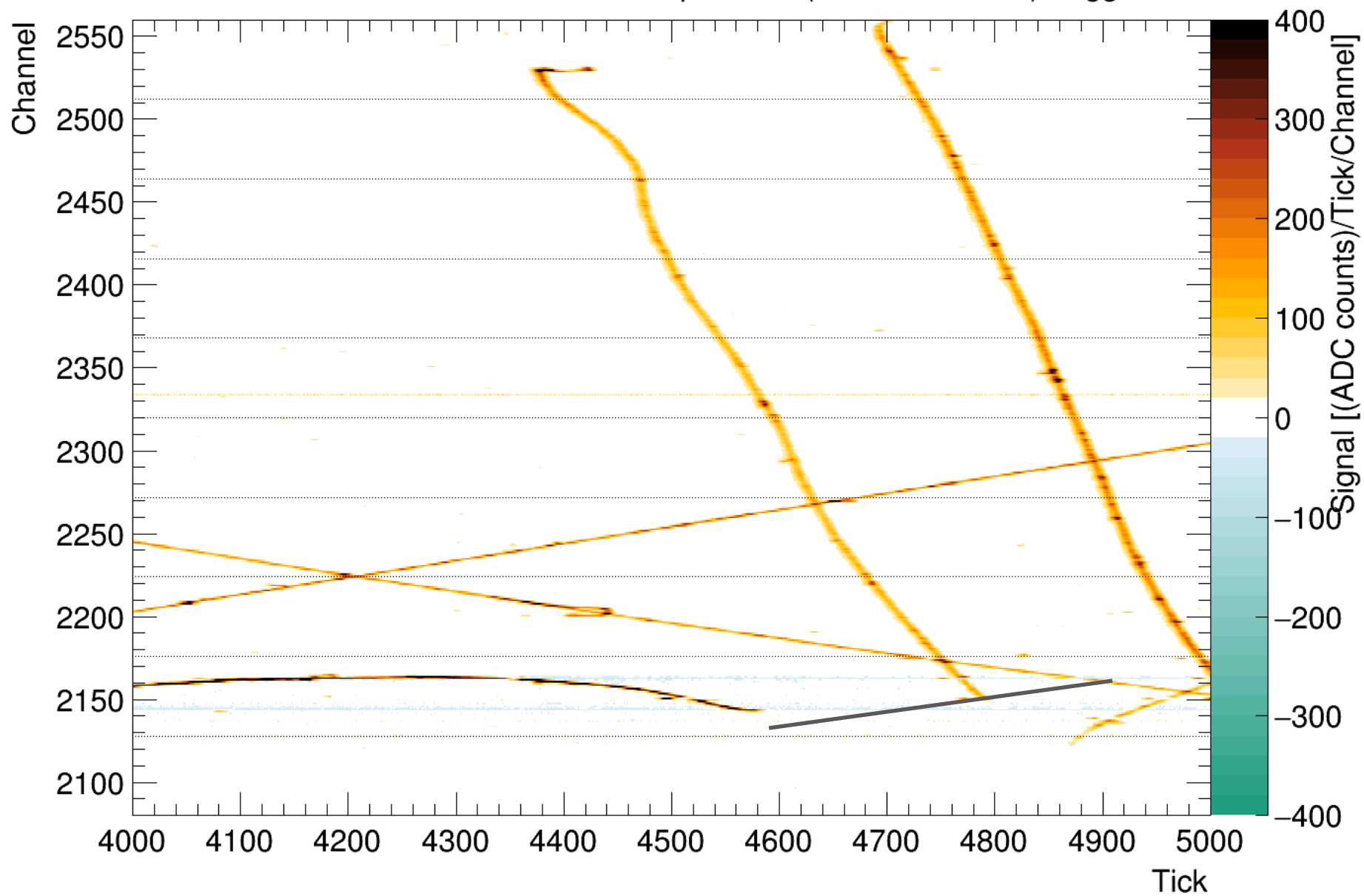Raw ADC for run 5308 event 271 TPC plane 0z (APA 3: US-RaS) Trigger 12
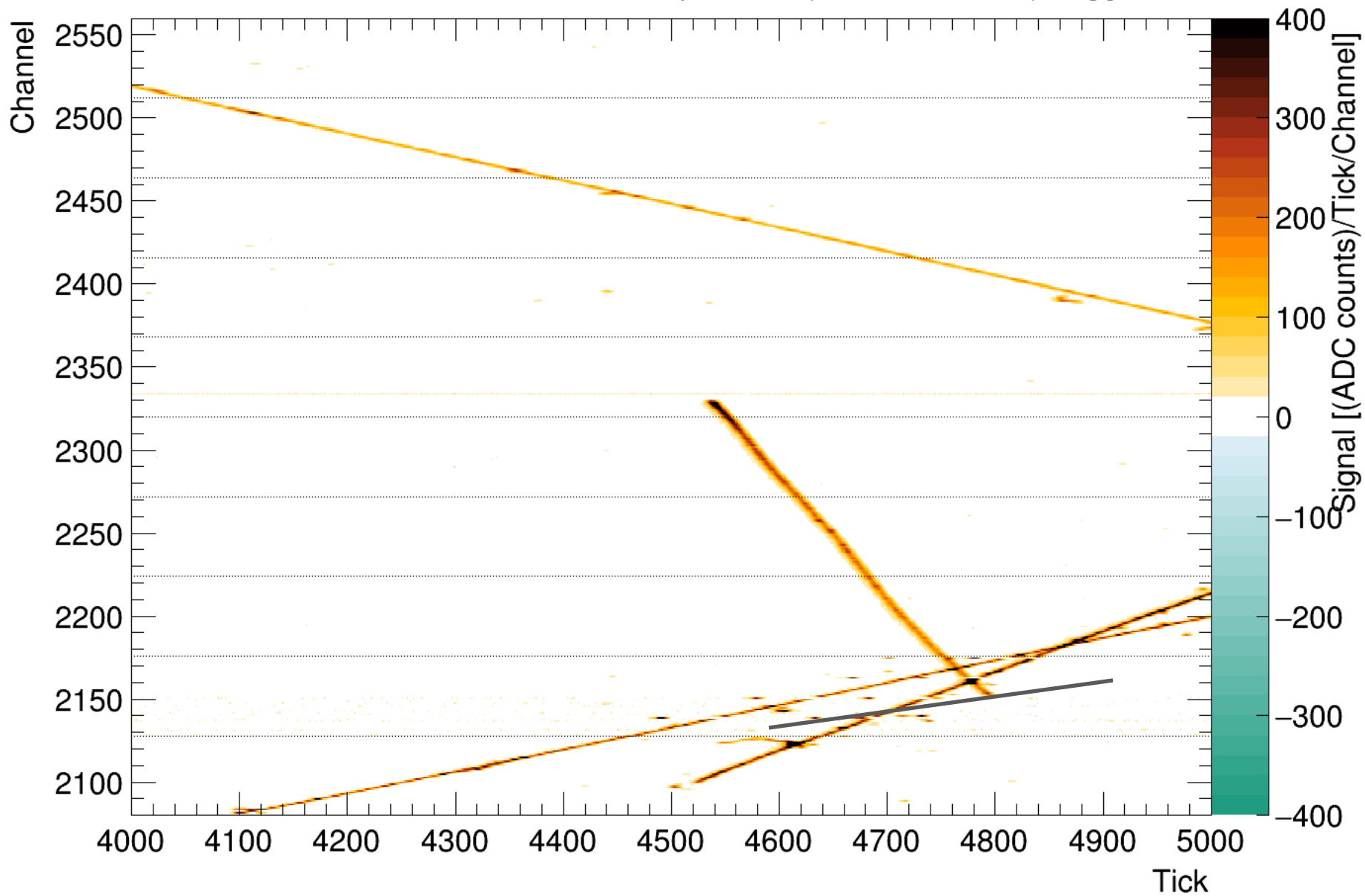
Raw ADC for run 5308 event 273 TPC plane 0z (APA 3: US-RaS) Trigger 12

Raw ADC for run 5308 event 277 TPC plane 0z (APA 3: US-RaS) Trigger 12

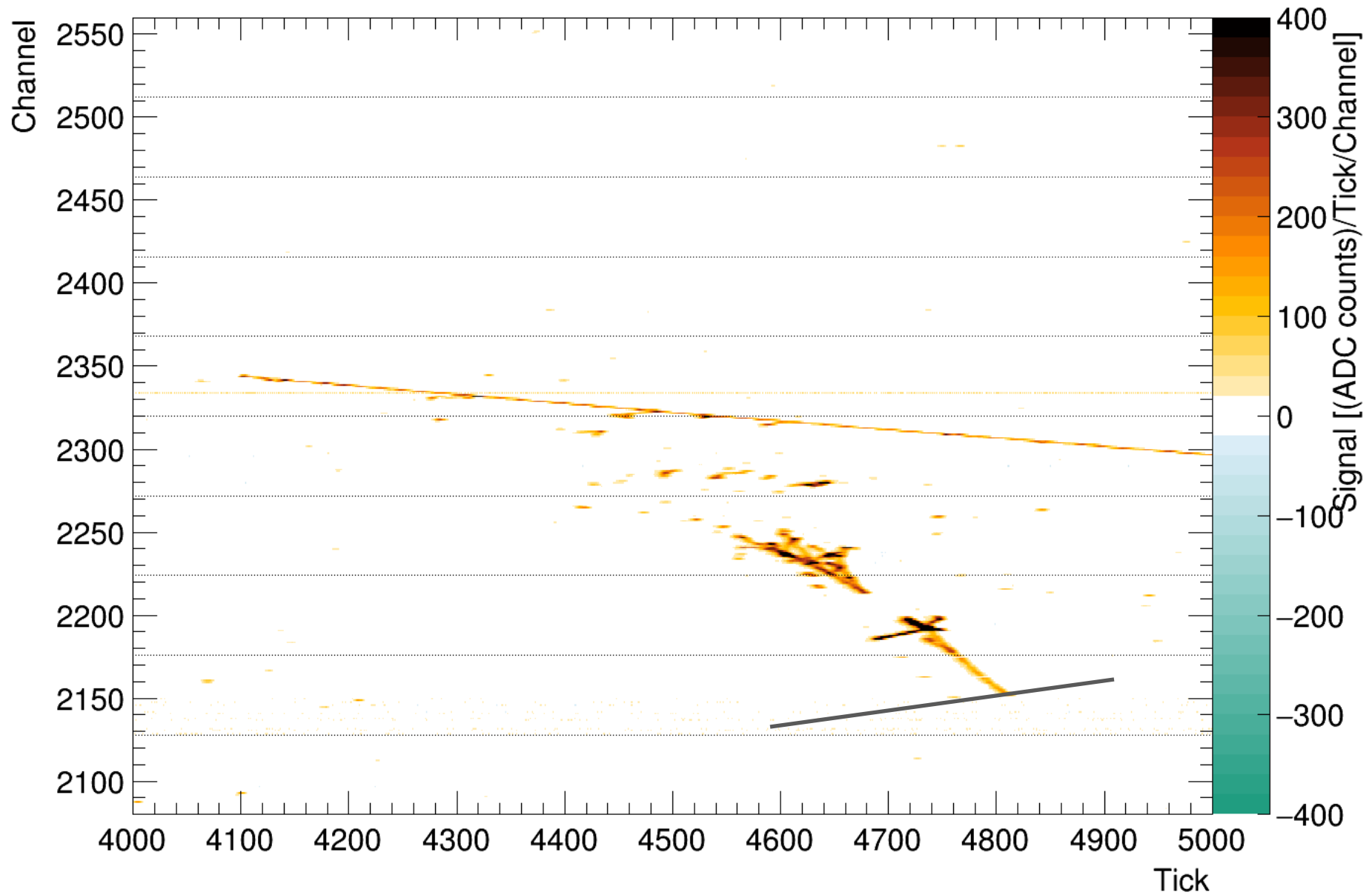Raw ADC for run 5308 event 287 TPC plane 0z (APA 3: US-RaS) Trigger 12

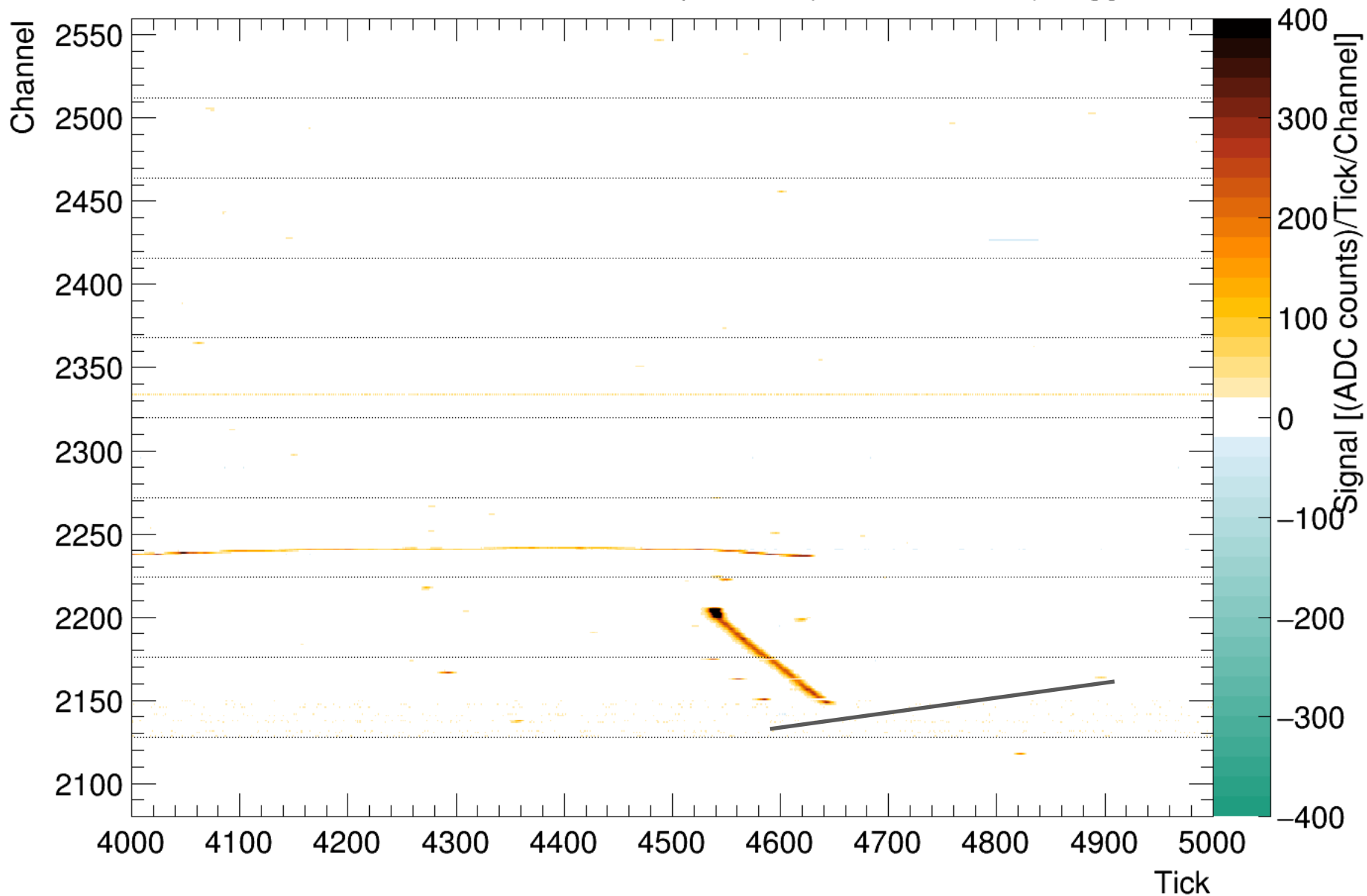Raw ADC for run 5308 event 441 TPC plane 0z (APA 3: US-RaS) Trigger 12

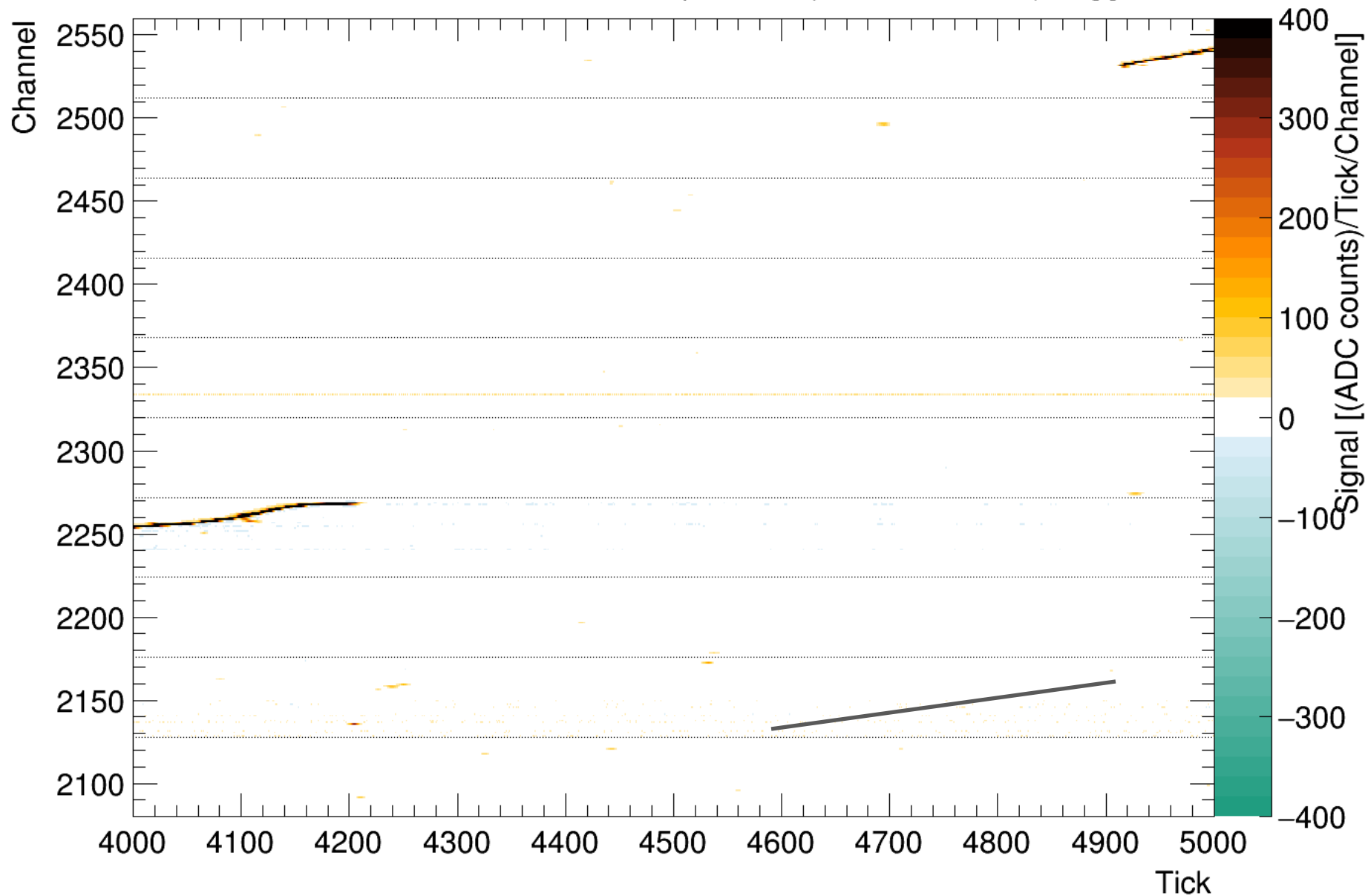Raw ADC for run 5308 event 446 TPC plane 0z (APA 3: US-RaS) Trigger 12

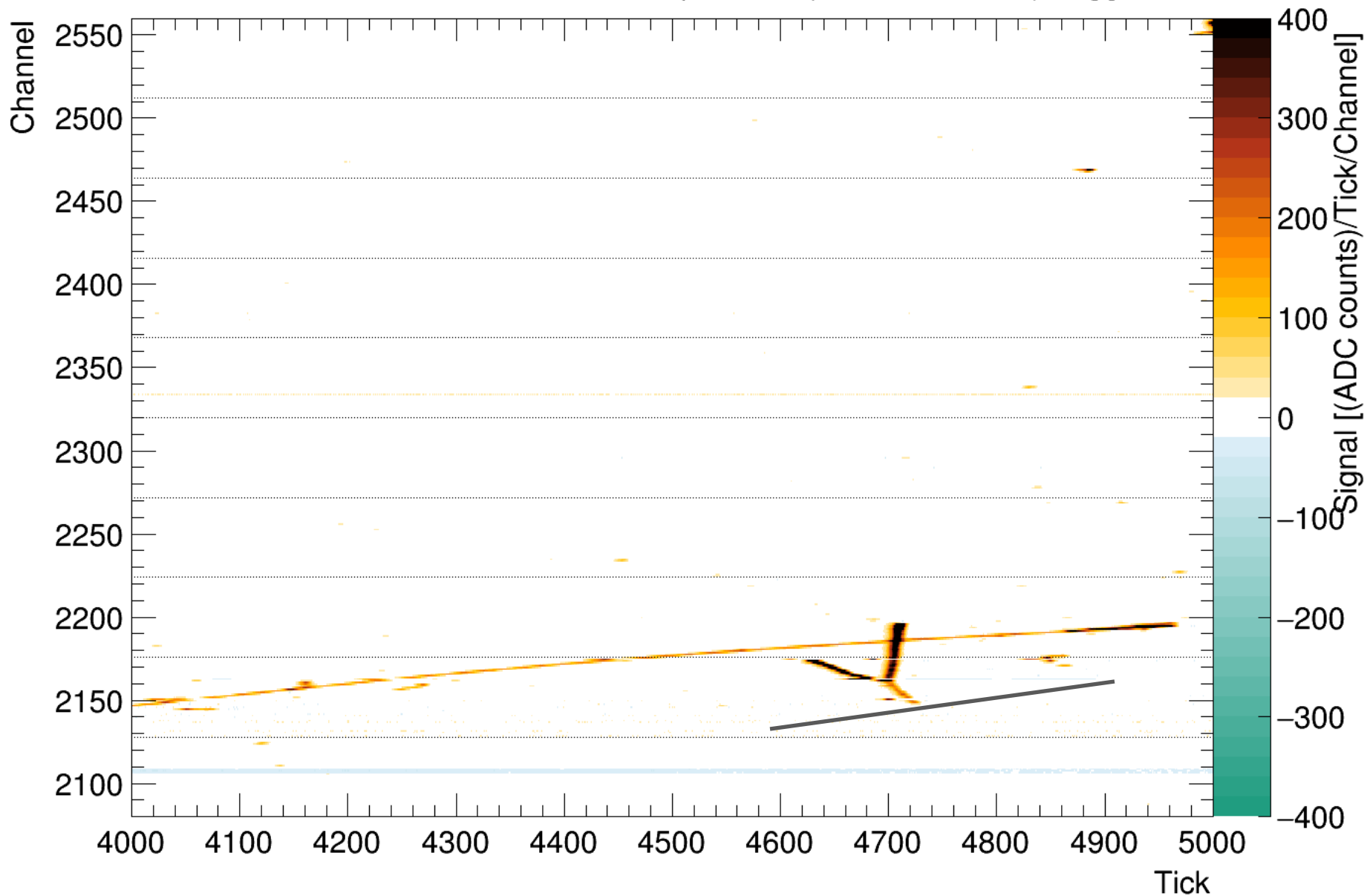Raw ADC for run 5308 event 502 TPC plane 0z (APA 3: US-RaS) Trigger 12

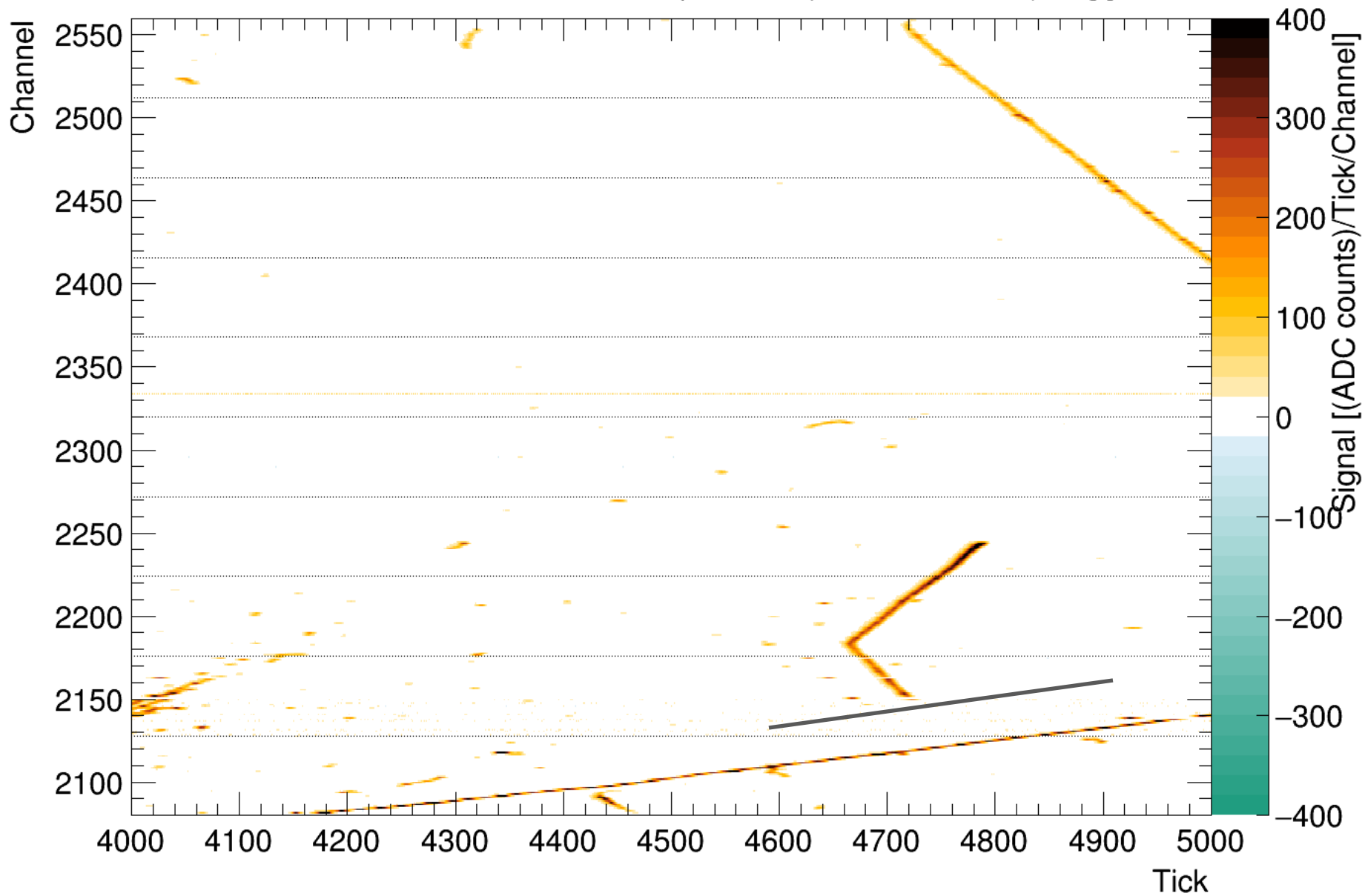Raw ADC for run 5308 event 505 TPC plane 0z (APA 3: US-RaS) Trigger 12

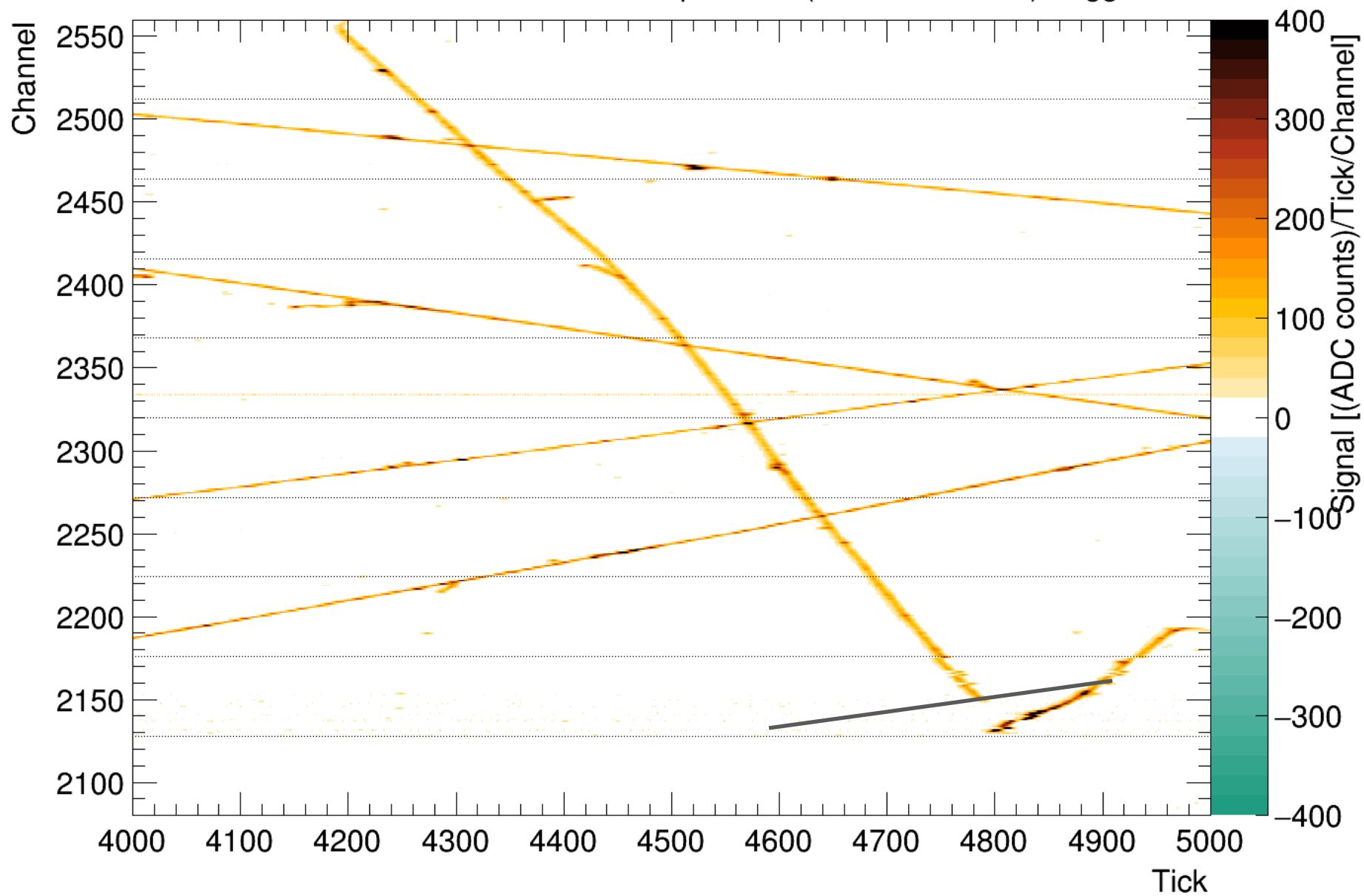Raw ADC for run 5308 event 508 TPC plane 0z (APA 3: US-RaS) Trigger 12

Raw ADC for run 5308 event 511 TPC plane 0z (APA 3: US-RaS) Trigger 12

Raw ADC for run 5308 event 514 TPC plane 0z (APA 3: US-RaS) Trigger 12
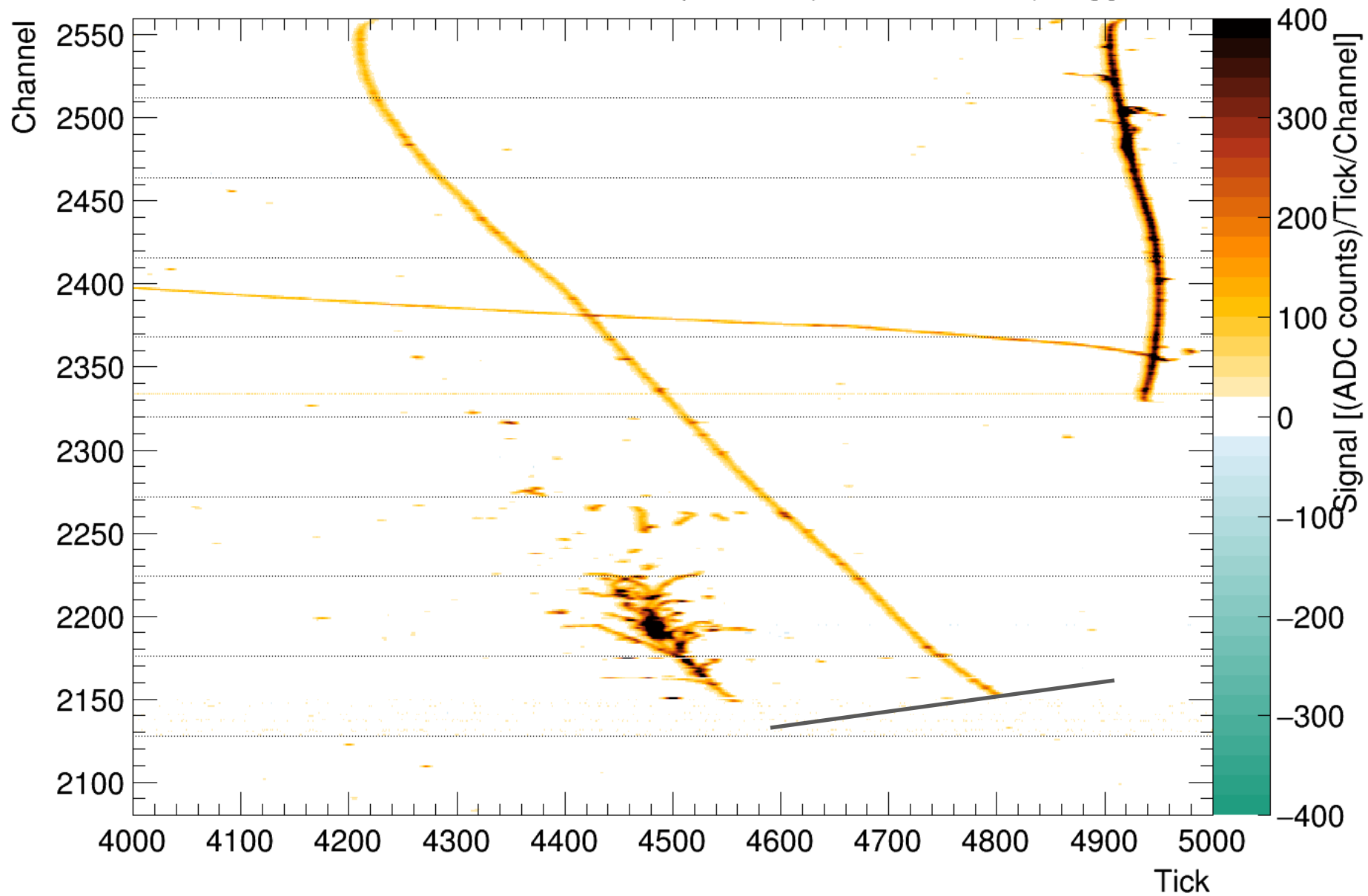
Raw ADC for run 5308 event 517 TPC plane 0z (APA 3: US-RaS) Trigger 12
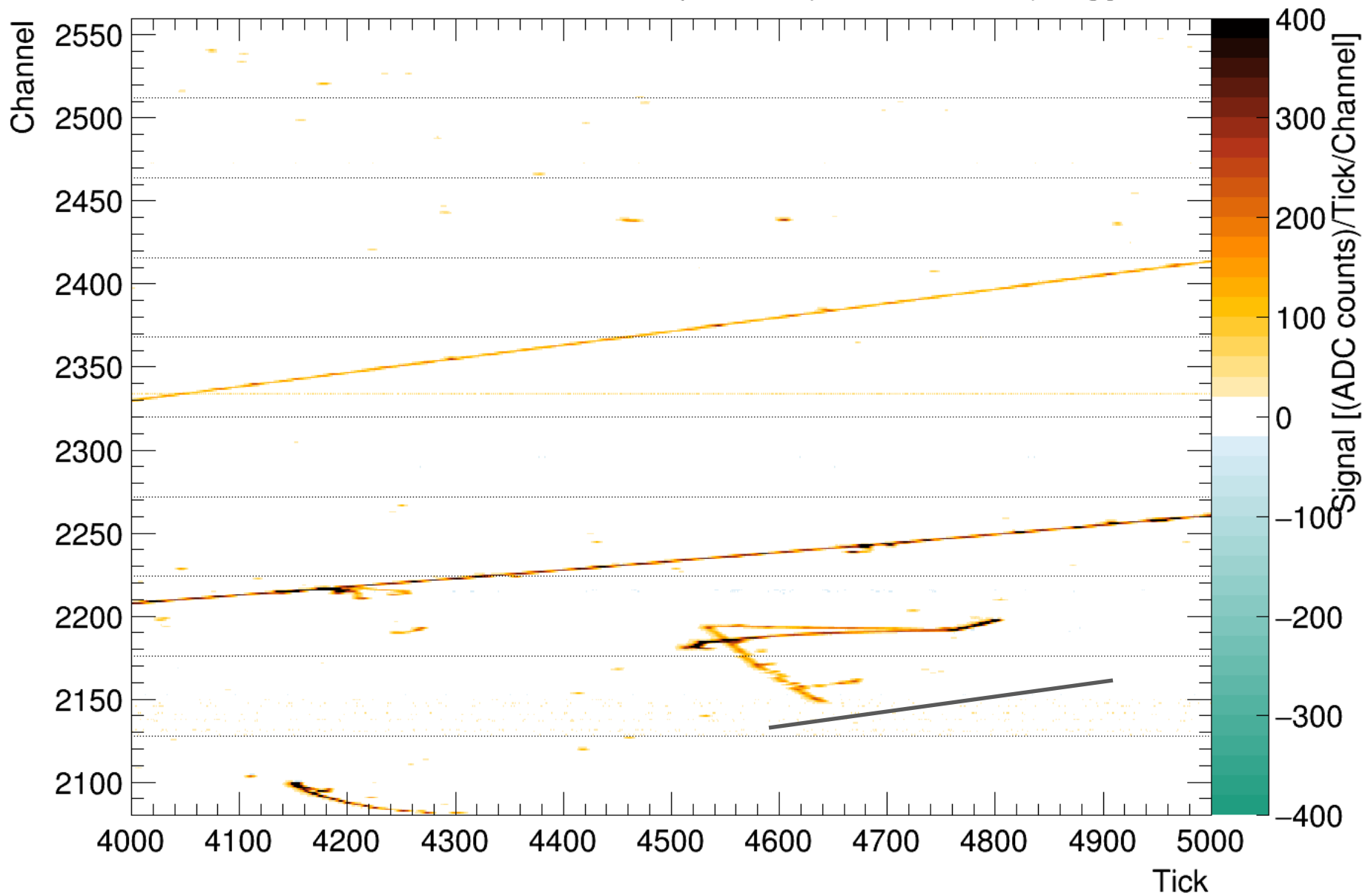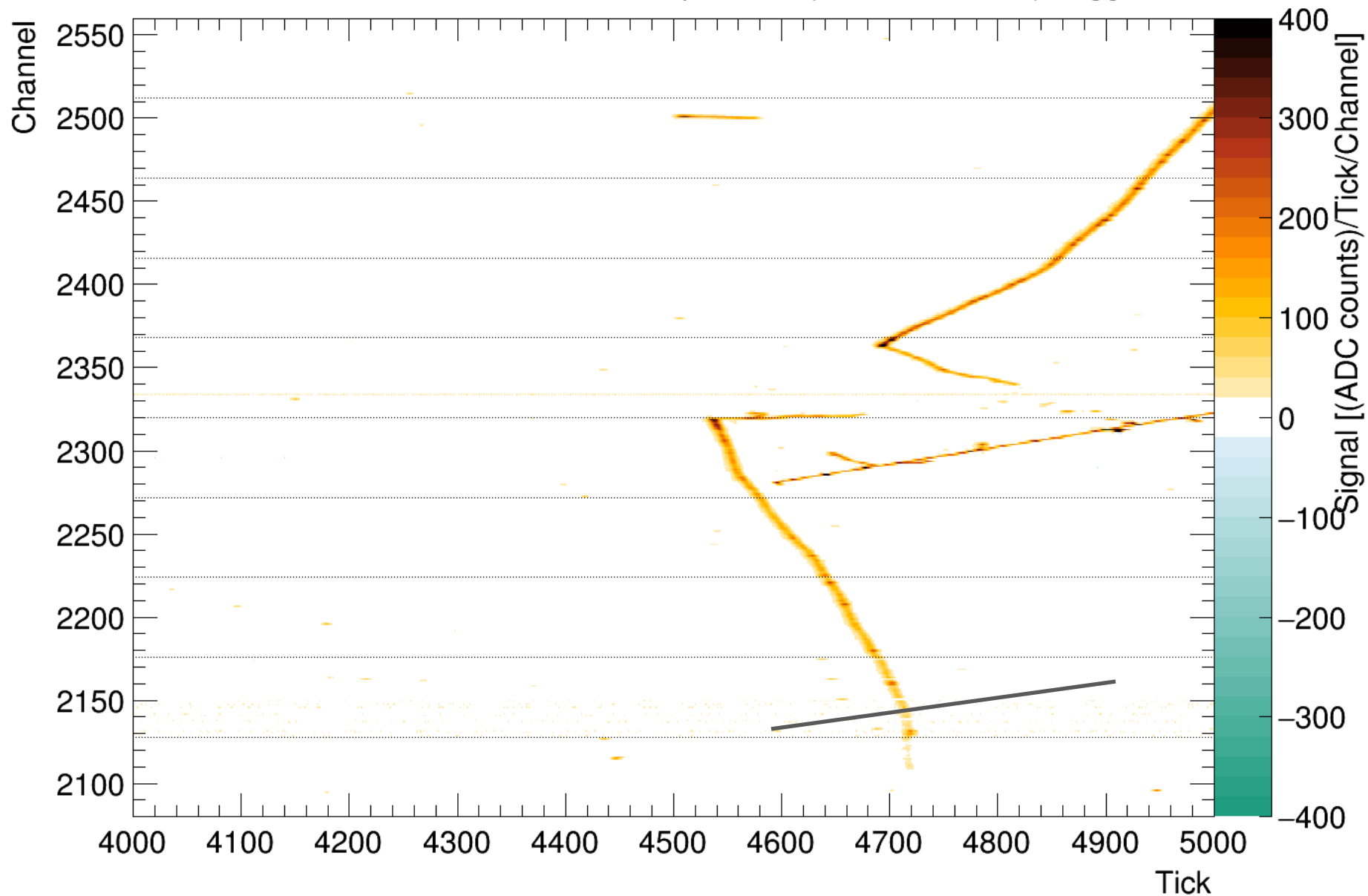
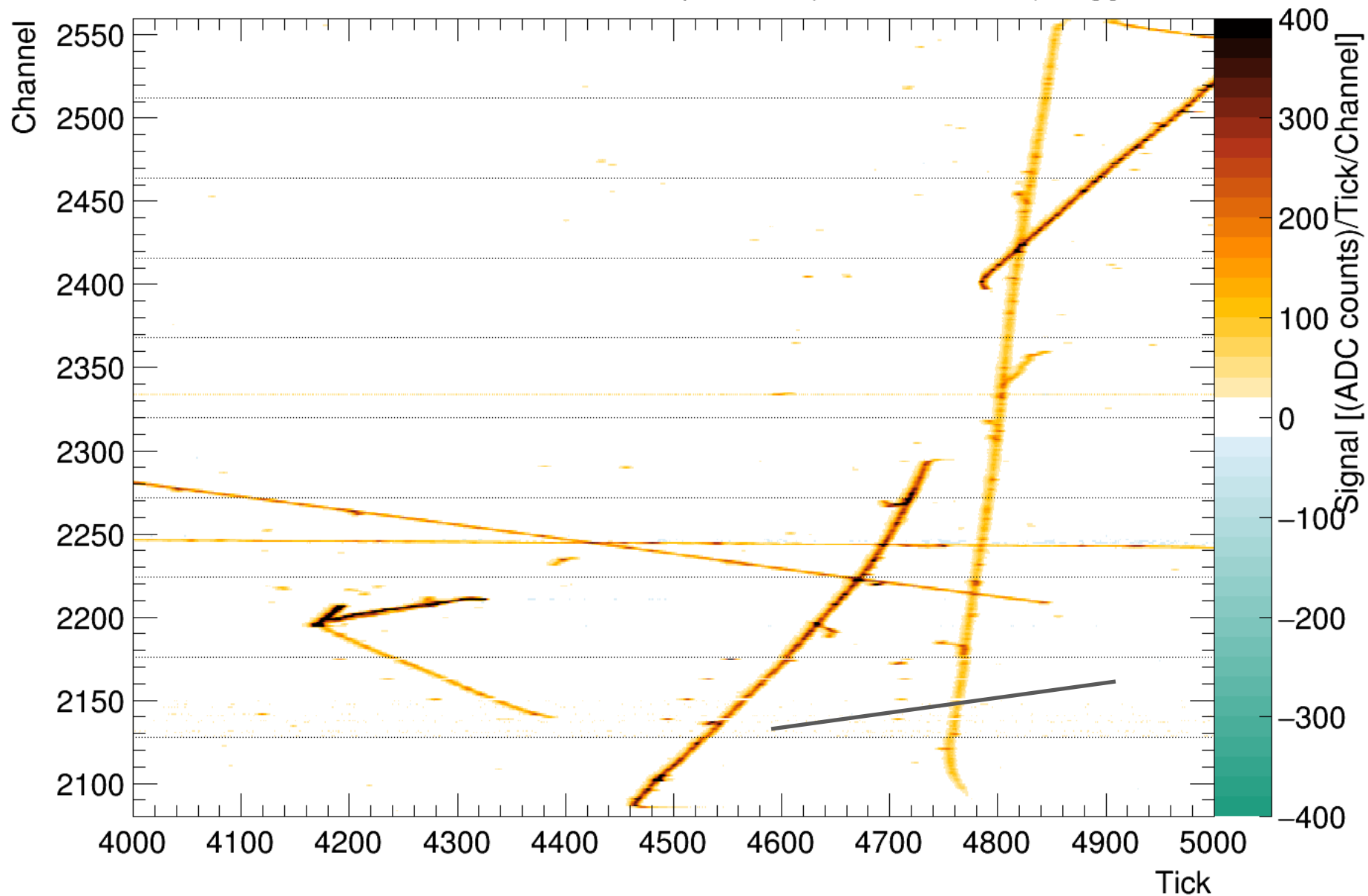Raw ADC for run 5308 event 518 TPC plane 0z (APA 3: US-RaS) Trigger 12

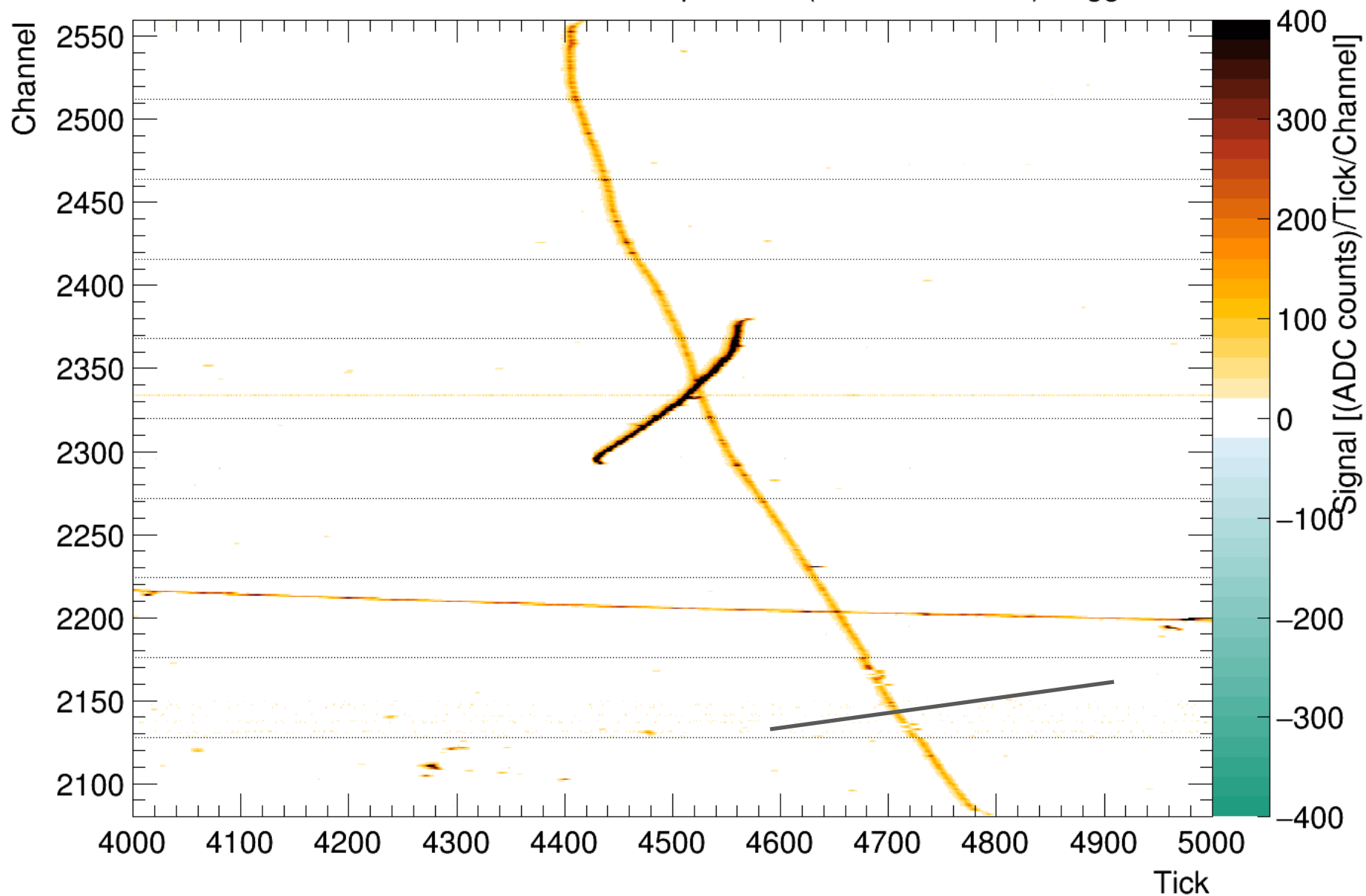# Raw ADC for run 5308 event 525 TPC plane 0z (APA 3: US-RaS) Trigger 12

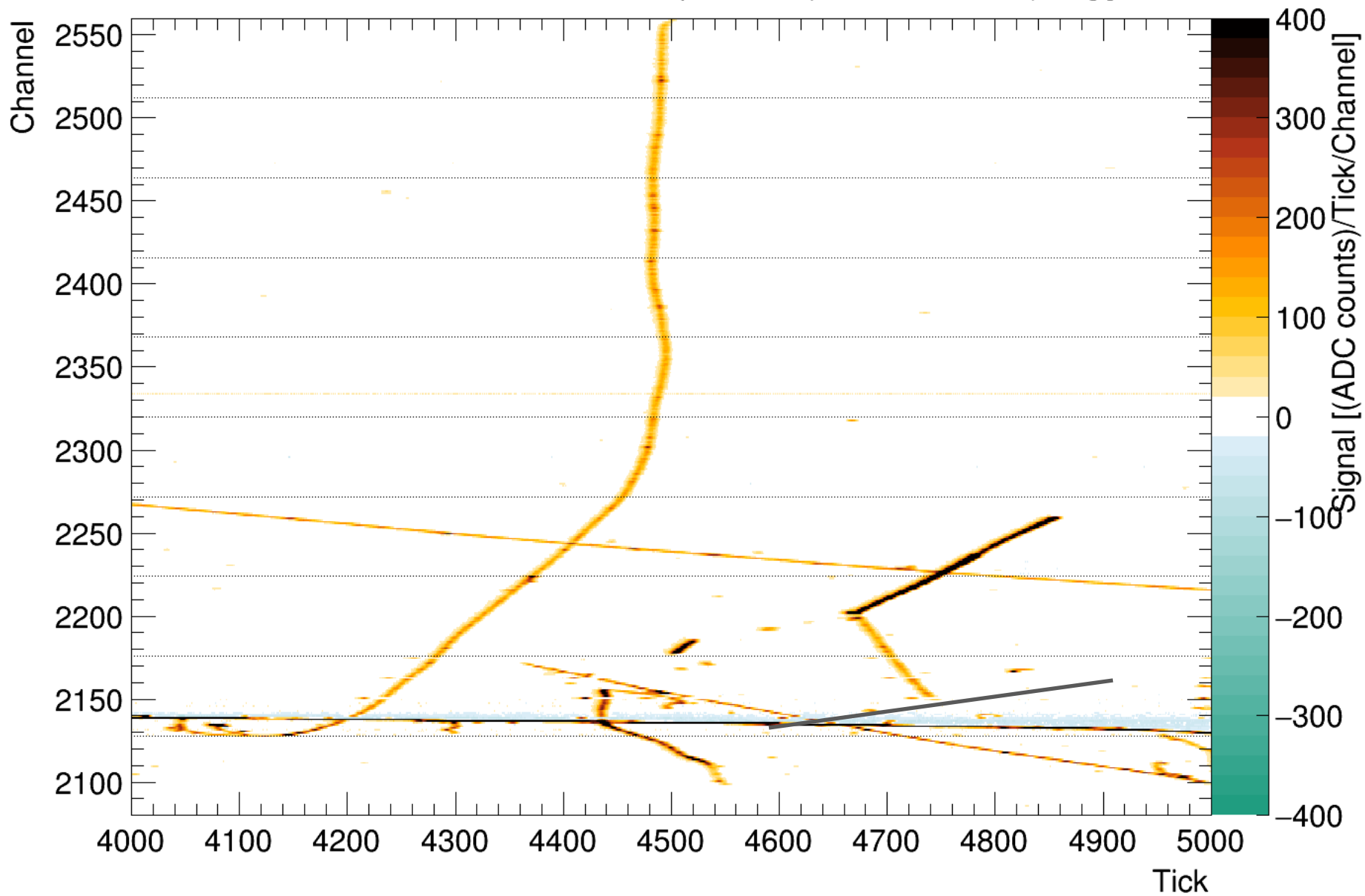Raw ADC for run 5308 event 574 TPC plane 0z (APA 3: US-RaS) Trigger 12

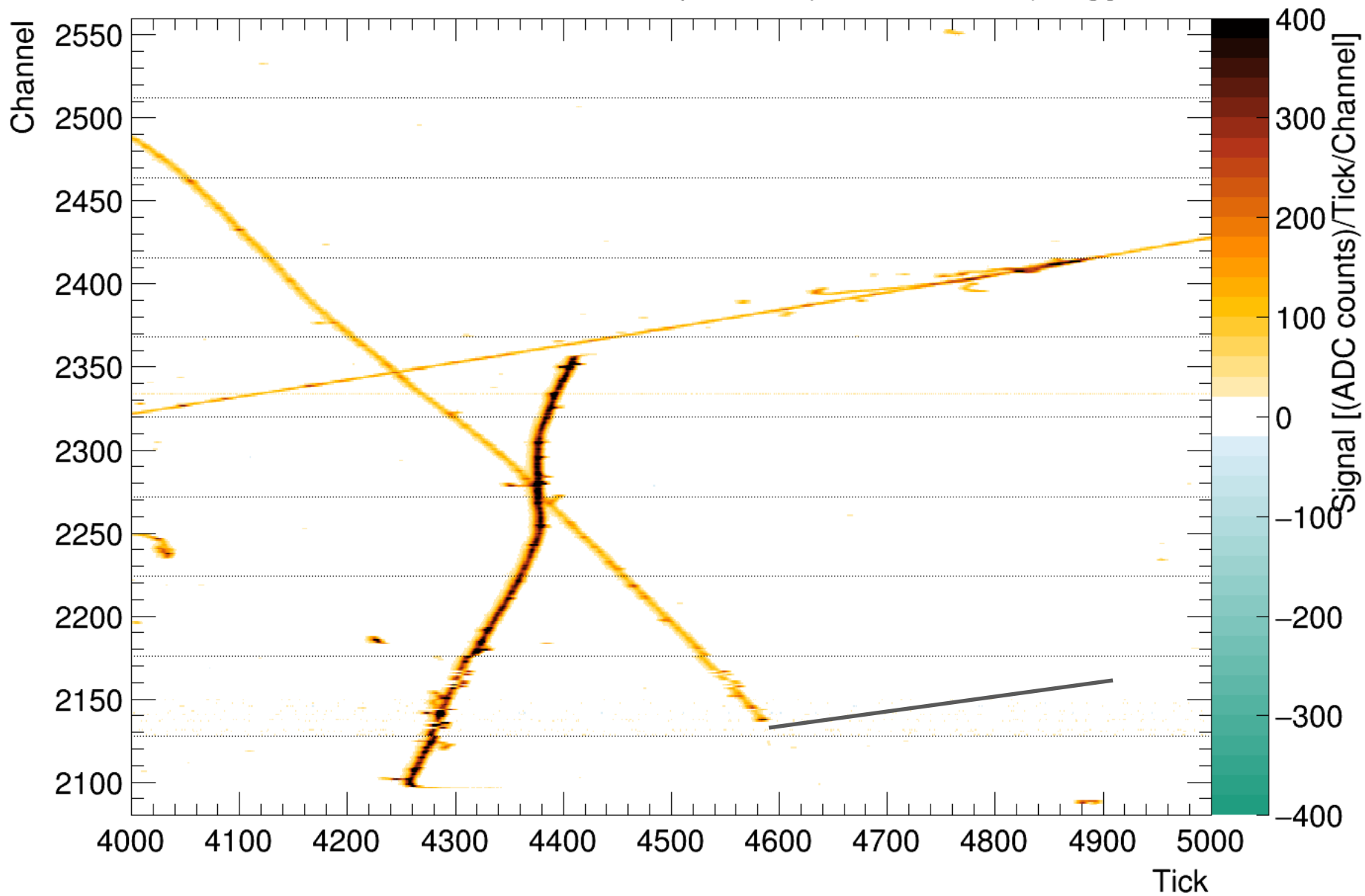Raw ADC for run 5308 event 582 TPC plane 0z (APA 3: US-RaS) Trigger 12

Raw ADC for run 5308 event 586 TPC plane 0z (APA 3: US-RaS) Trigger 12

Raw ADC for run 5308 event 599 TPC plane 0z (APA 3: US-RaS) Trigger 12

Raw ADC for run 5308 event 606 TPC plane 0z (APA 3: US-RaS) Trigger 12

Raw ADC for run 5308 event 681 TPC plane 0z (APA 3: US-RaS) Trigger 12