

ProtoDUNE TPC data: Pedestals

ProtoDUNE sim/reco

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BNL

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Introduction

I have been studying pedestals

Current reco

- Pedestal evaluated for each events using pedestal fitter
 - Removes sticky code and fits Gaussian for each channel

Analysis here

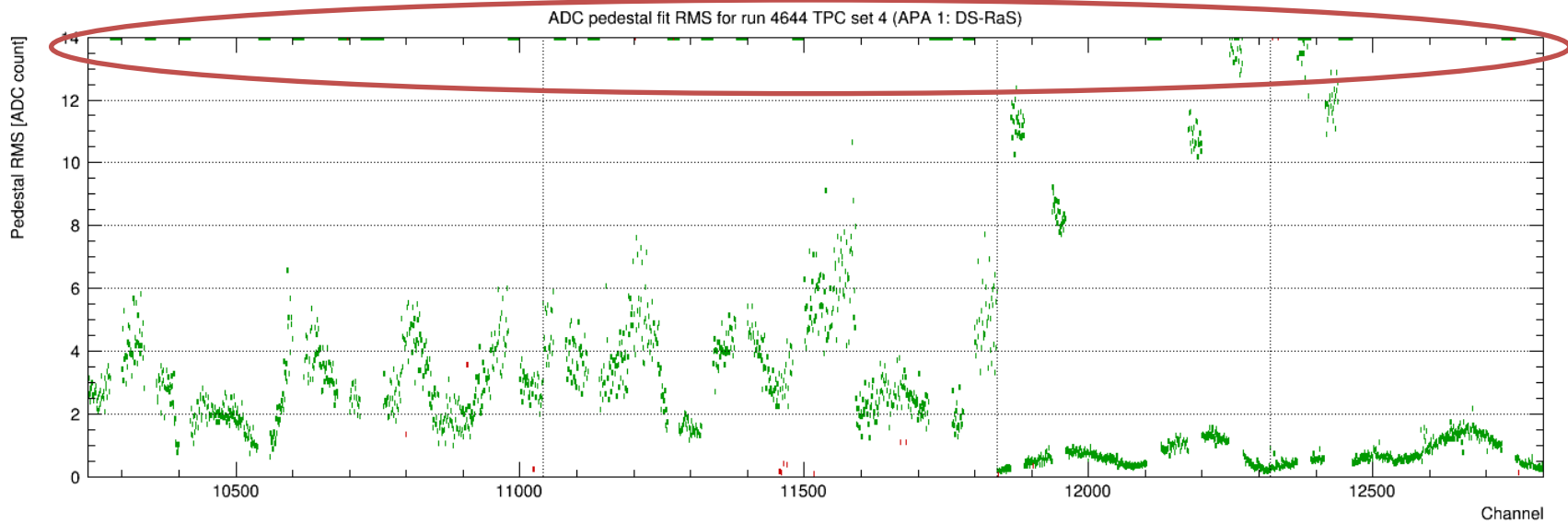
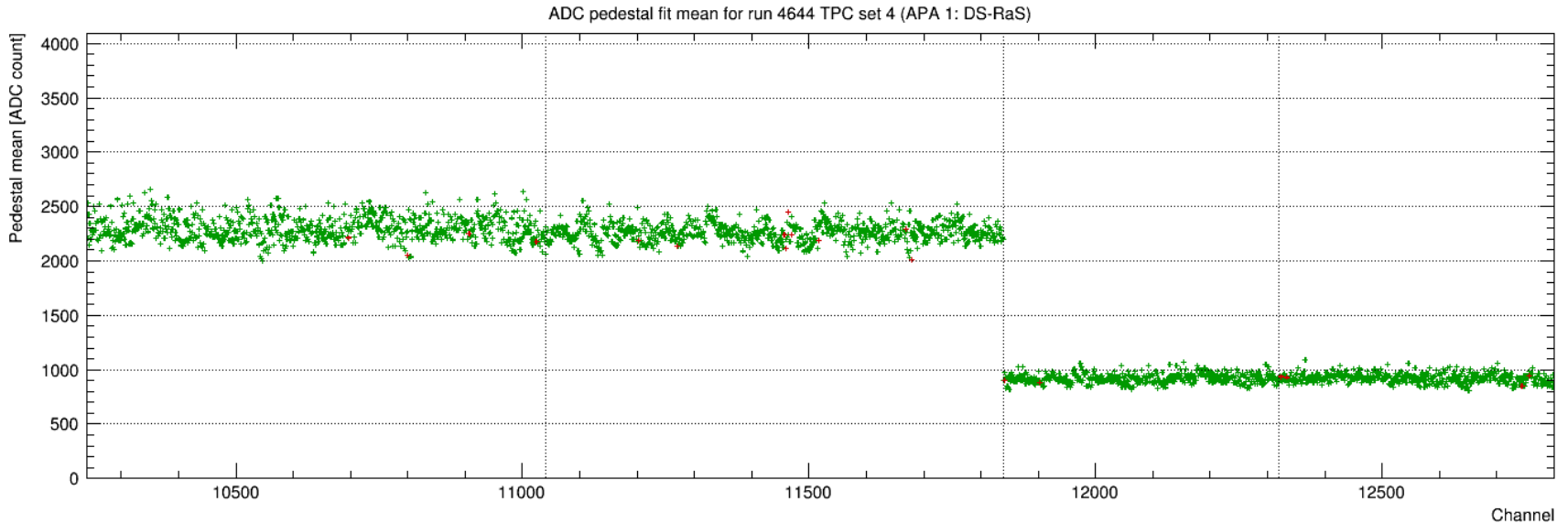
- Look at first 999 events in each run
- For each channel evaluate pedestal mean and RMS
- Plot these vs. channel for each APA
- Mean shows if pedestals change from day to day
- RMS shows how pedestals change from event to event
 - Sensitive to “slow noise”, i.e. noise slower than 3 ms readout window
- Plots follow...

Data summary

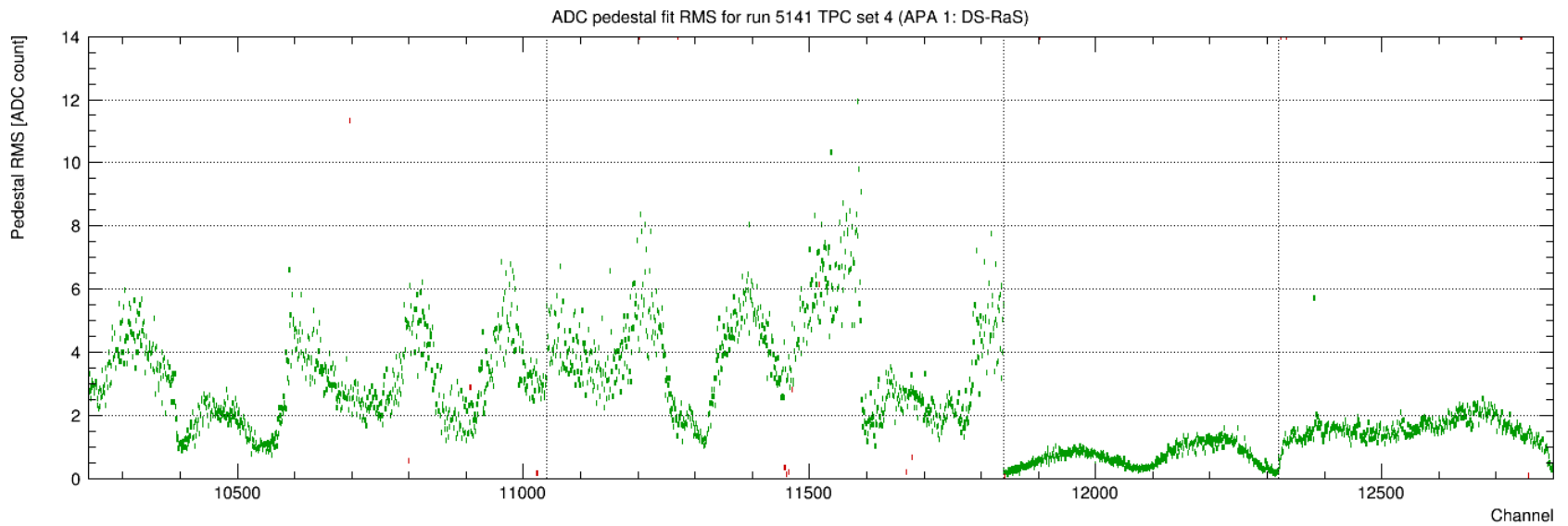
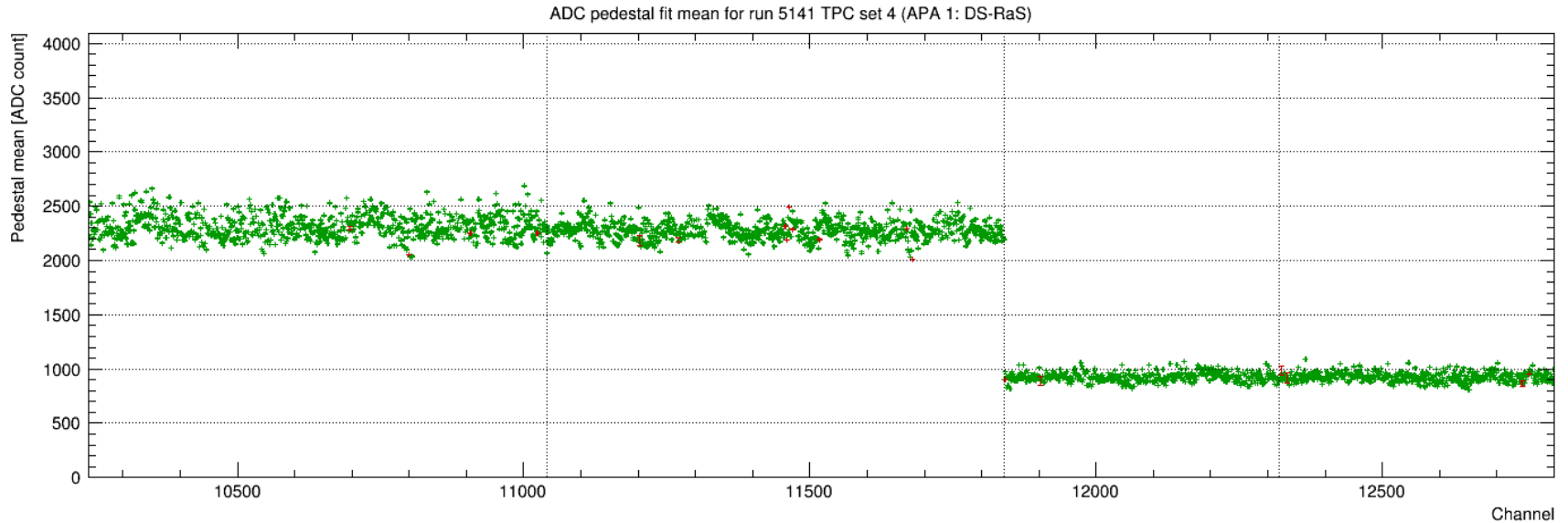
Run	Date	Comments	
4644	24 Sep	Early run with 7 GeV beam and short tracks.	
5141	10 Oct	Physics. 7 GeV. First run in GRL.	
5174	11 Oct	Physics. 7 GeV. Last GRL run with old ASIC offset.	
5225	12 Oct	Physics. 1 GeV. Early GRL run with new ASIC offset.	
5341	17 Oct	Physics. 1 GeV. 160 kV. Before replacing Heinzinger PS at 15:00	
5380	17 Oct	Cosmics. After replacing Heinzinger PS at 15:00.	
5452	23 Oct	Physics. 2 GeV.	
5461	24 Oct	Cosmics (beam off).	
5463	24 Oct	Cosmics. (beam off). Last cosmics before HV off on Oct 25.	
5580	26 Oct	Cosmics (beam off). First cosmics after beam off on Oct 25.	
5585	26 Oct	Cosmics. Last cosmics before adding oil Oct 30.	Induction noise falls.
5700	30 Oct	Cosmics (beam off). After adding oil and stabilizing HV cables.	Some planes noisy.
5726	1 Nov	Cosmics (beam off).	
5770	2 Nov	Physics. 6 GeV.	
5844	12 Nov	Physics. 1 GeV. Last run in GRL	
6118	10 Dec	Cosmics. Begin cosmic data taking.	Induction noise falls. APA 1 ped shift.
6141	11 Dec	Cosmics. Last cosmic run before switching Heinzinger PS	
6157	12 Dec	Cosmics. First cosmic run after switching PS.	
6202	14 Dec	Cosmics.	
6228	18 Dec	Cosmics. Last run with HV on in 2018.	
6530	24 Jan	Cosmics. First 2019 cosmics?	
6791	13 Feb	Cosmics.	

APA 1

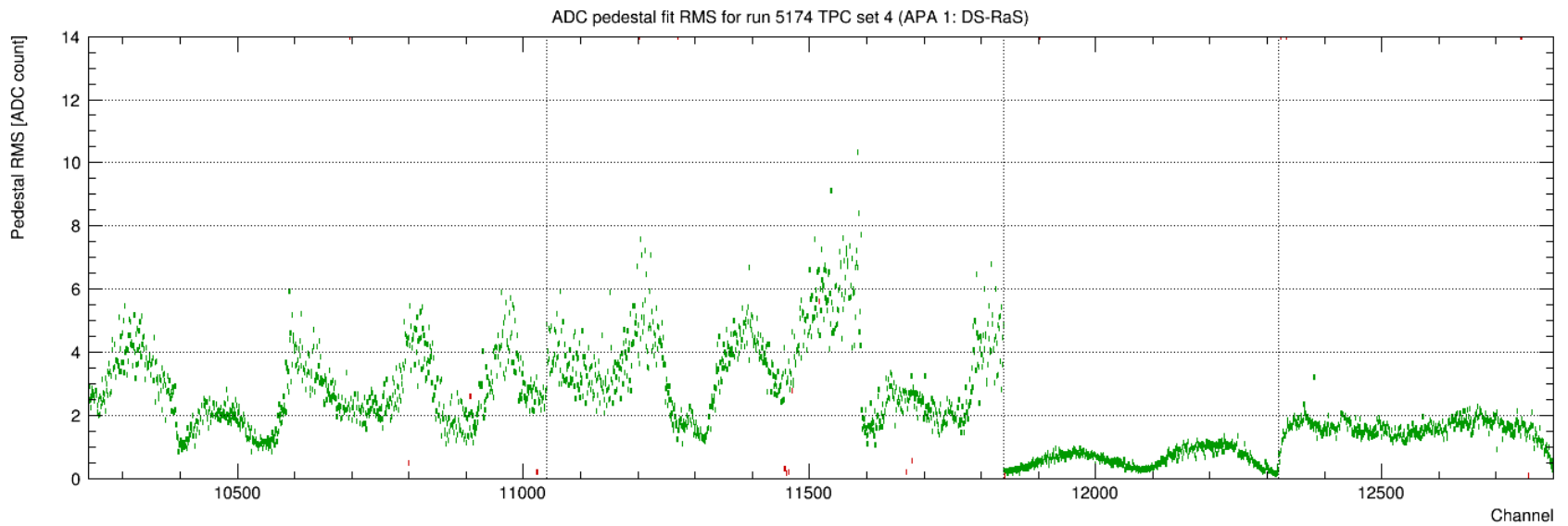
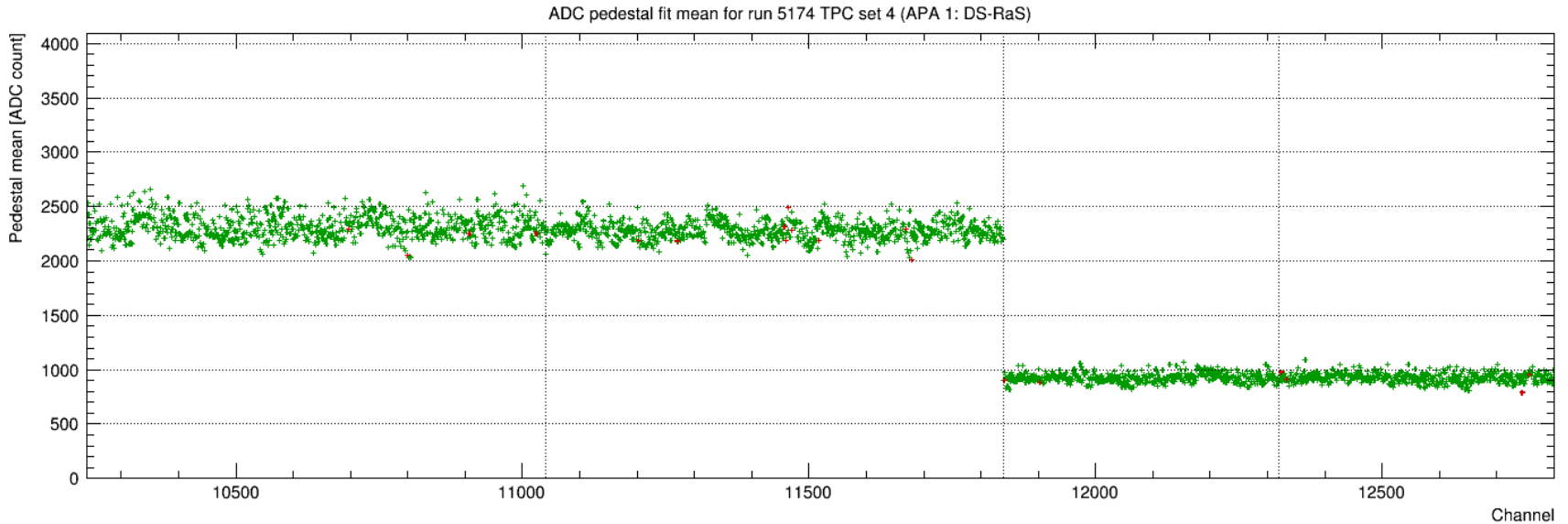
APA 1 run 4644 events 1-999



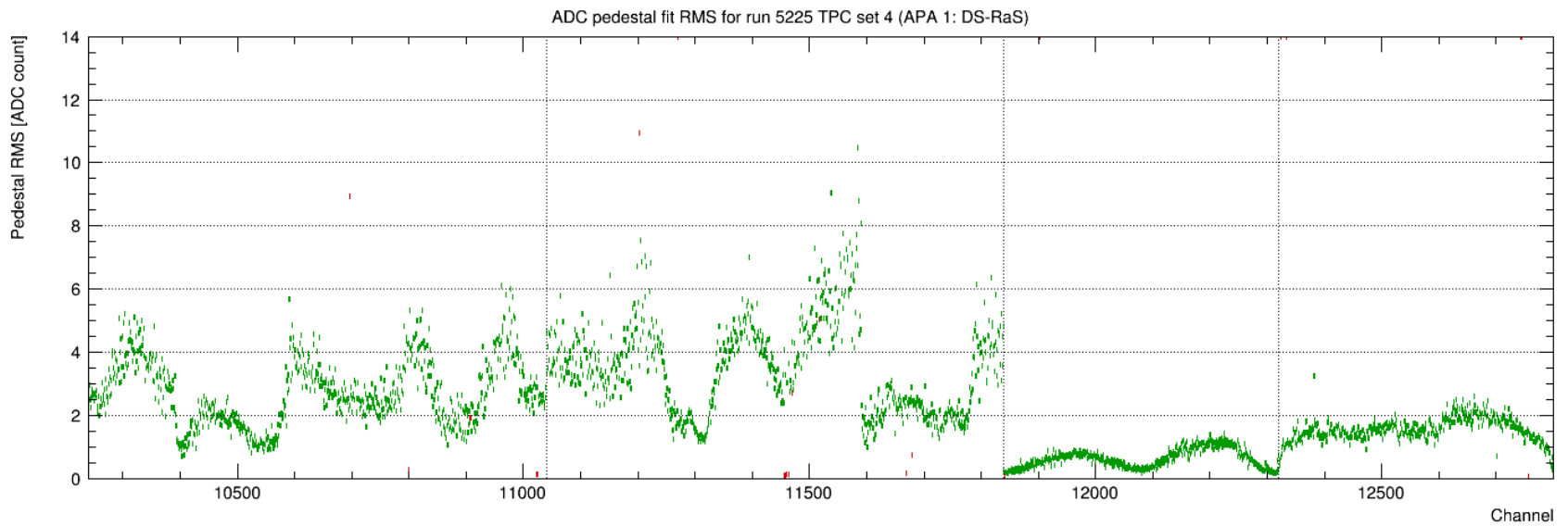
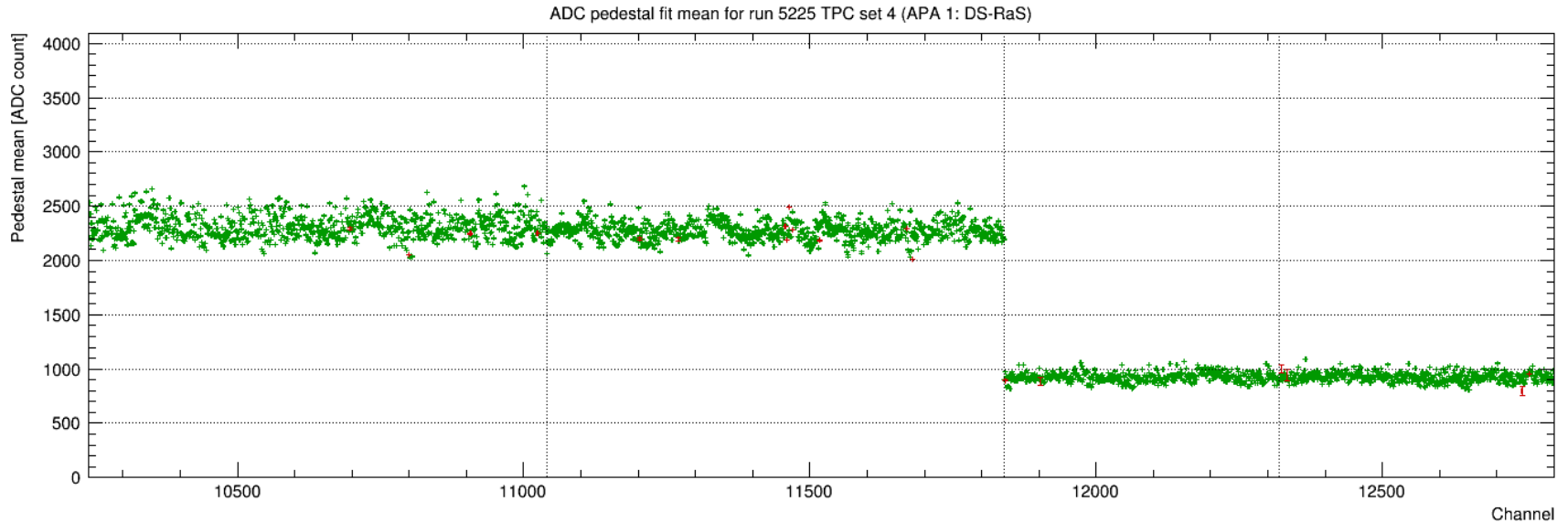
APA 1 run 5141 events 1-999



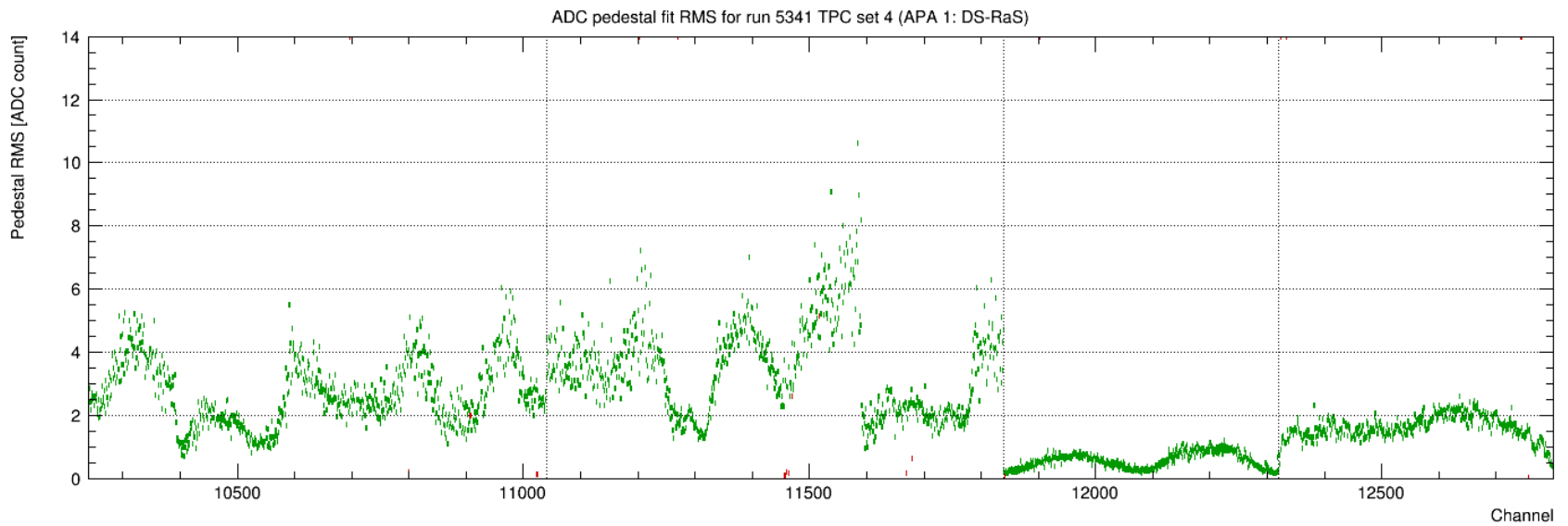
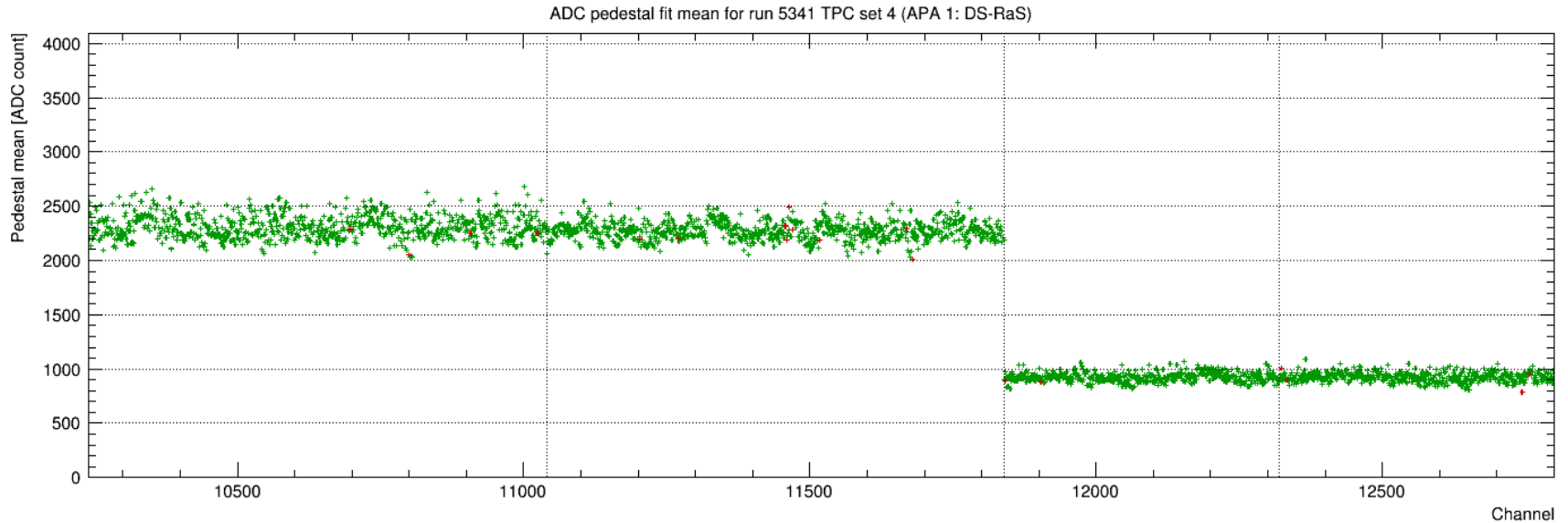
APA 1 run 5174 events 1-999



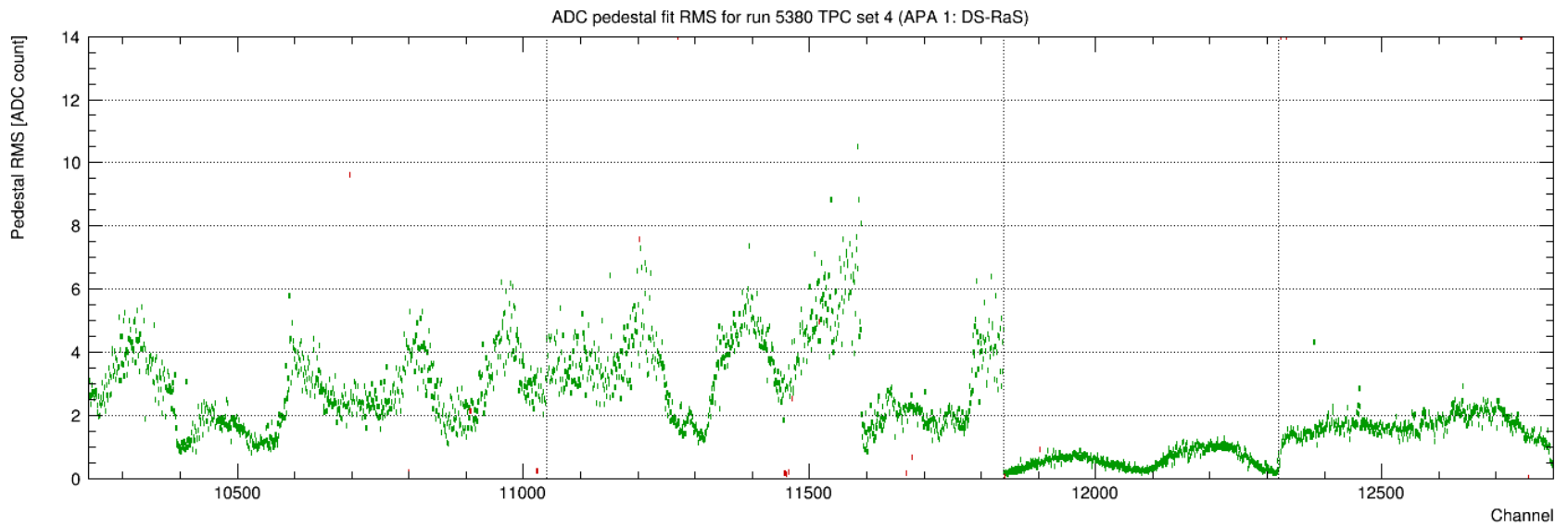
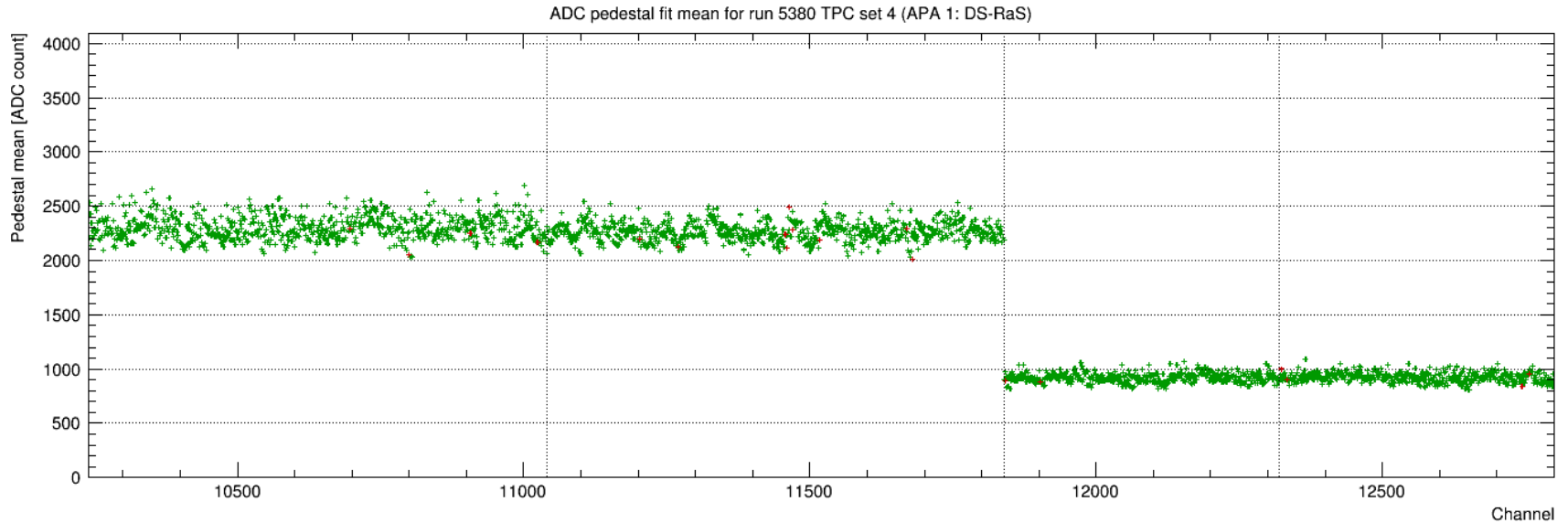
APA 1 run 5225 events 1-999



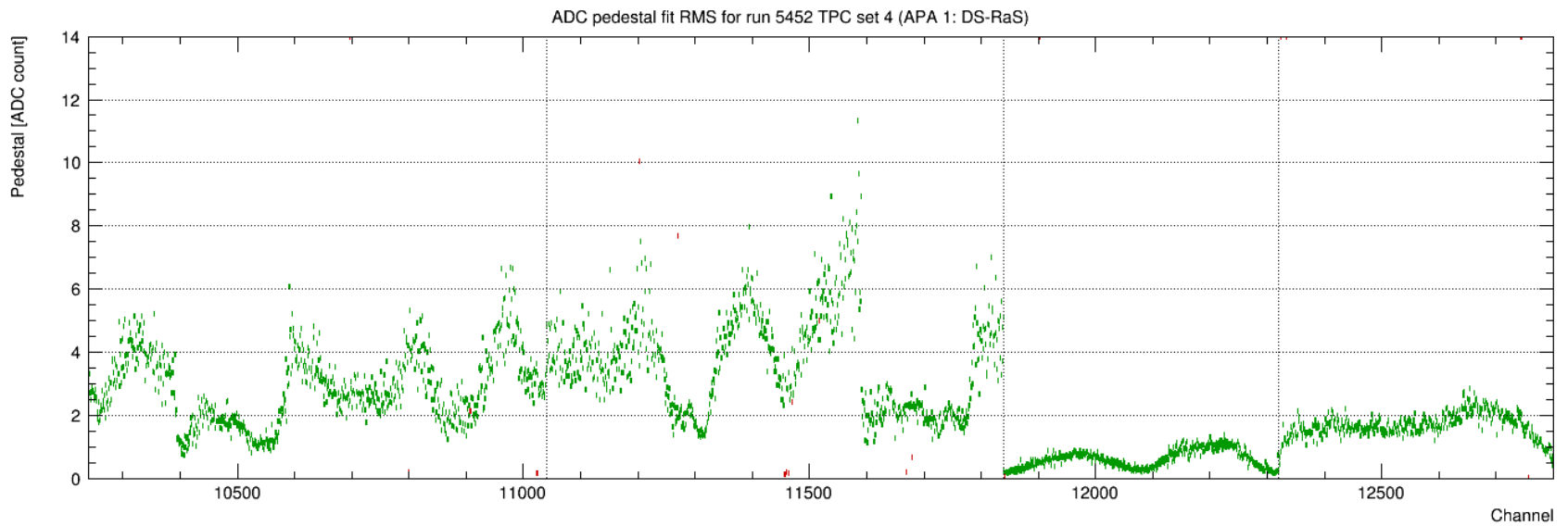
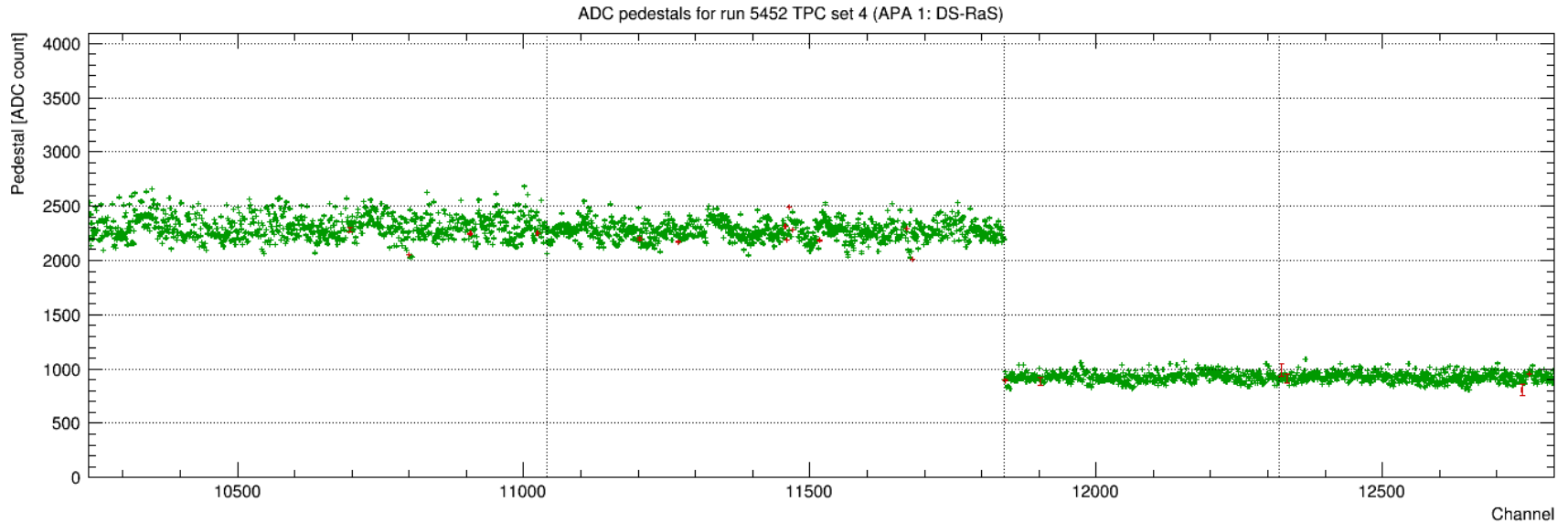
APA 1 run 5341 events 1-999



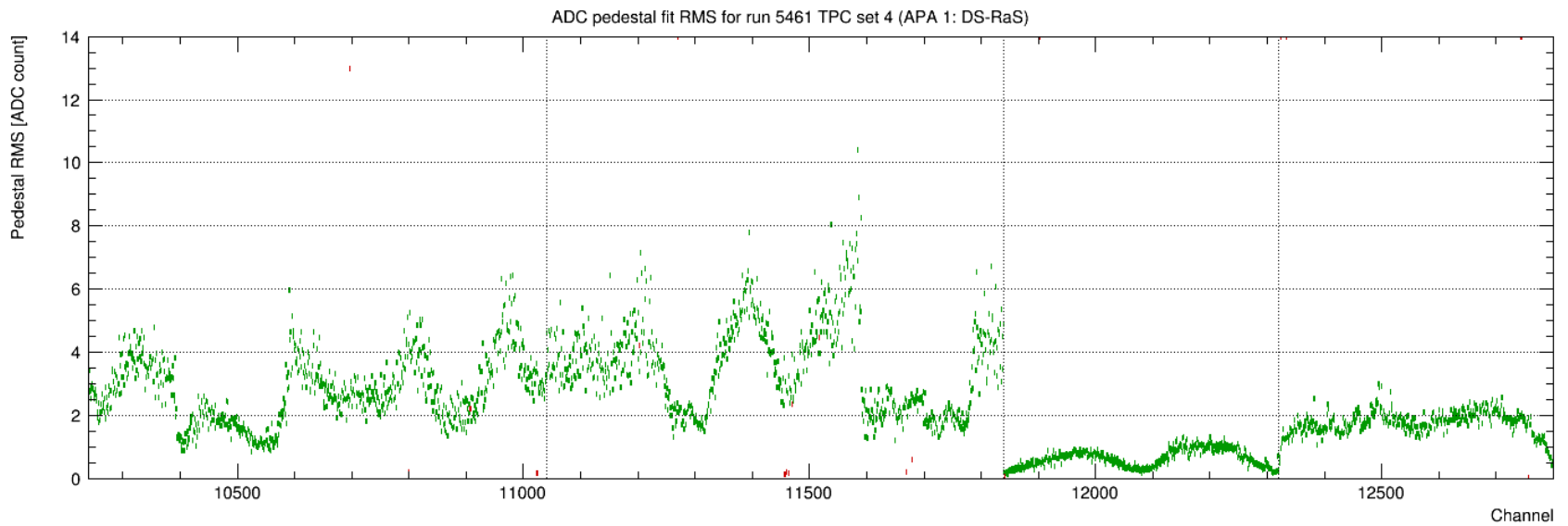
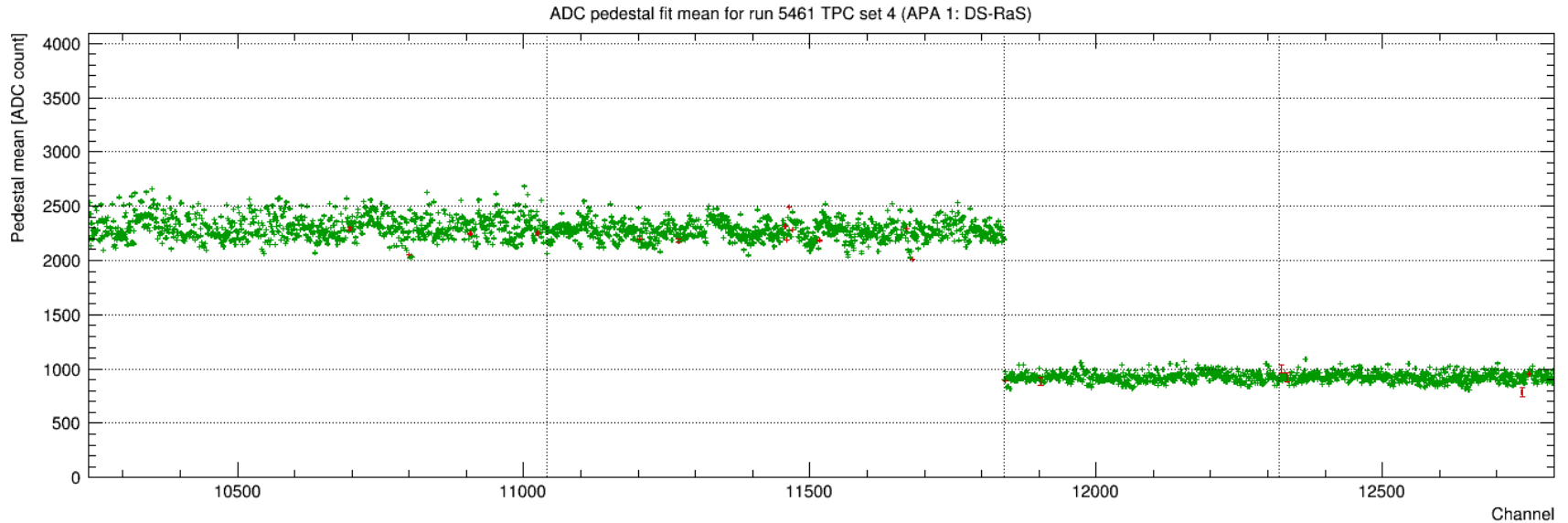
APA 1 run 5380 events 1-999



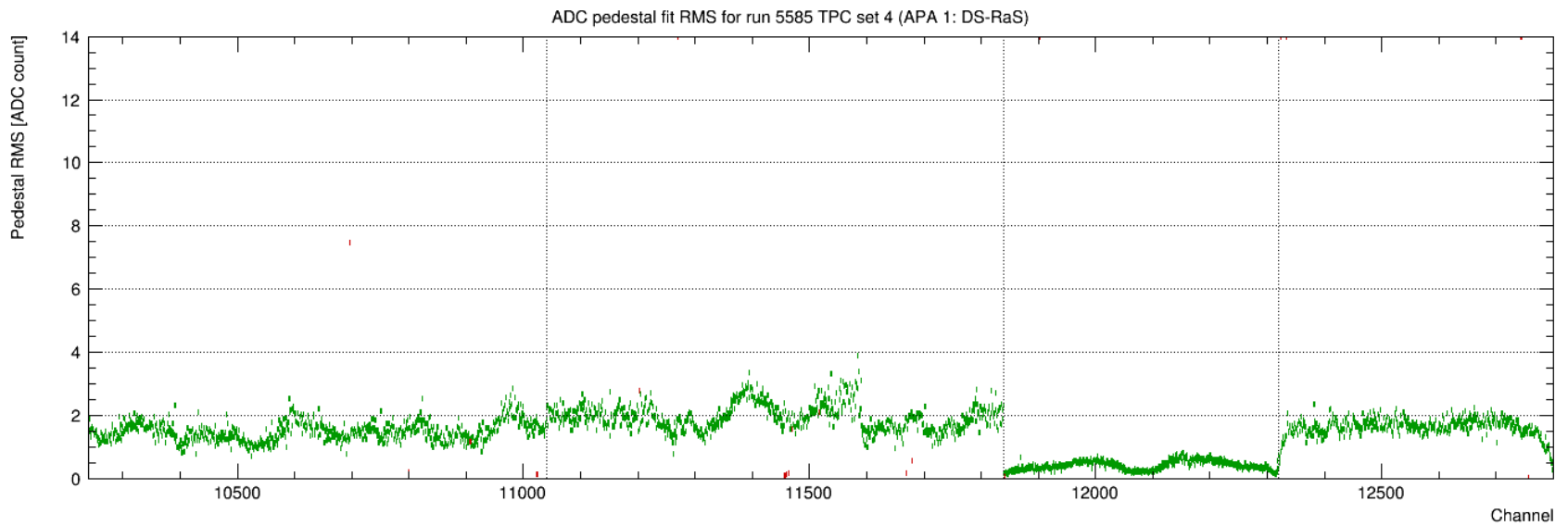
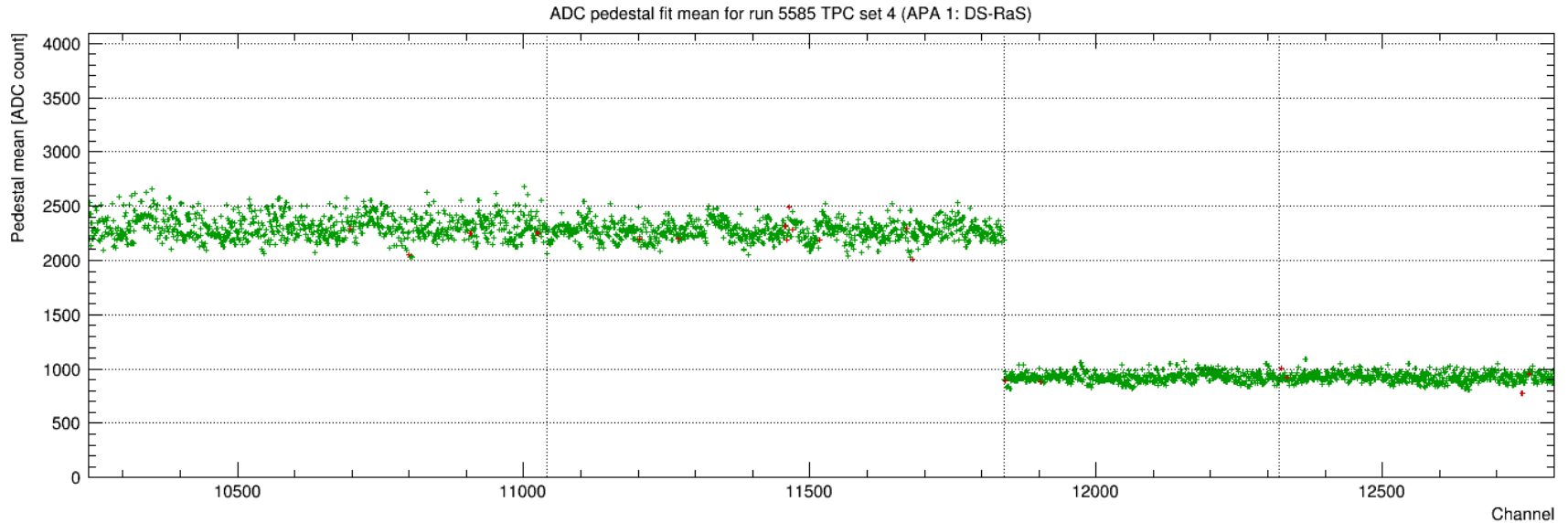
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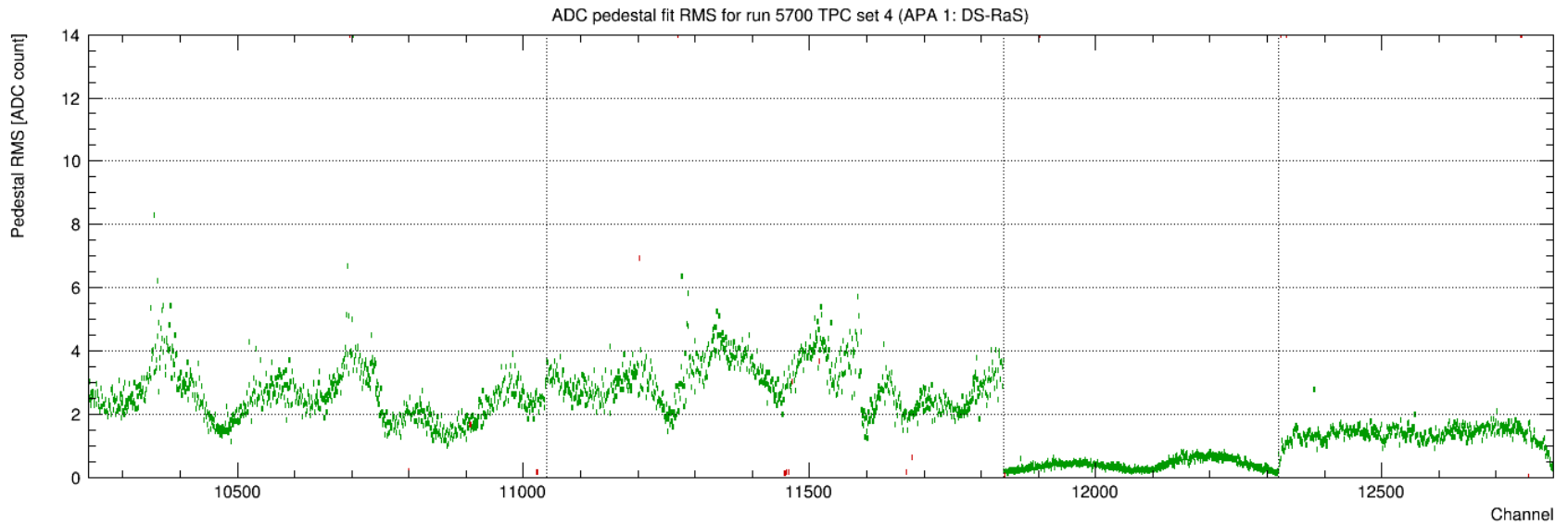
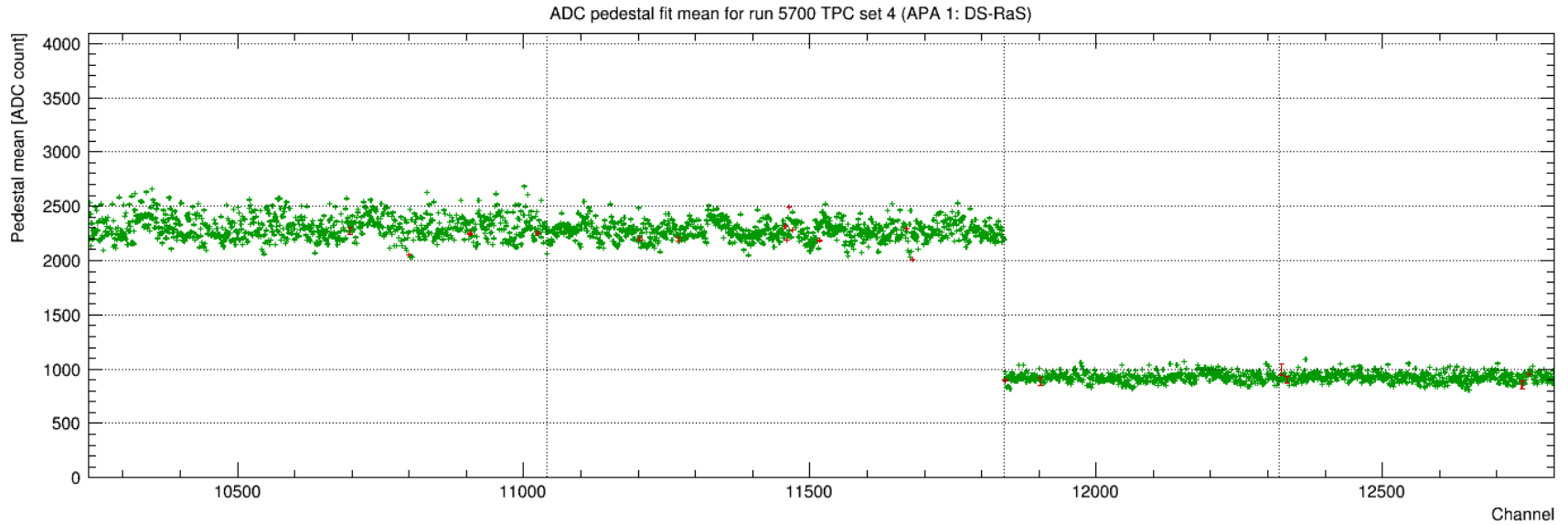
APA 1 run 5461 events 1-999



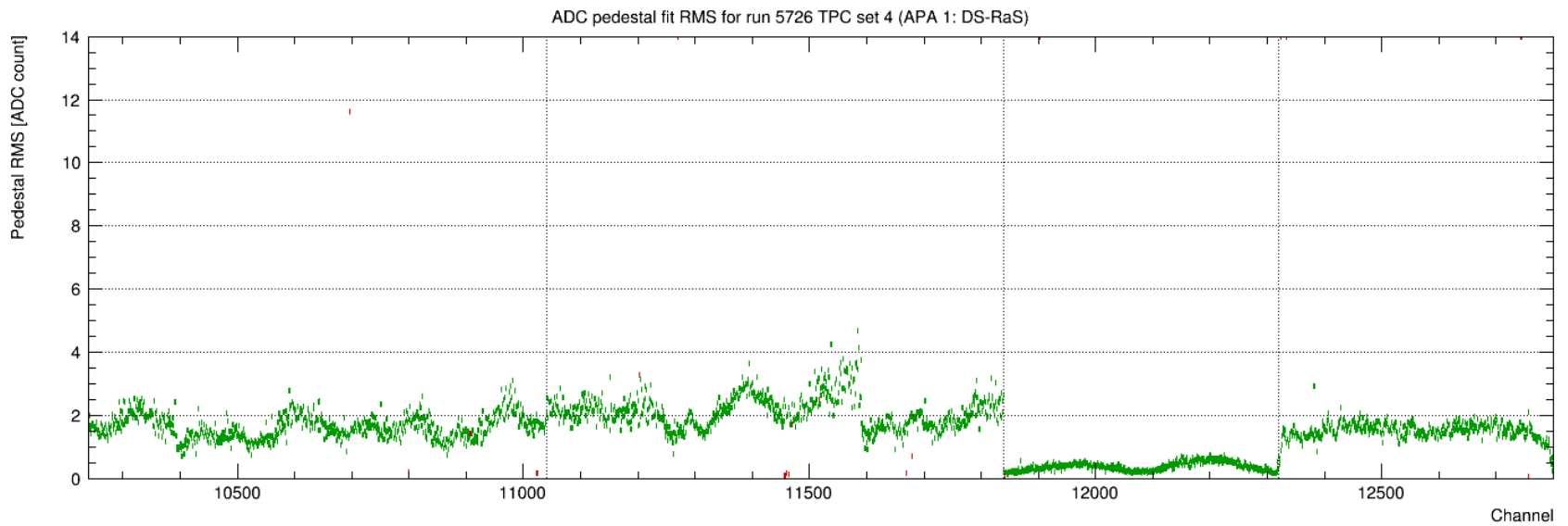
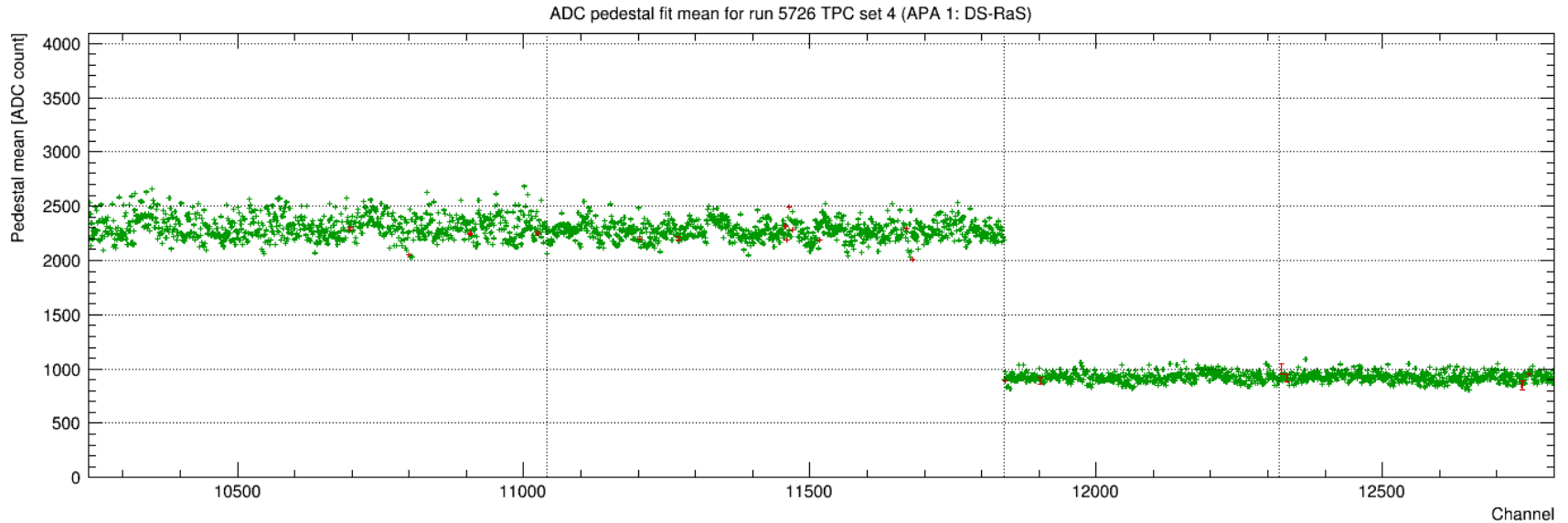
APA 1 run 5585 events 1-999



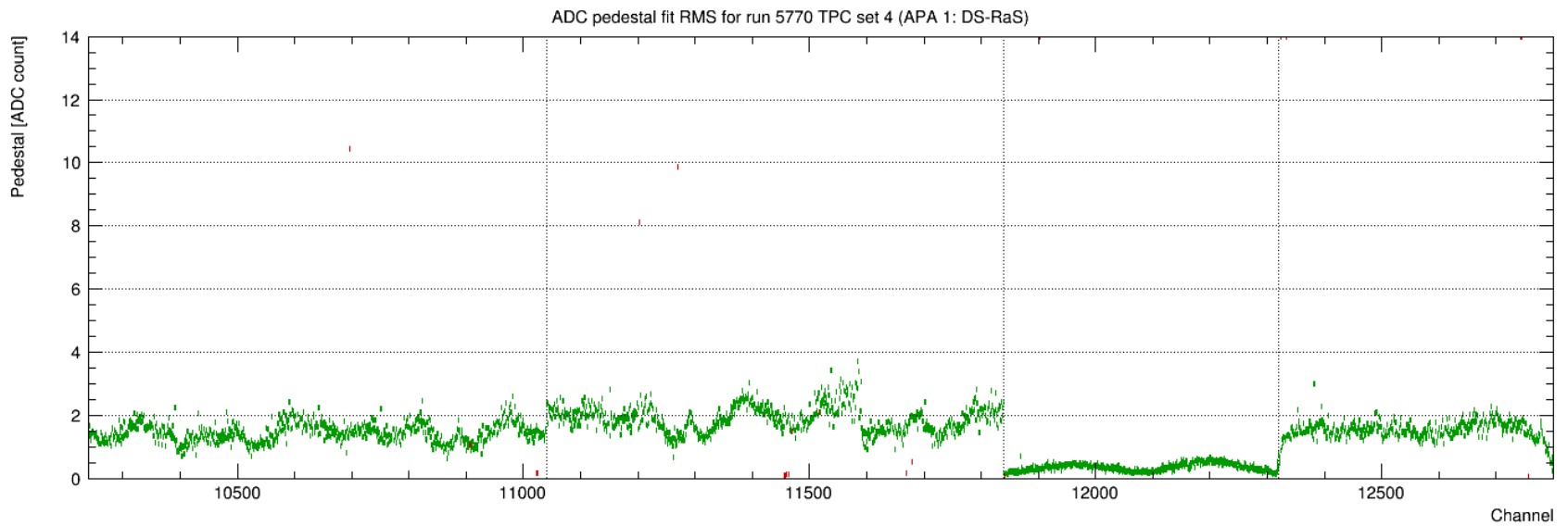
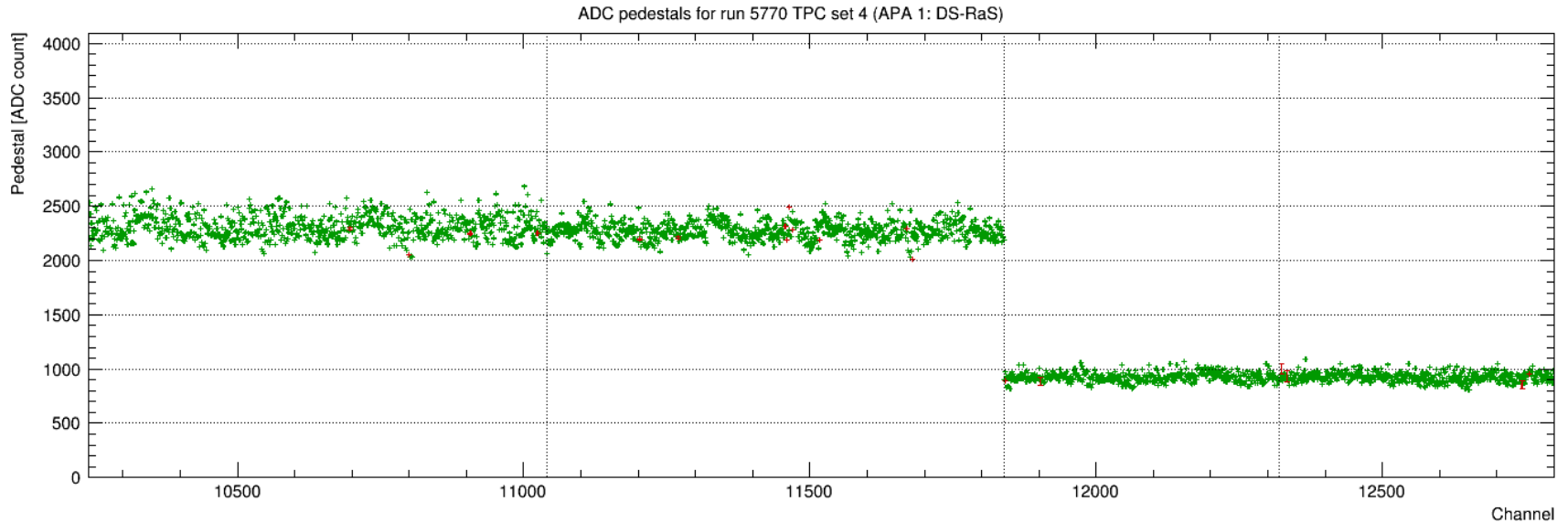
APA 1 run 5700 events 1-999



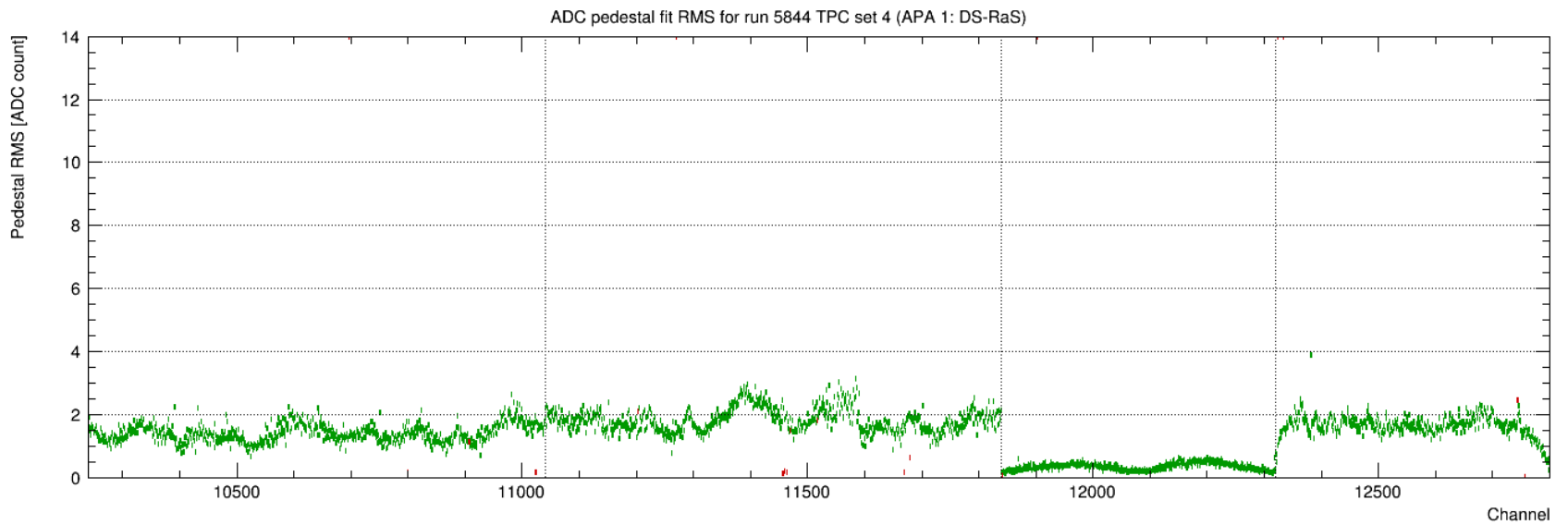
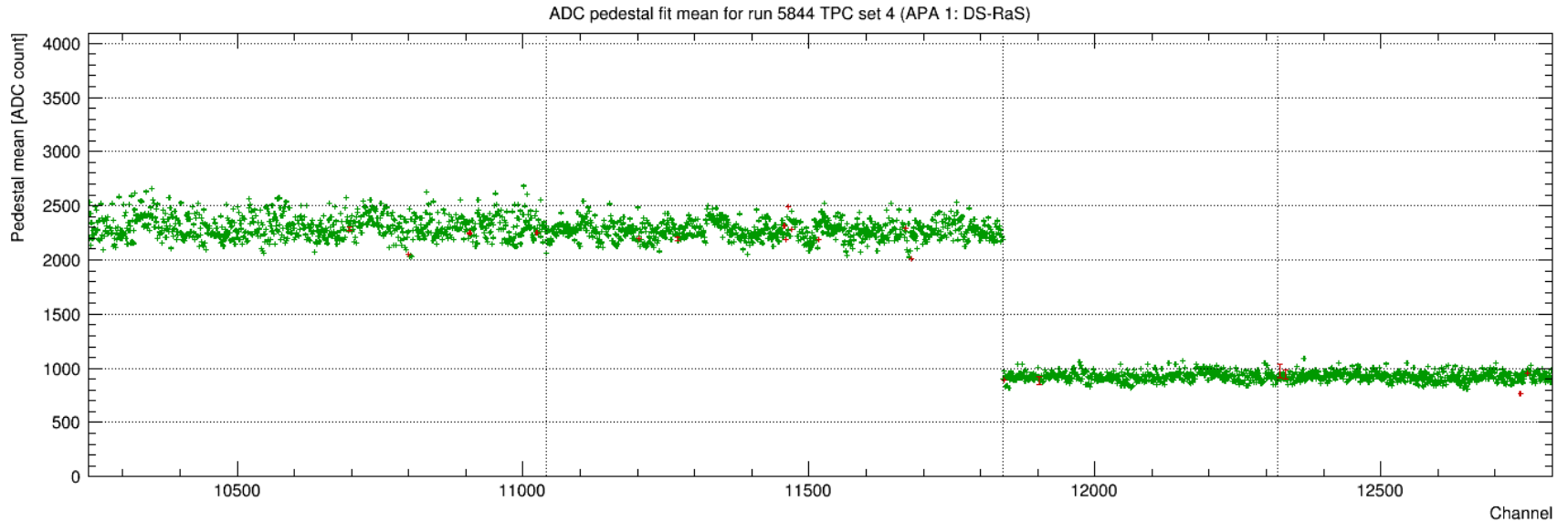
APA 1 run 5726 events 1-999



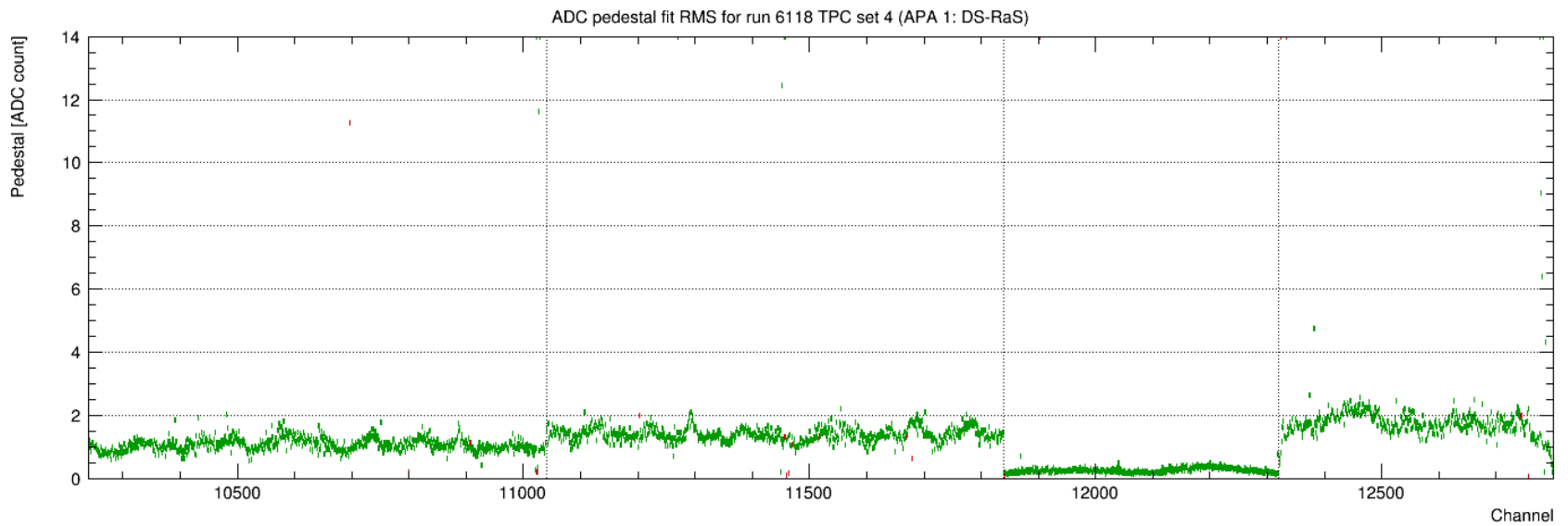
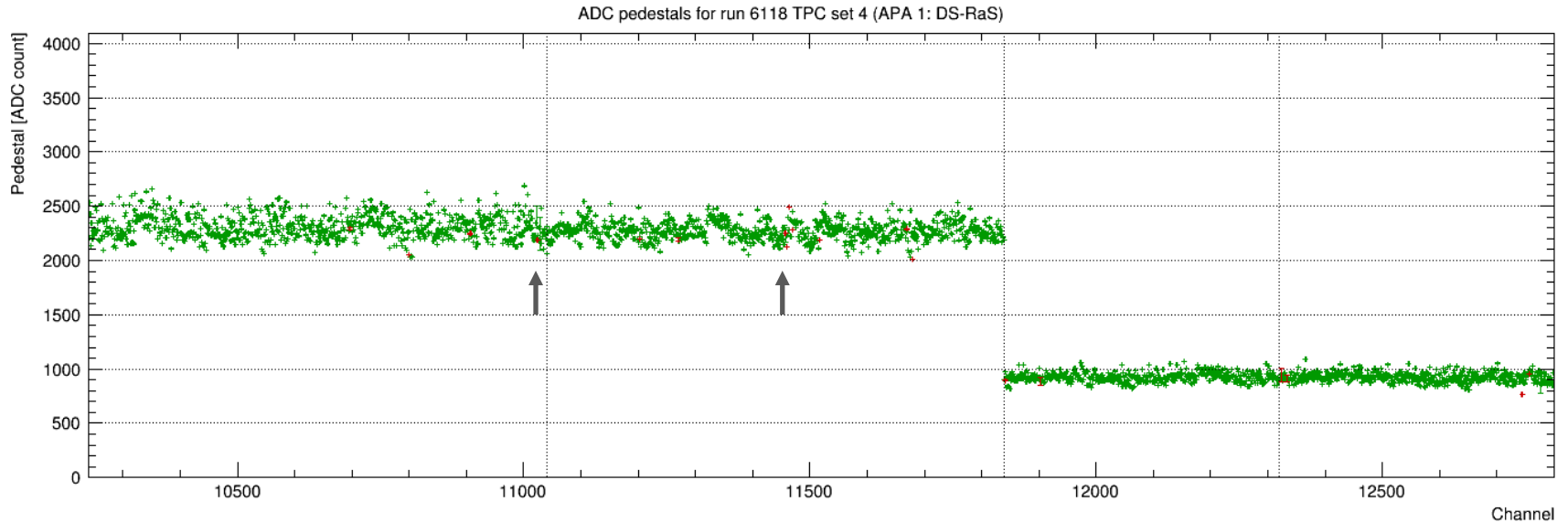
APA 1 run 5770 events 1-999



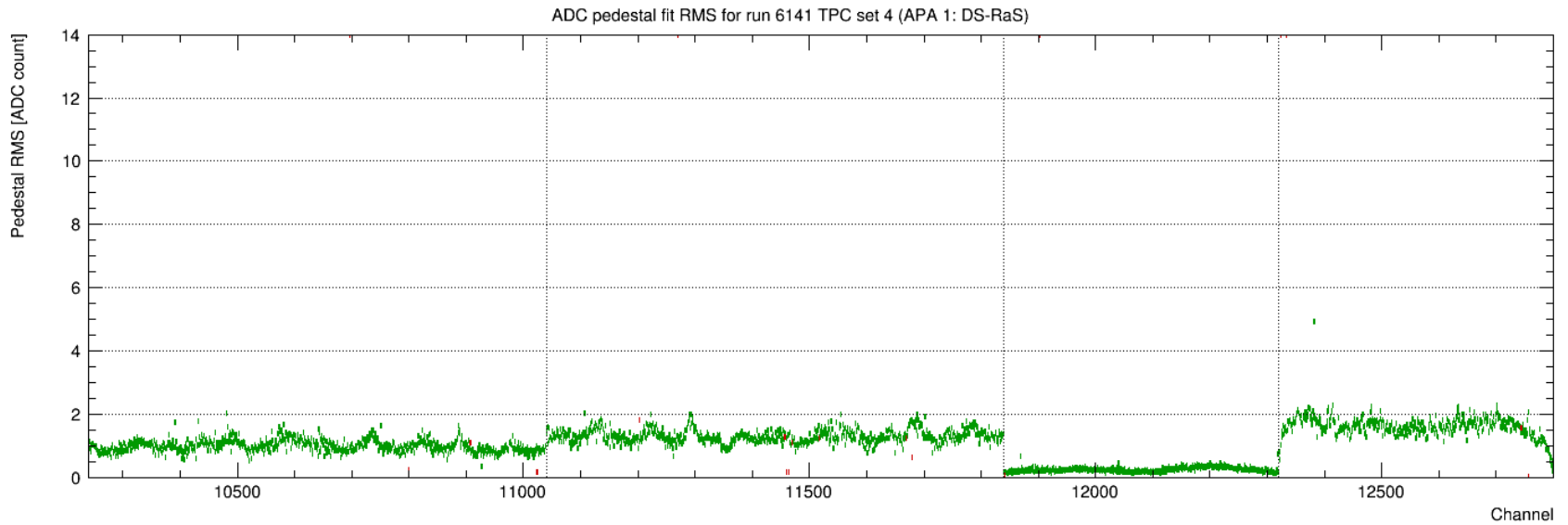
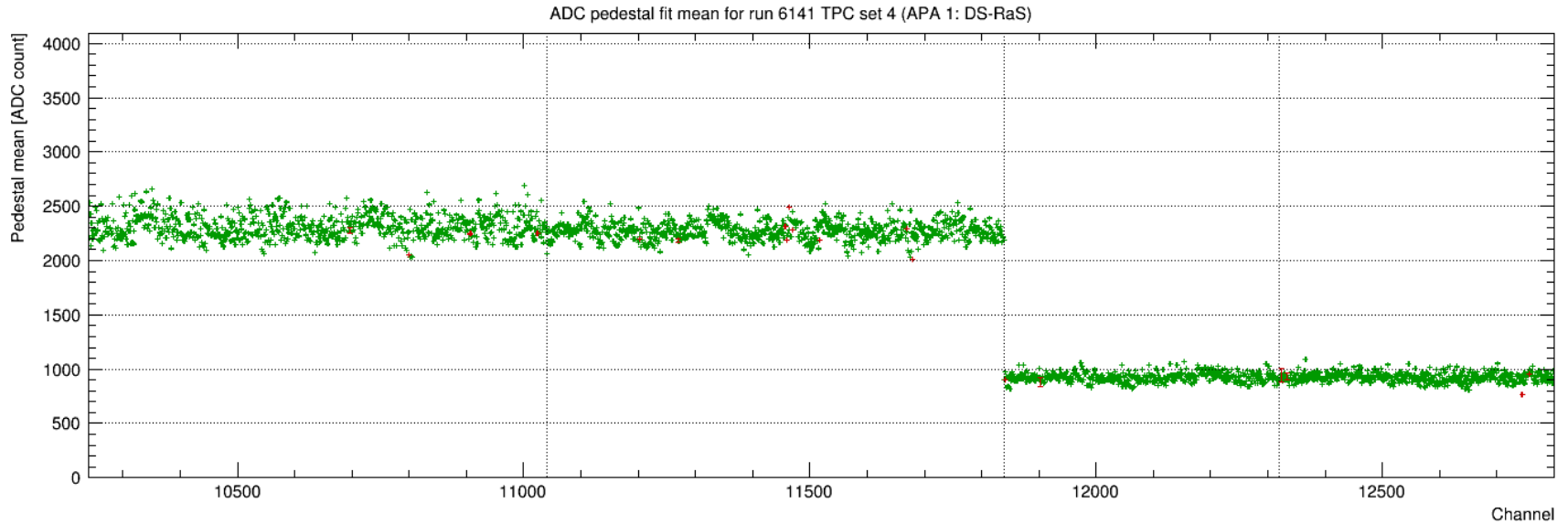
APA 1 run 5844 events 1-999



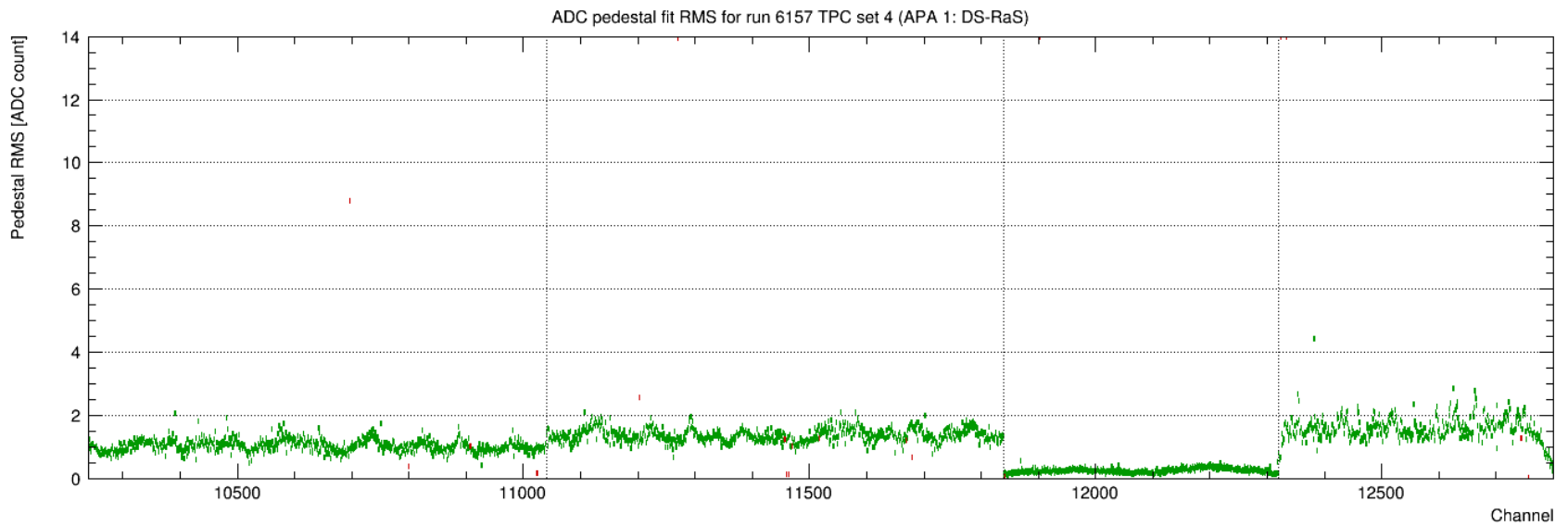
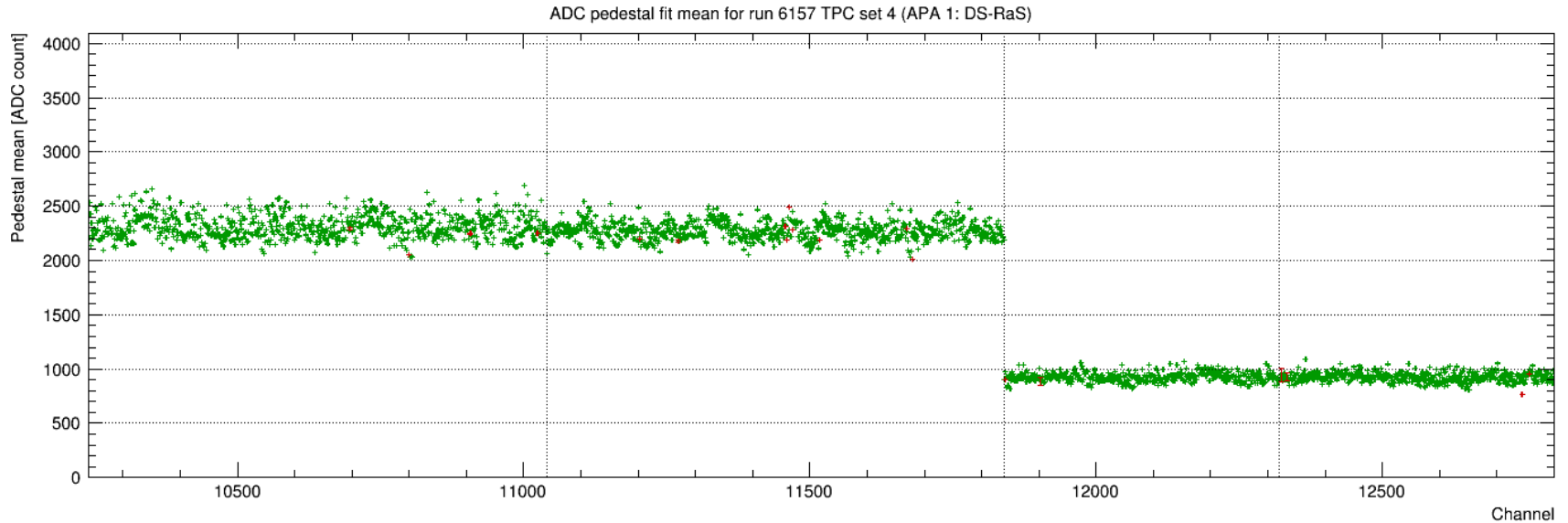
APA 1 run 6118 events 1-999



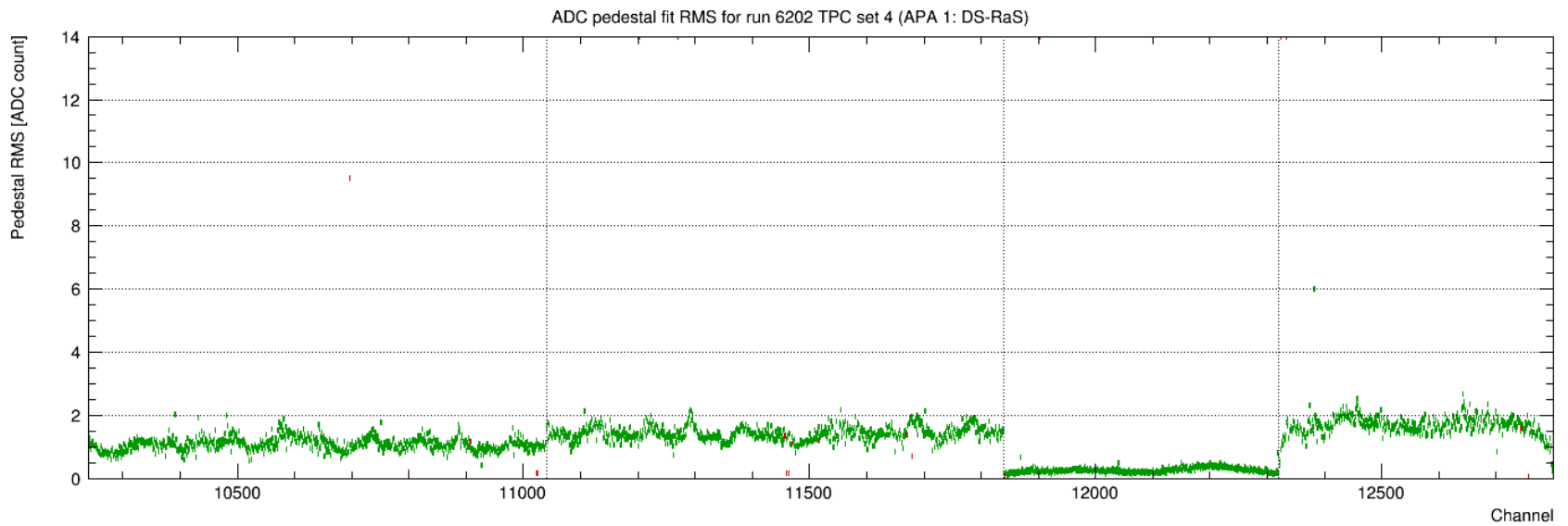
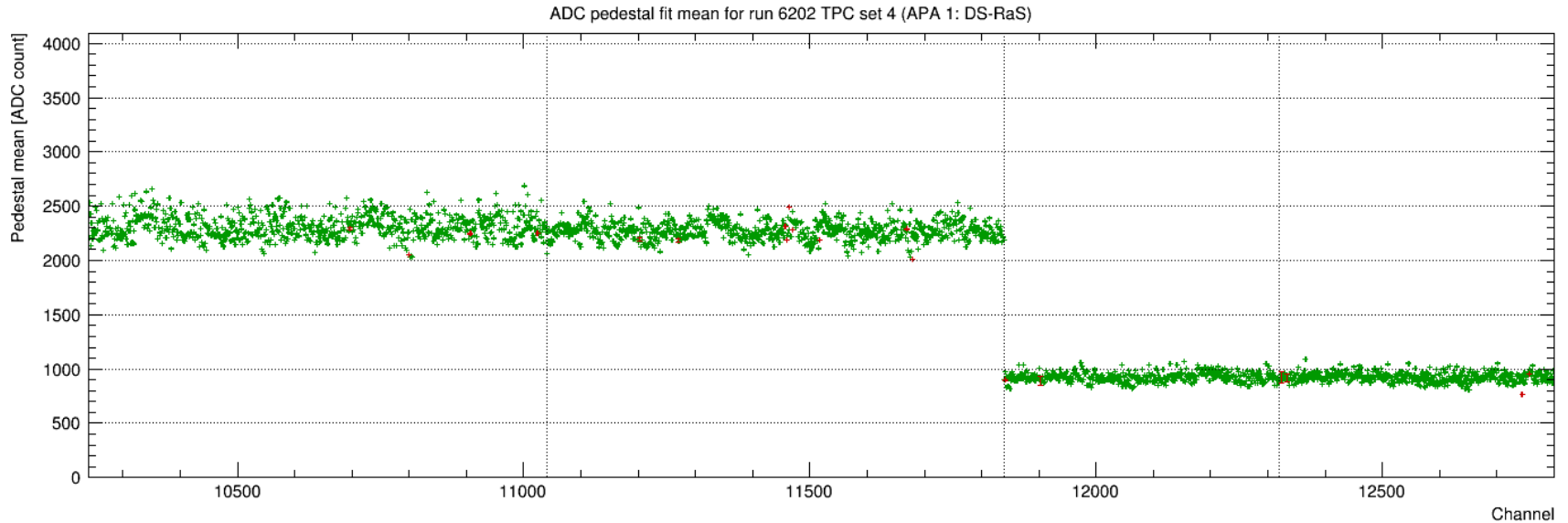
APA 1 run 6141 events 1-999



APA 1 run 6157 events 1-999

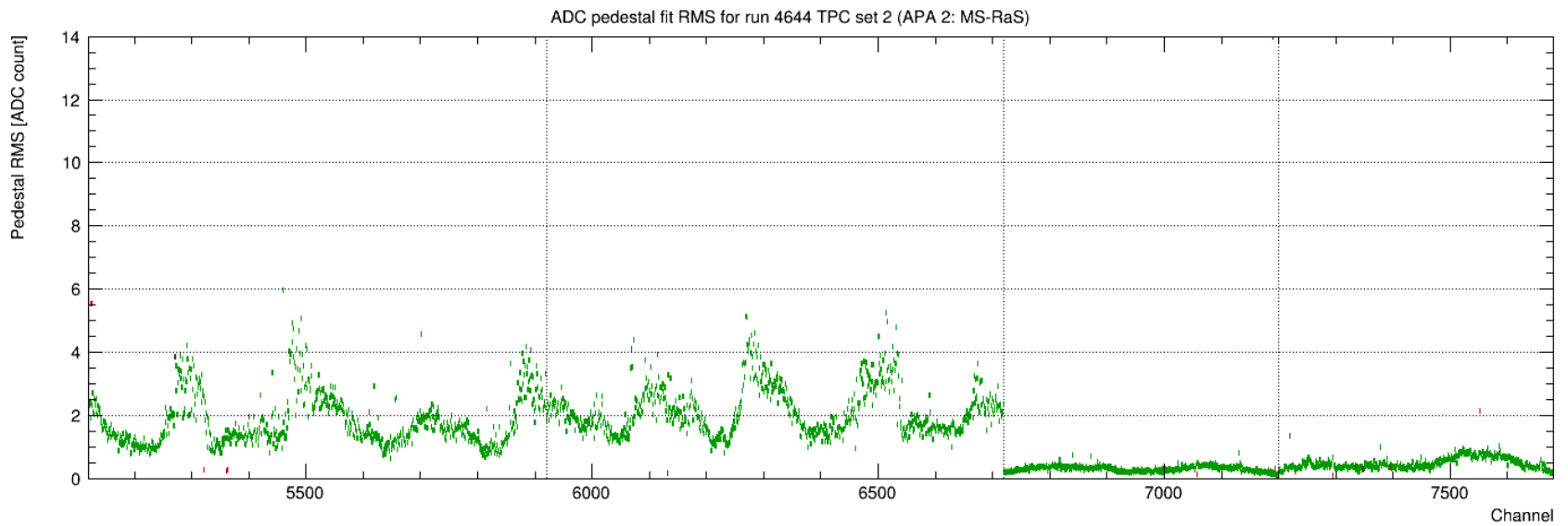
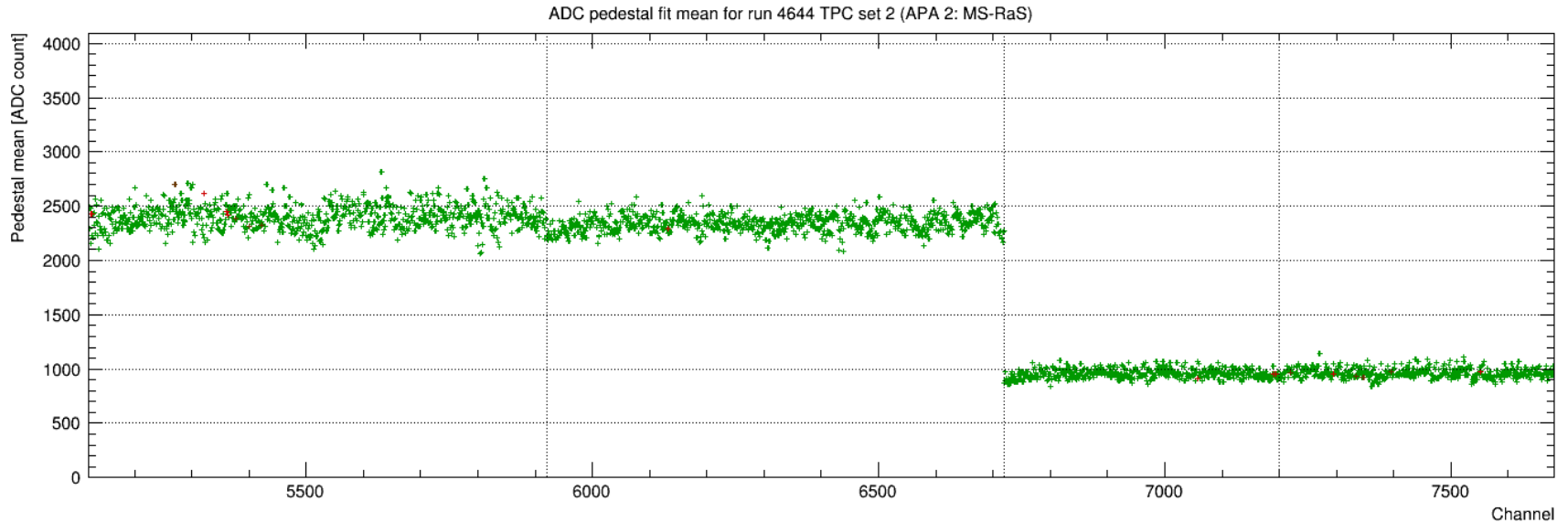


APA 1 run 6202 events 1-999

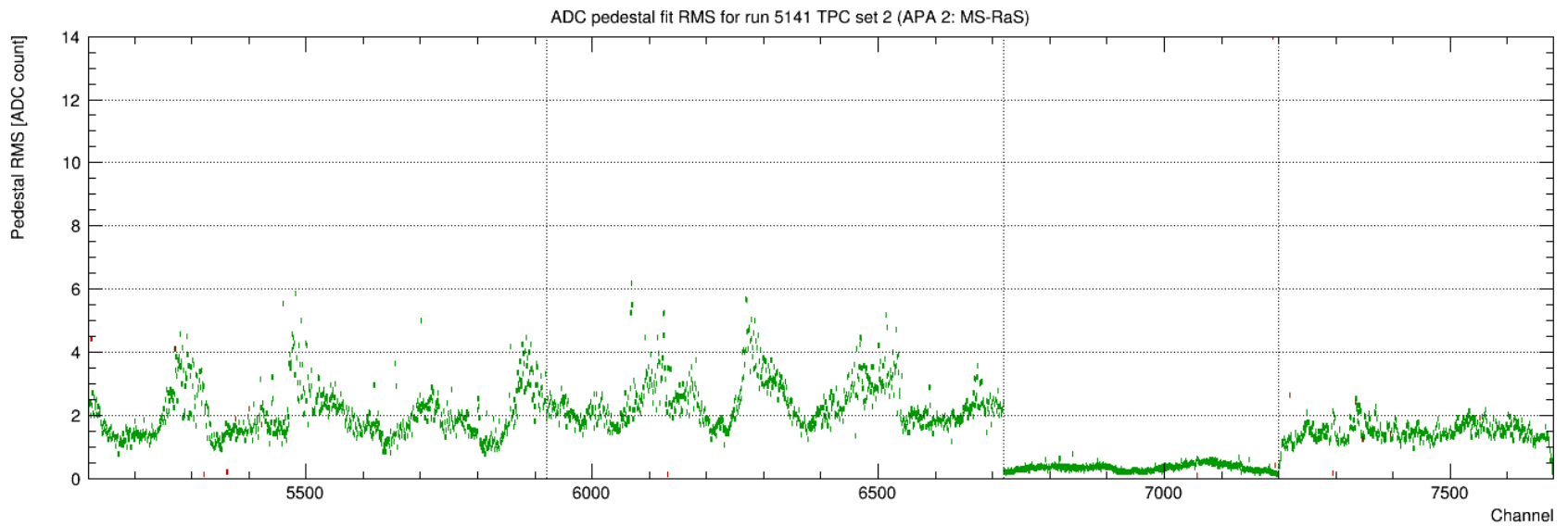
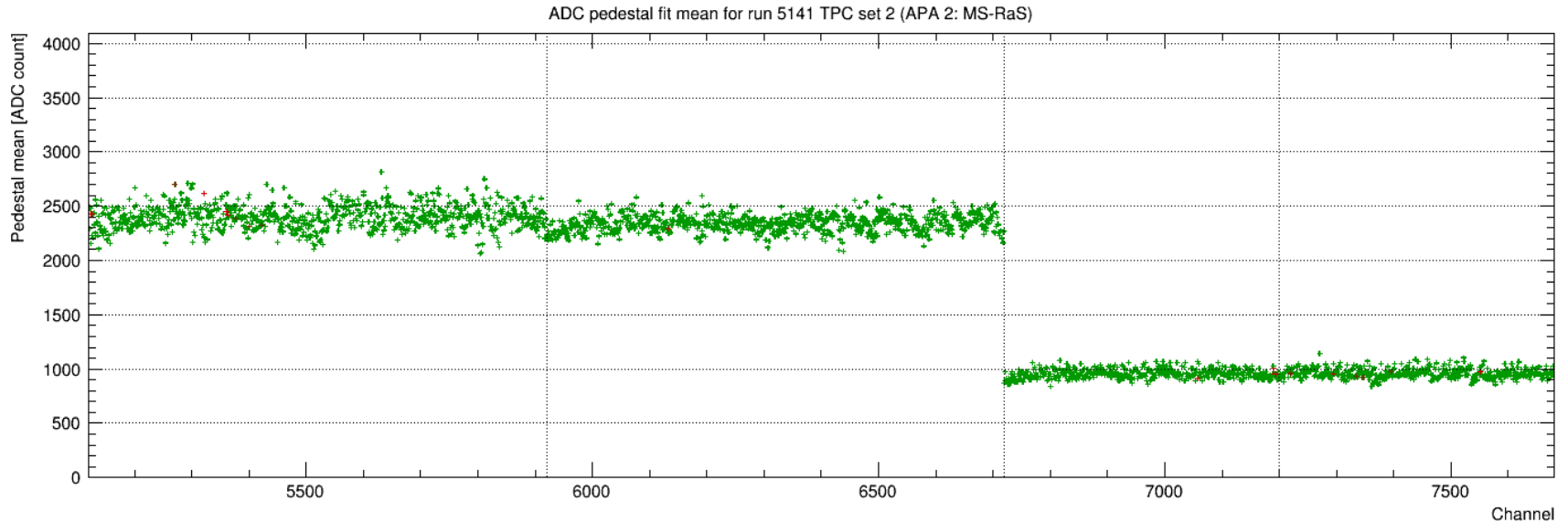


APA 2

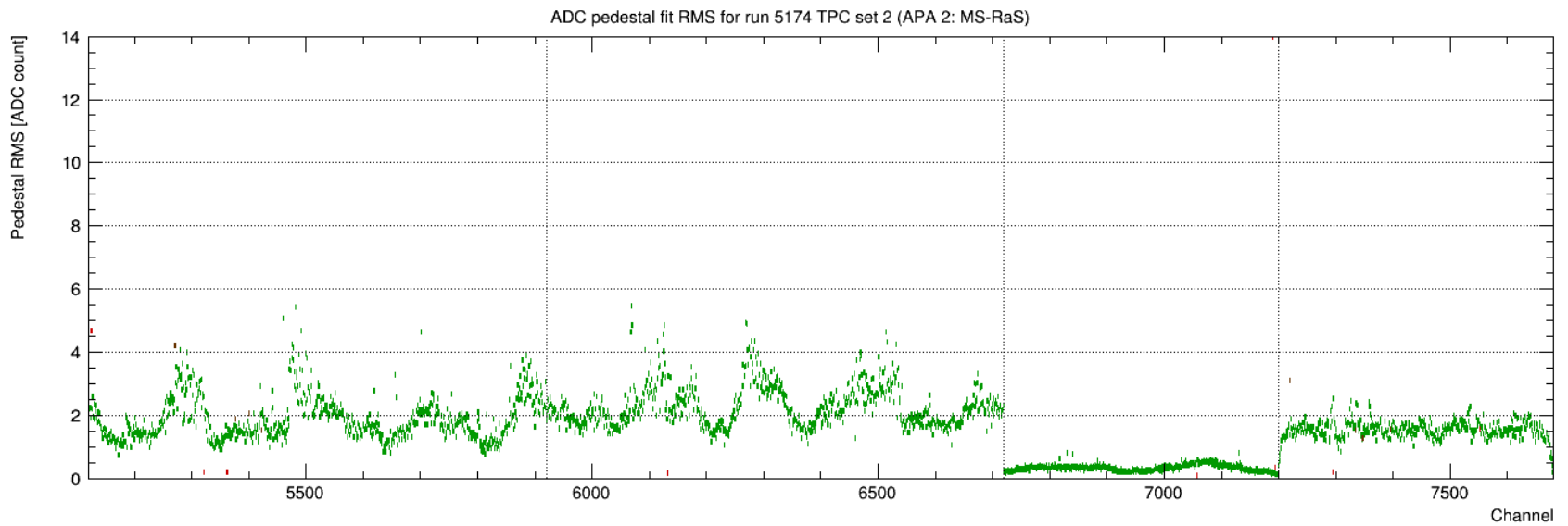
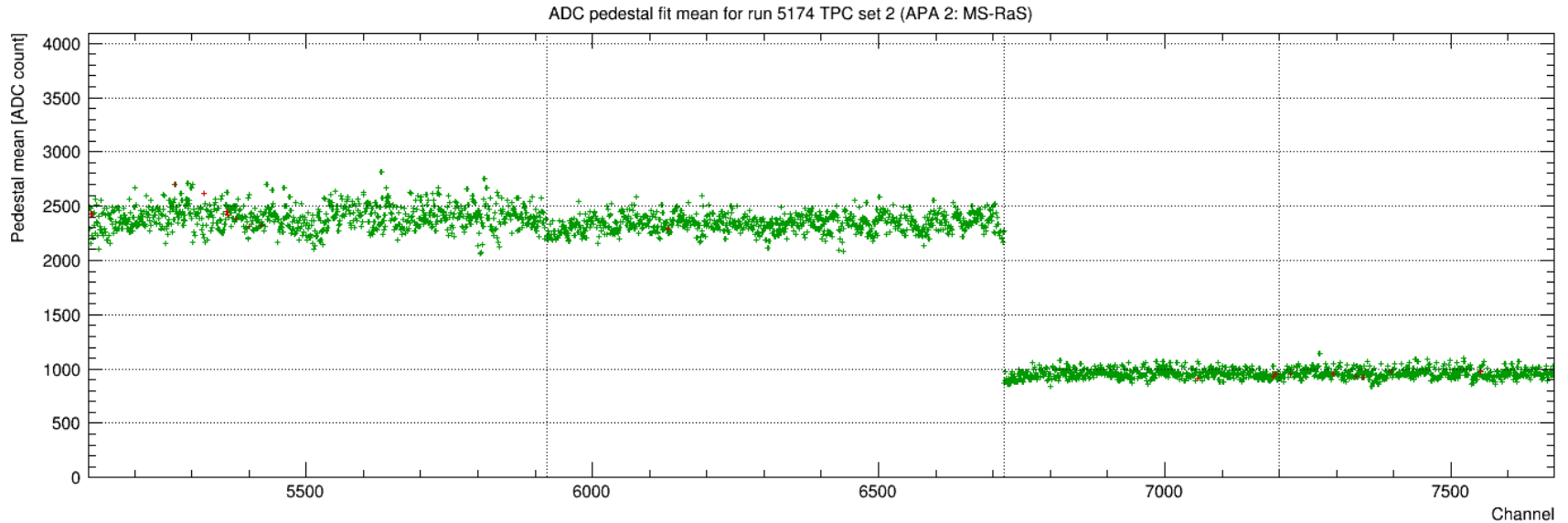
APA 2 run 4644 events 1-999



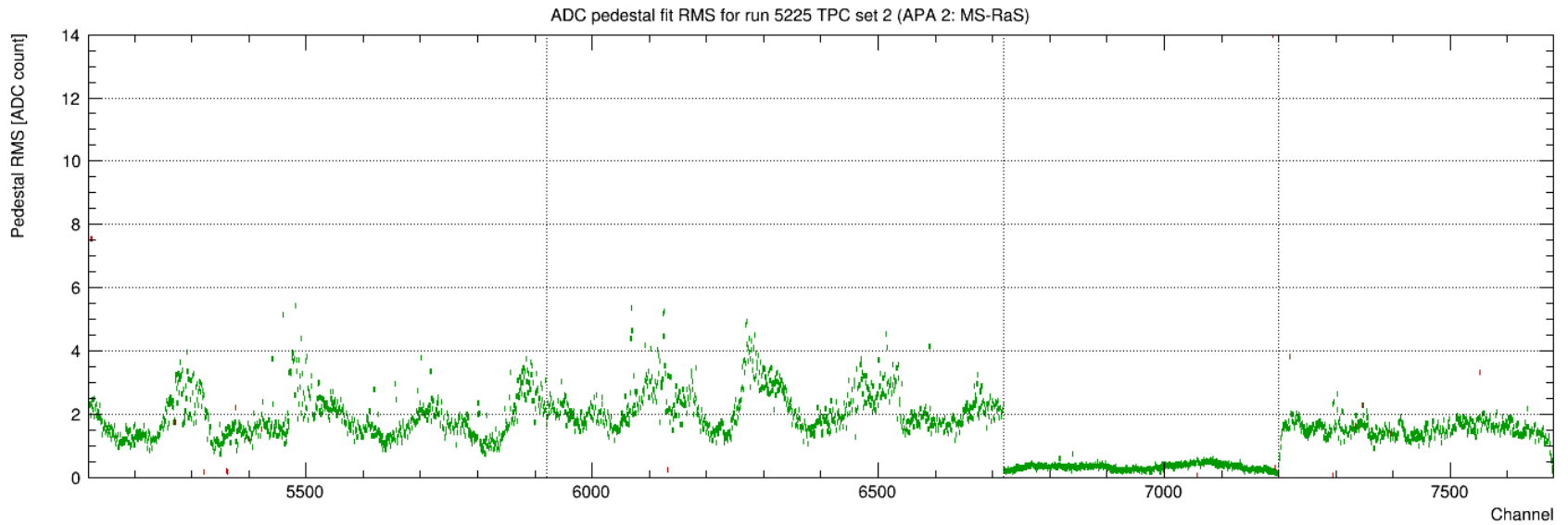
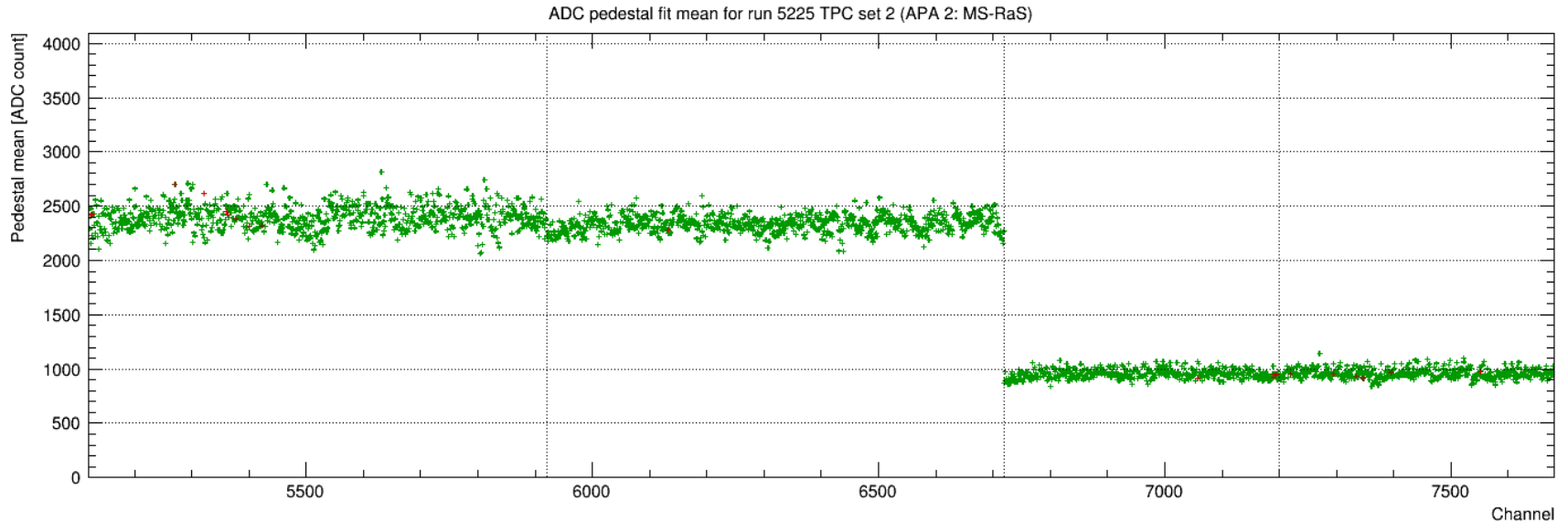
APA 2 run 5141 events 1-999



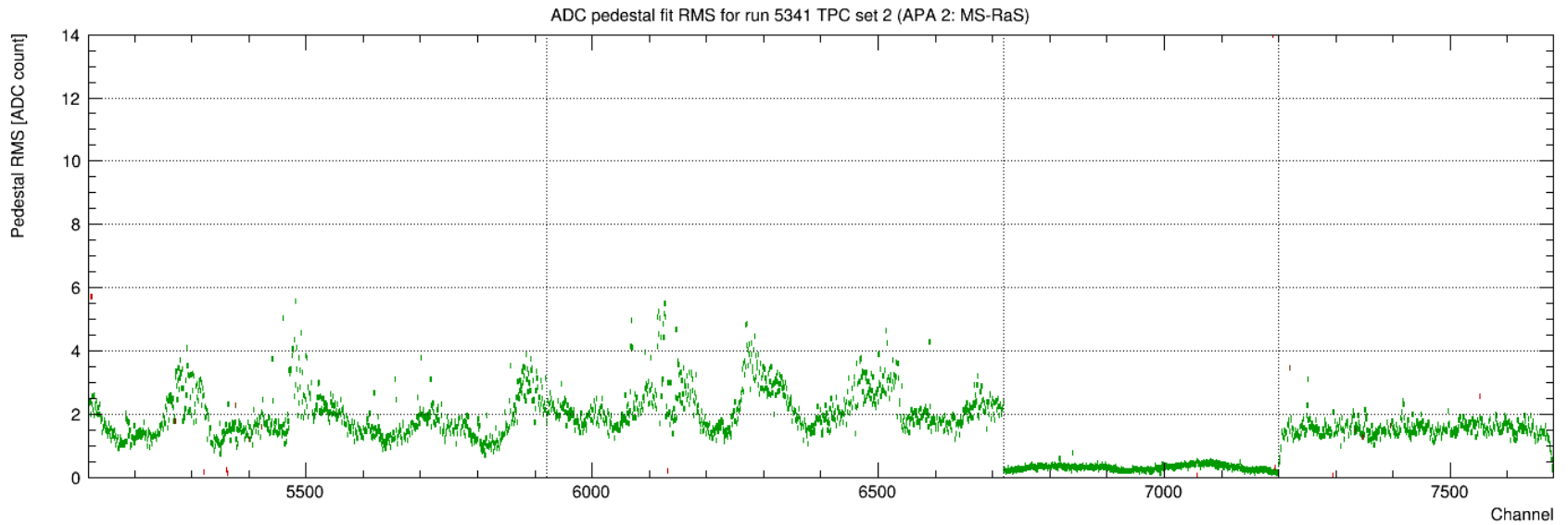
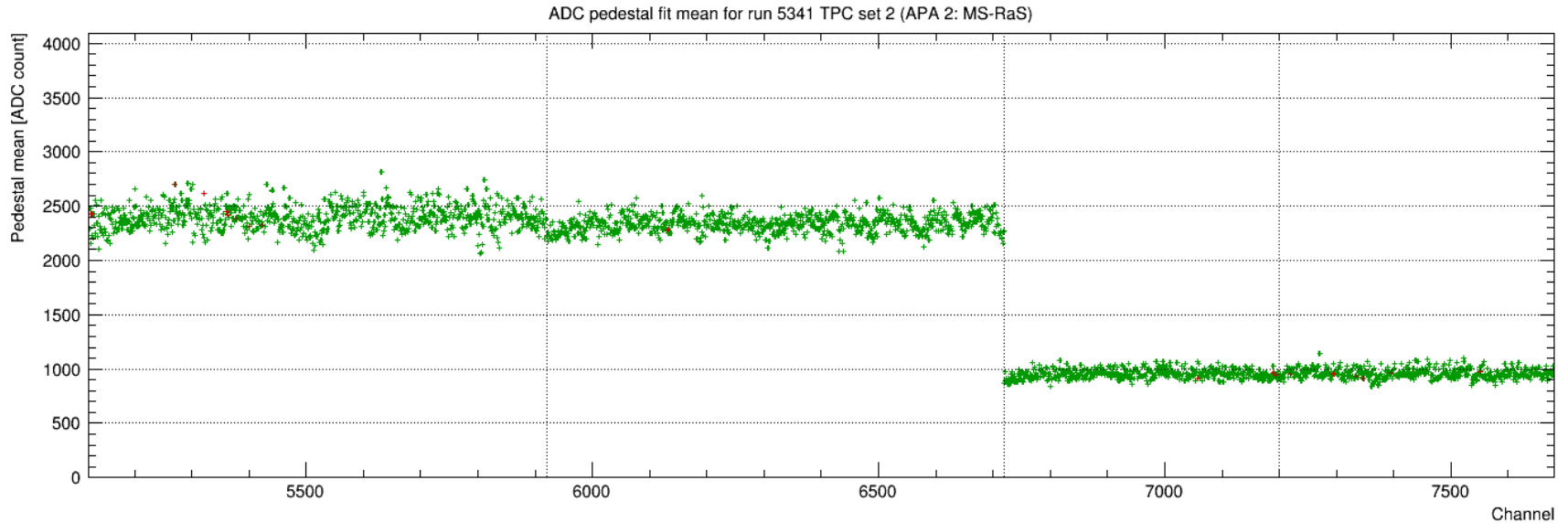
APA 2 run 5174 events 1-999



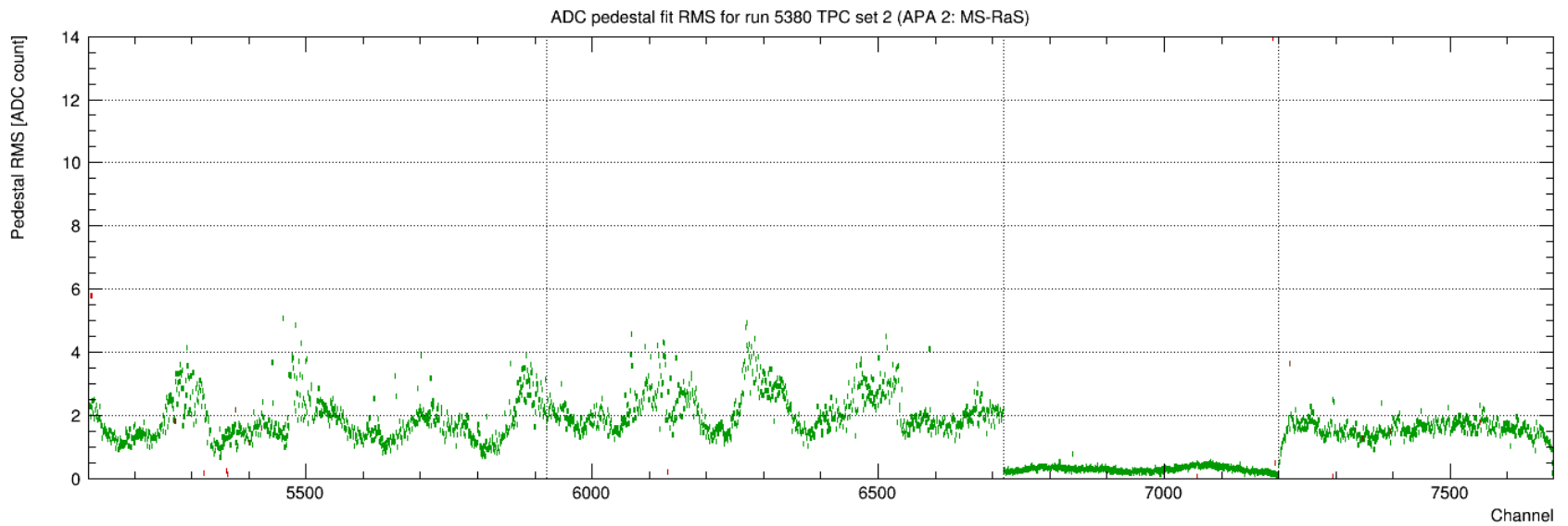
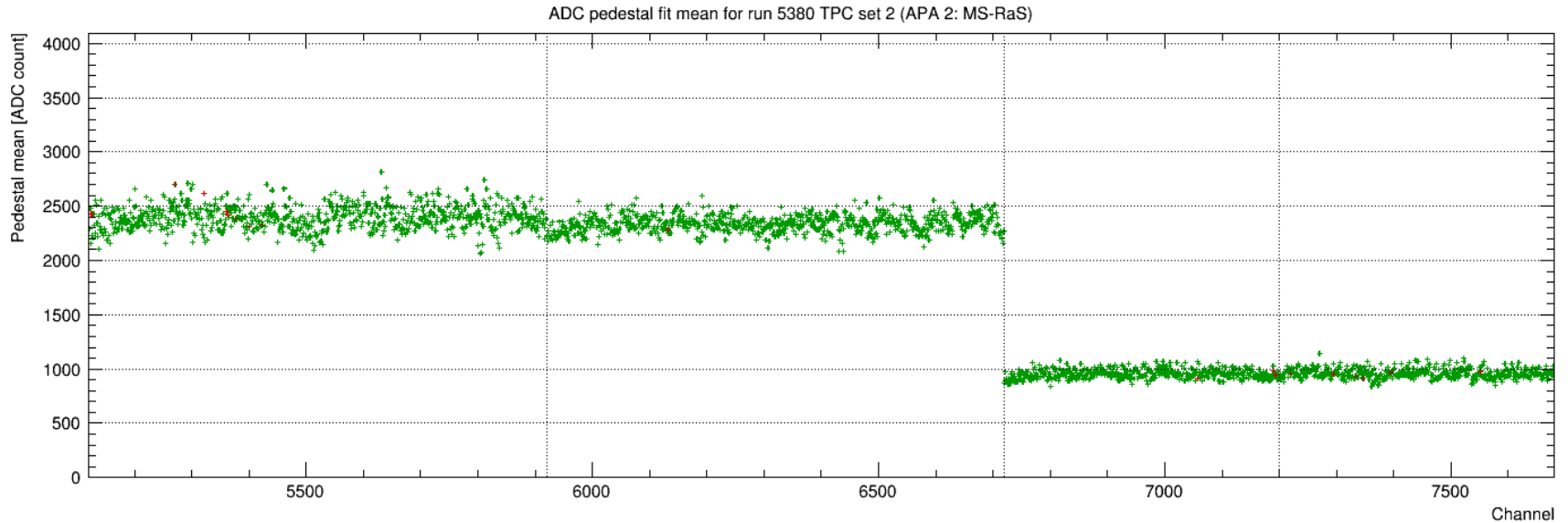
APA 2 run 5225 events 1-999



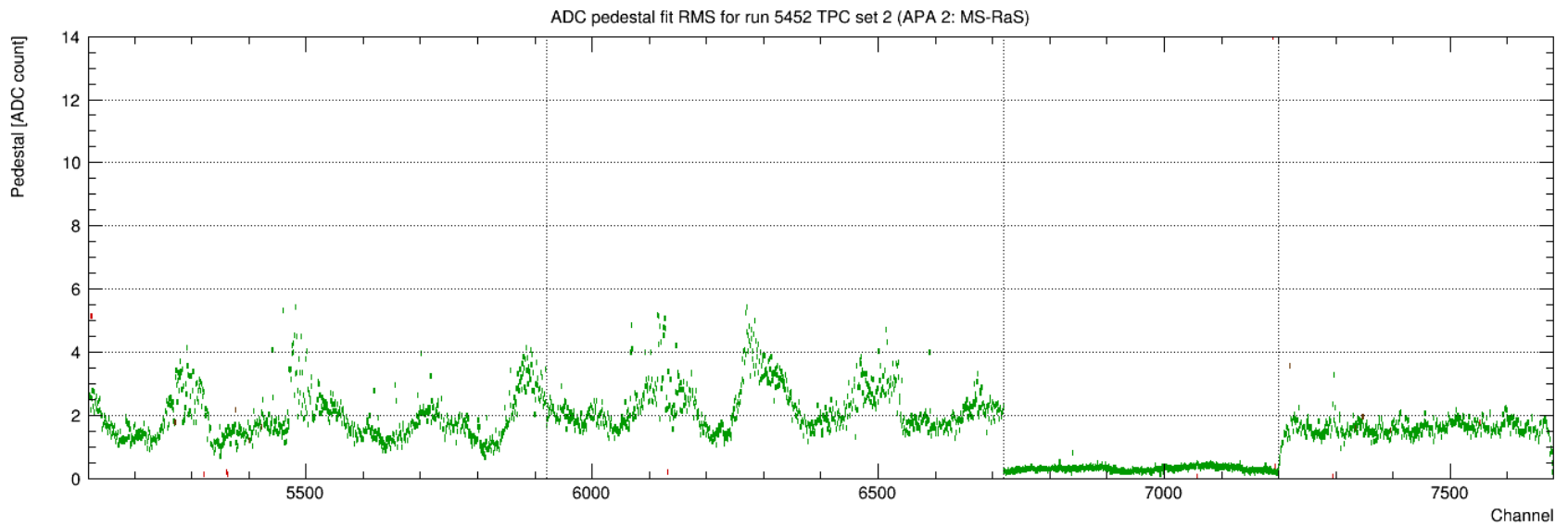
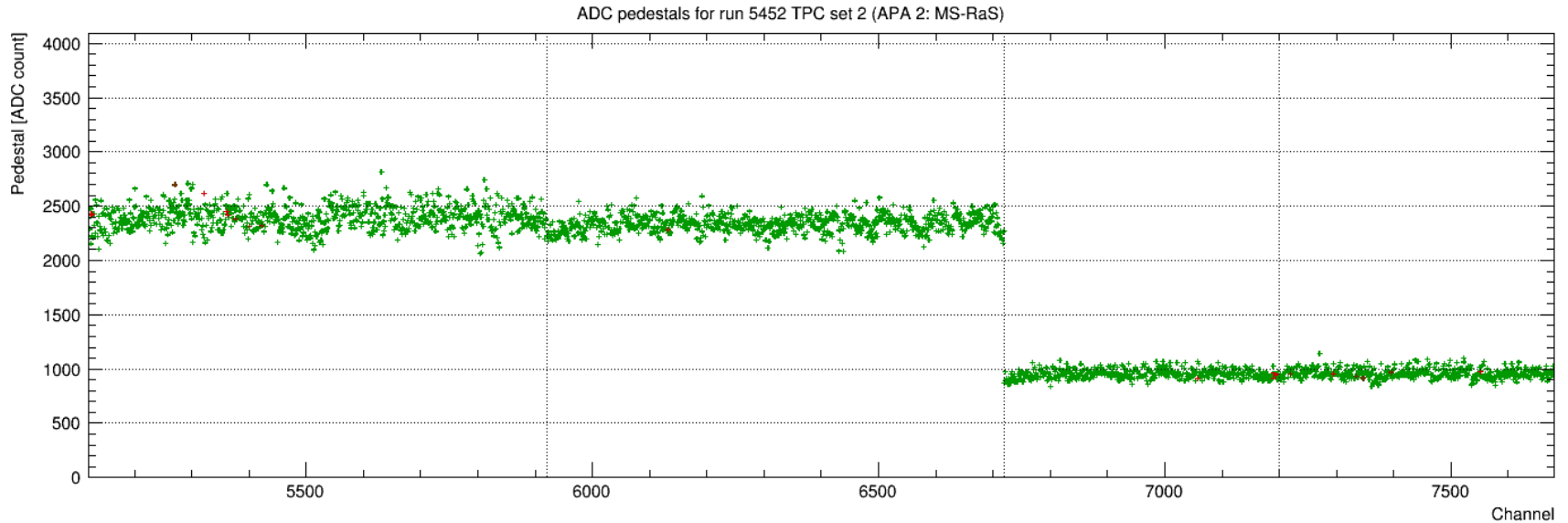
APA 2 run 5341 events 1-999



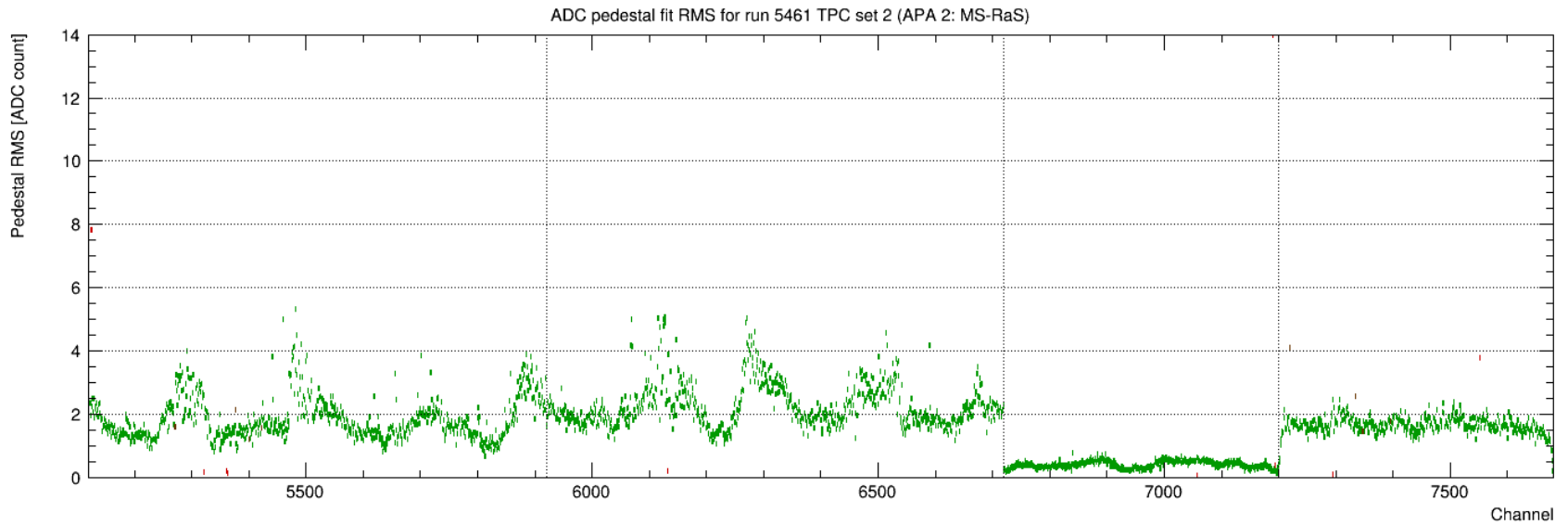
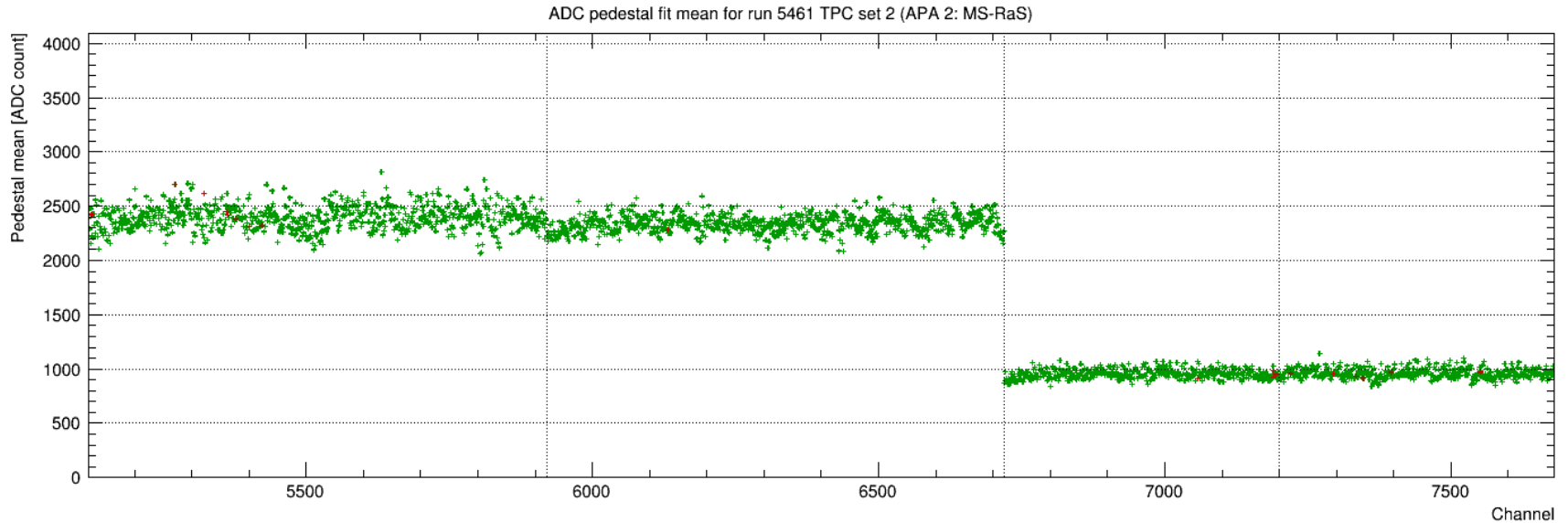
APA 2 run 5380 events 1-999



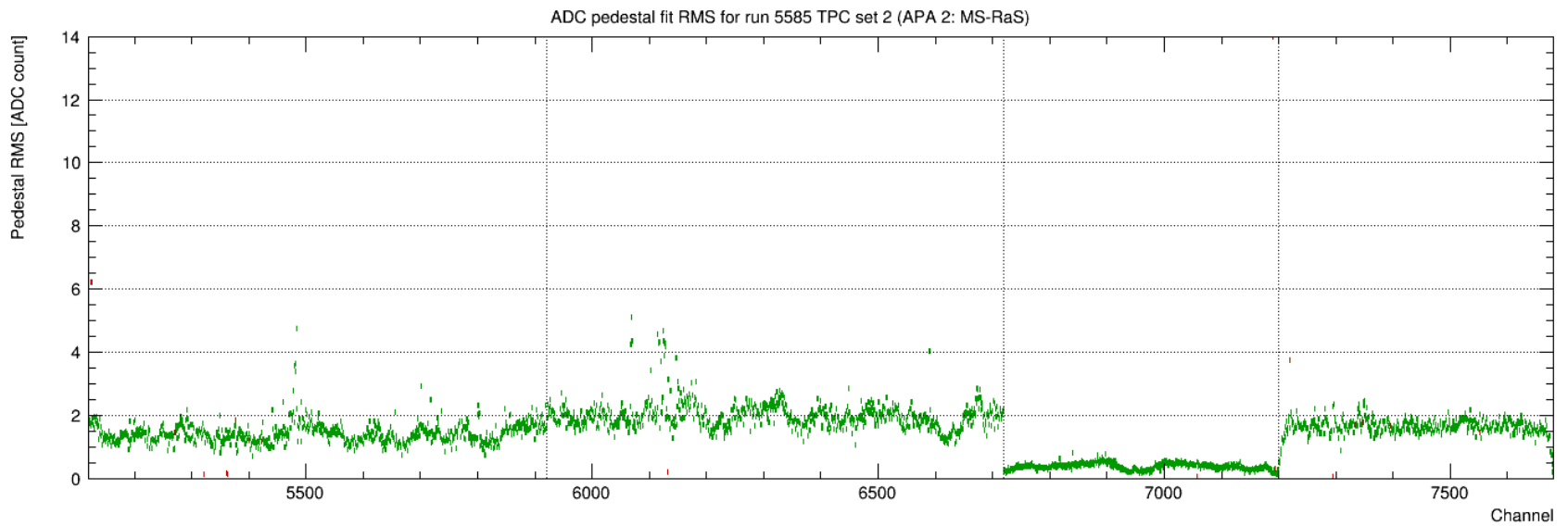
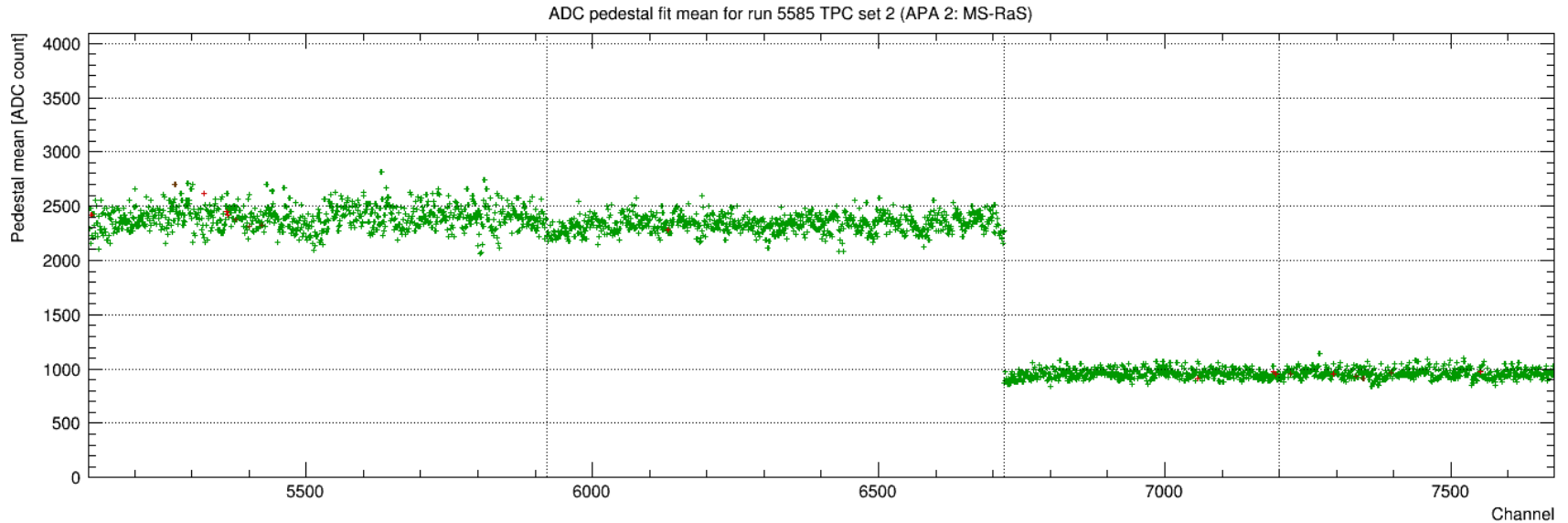
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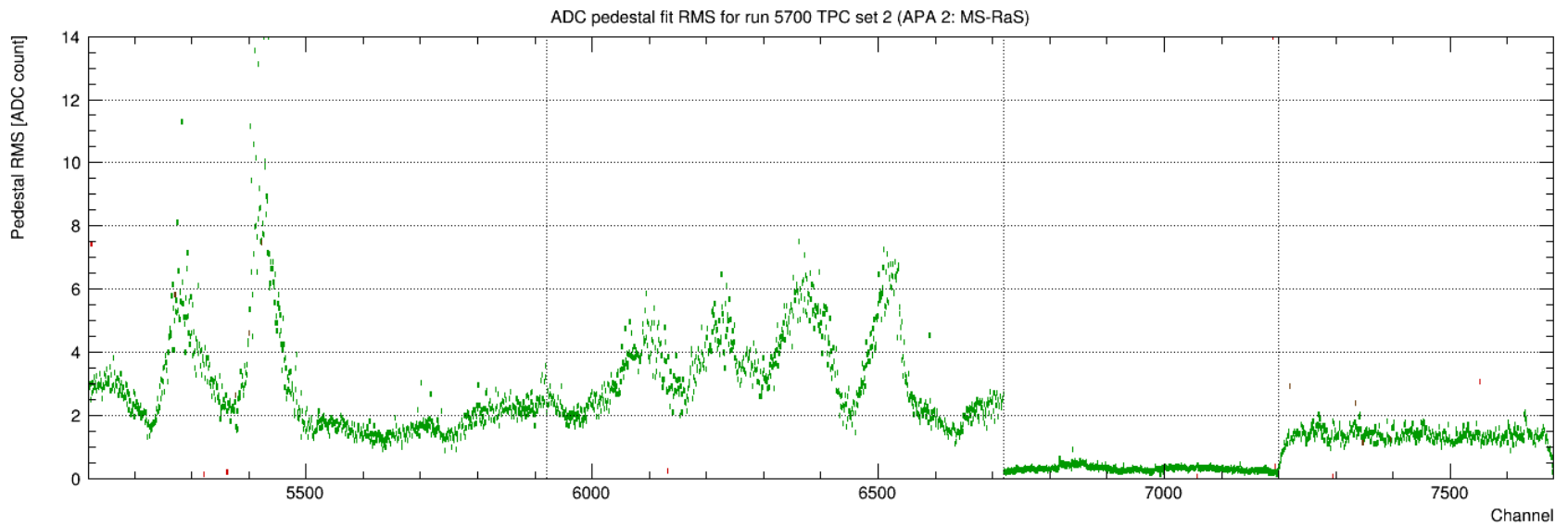
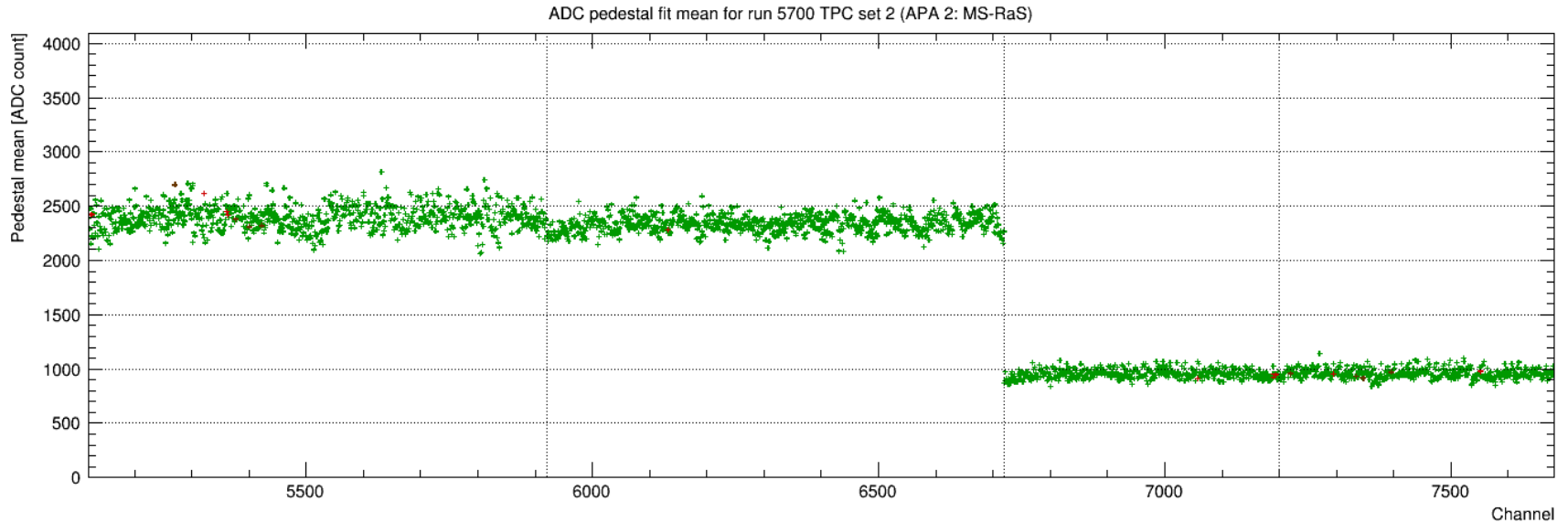
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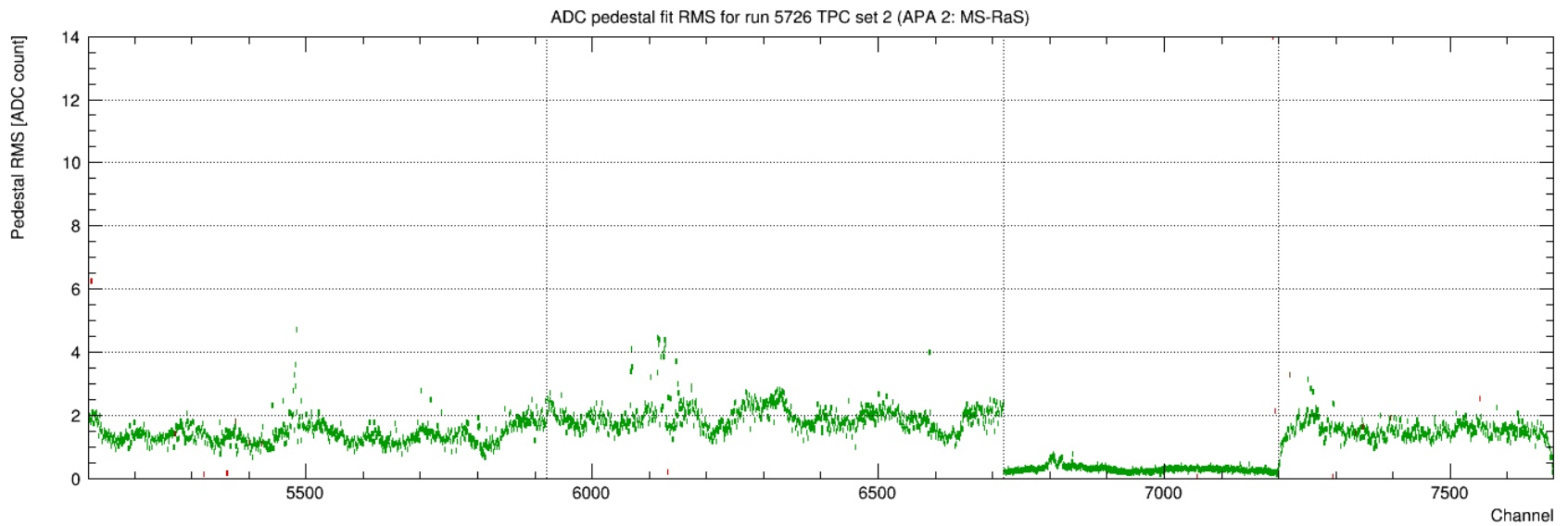
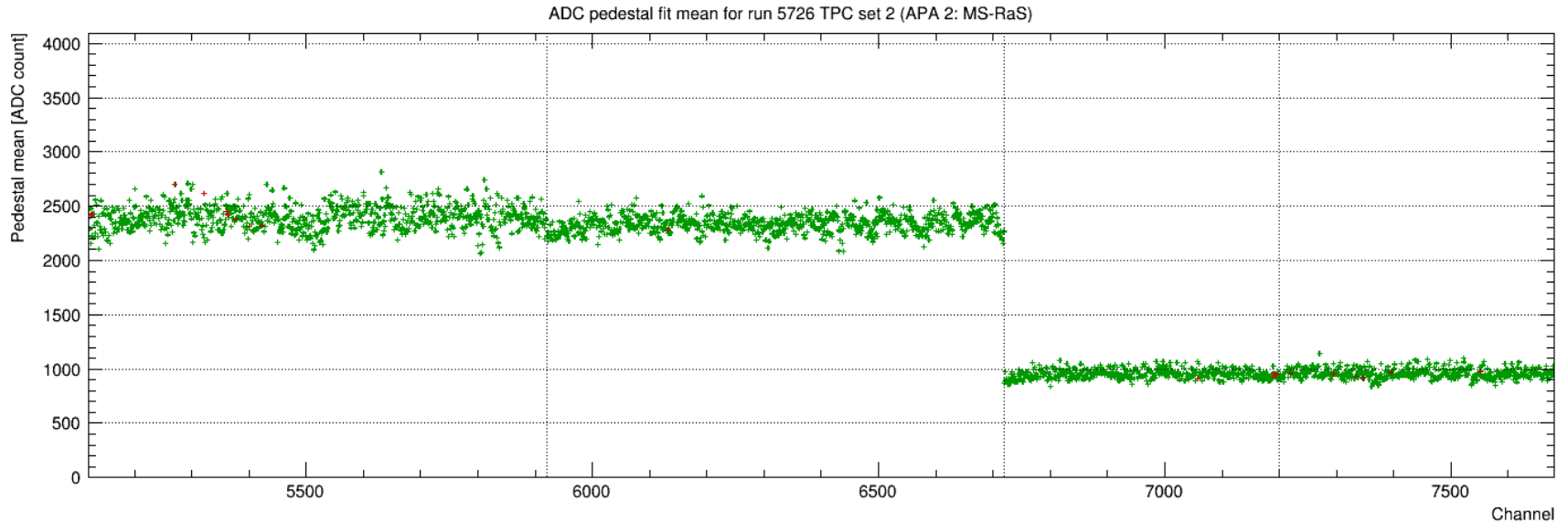
APA 2 run 5585 events 1-999



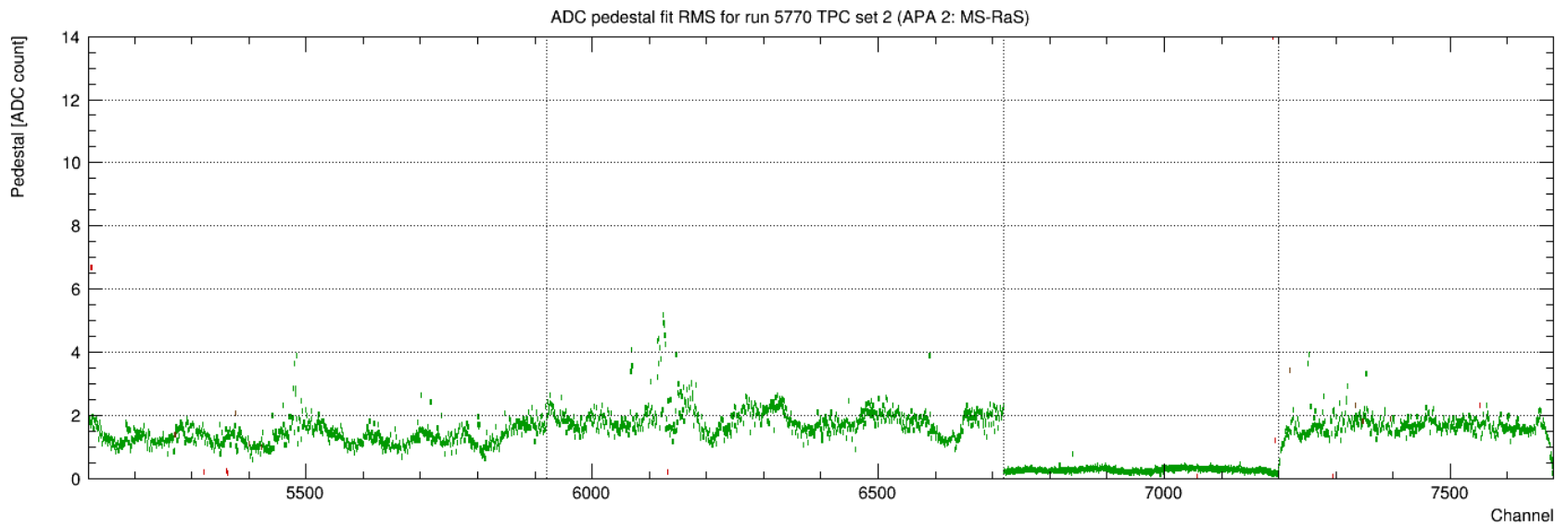
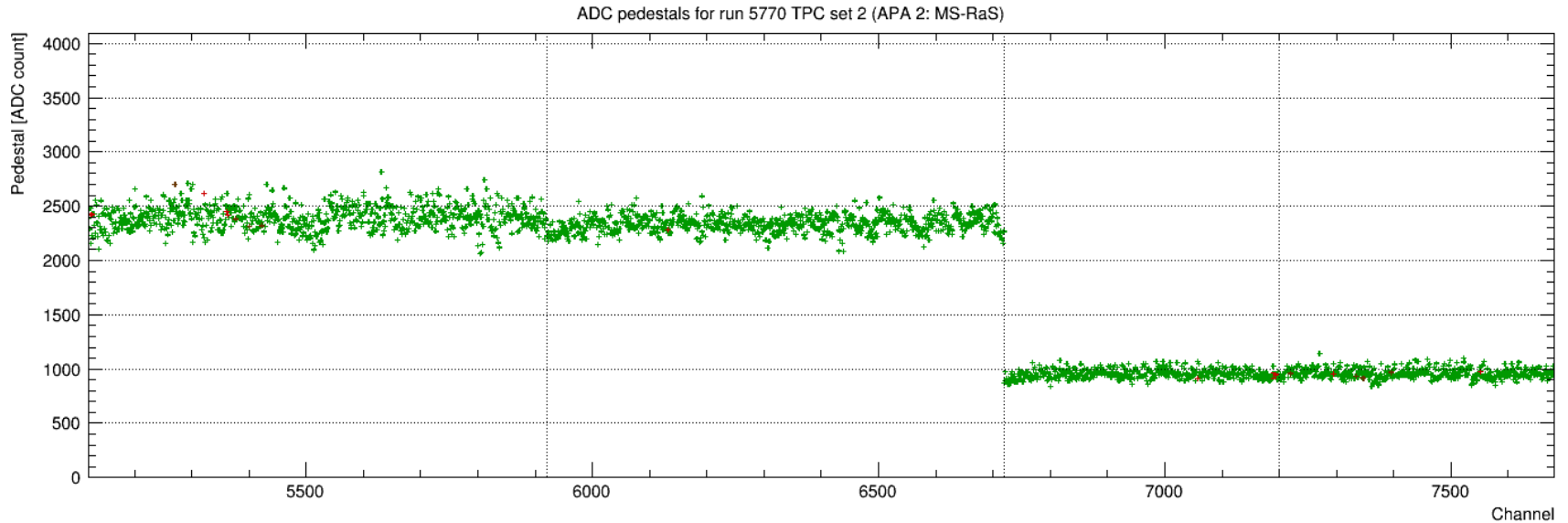
APA 2 run 5700 events 1-999



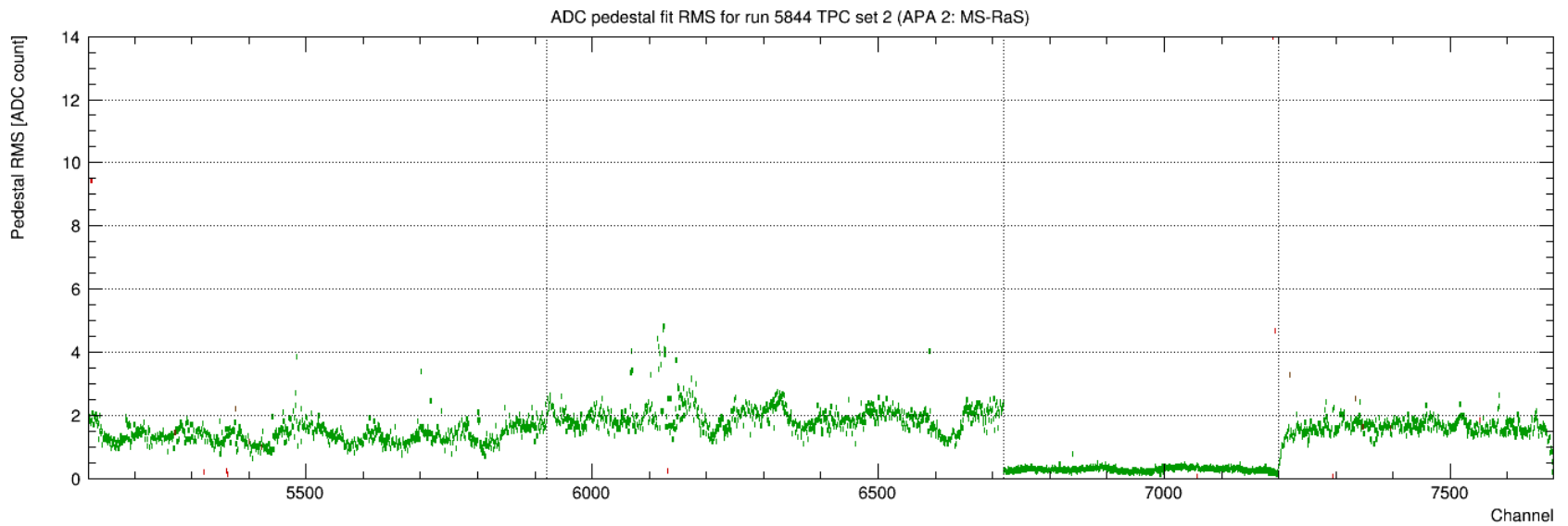
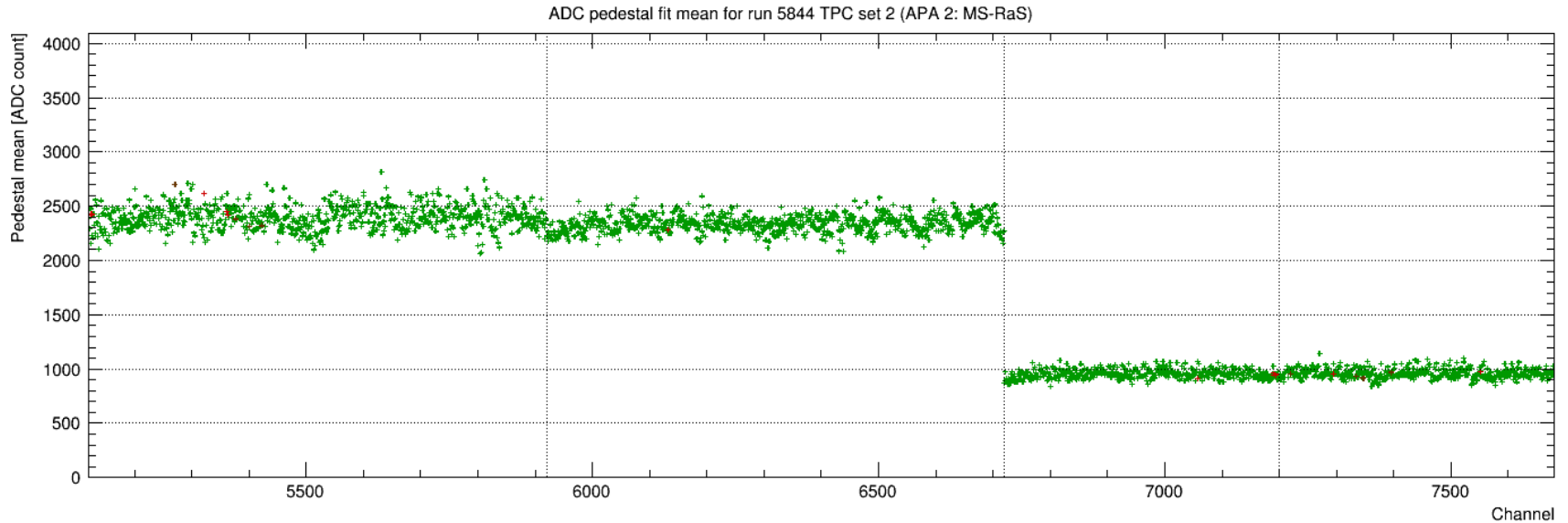
APA 2 run 5726 events 1-999



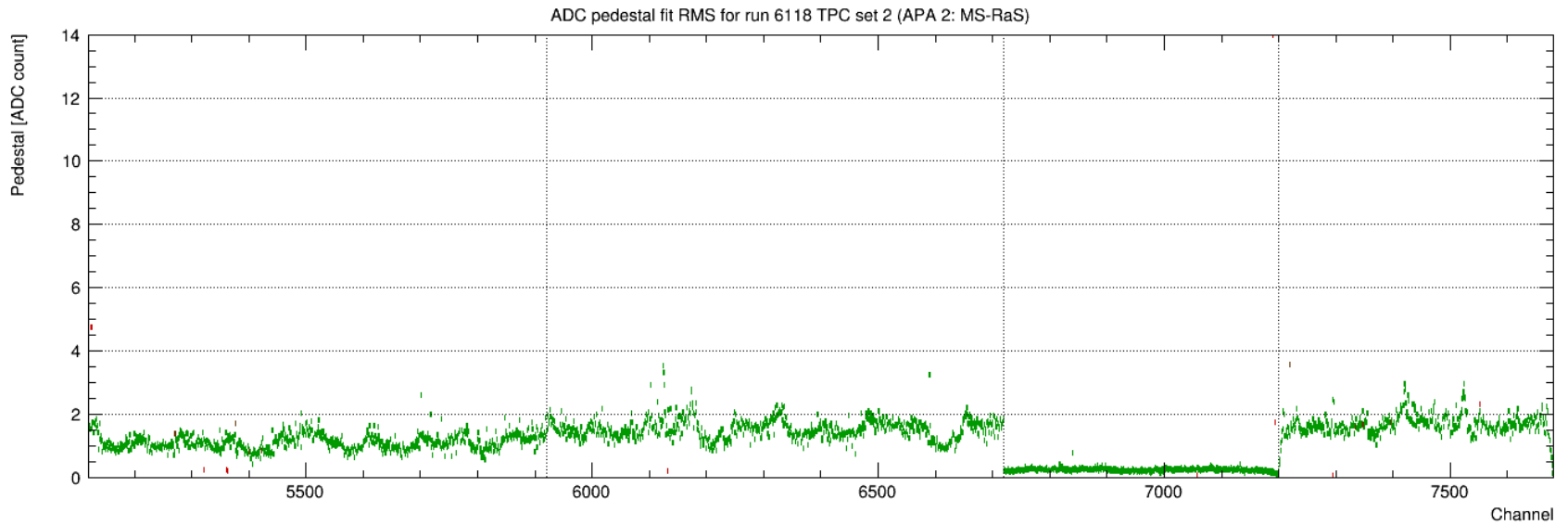
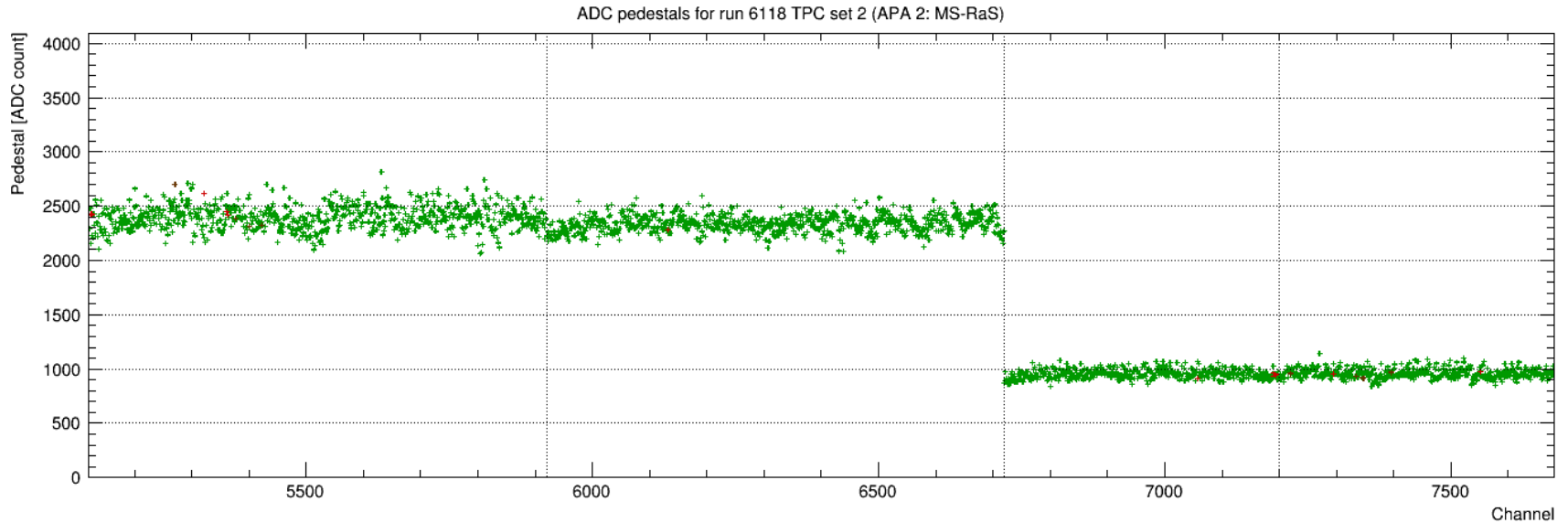
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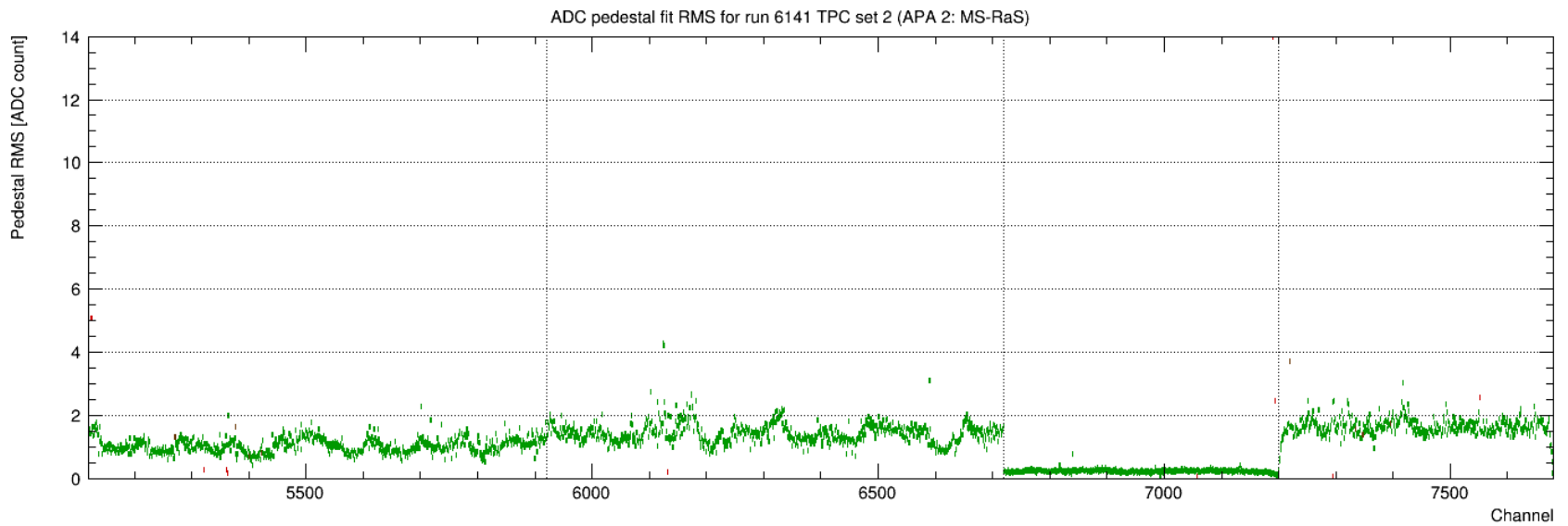
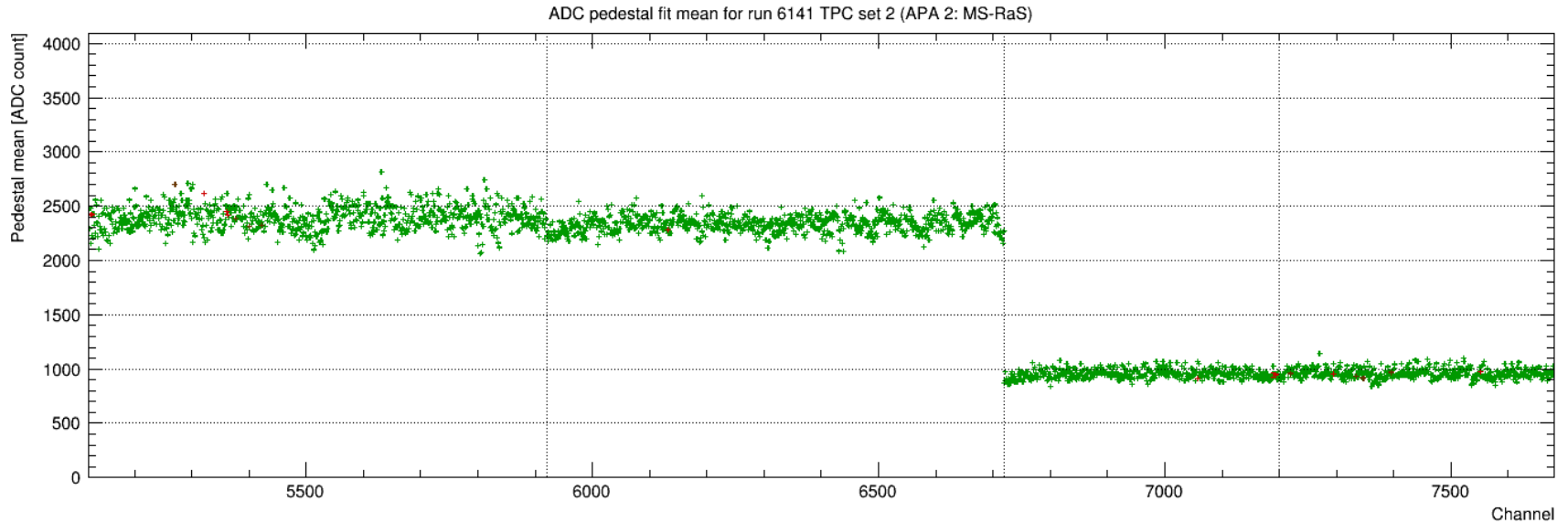
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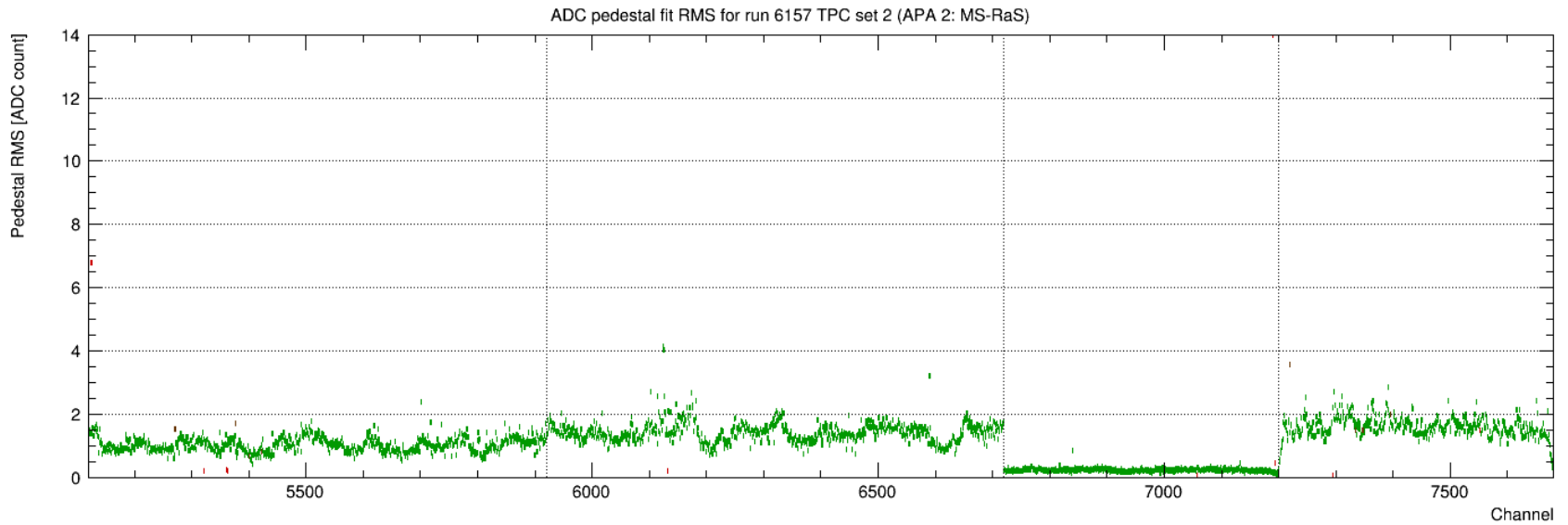
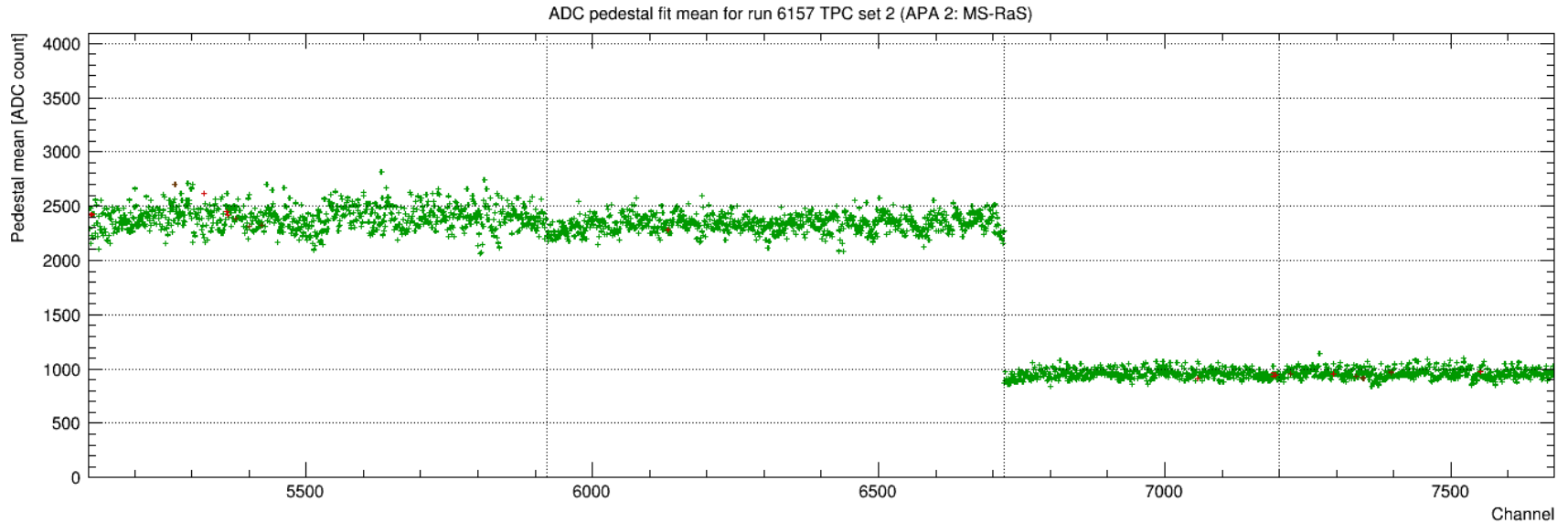
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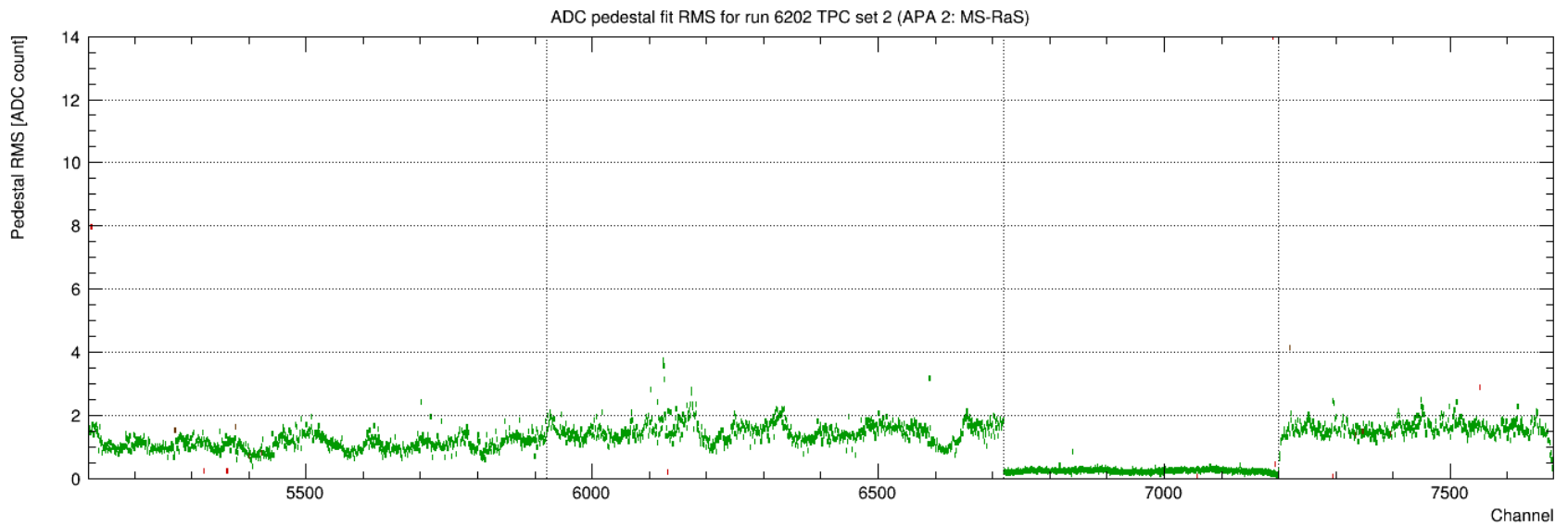
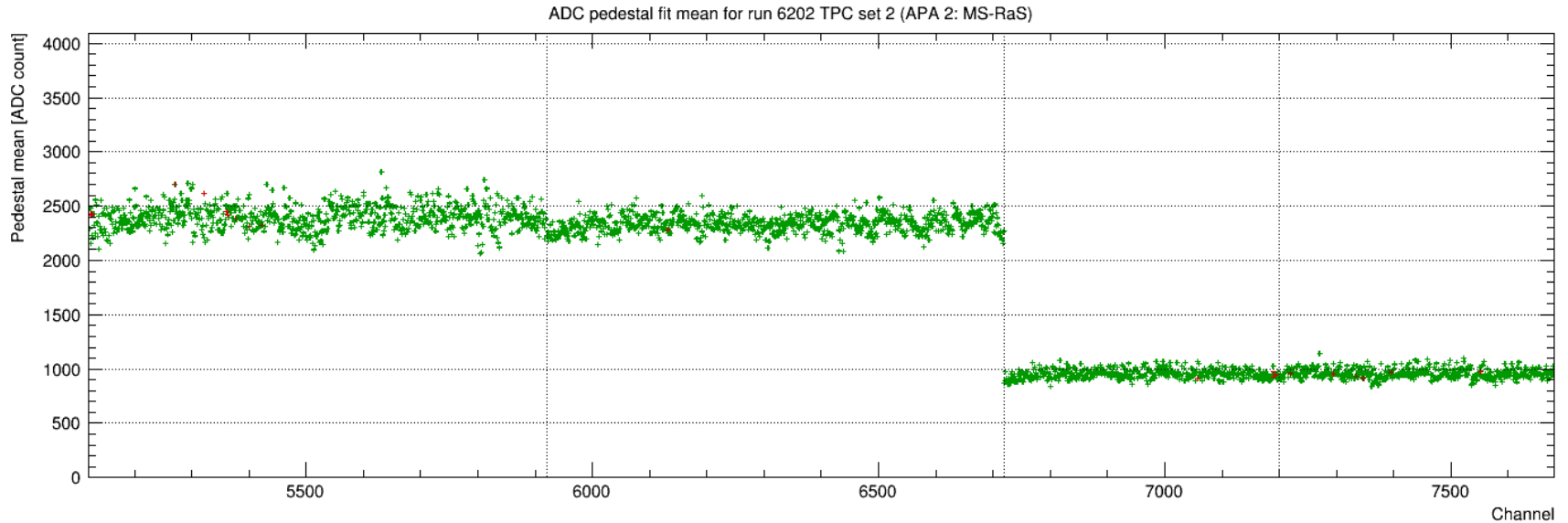
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APA 2 run 6157 events 1-999

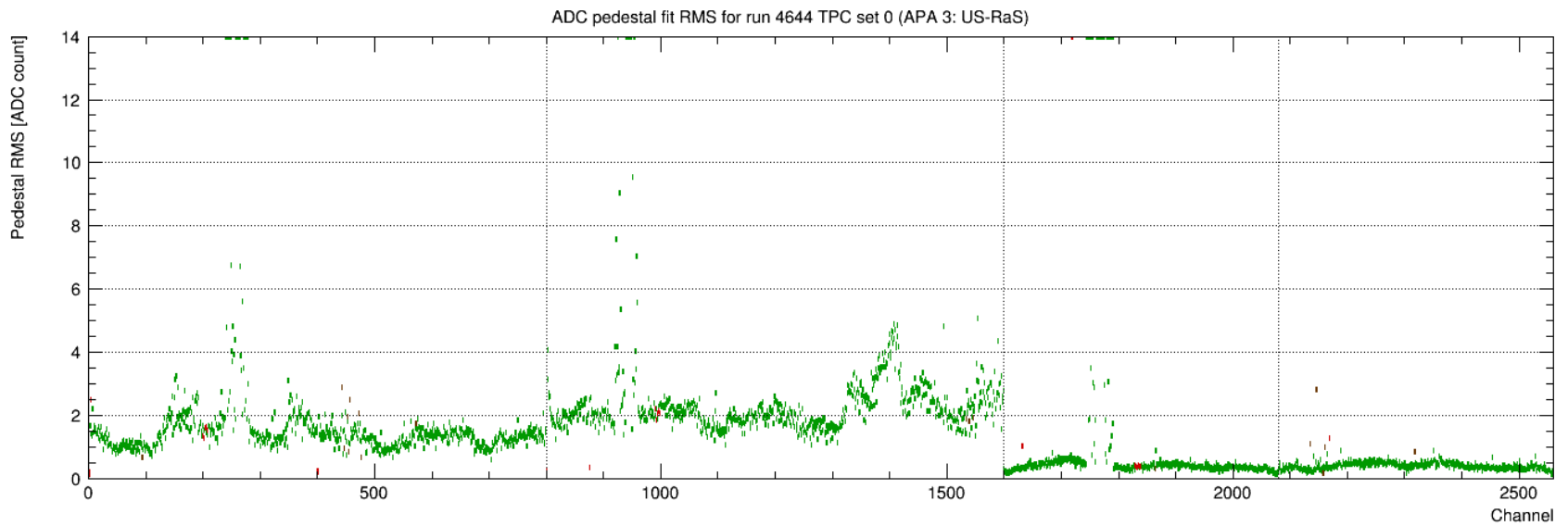
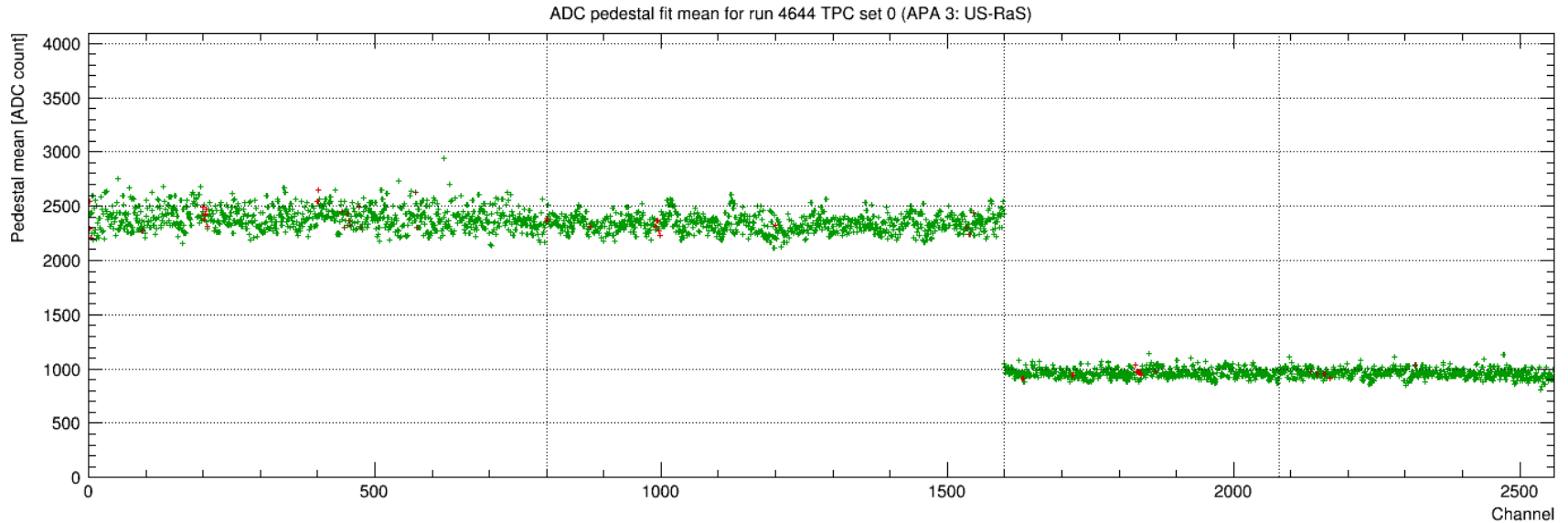


APA 2 run 6202 events 1-999

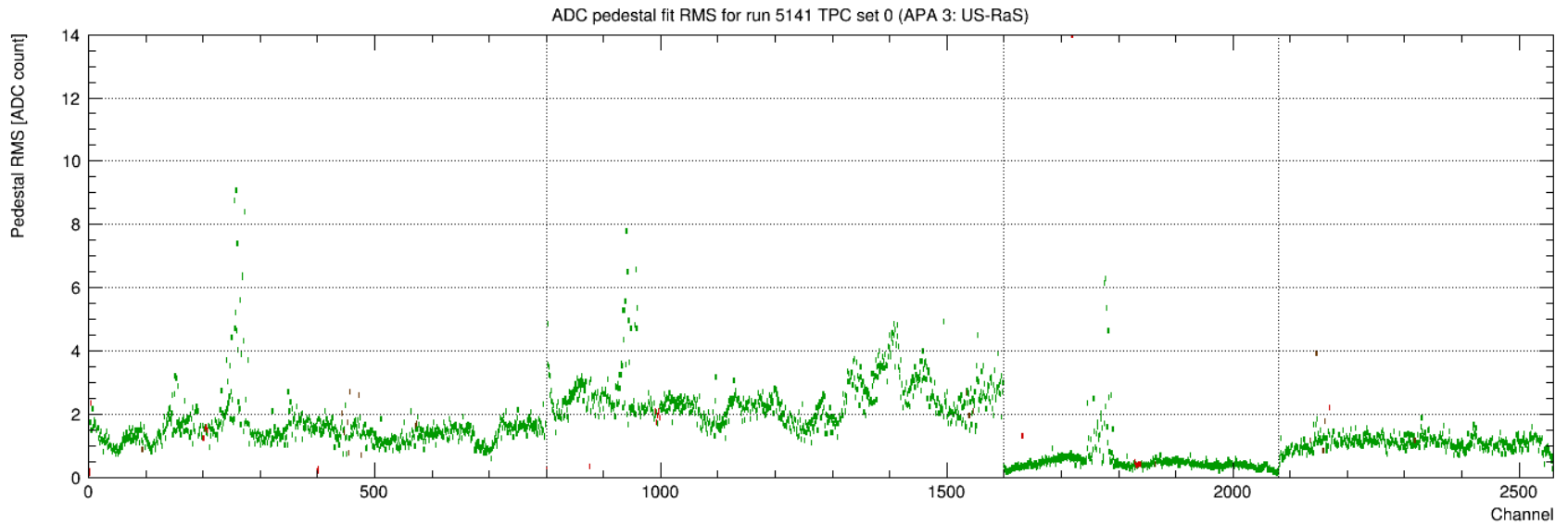
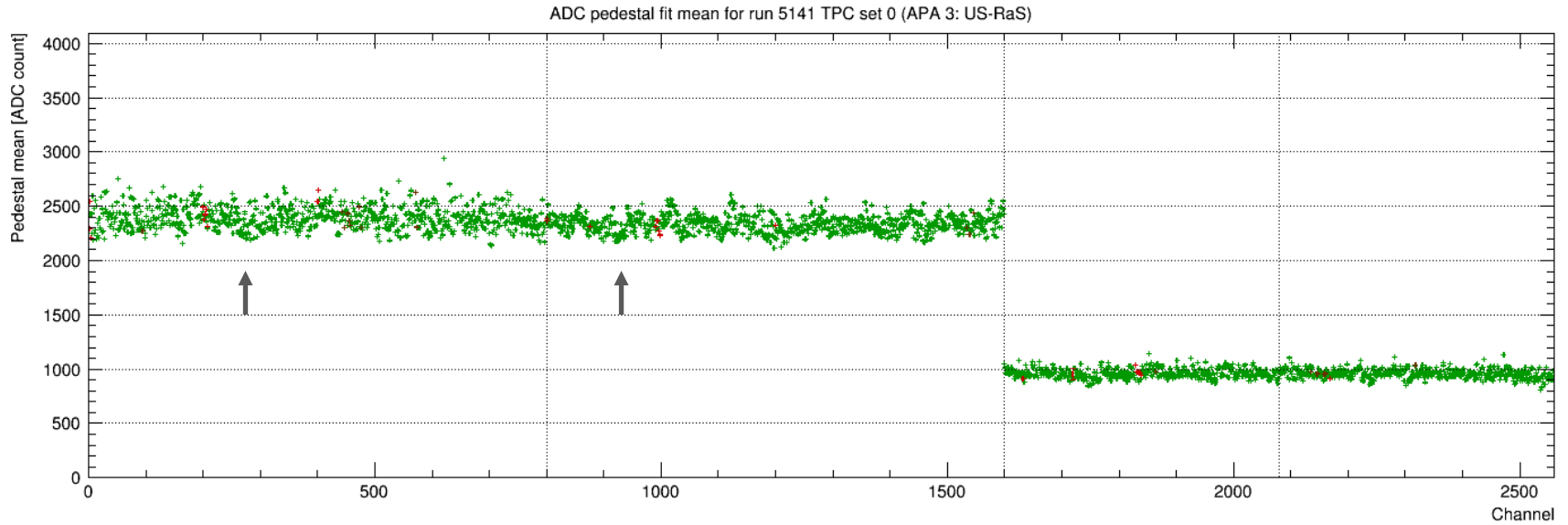


APA 3

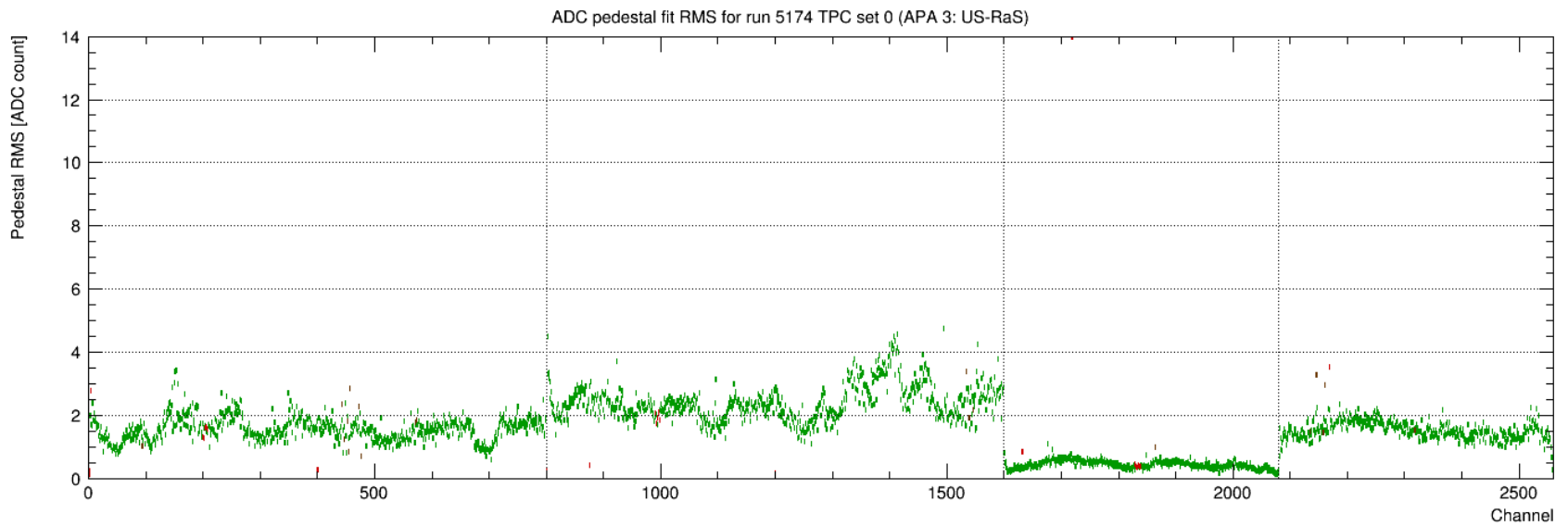
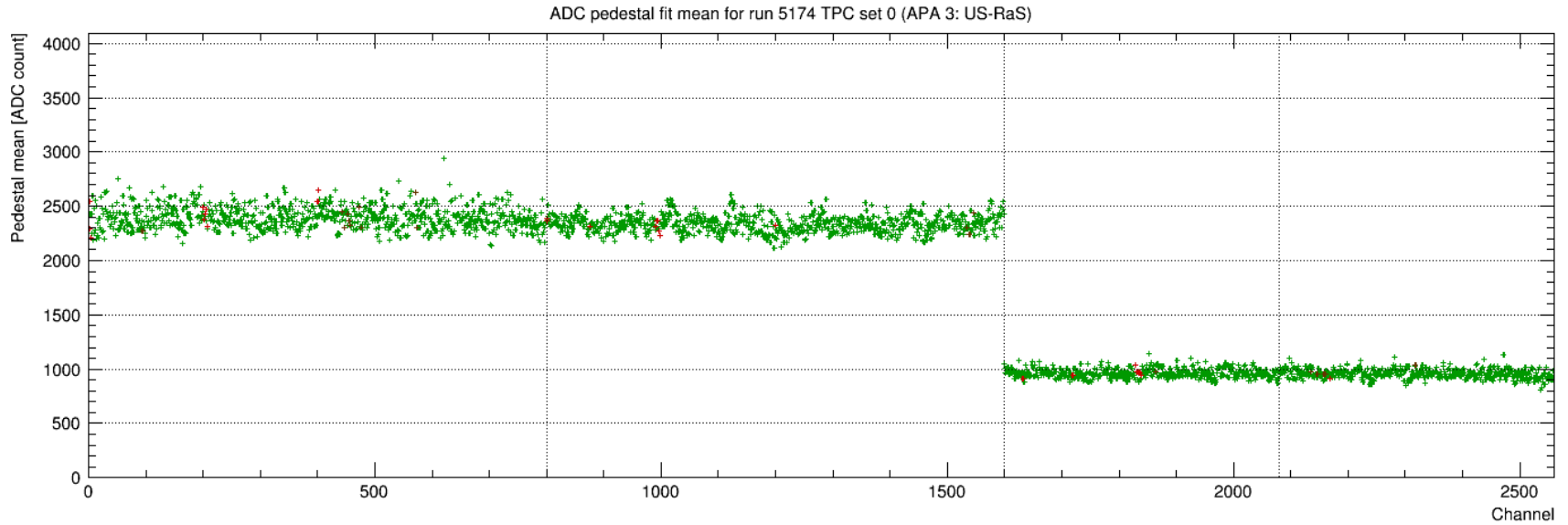
APA 3 run 4644 events 1-999



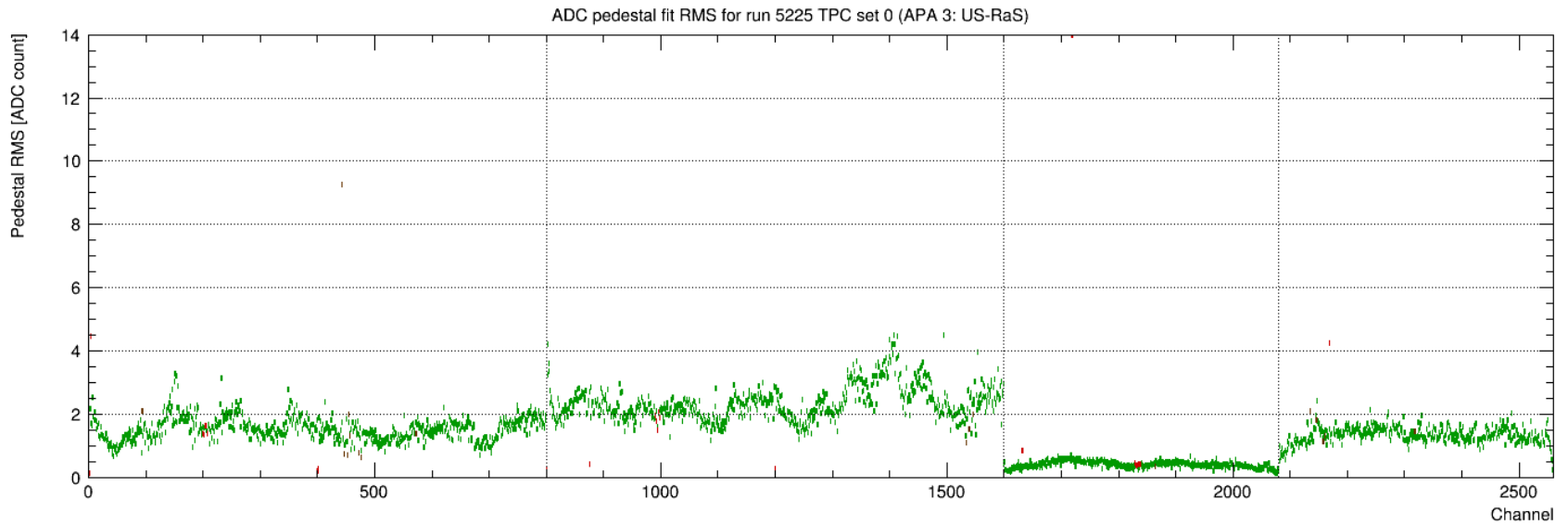
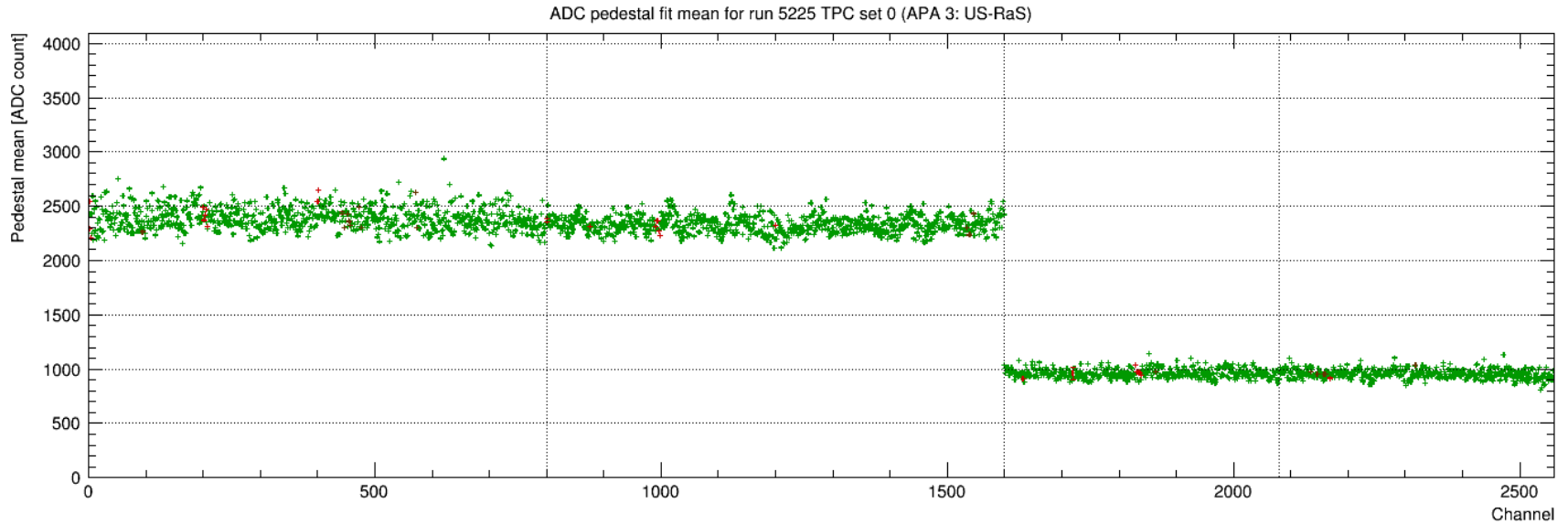
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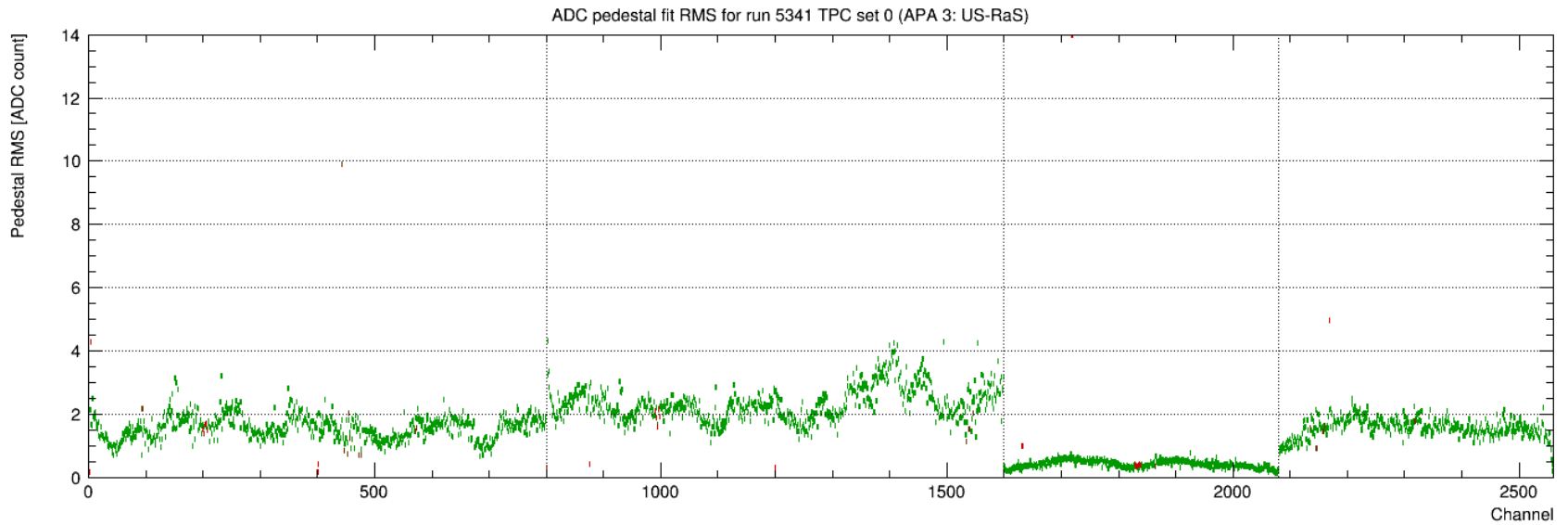
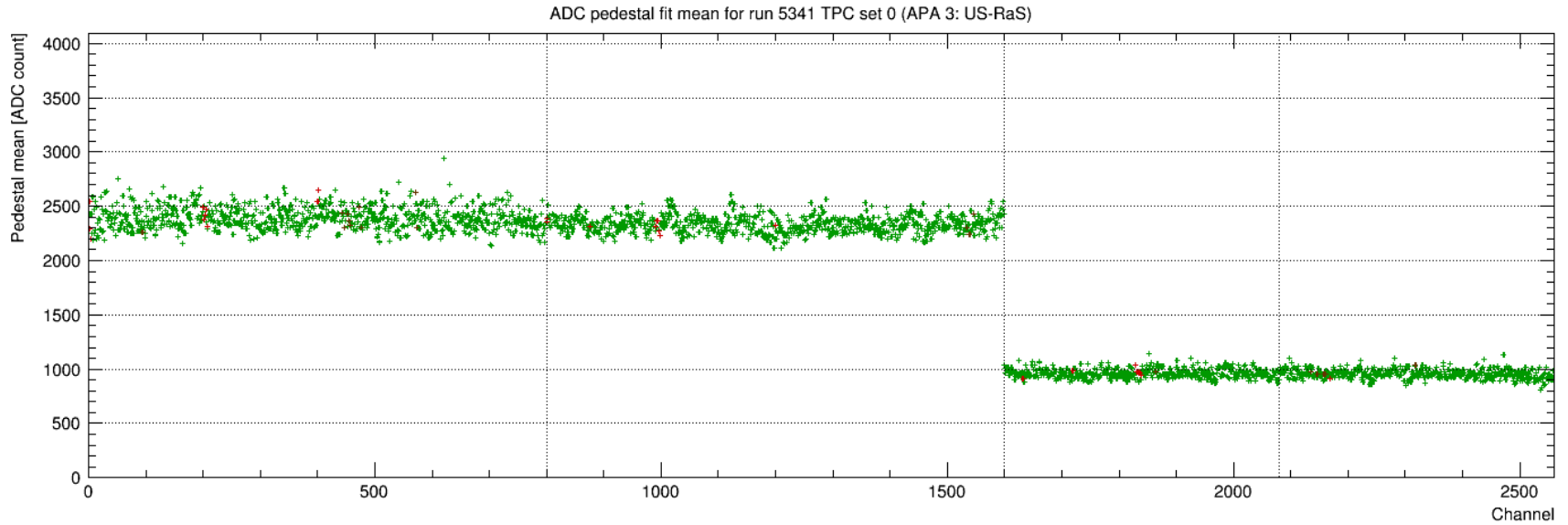
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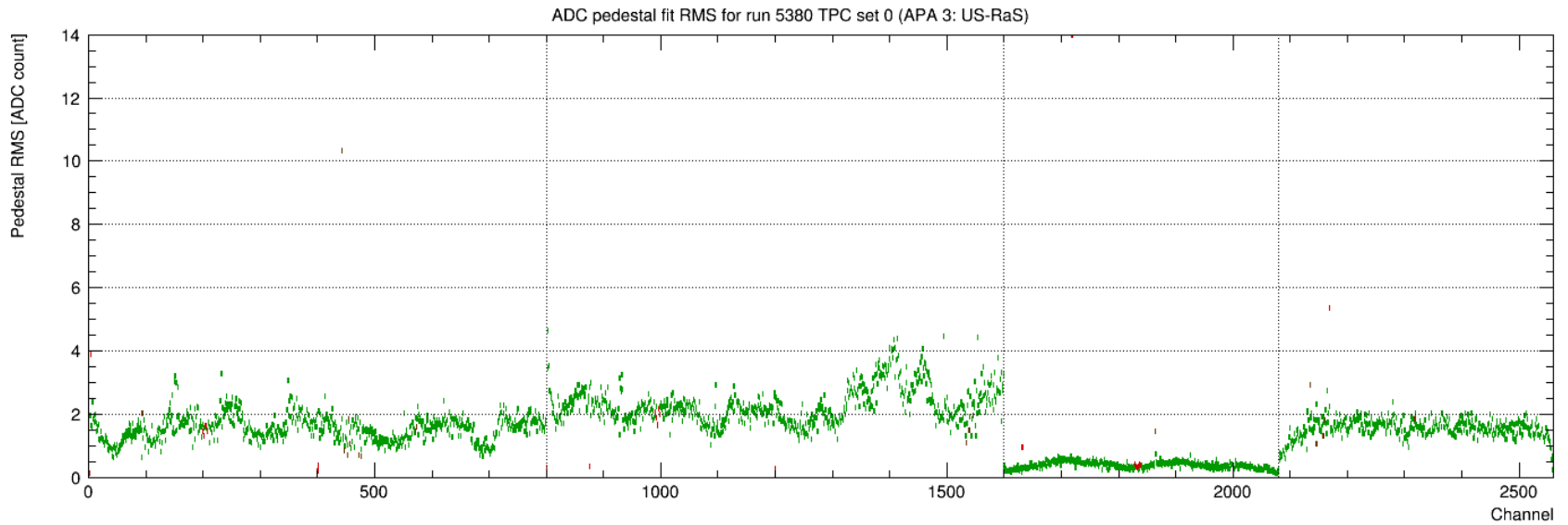
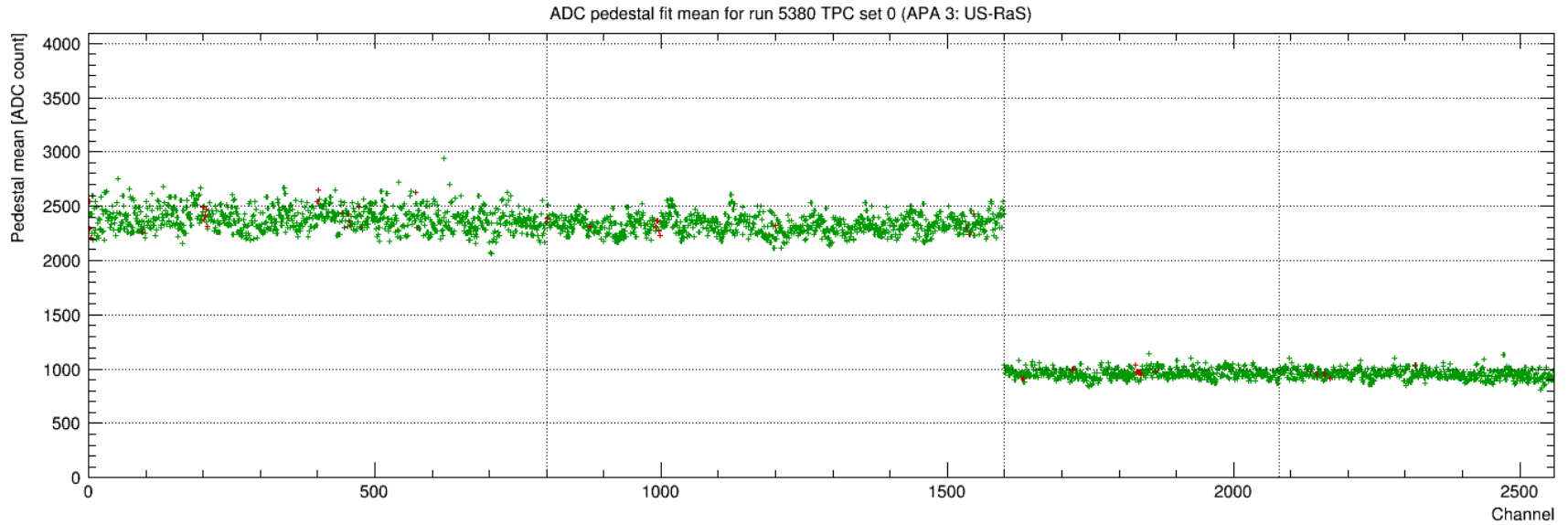
APA 3 run 5225 events 1-999



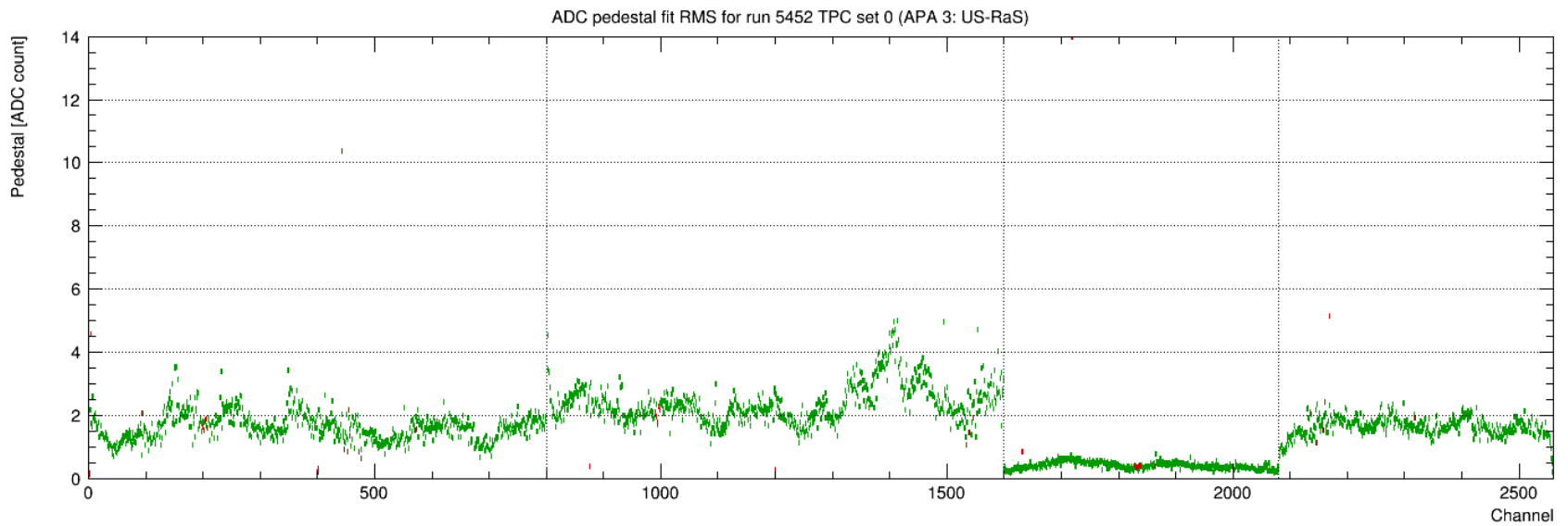
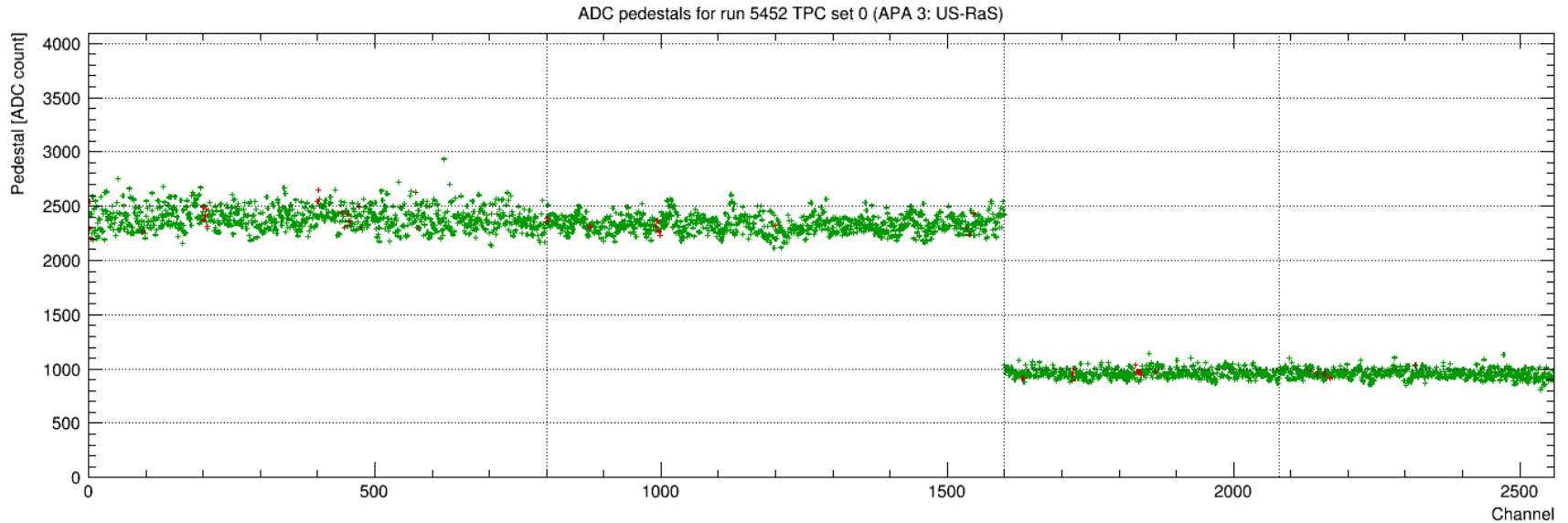
APA 3 run 5341 events 1-999



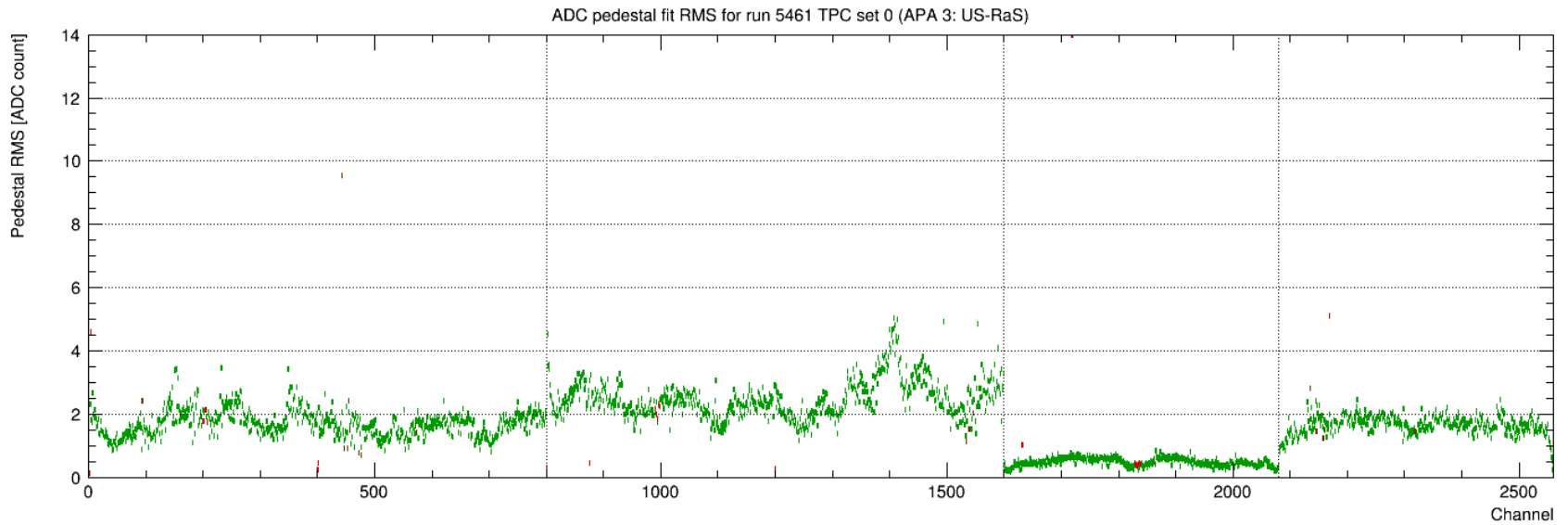
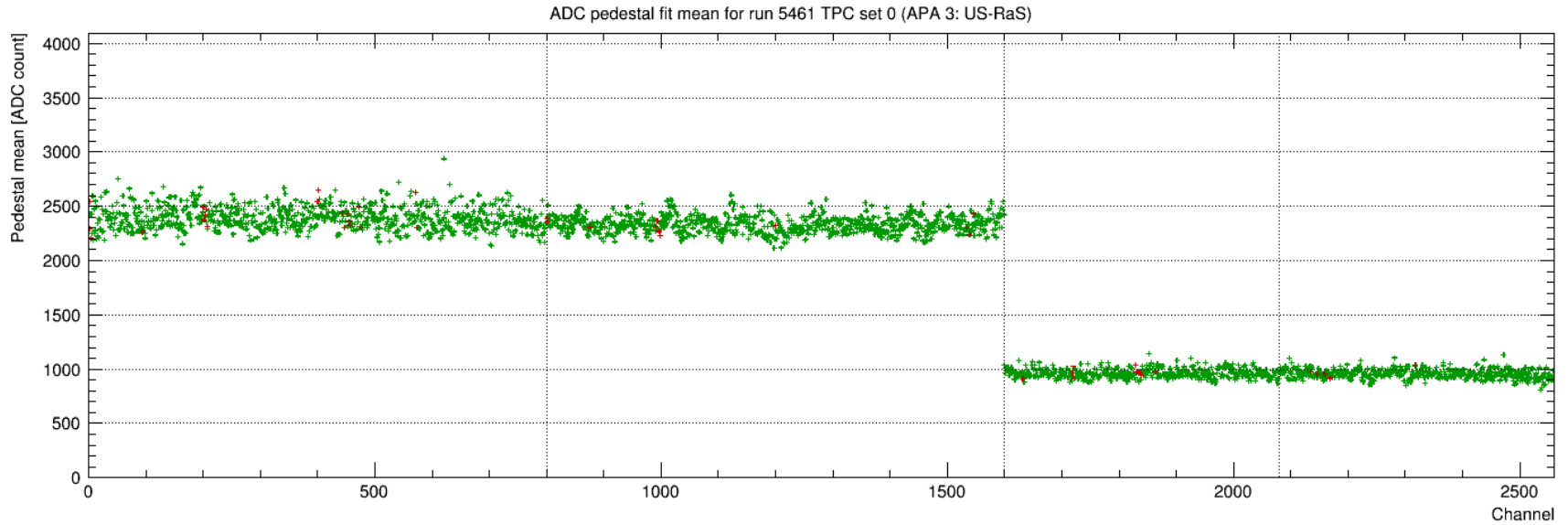
APA 3 run 5380 events 1-999



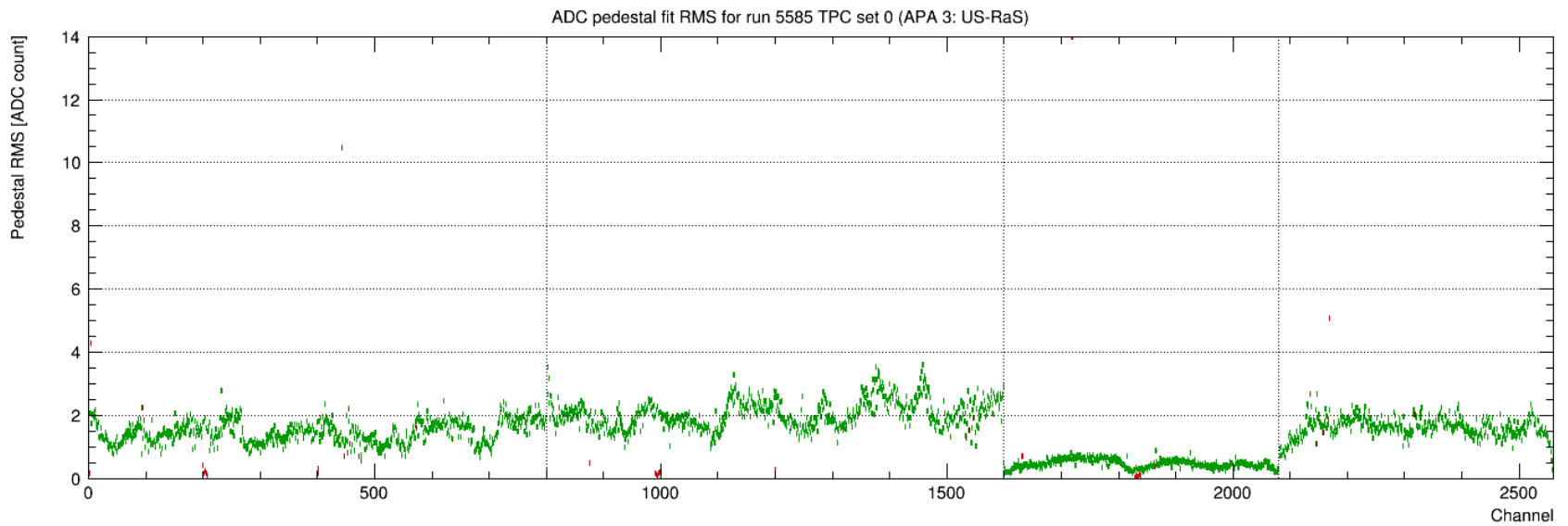
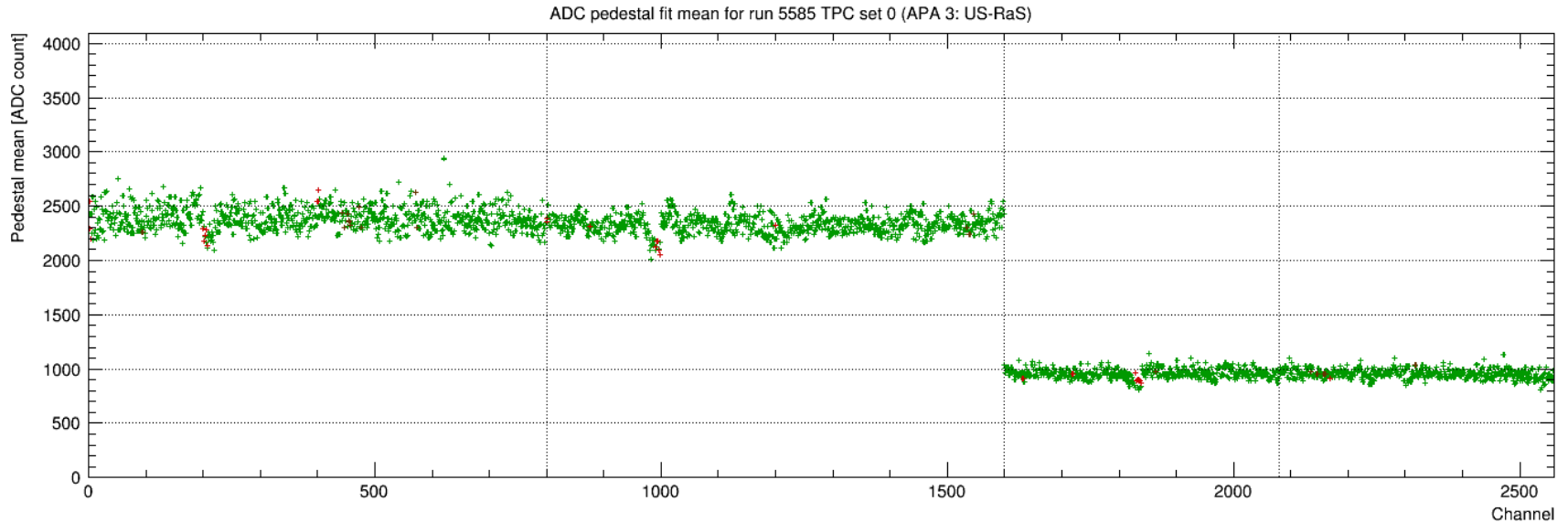
APA 3 run 5452 events 1-999



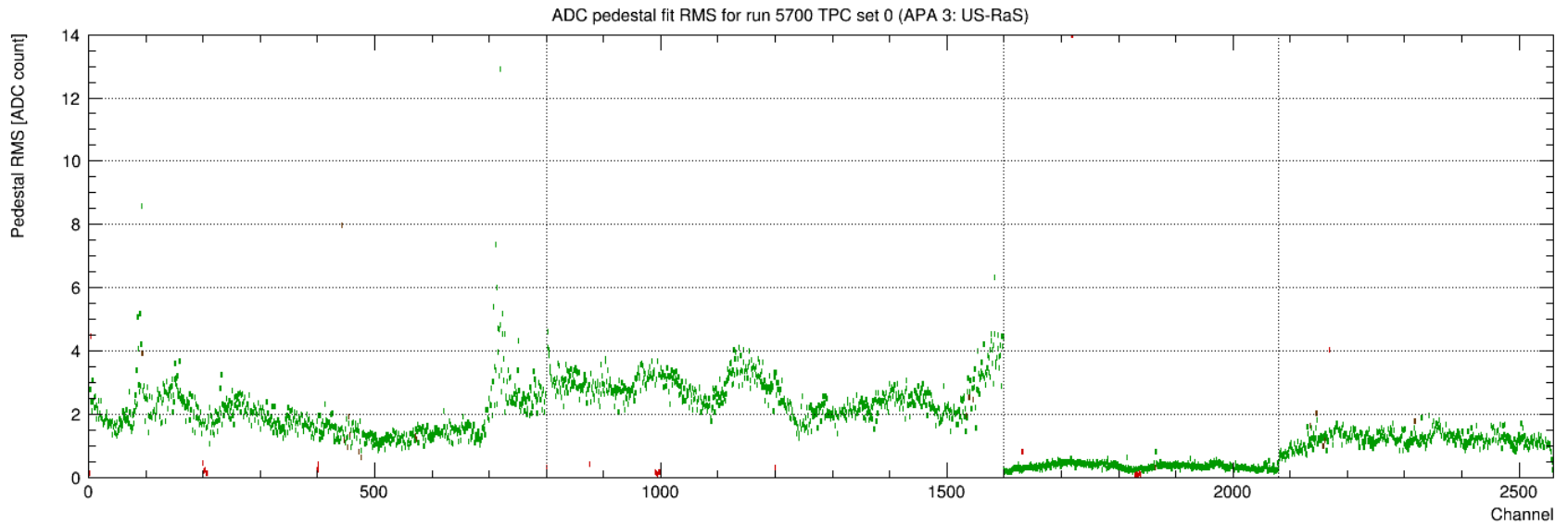
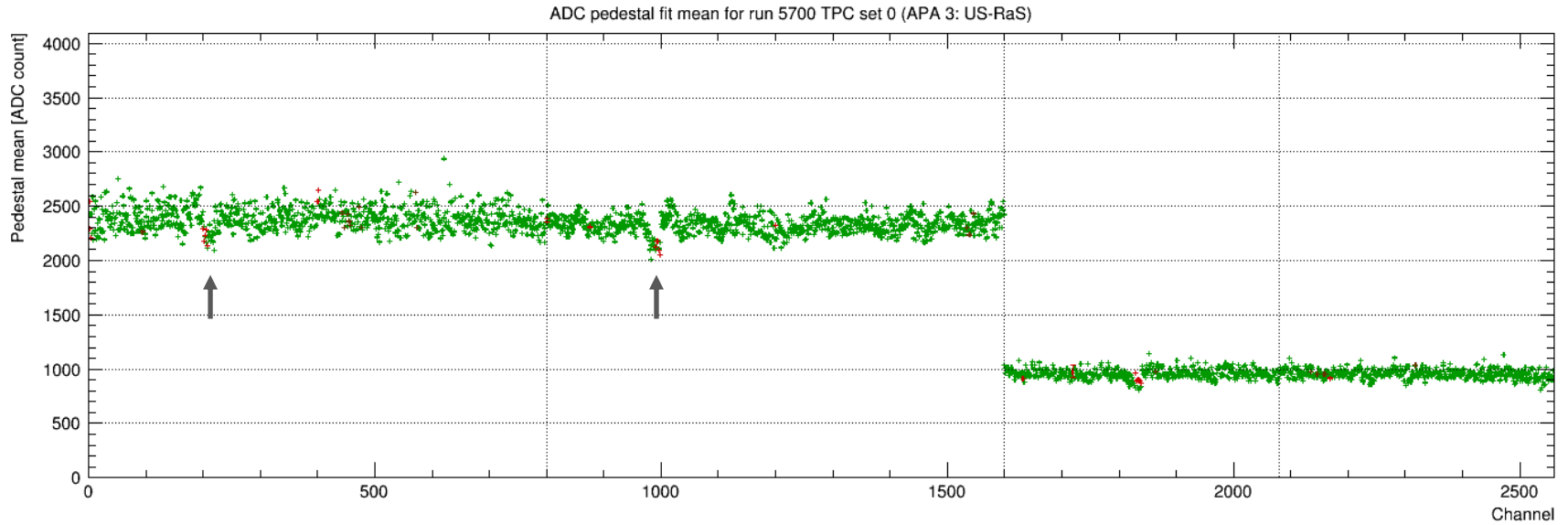
APA 3 run 5461 events 1-999



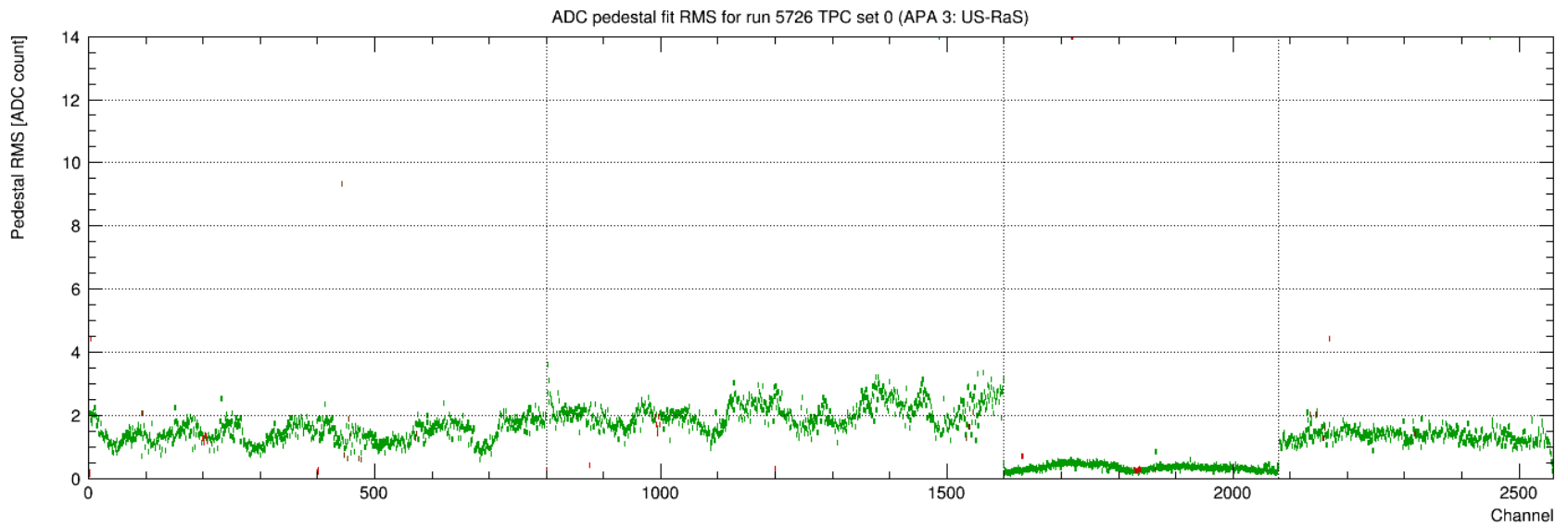
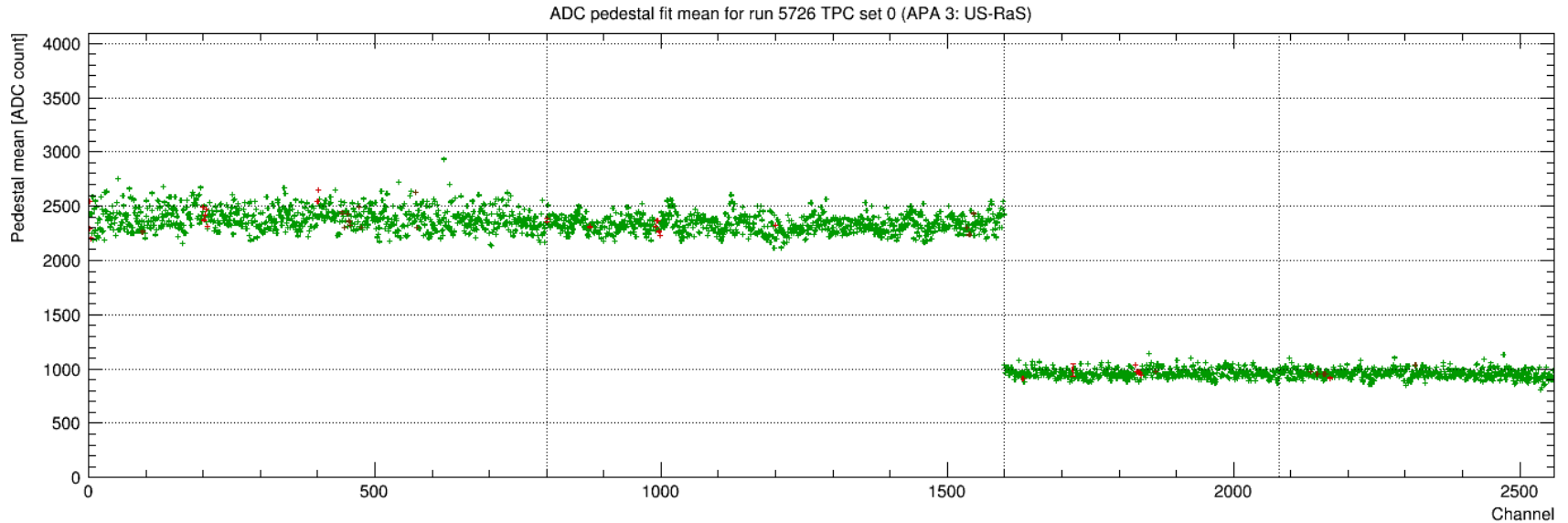
APA 3 run 5585 events 1-999



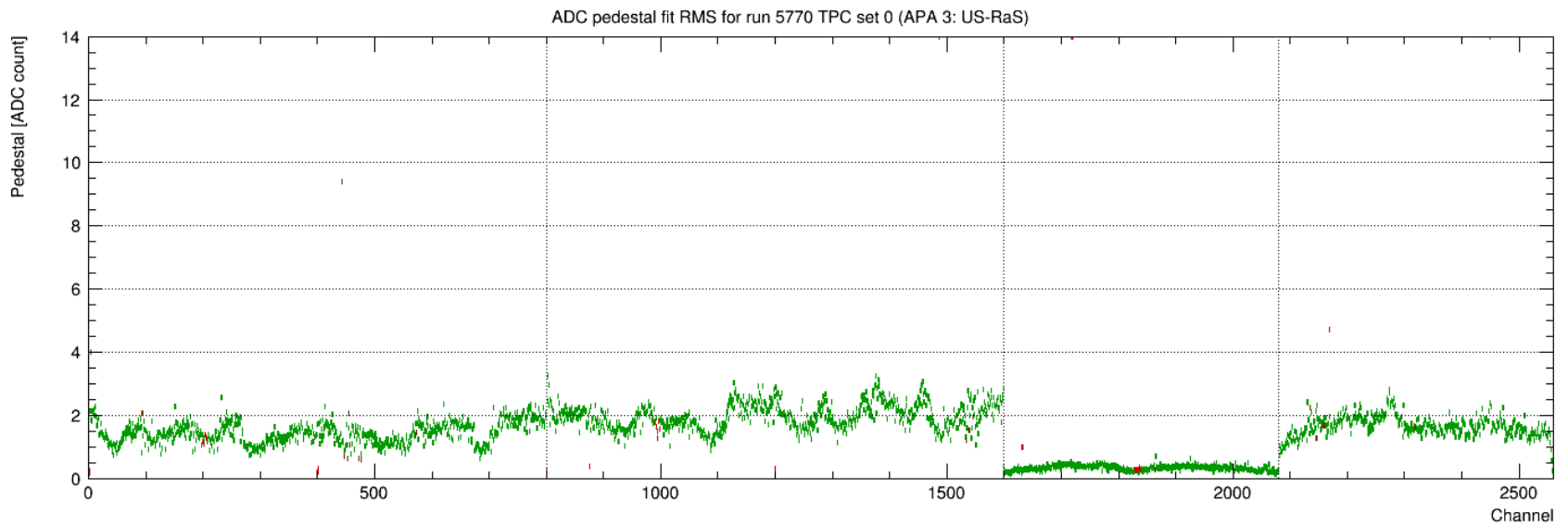
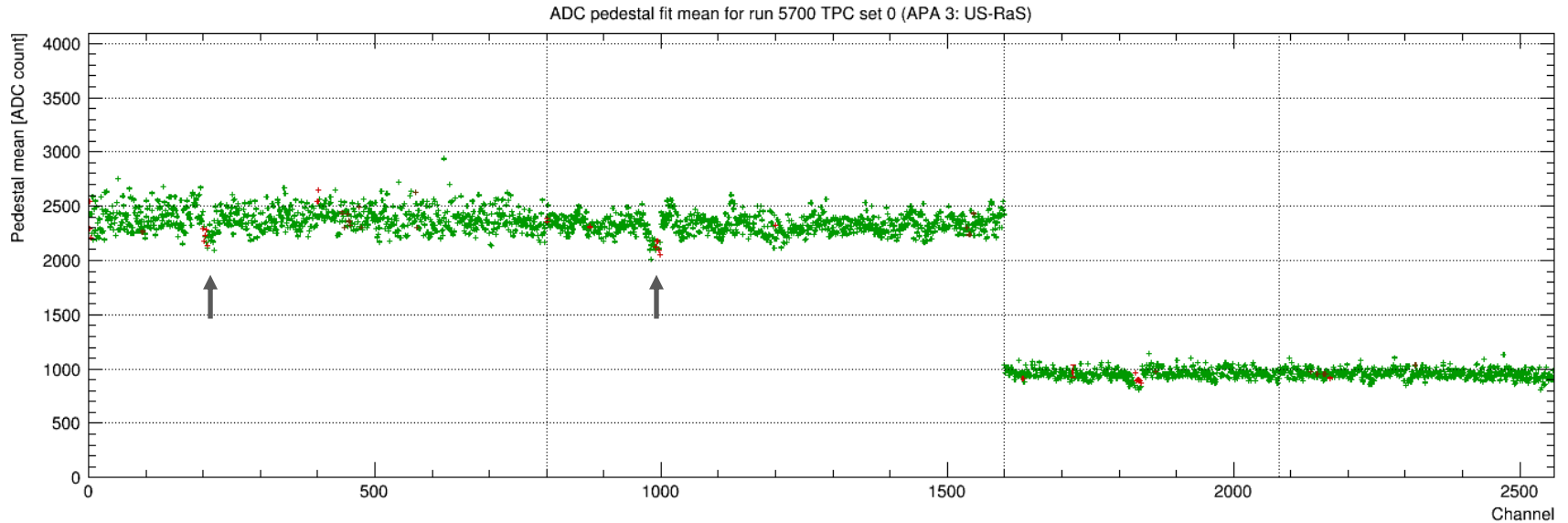
APA 3 run 5700 events 1-999



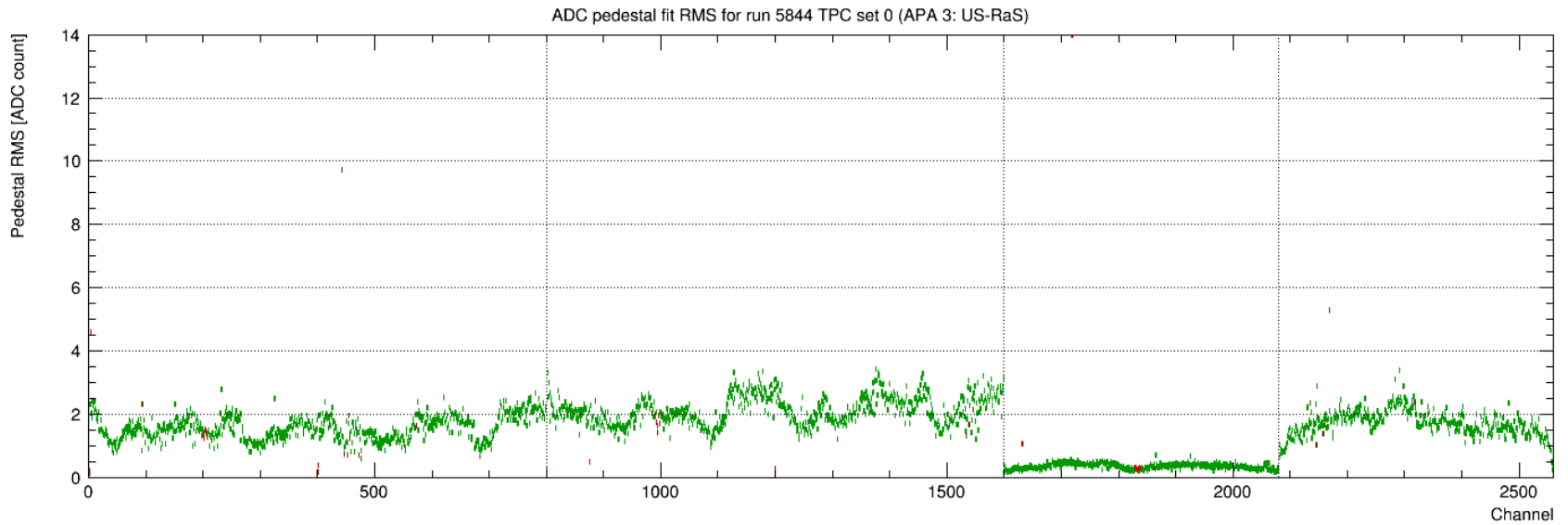
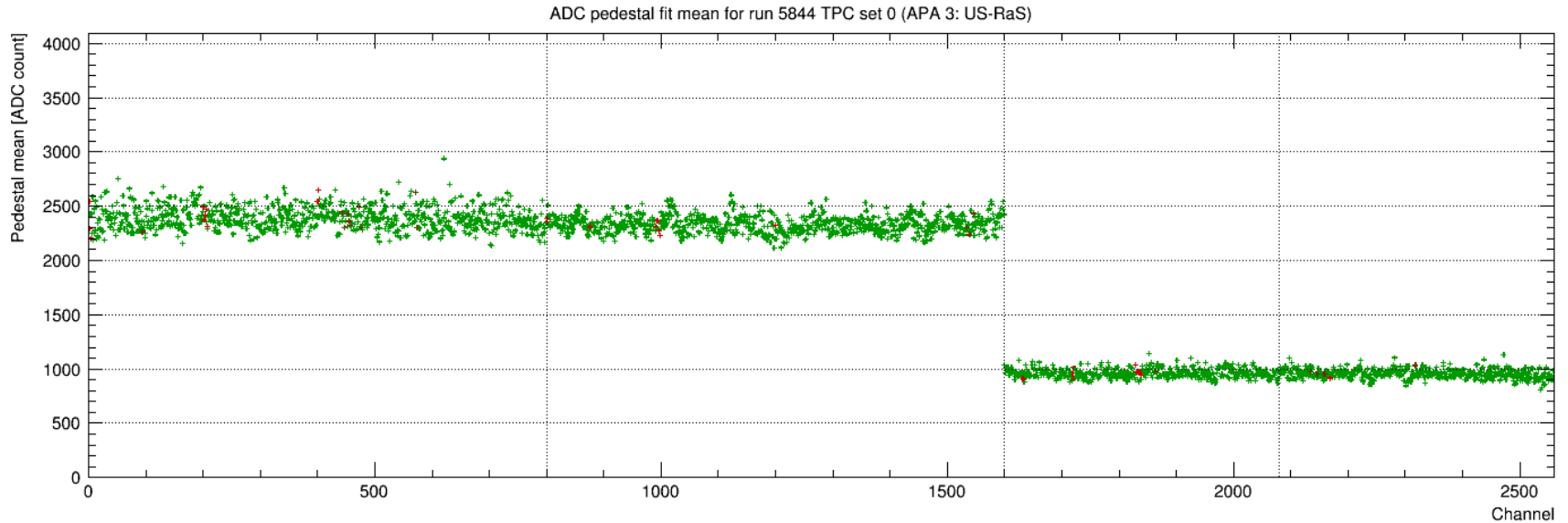
APA 3 run 5726 events 1-999



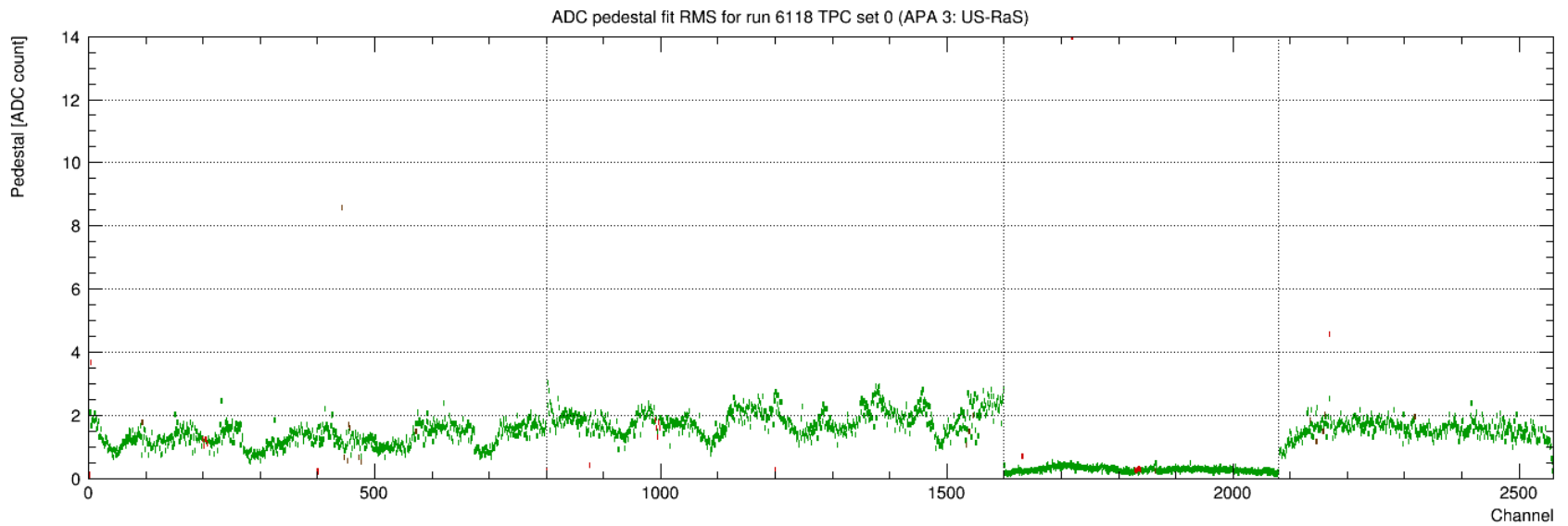
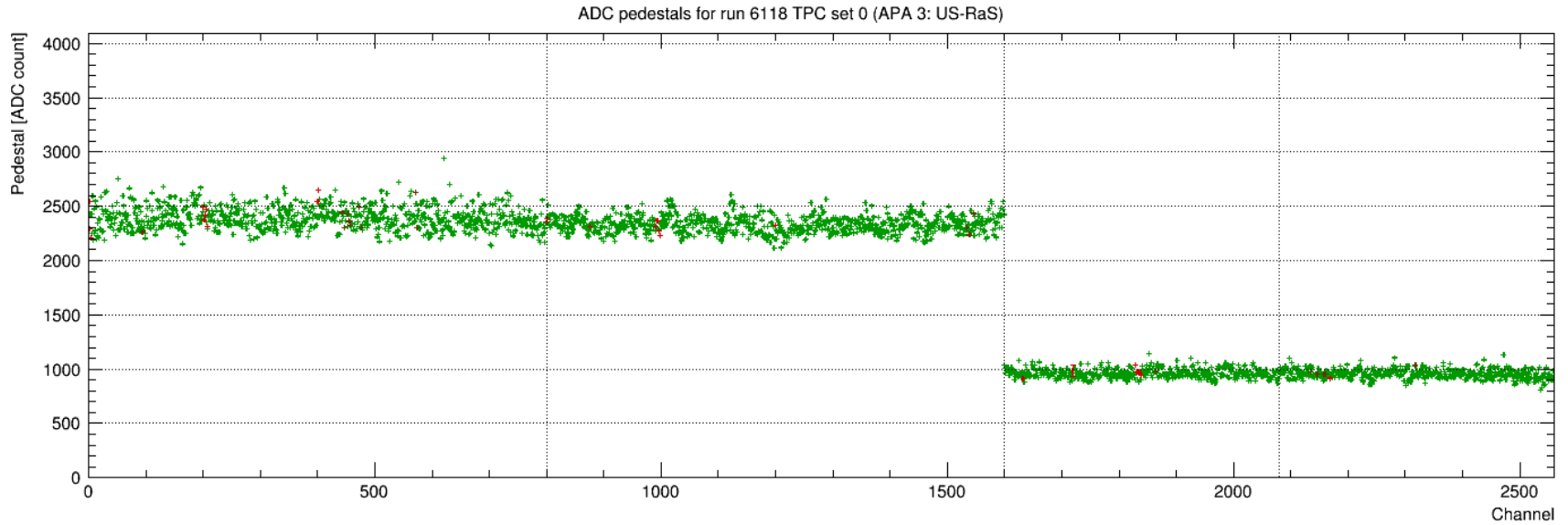
APA 3 run 5770 events 1-999



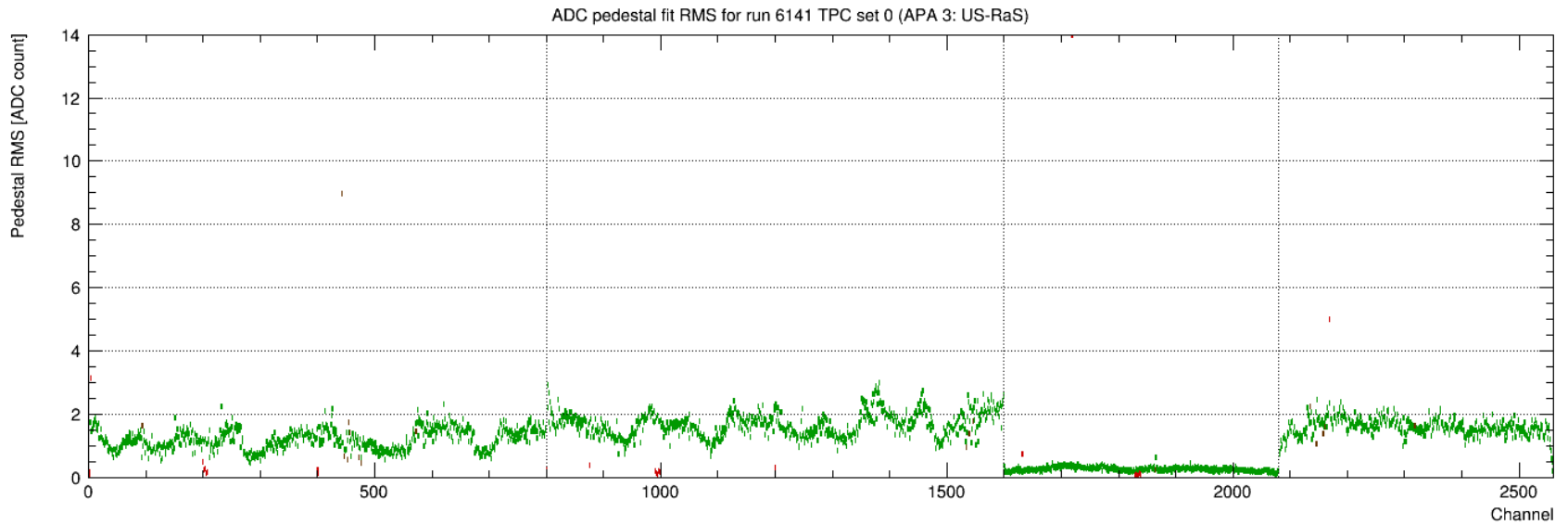
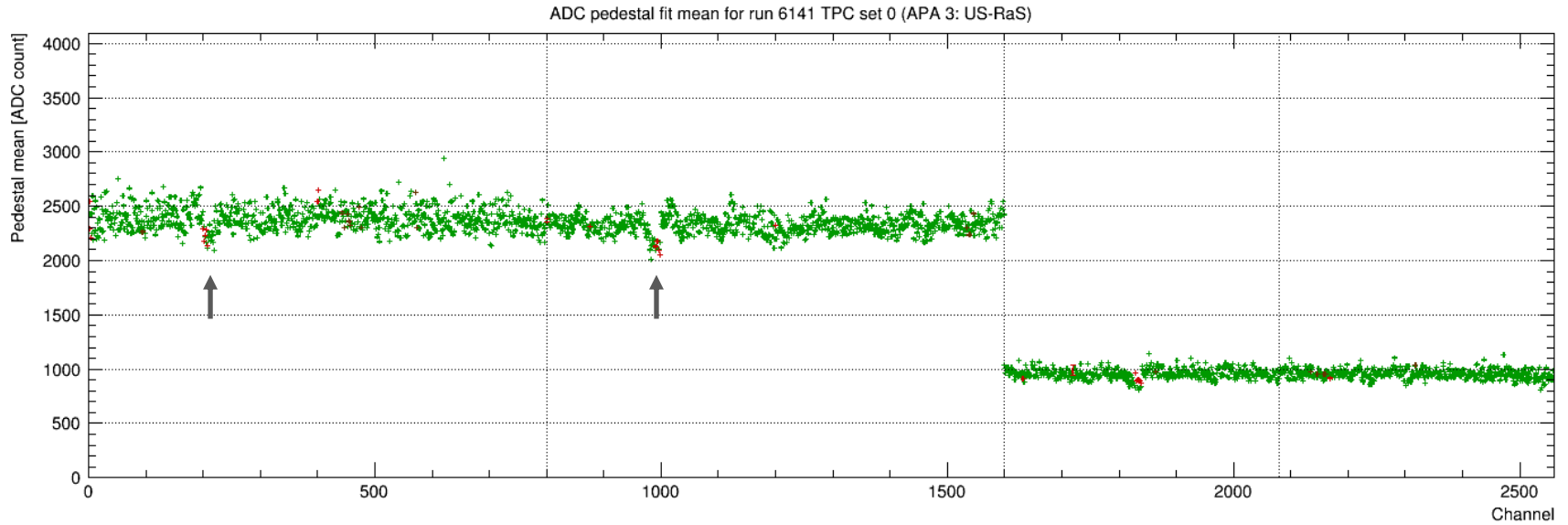
APA 3 run 5844 events 1-999



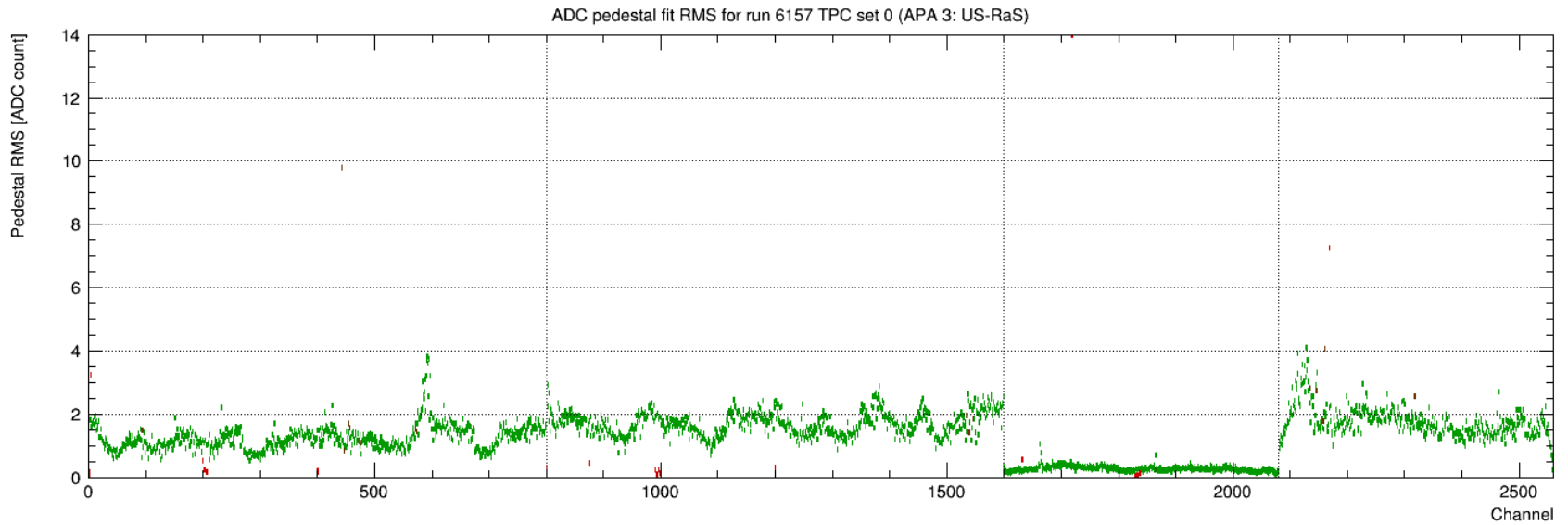
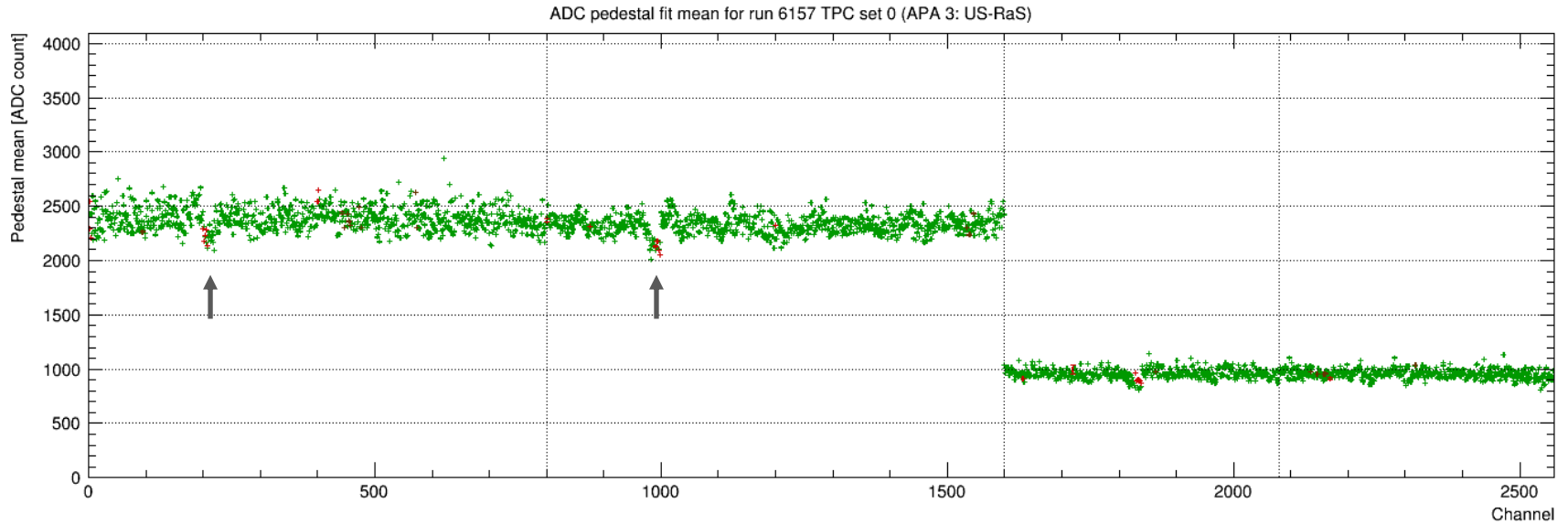
APA 3 run 6118 events 1-999



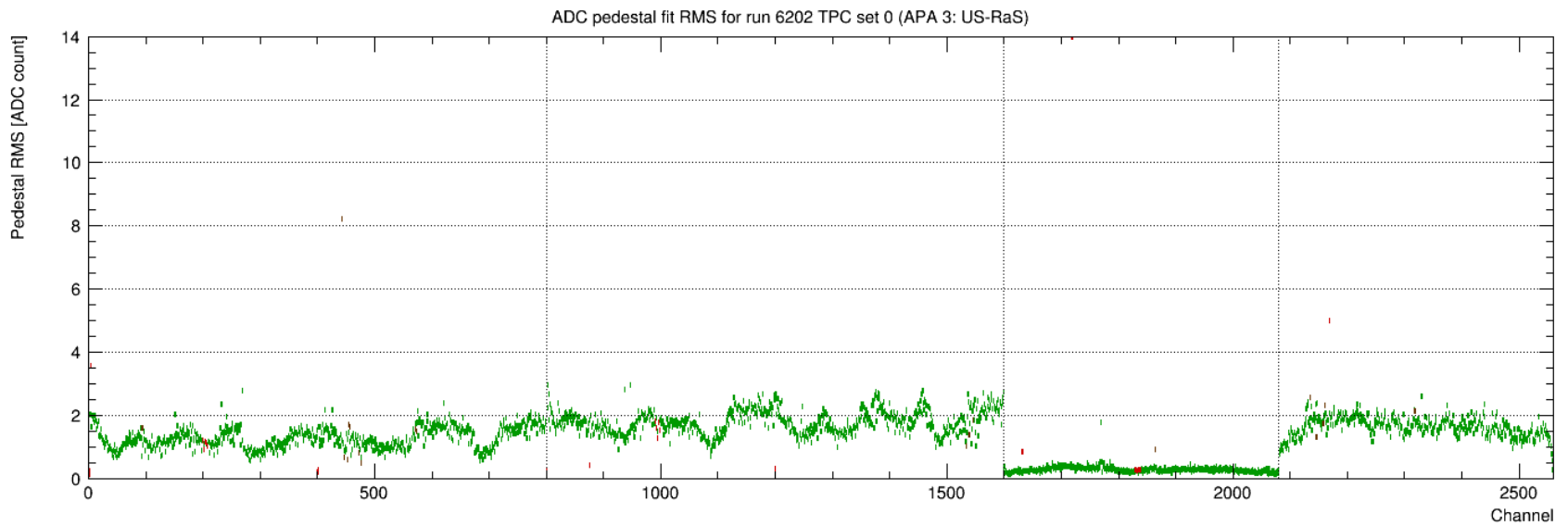
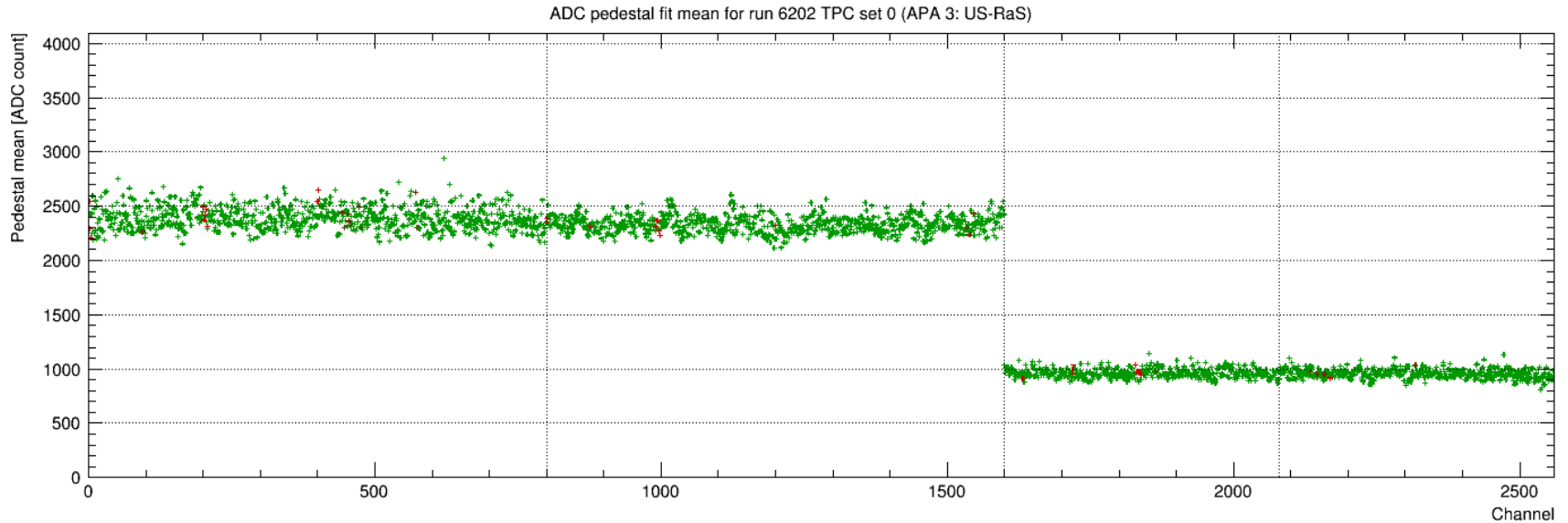
APA 3 run 6141 events 1-999



APA 3 run 6157 events 1-999

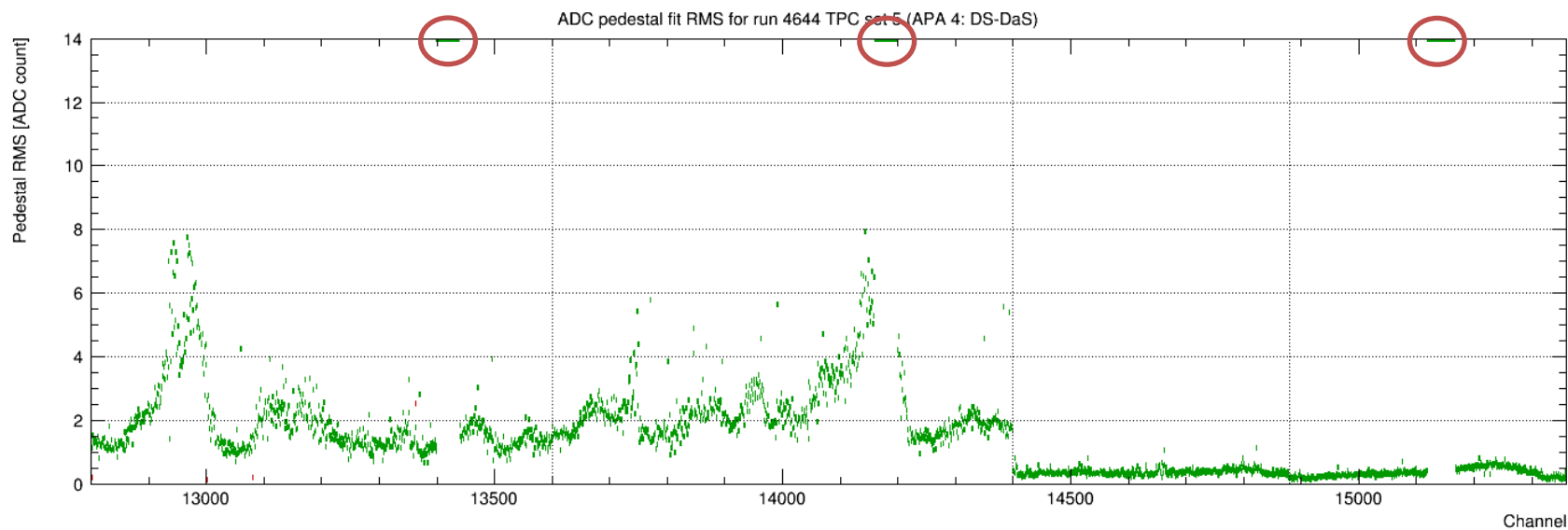
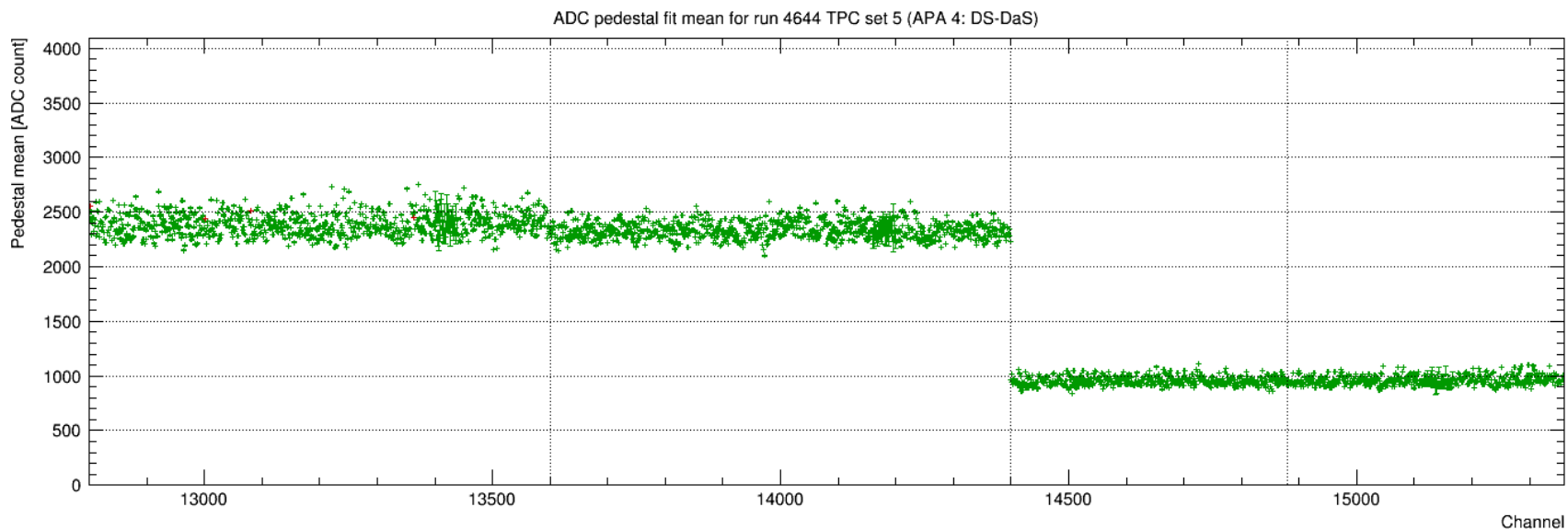


APA 3 run 6202 events 1-999

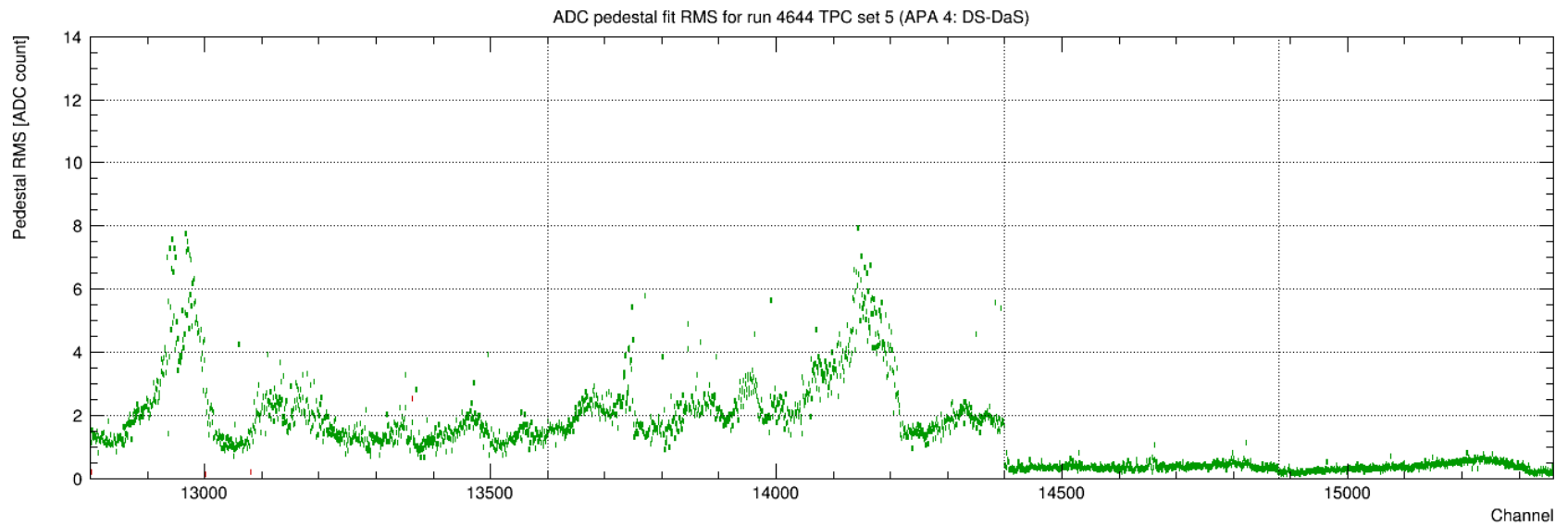
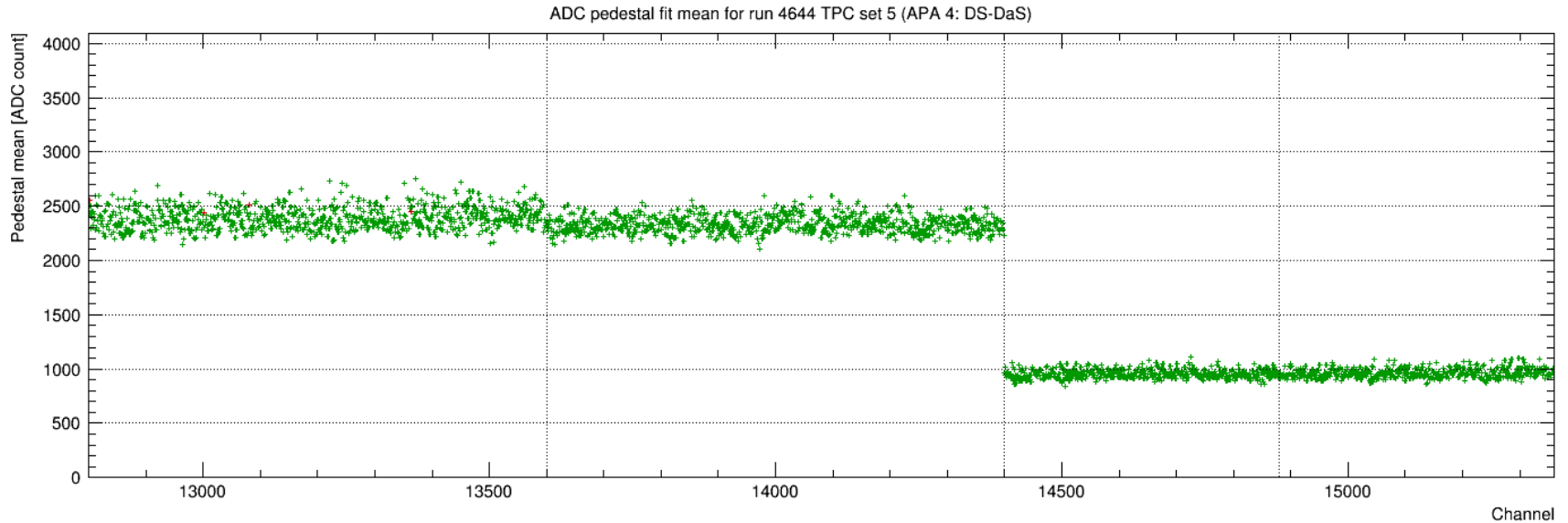


APA 4

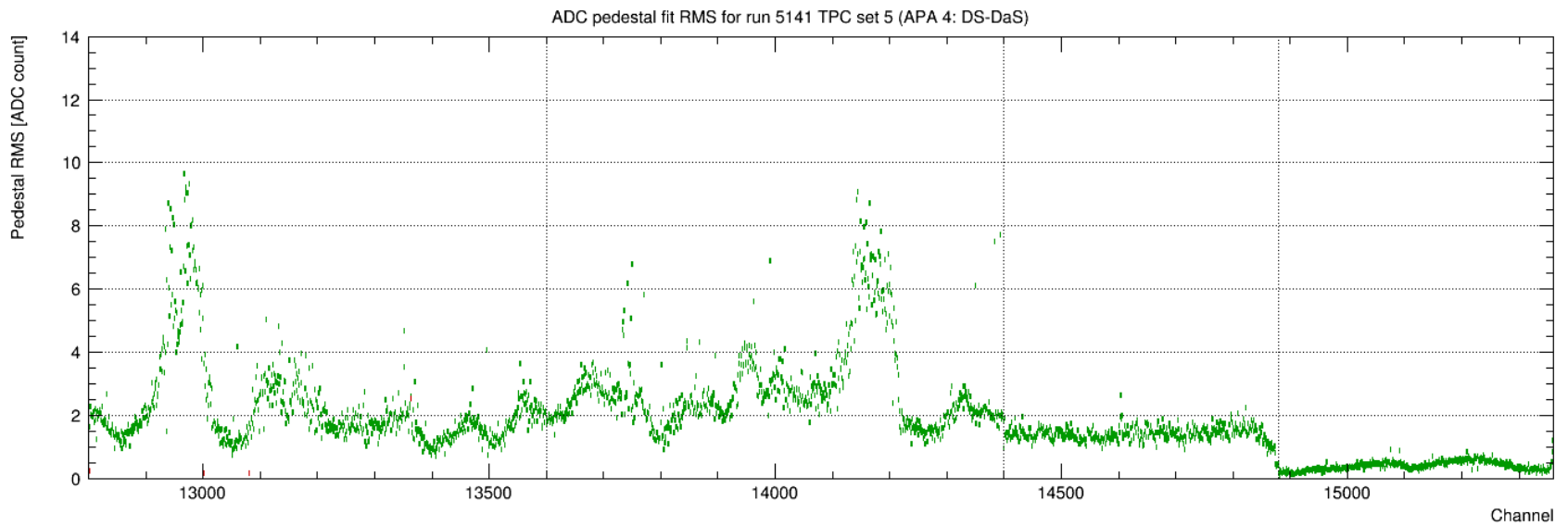
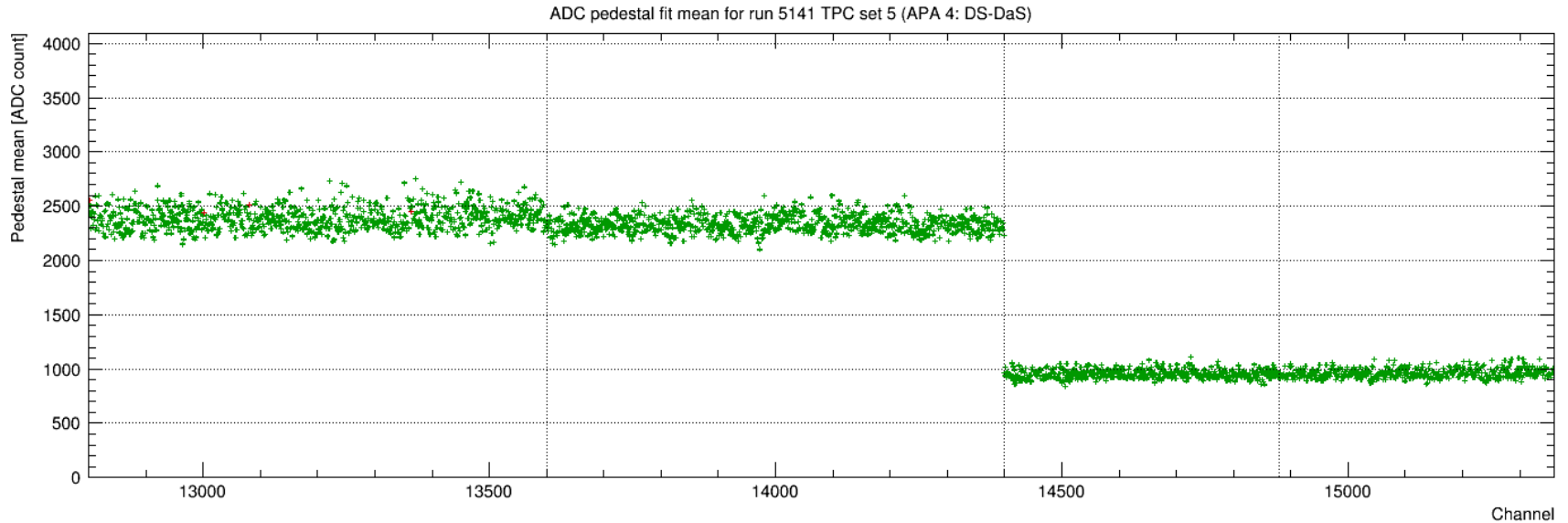
APA 4 run 4644 events 1-999 old reco



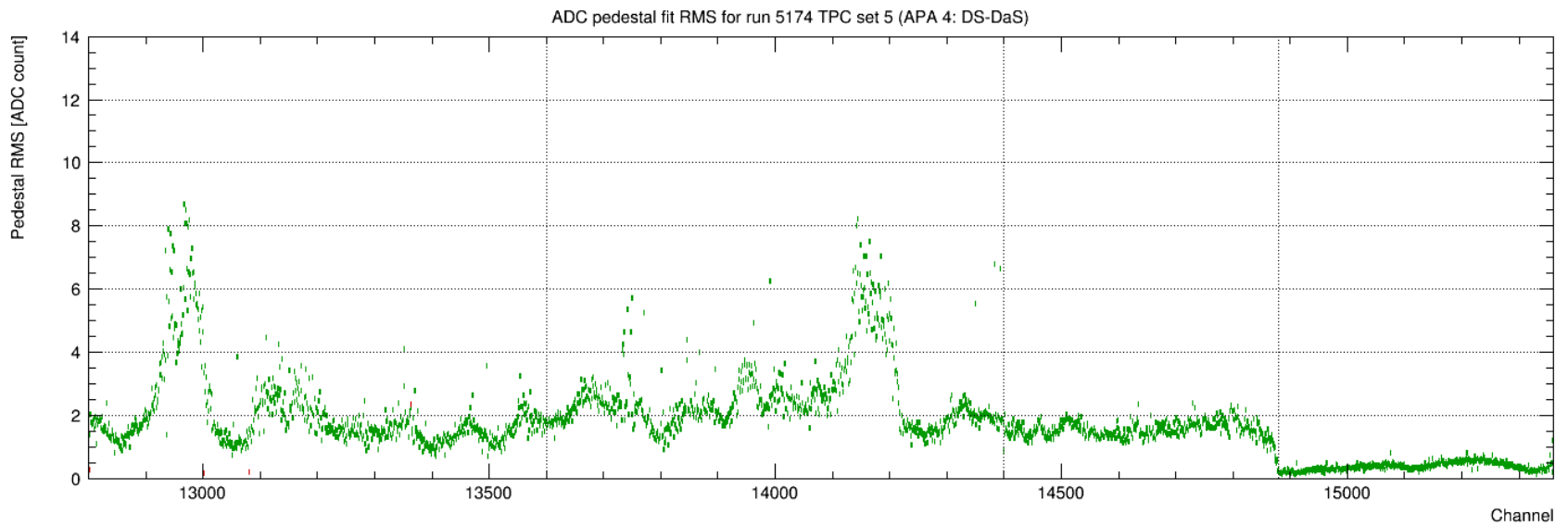
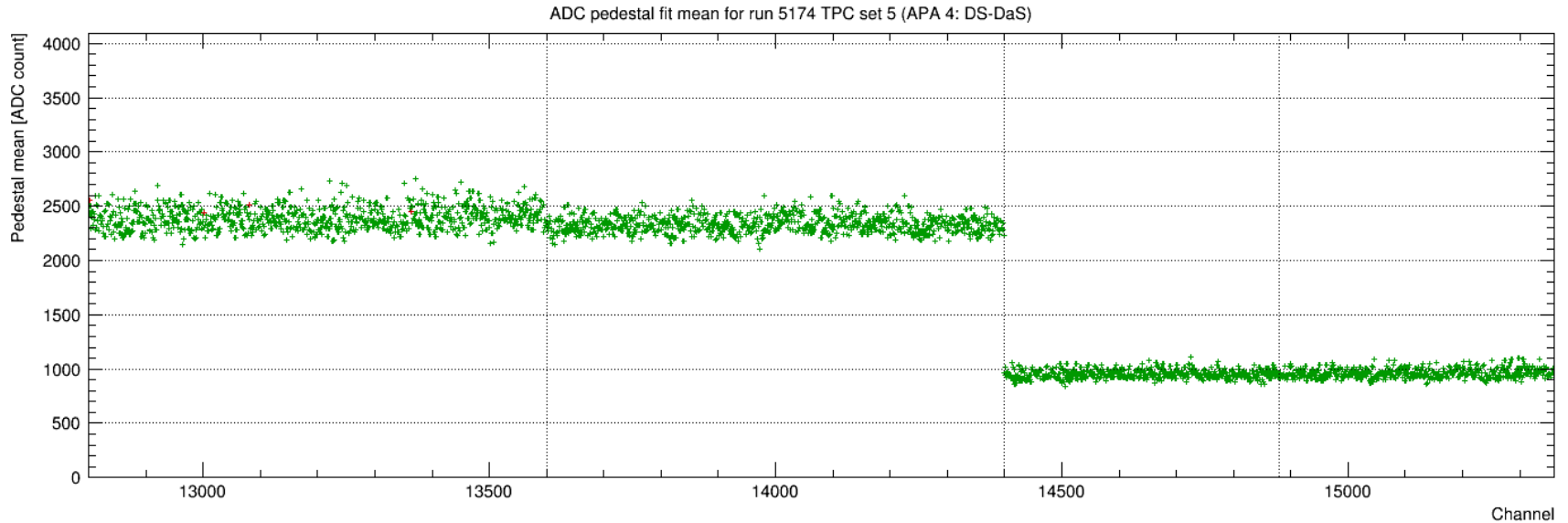
APA 4 run 4644 events 1-999 new reco



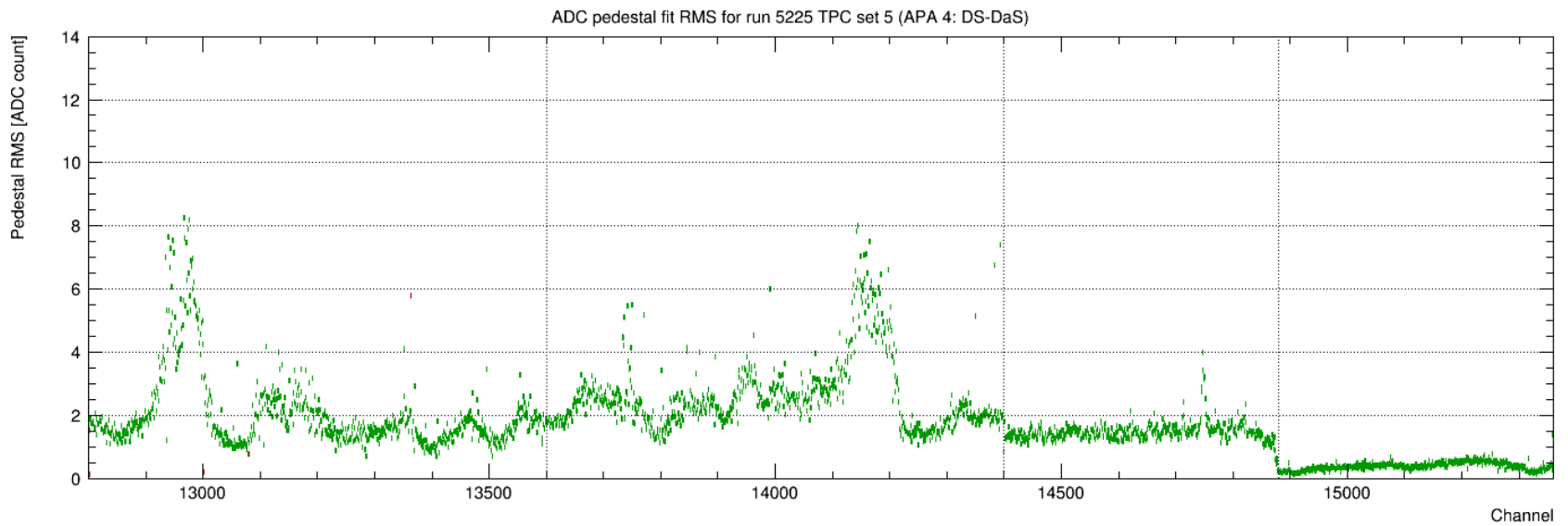
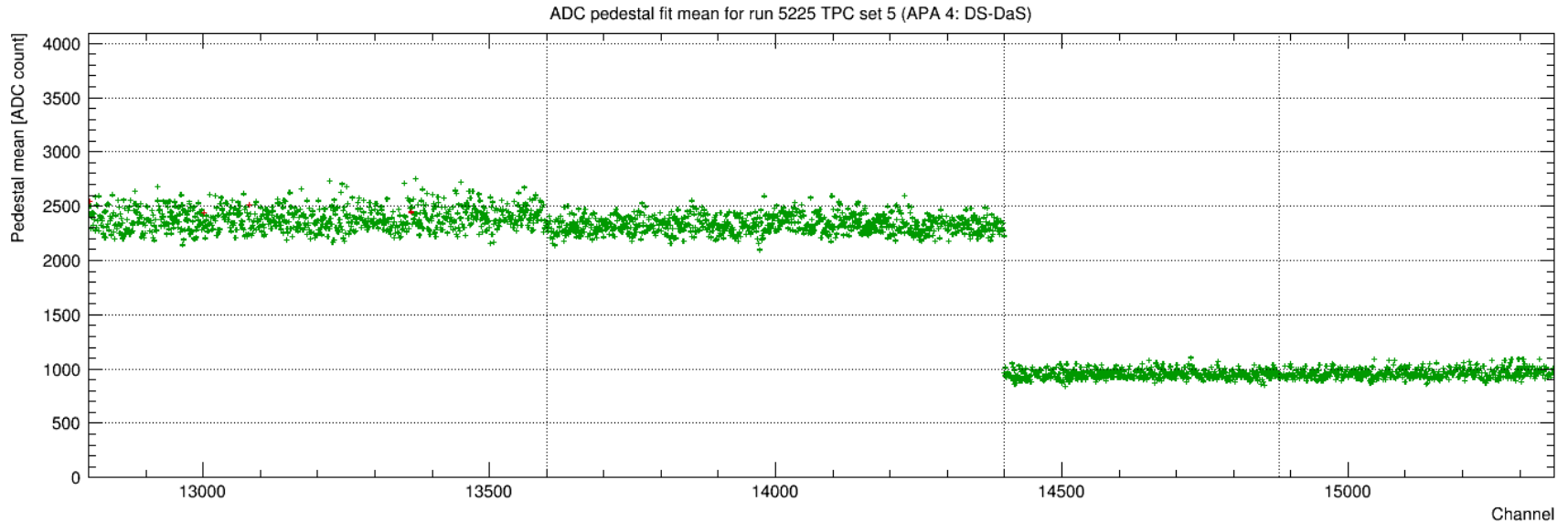
APA 4 run 5141 events 1-999



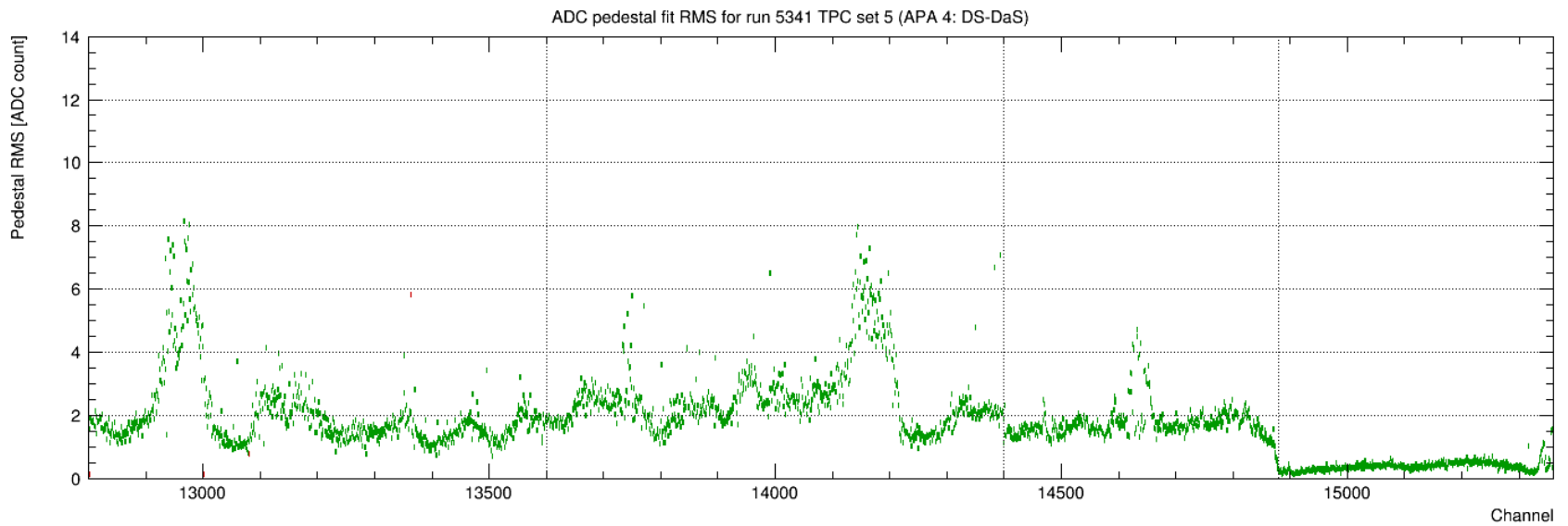
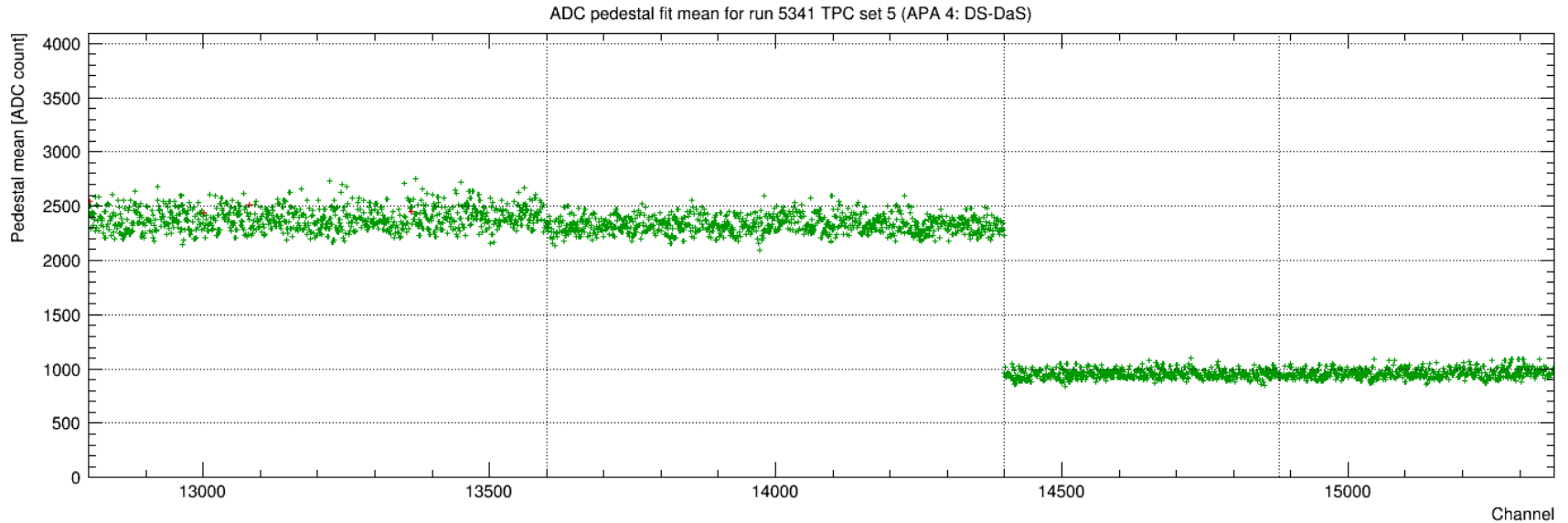
APA 4 run 5174 events 1-999



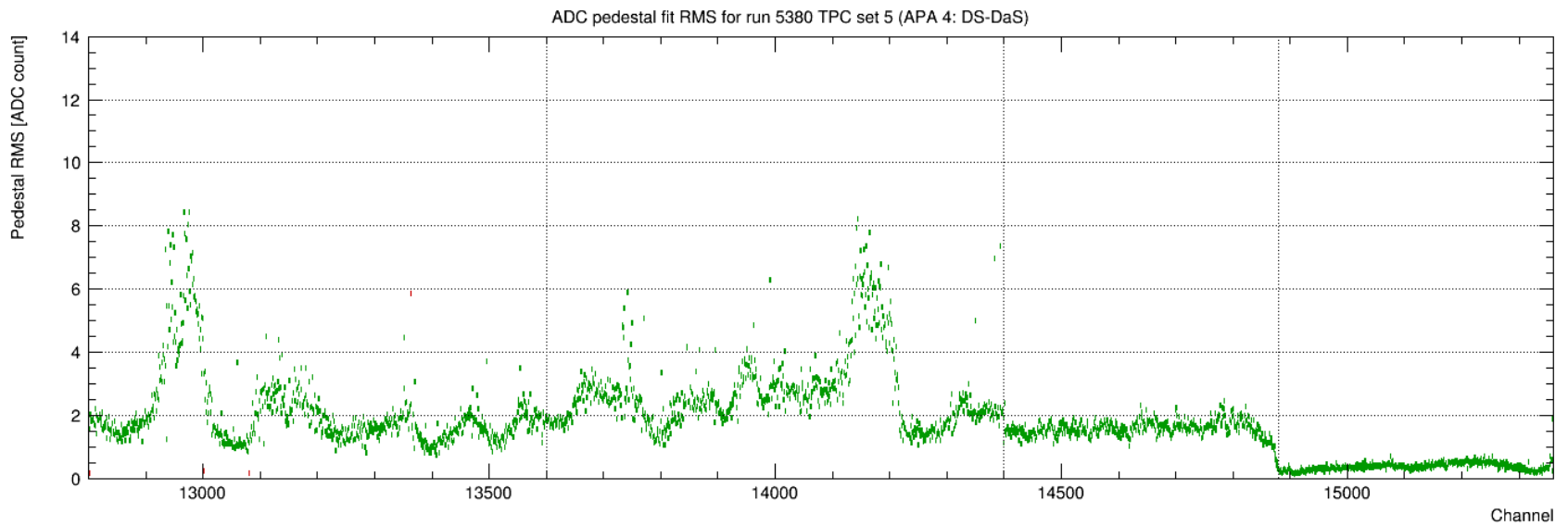
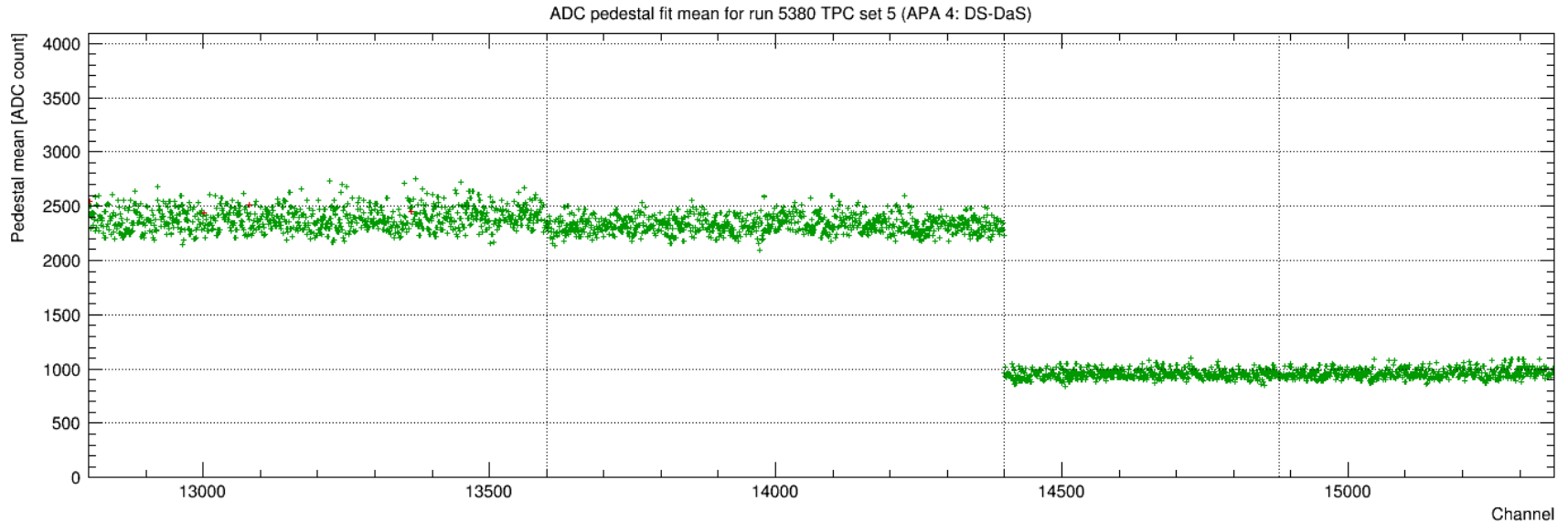
APA 4 run 5225 events 1-999



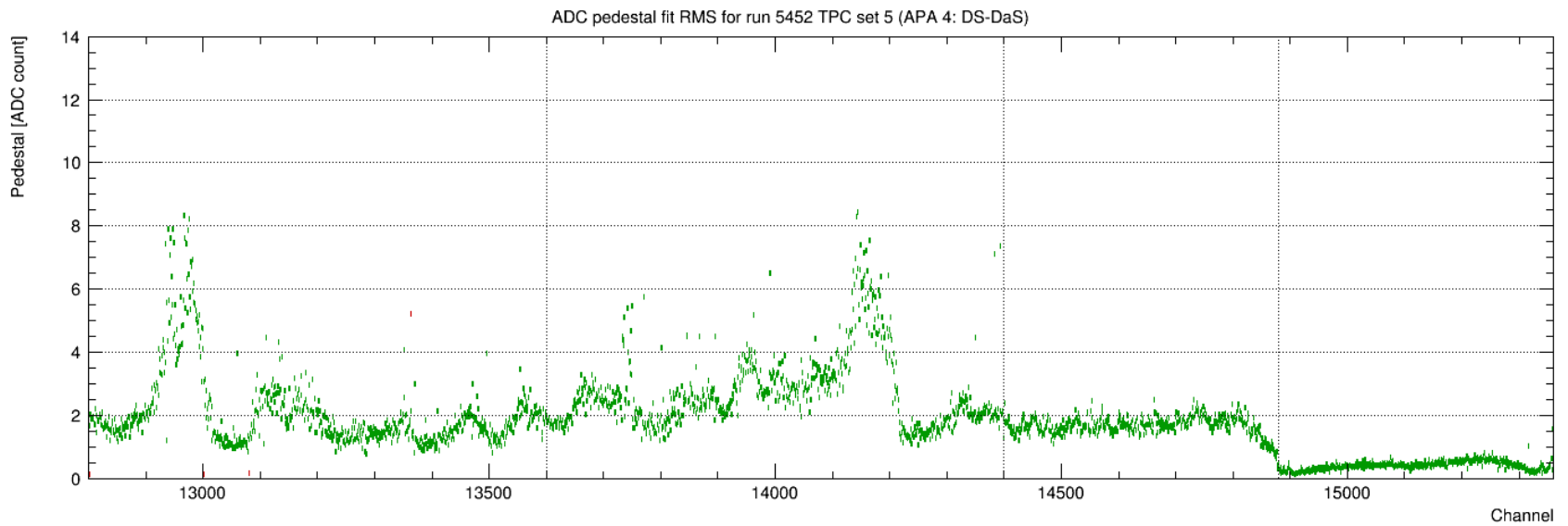
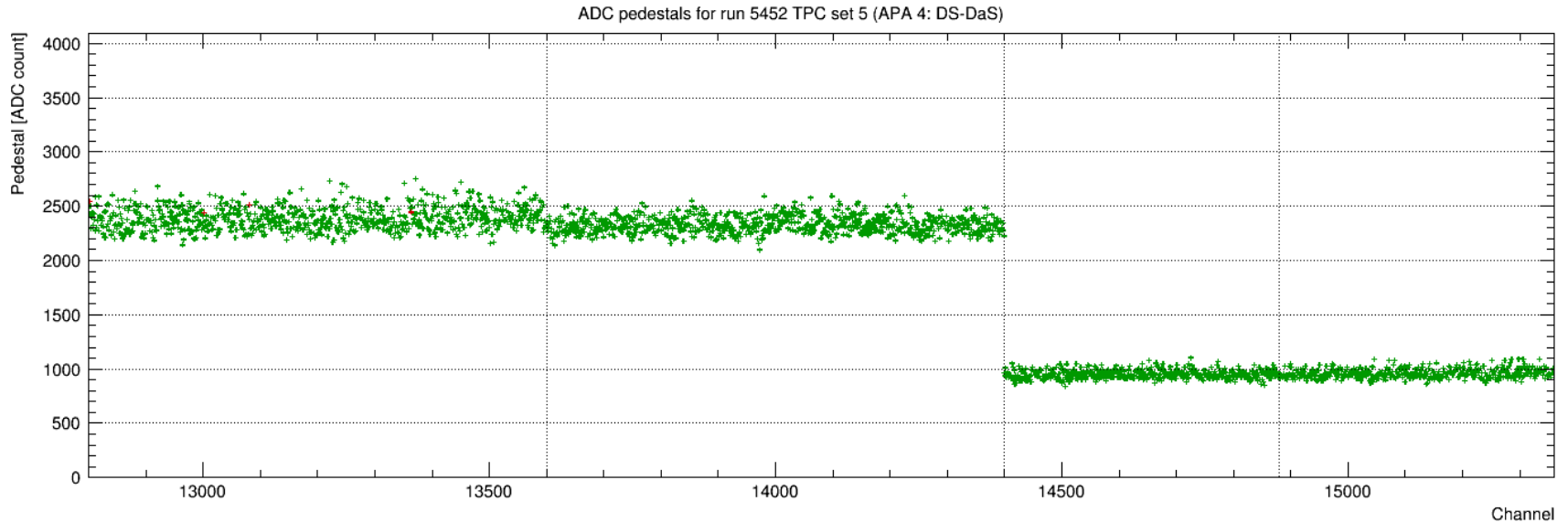
APA 4 run 5341 events 1-999



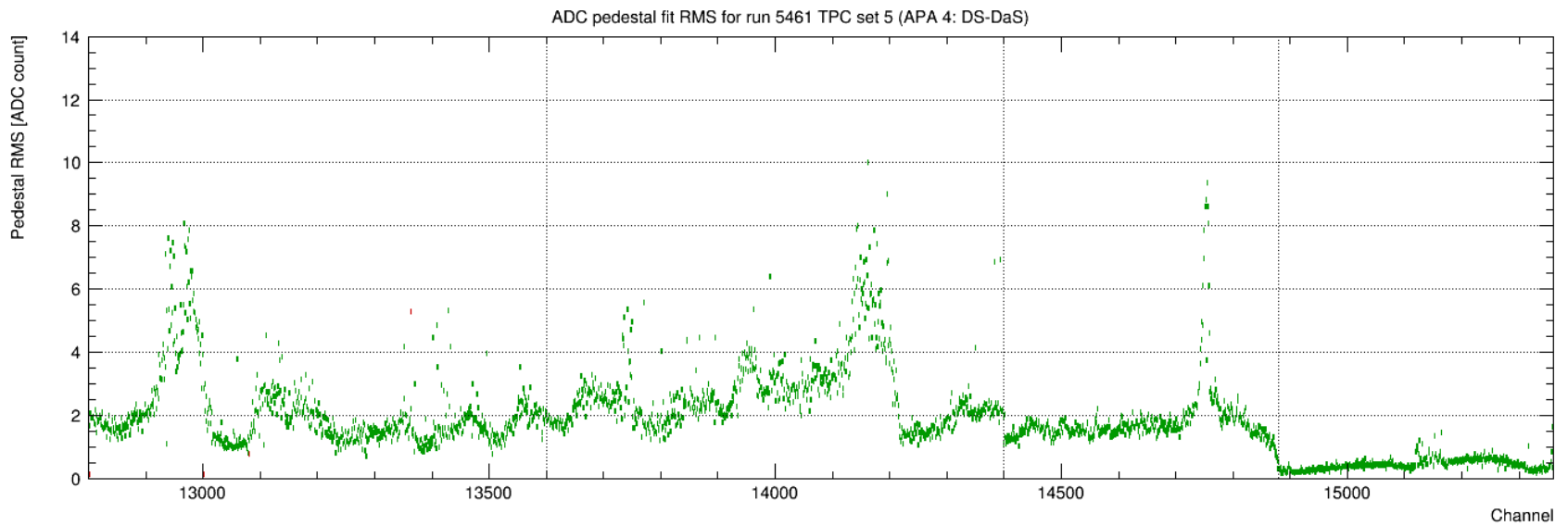
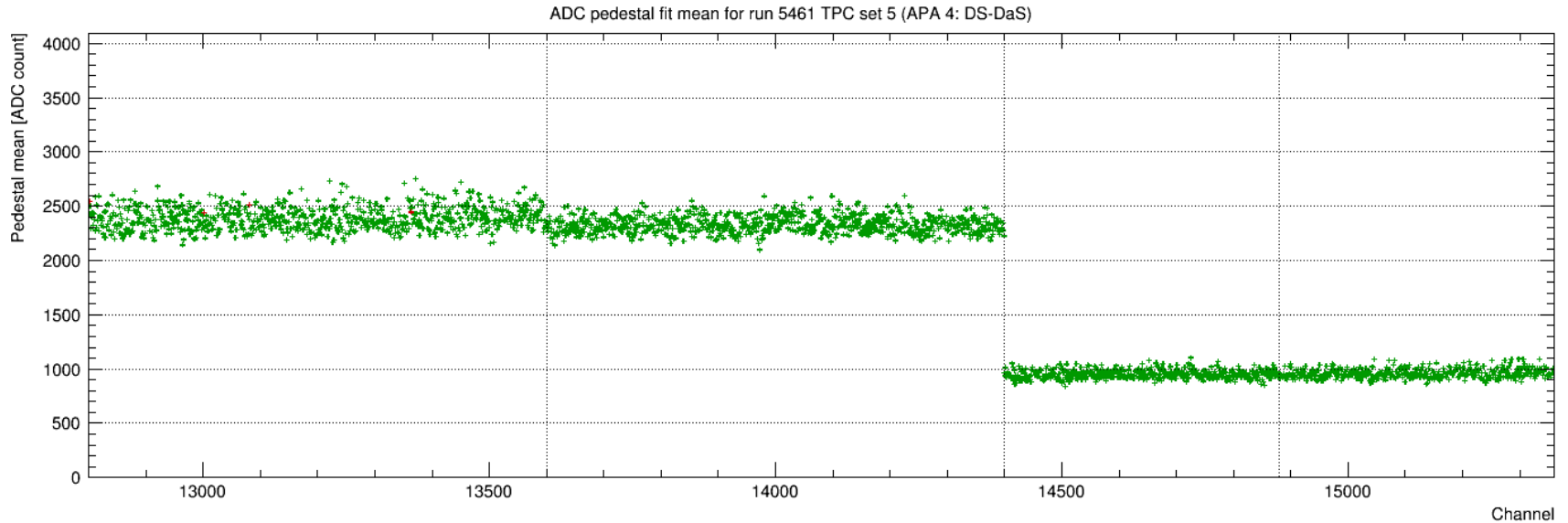
APA 4 run 5380 events 1-999



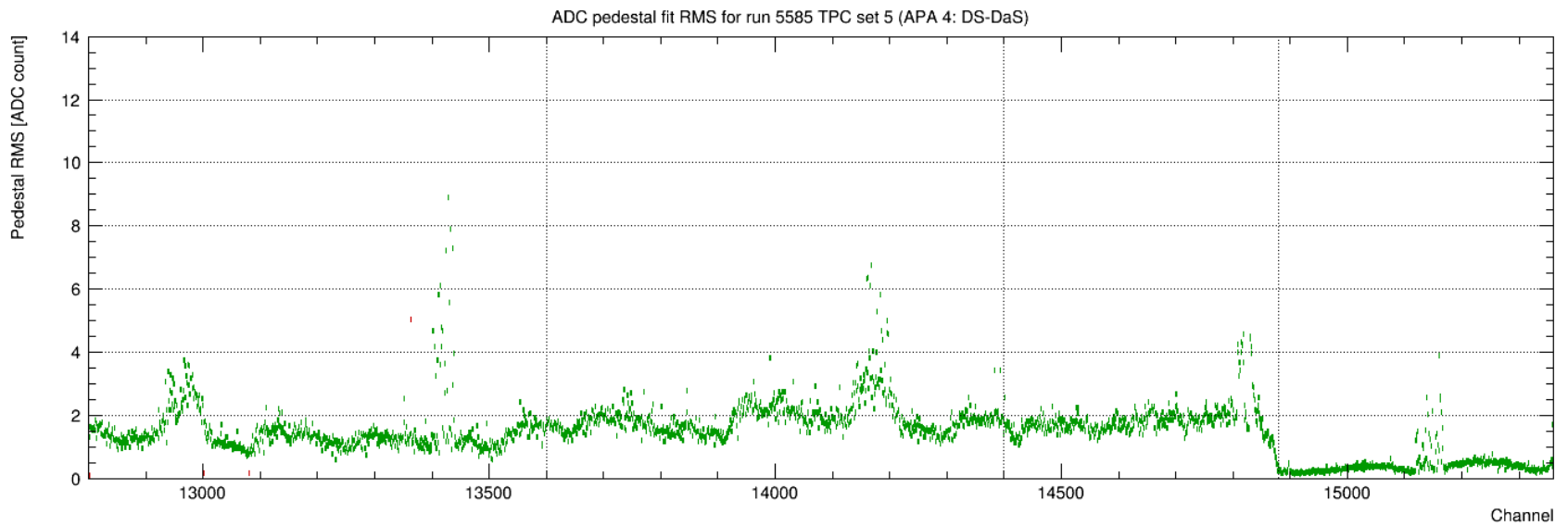
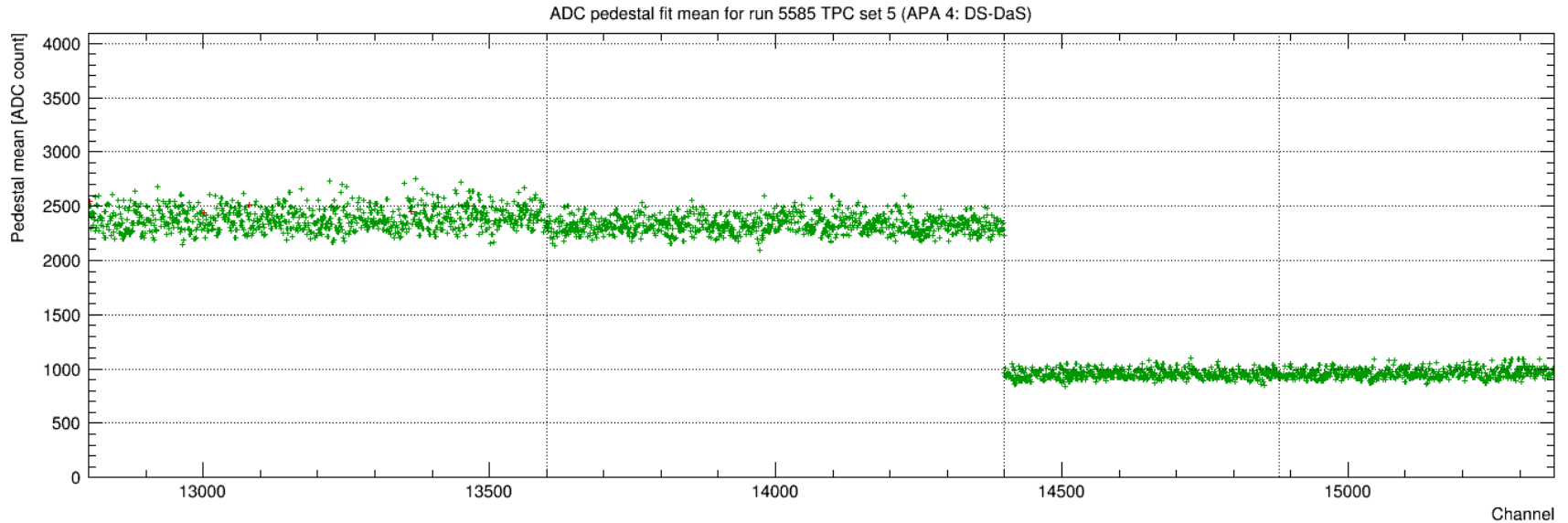
APA 4 run 5452 events 1-999



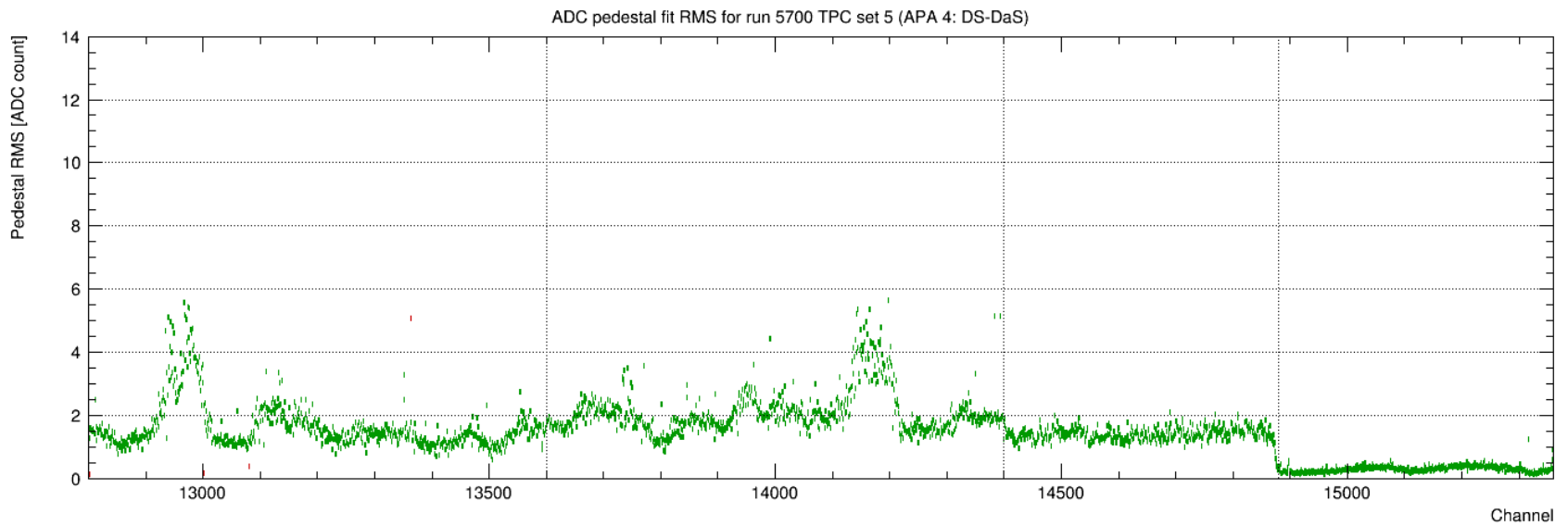
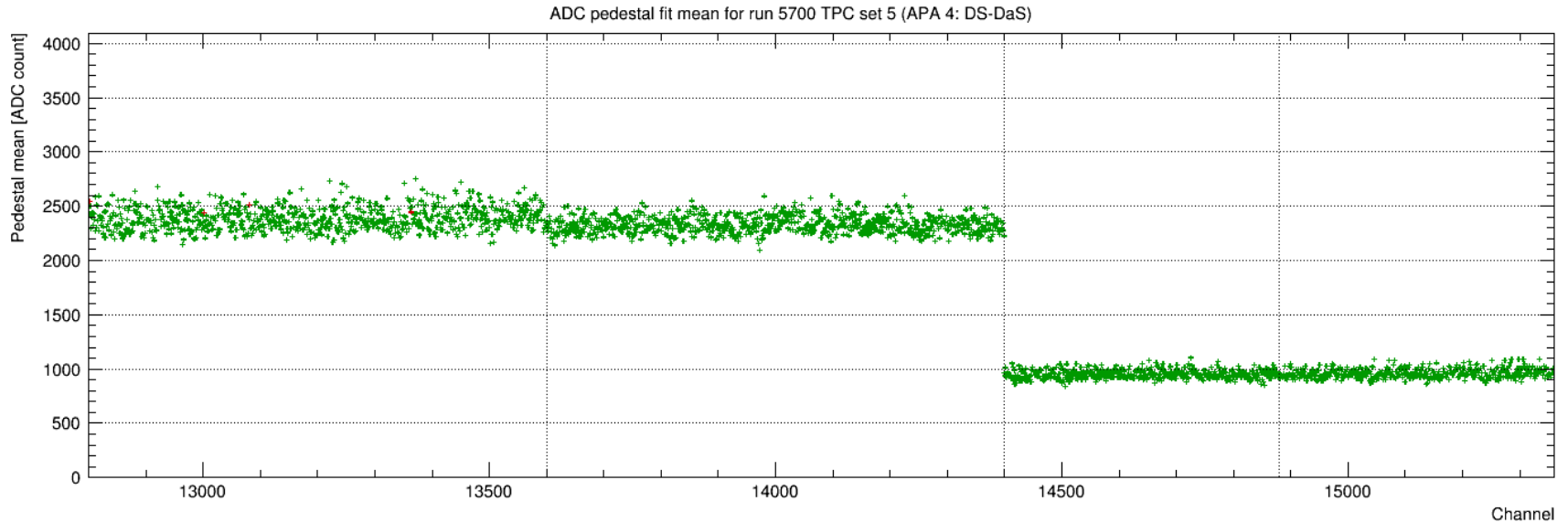
APA 4 run 5461 events 1-999



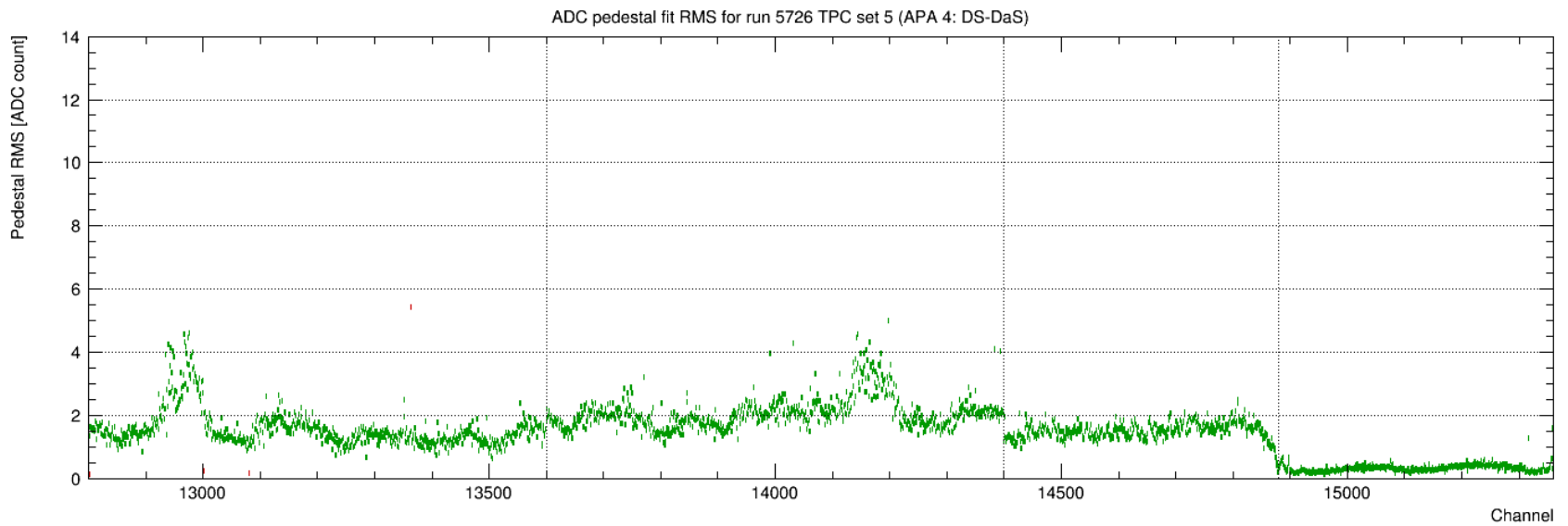
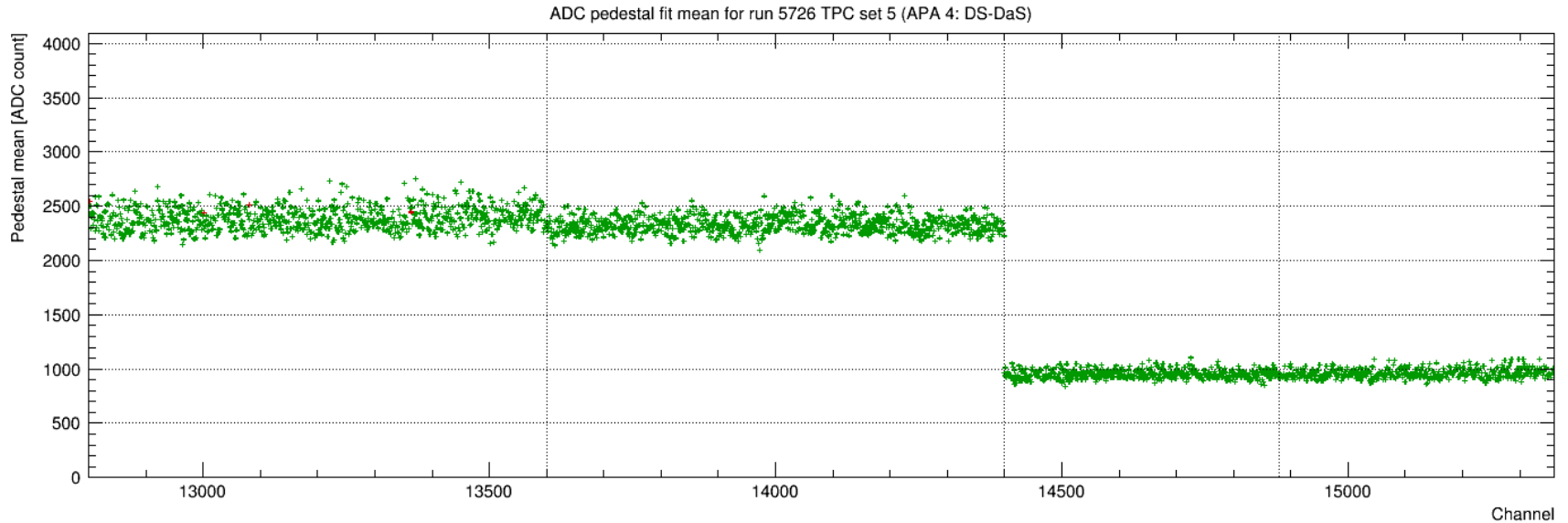
APA 4 run 5585 events 1-999



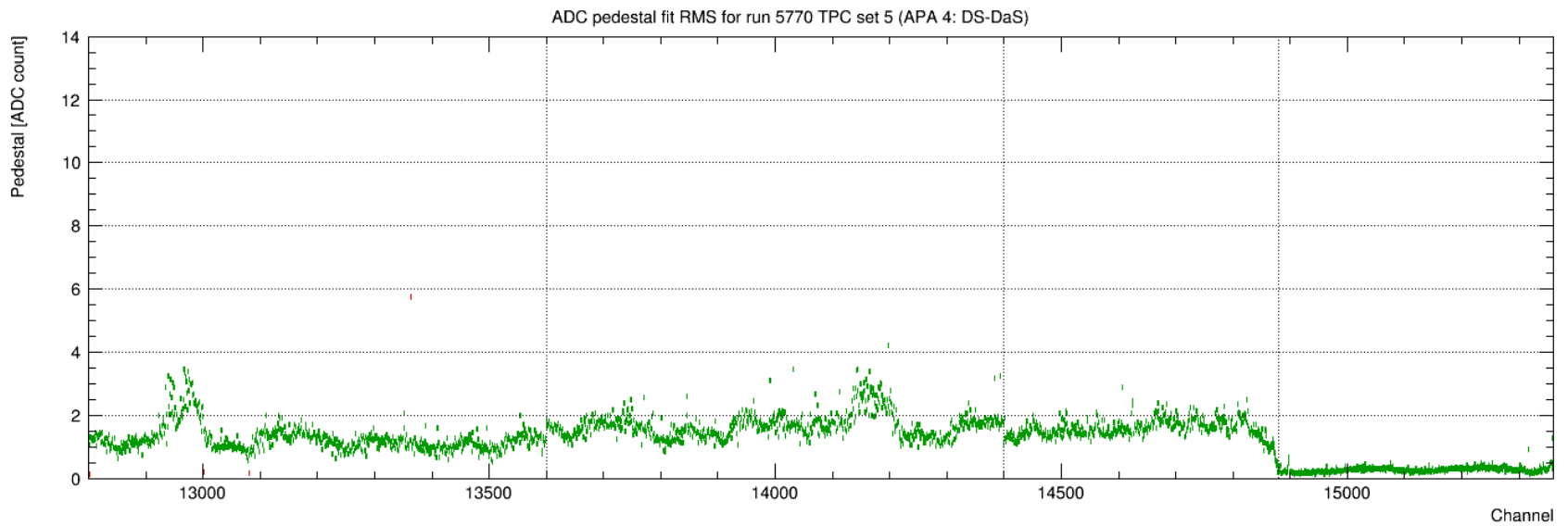
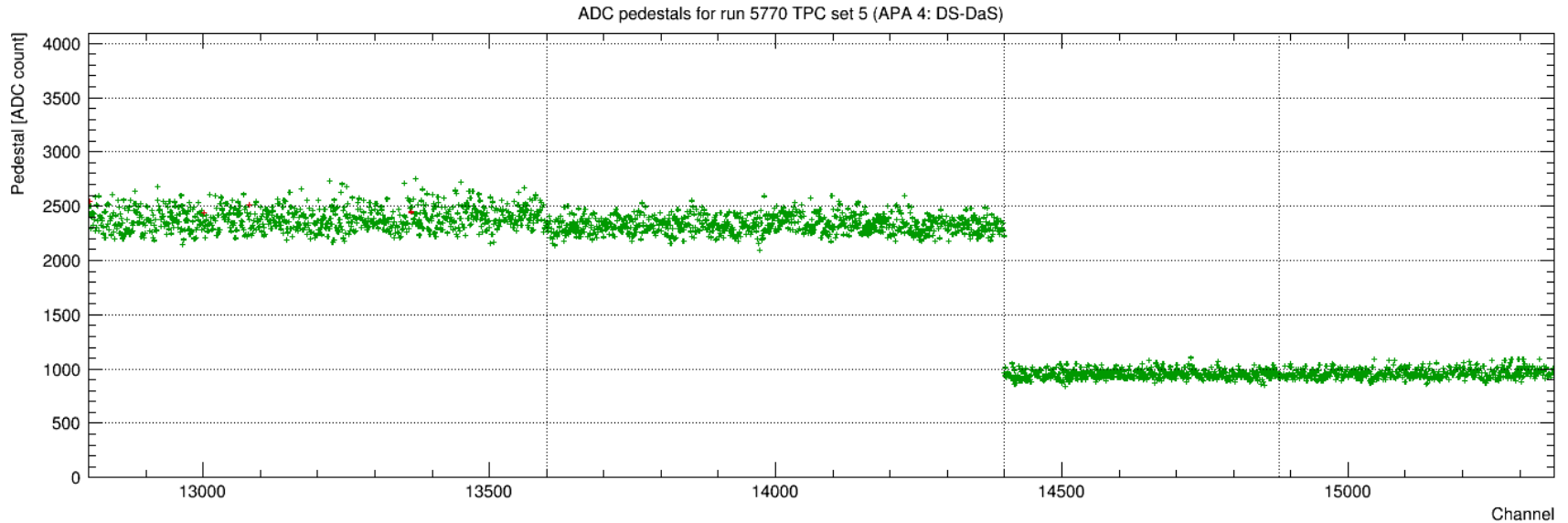
APA 4 run 5700 events 1-999



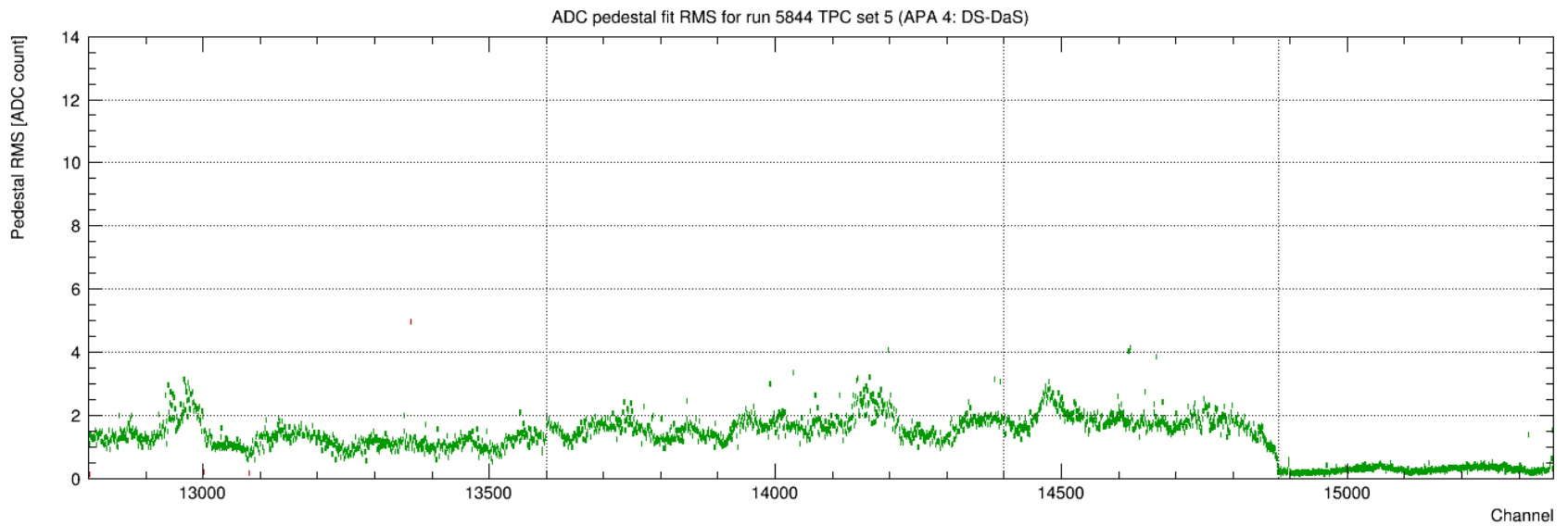
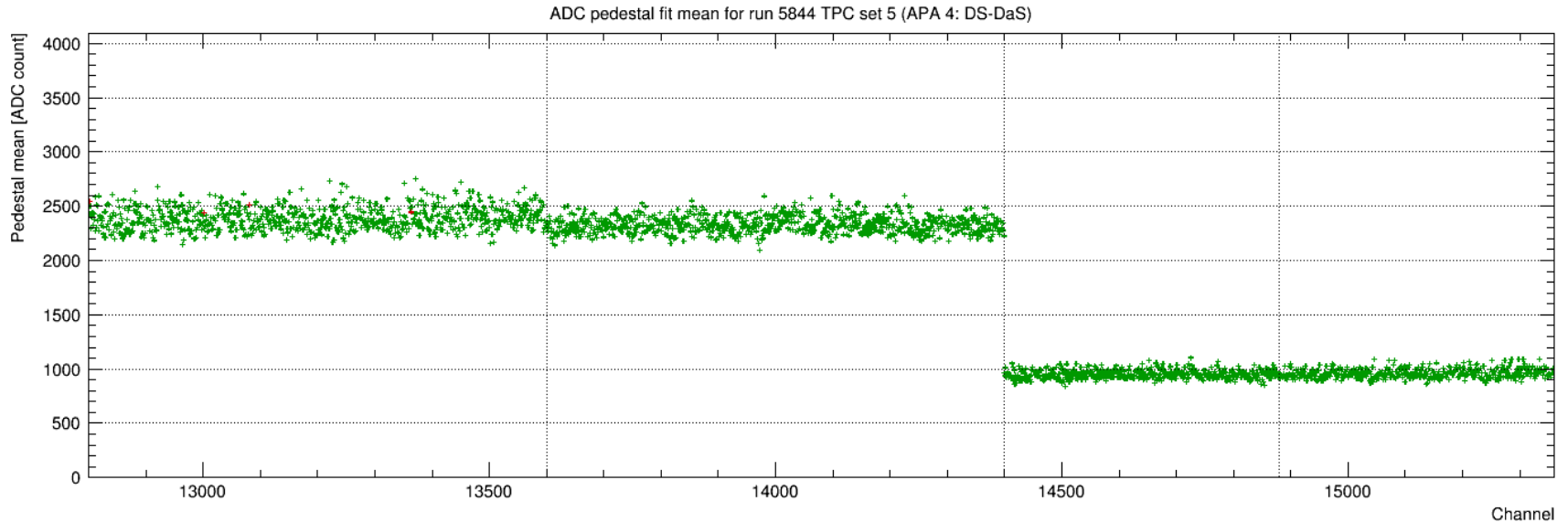
APA 4 run 5726 events 1-999



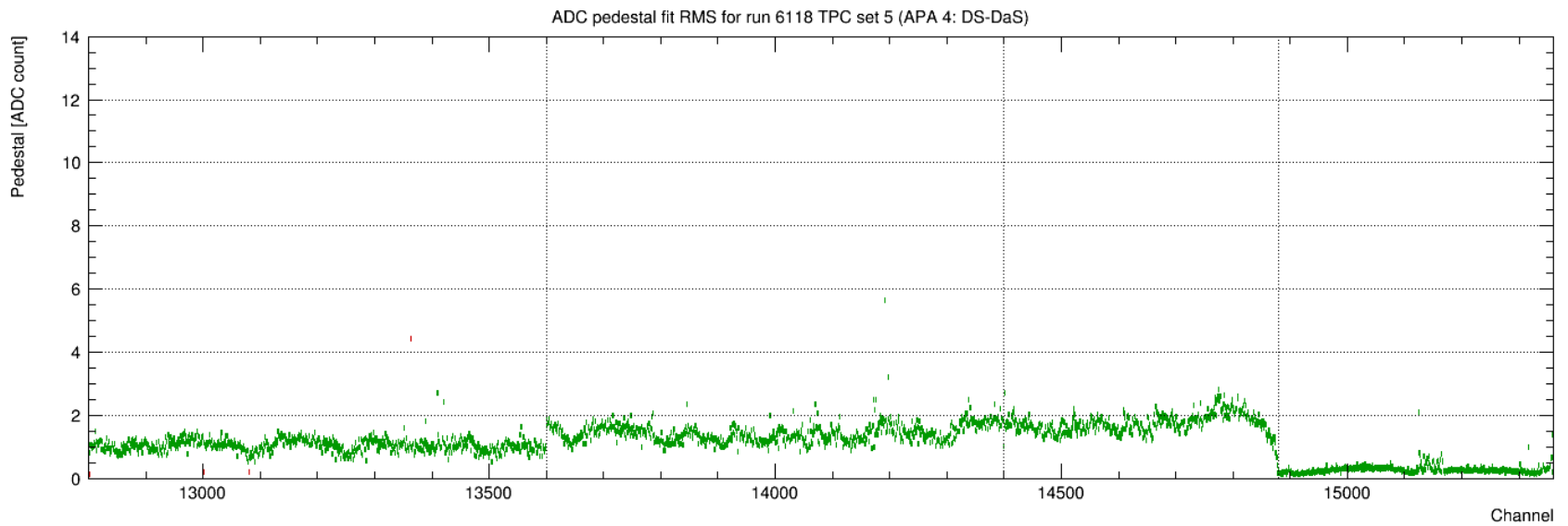
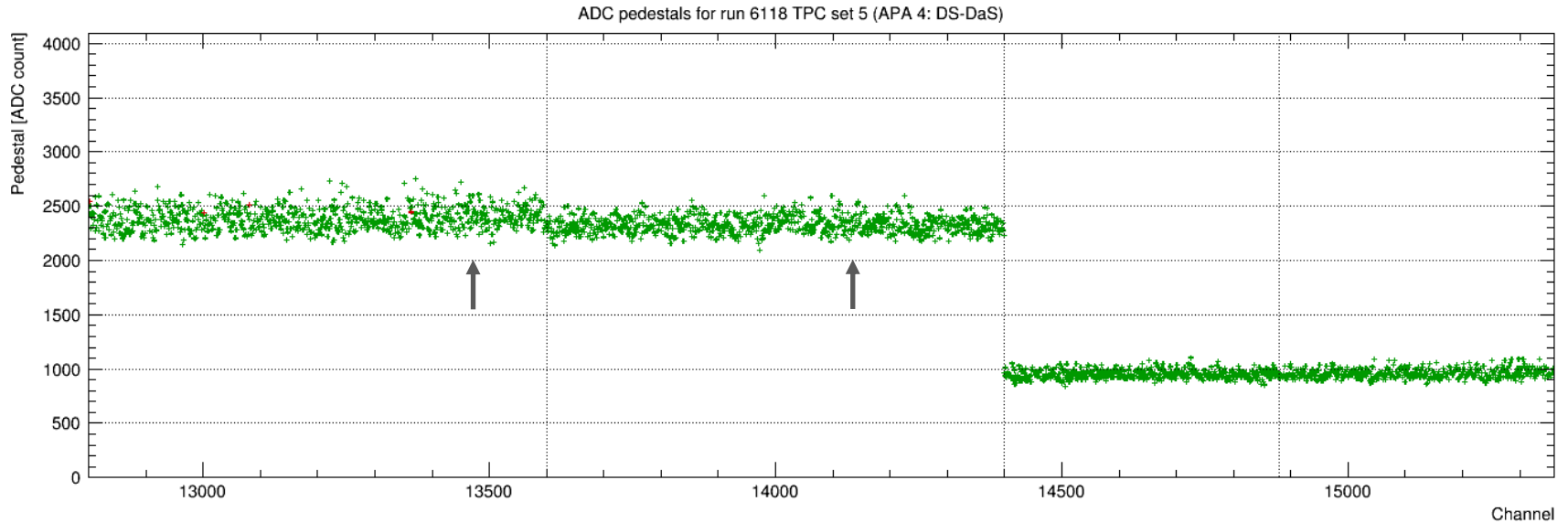
APA 4 run 5770 events 1-999



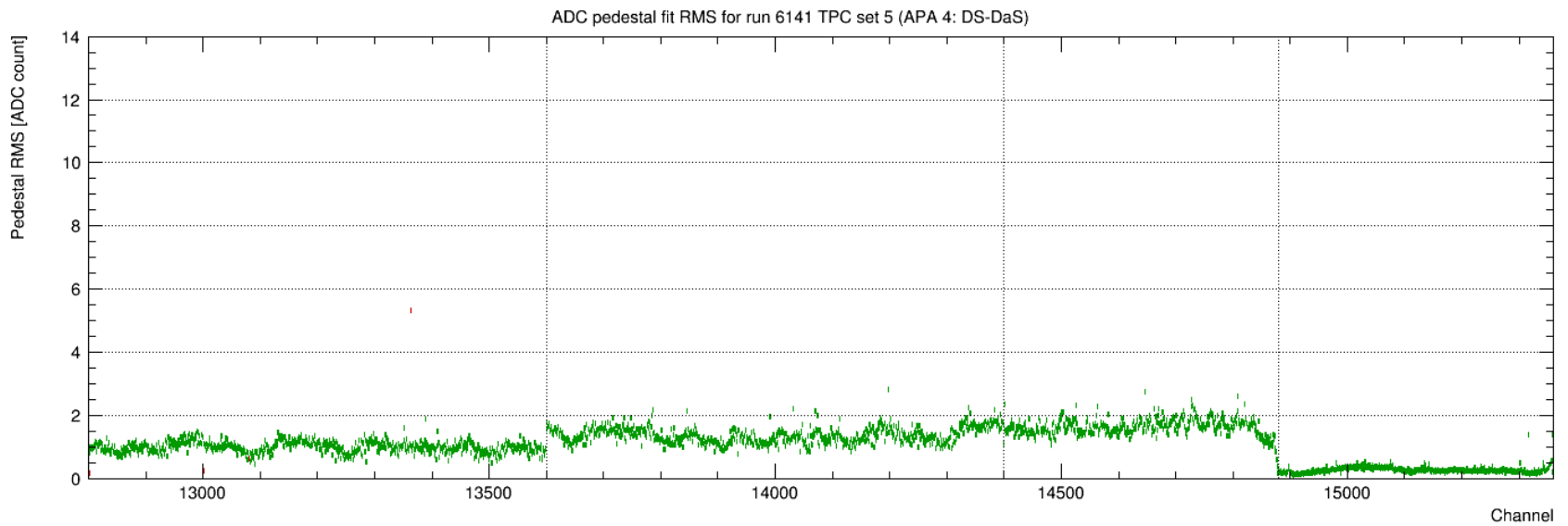
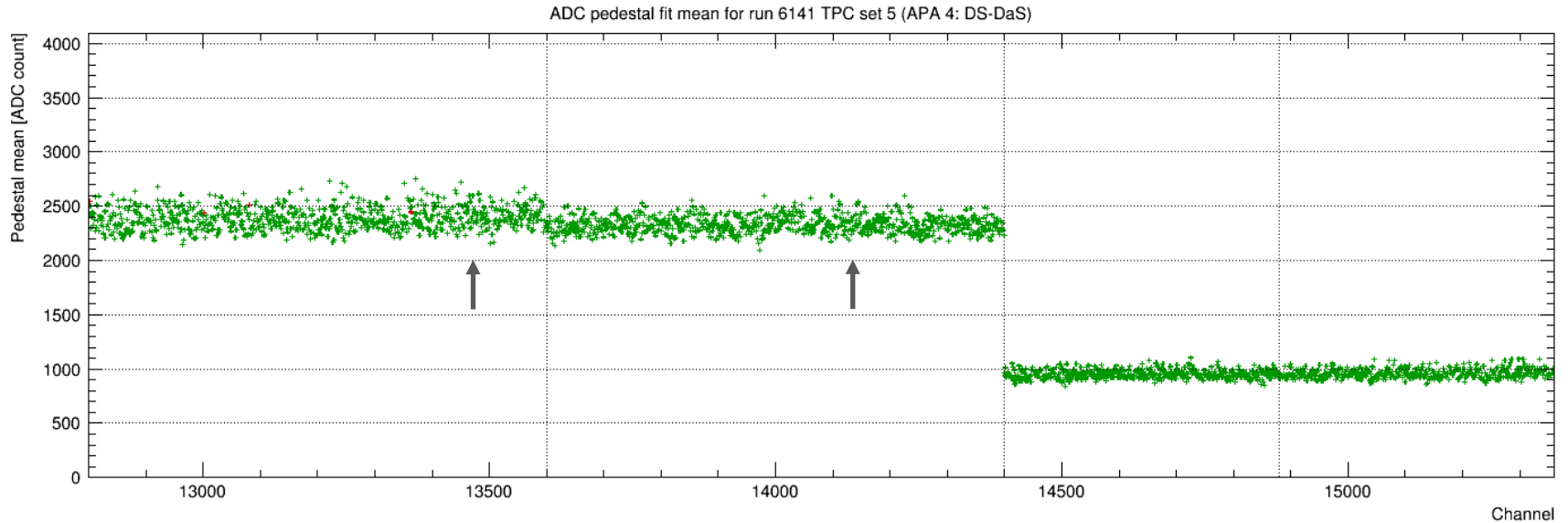
APA 4 run 5844 events 1-999



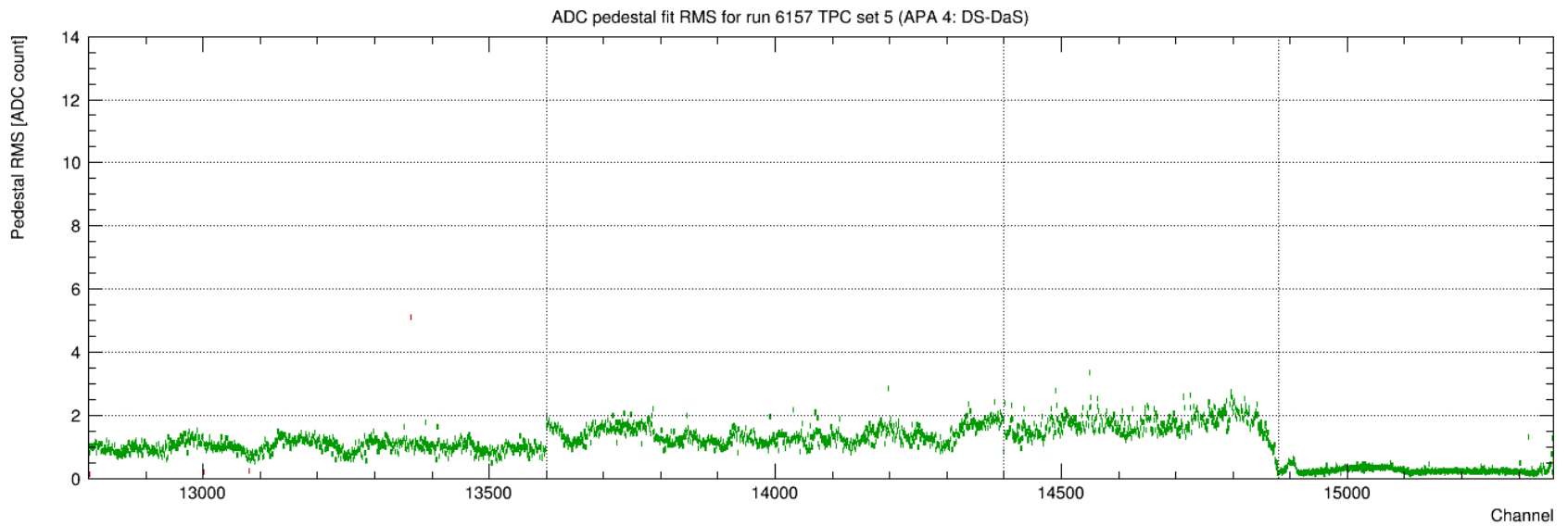
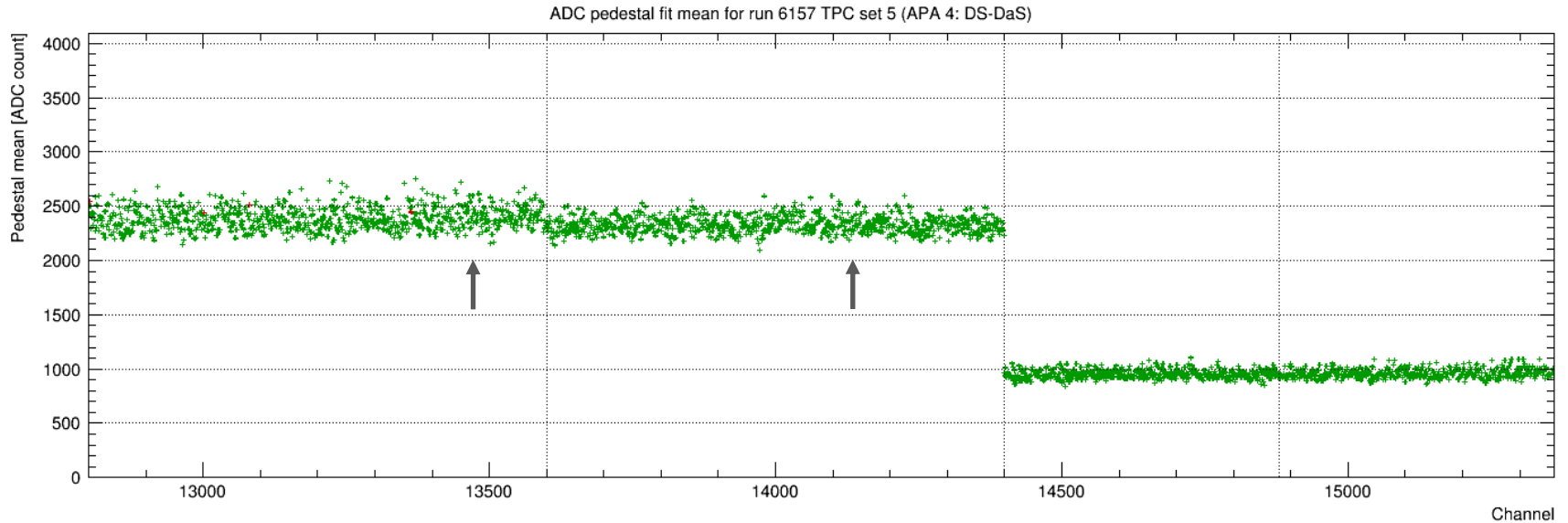
APA 4 run 6118 events 1-999



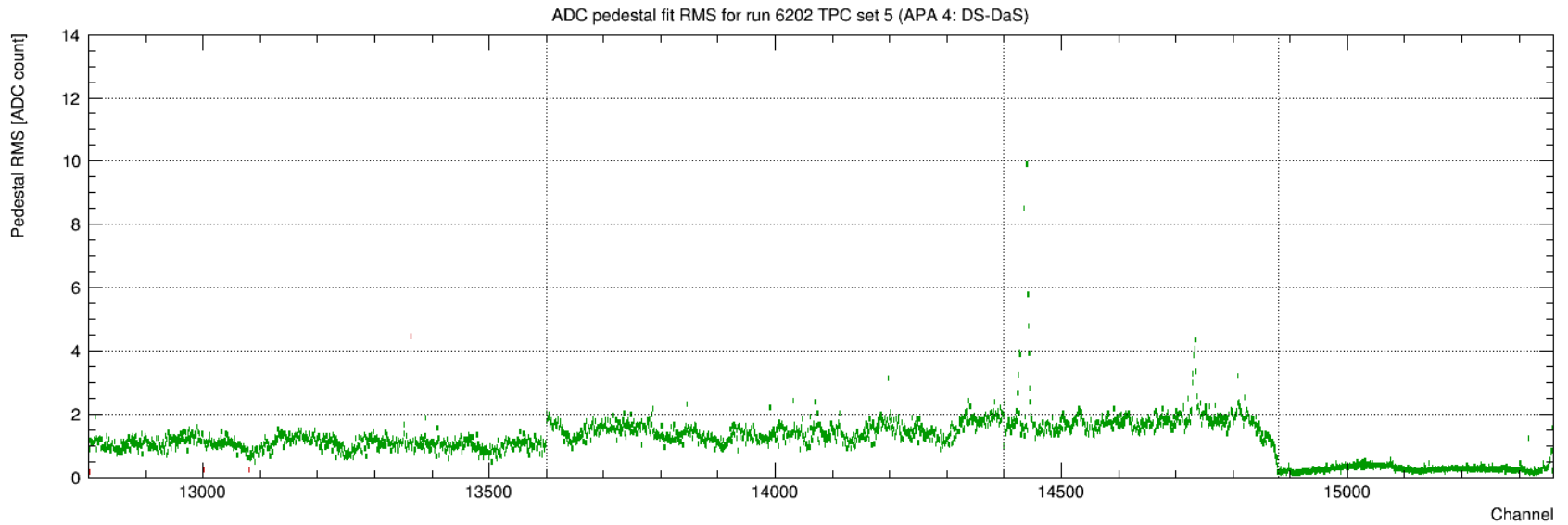
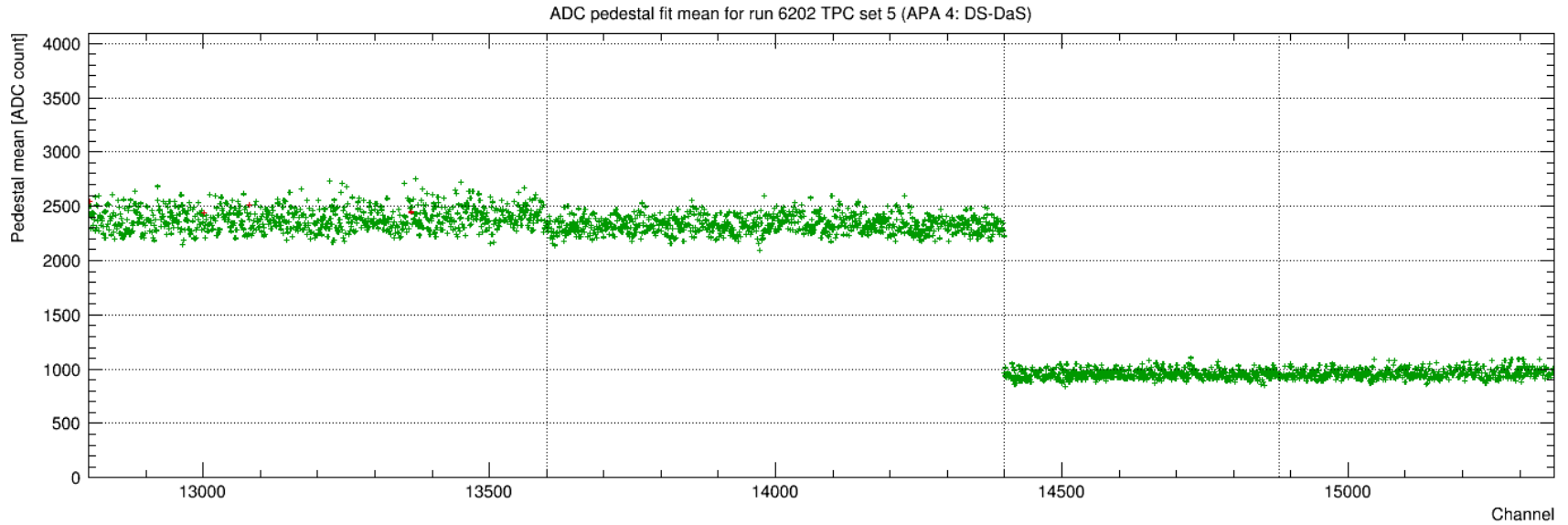
APA 4 run 6141 events 1-999



APA 4 run 6157 events 1-999

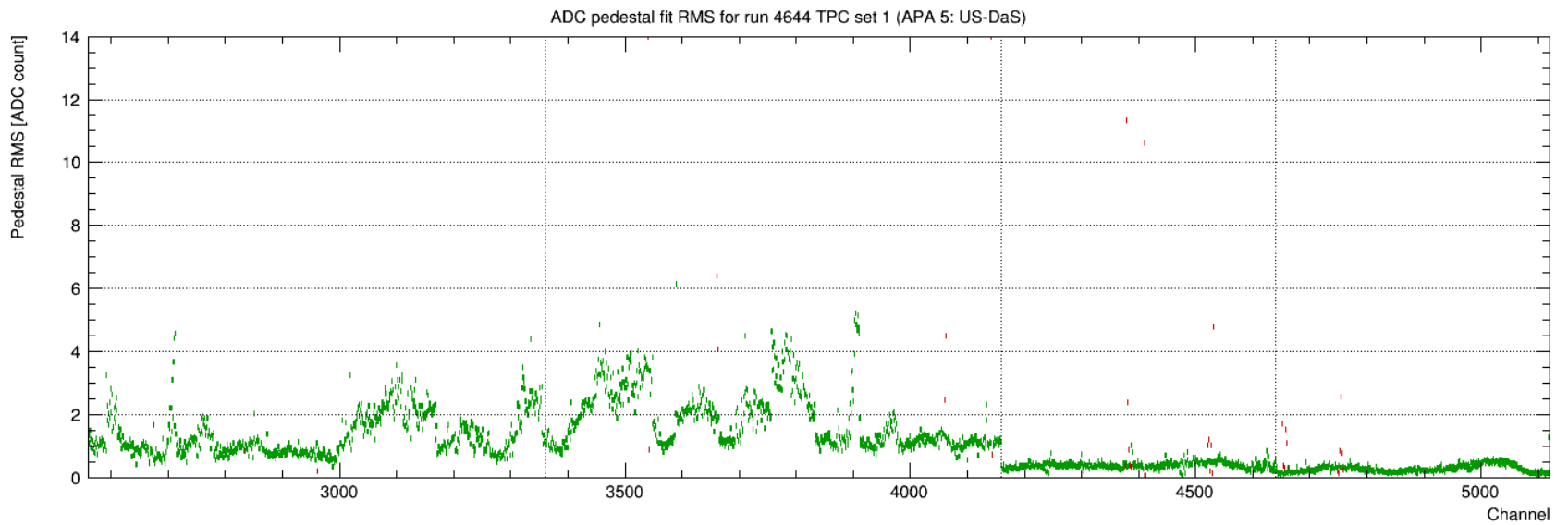
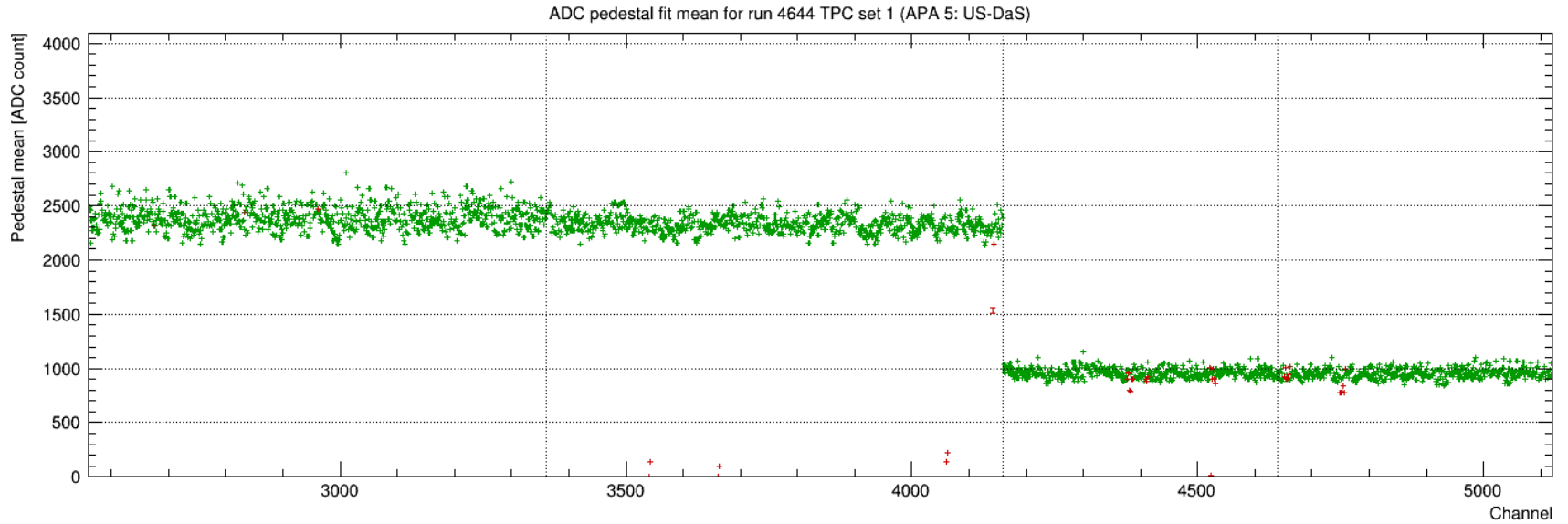


APA 4 run 6202 events 1-999

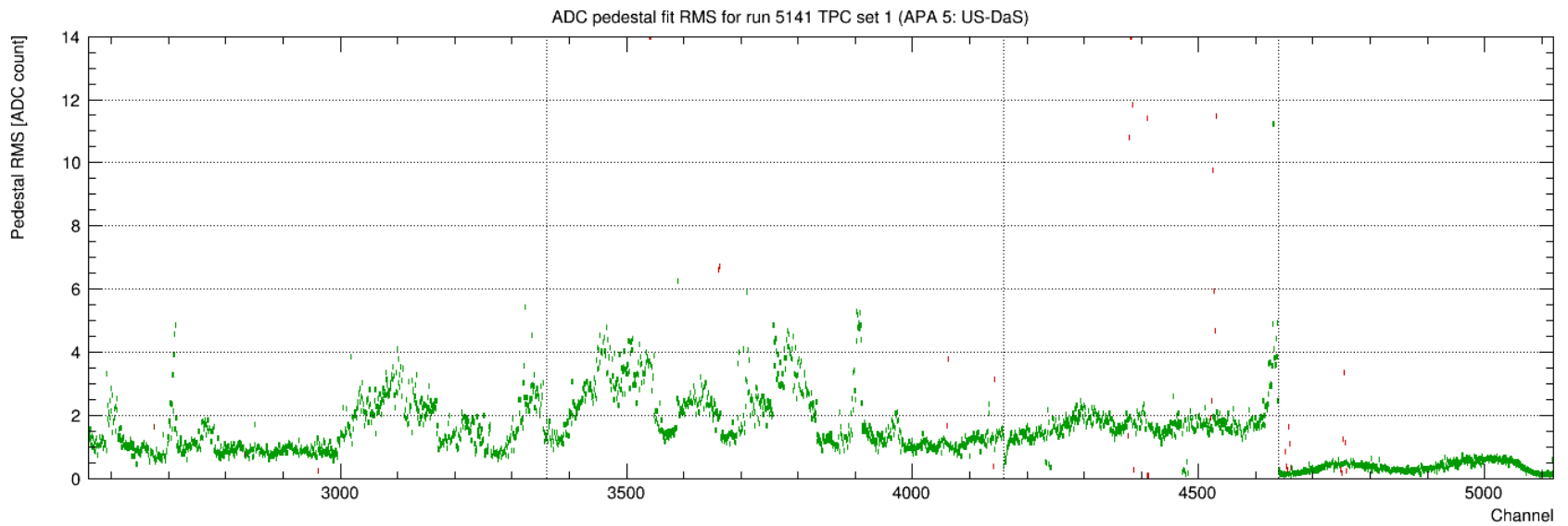
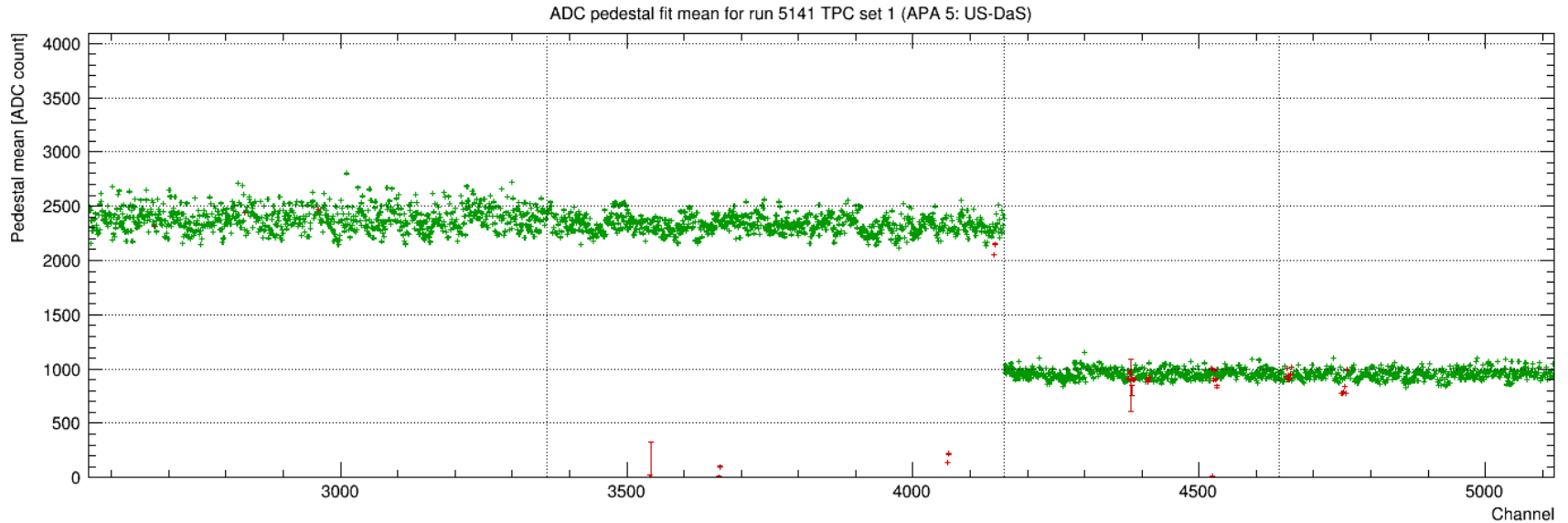


APA 5

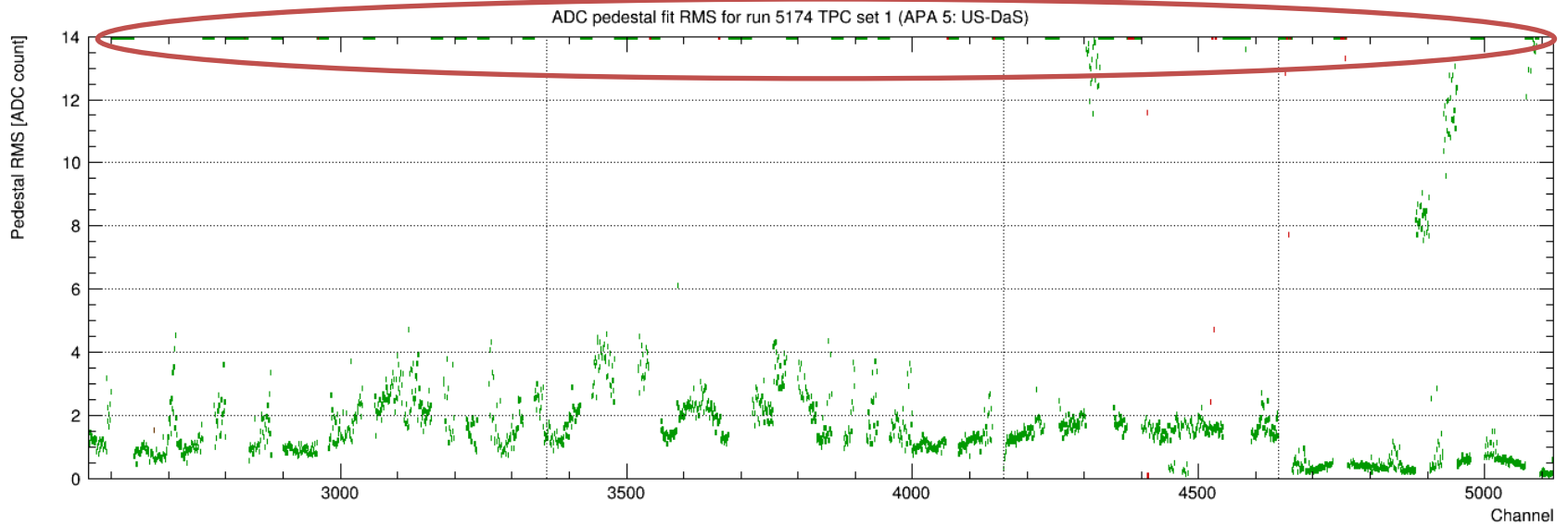
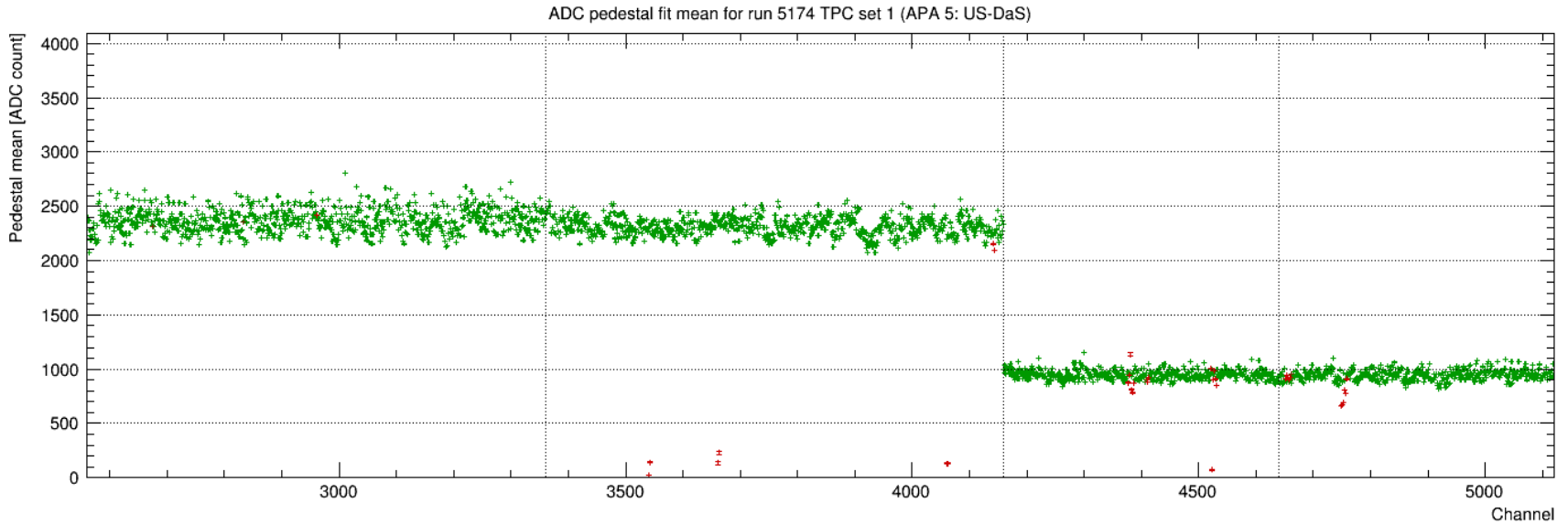
APA 5 run 4644 events 1-999



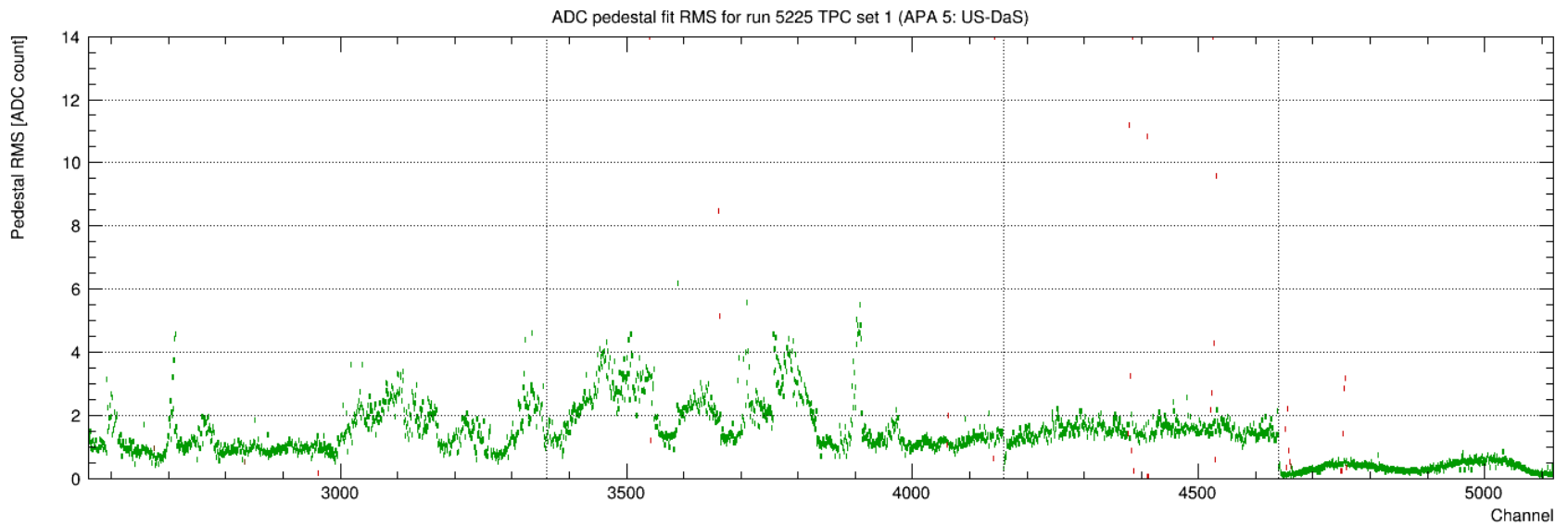
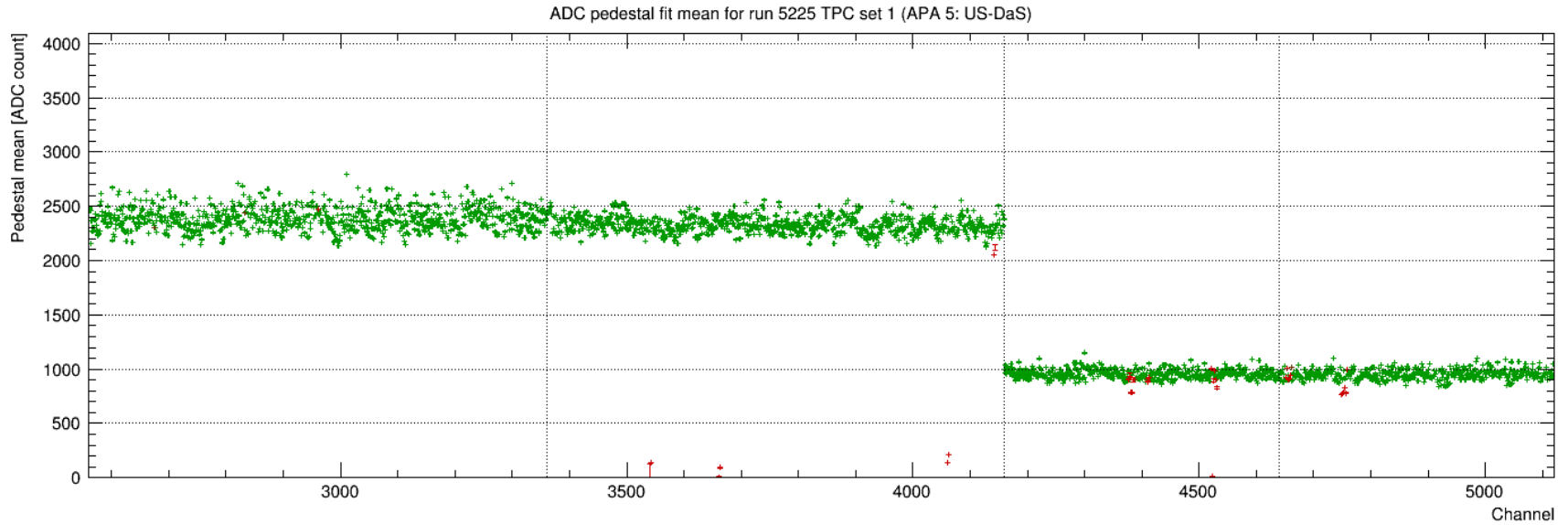
APA 5 run 5141 events 1-999



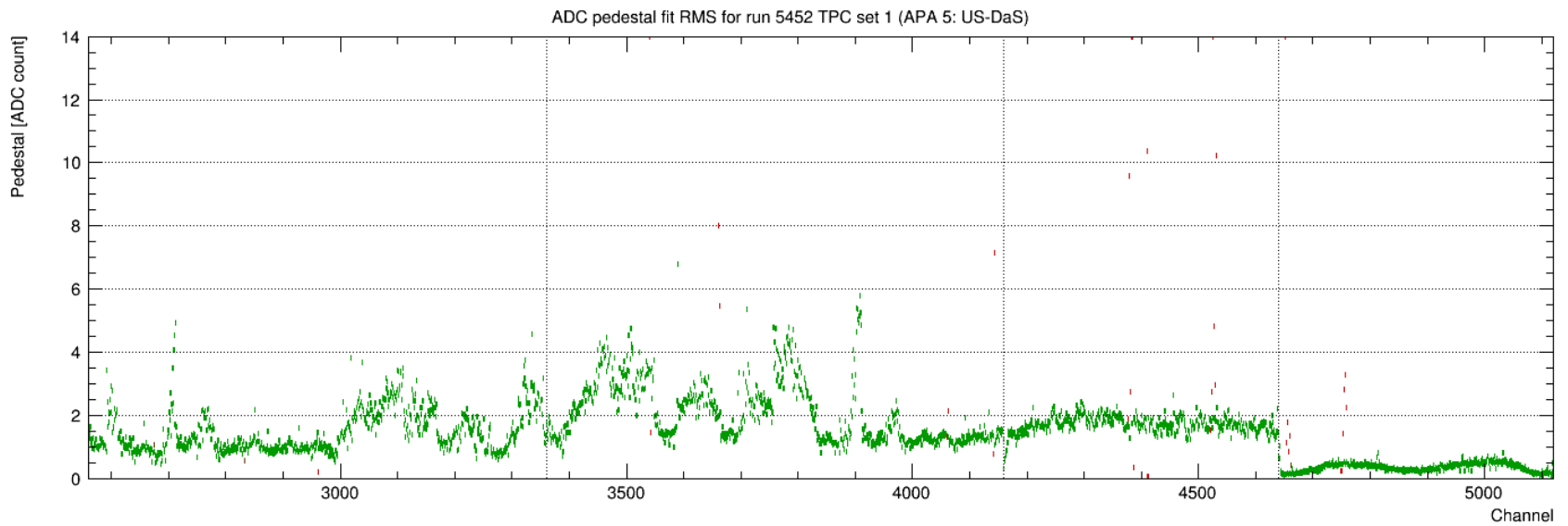
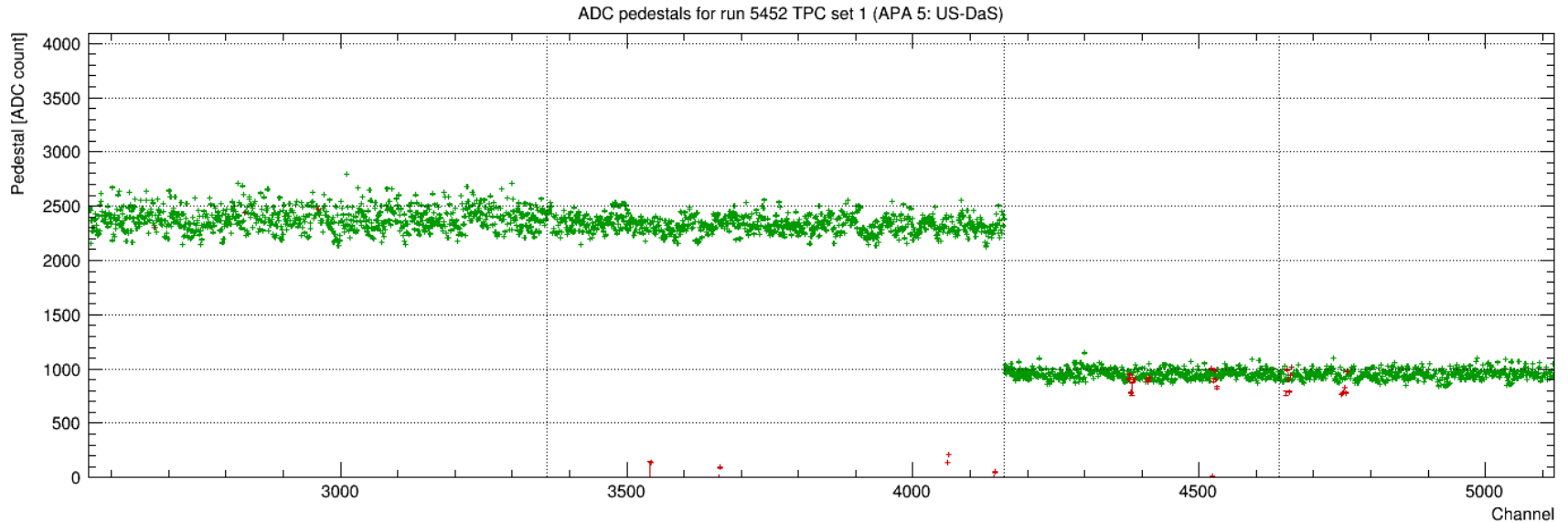
APA 5 run 5174 events 1-999



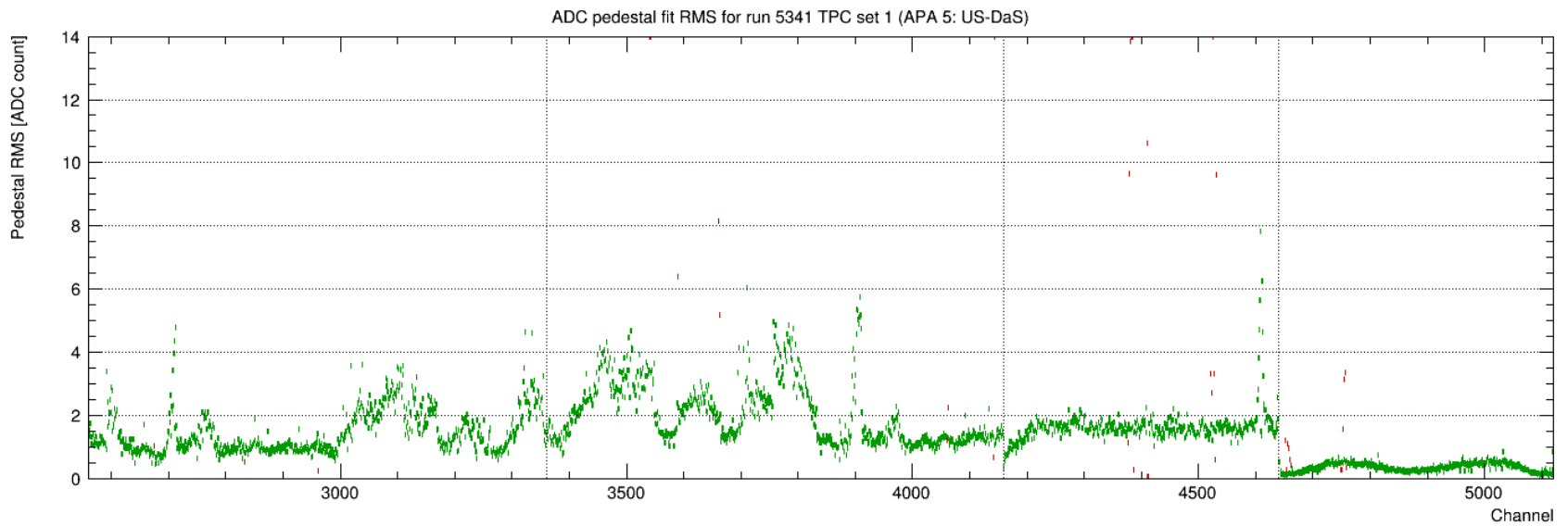
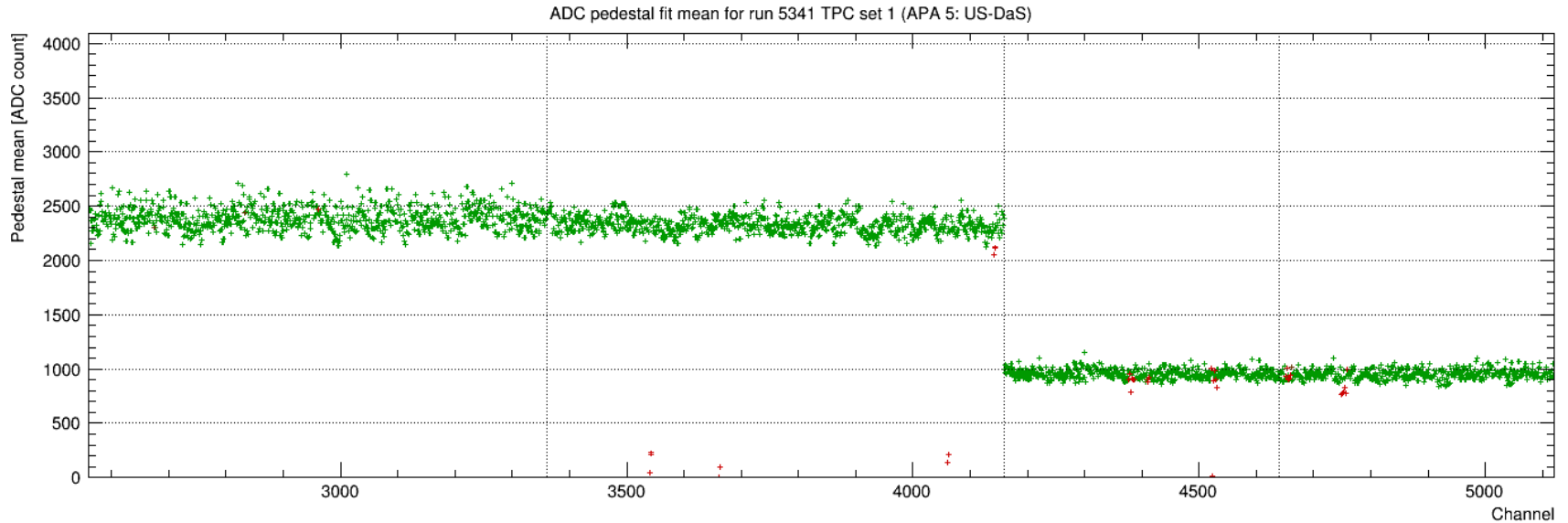
APA 5 run 5225 events 1-999



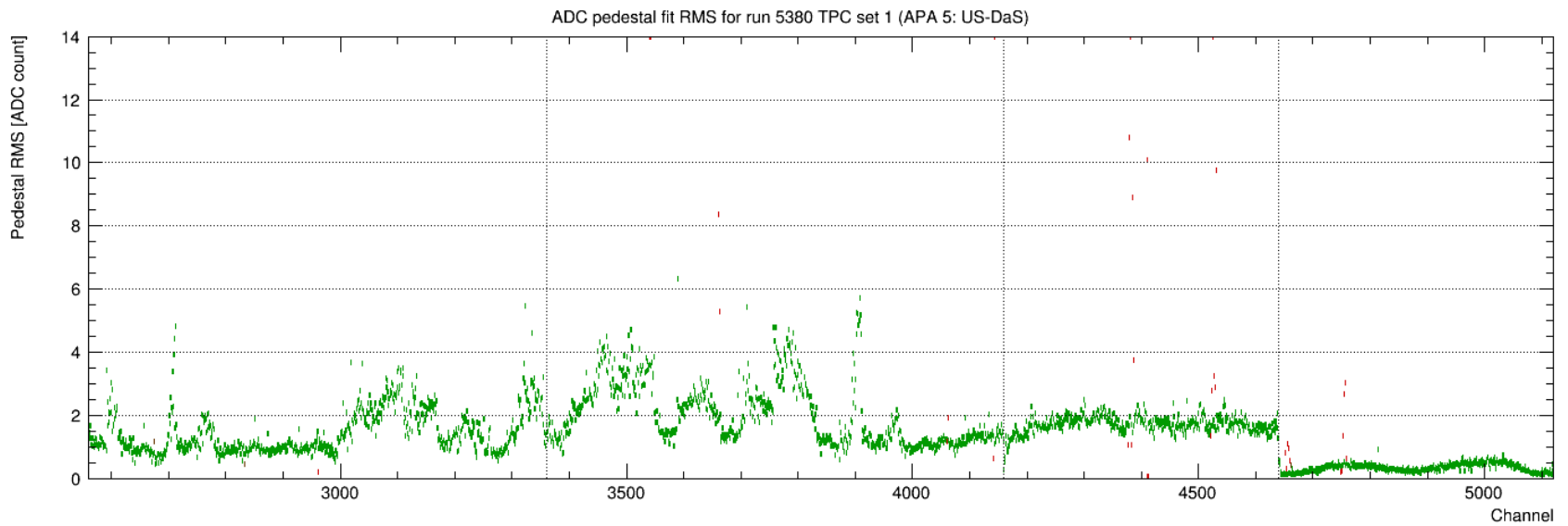
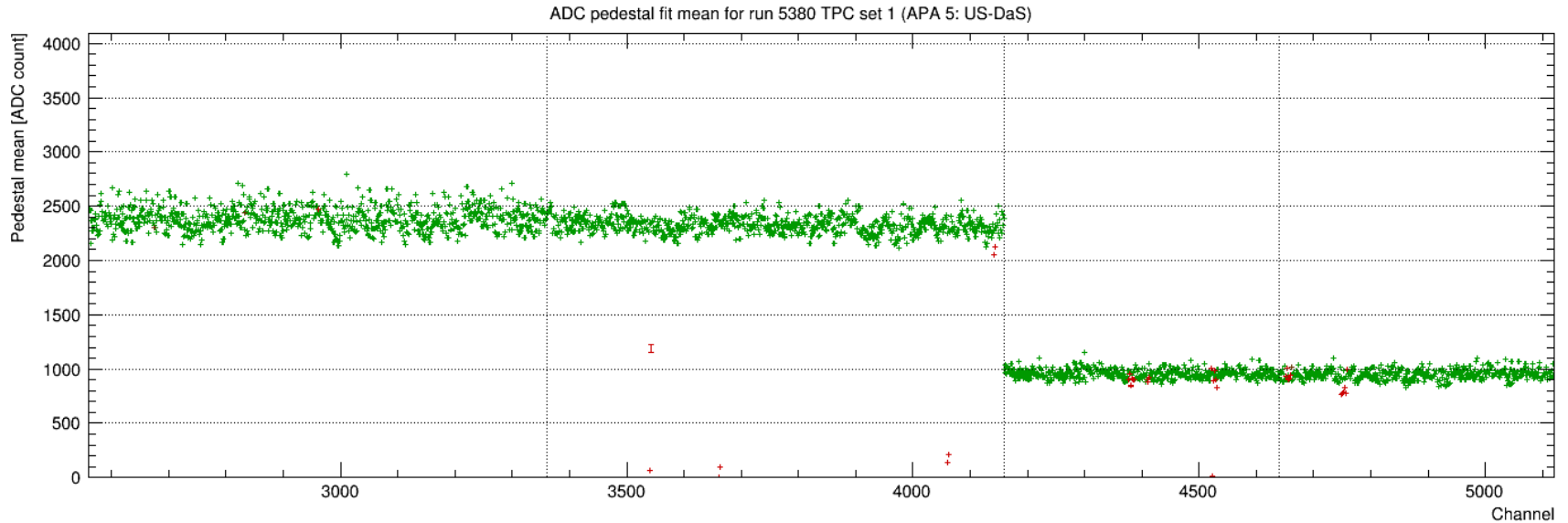
APA 5 run 5452 events 1-999



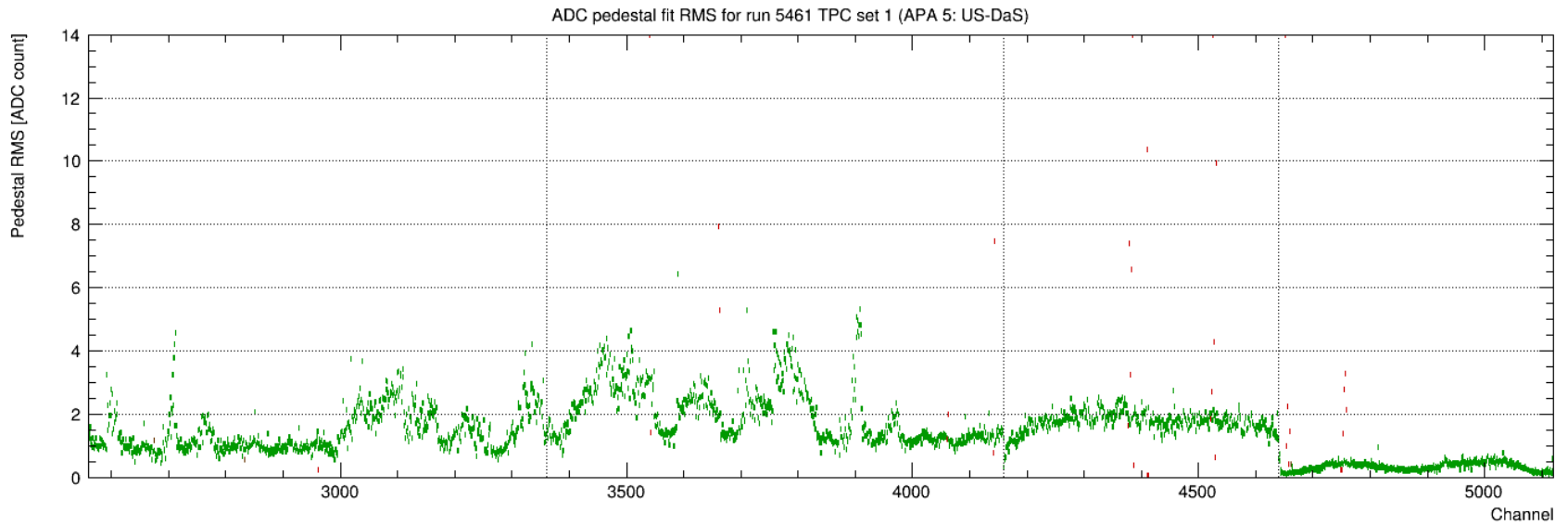
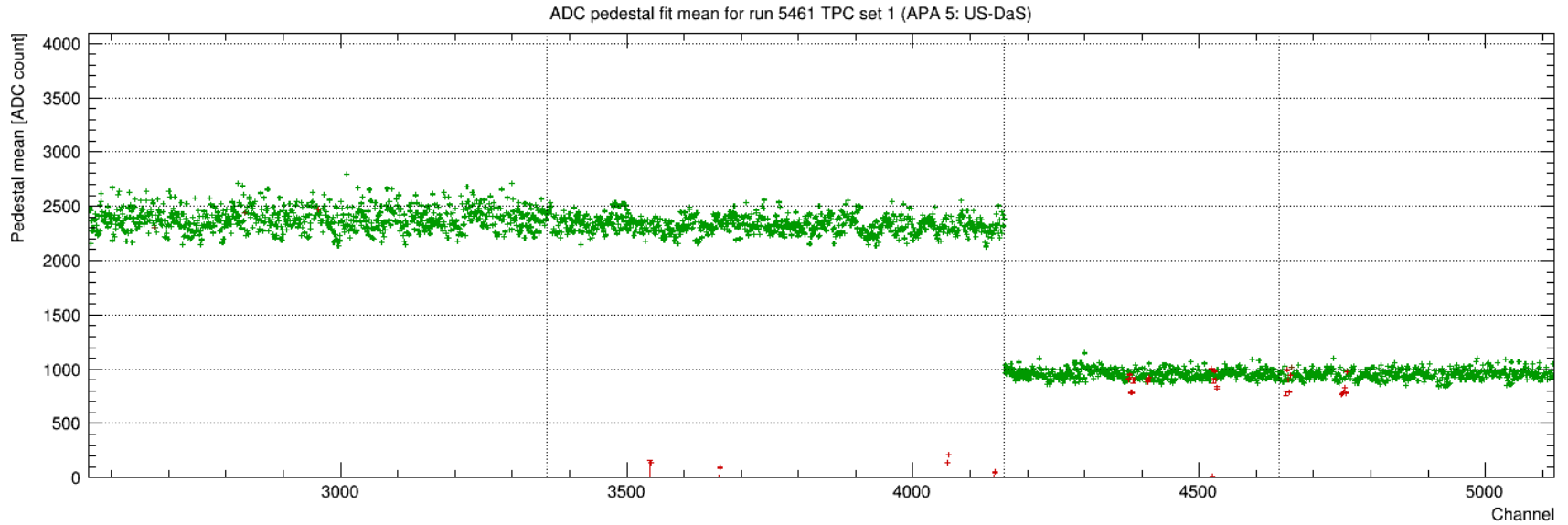
APA 5341 run events 1-999



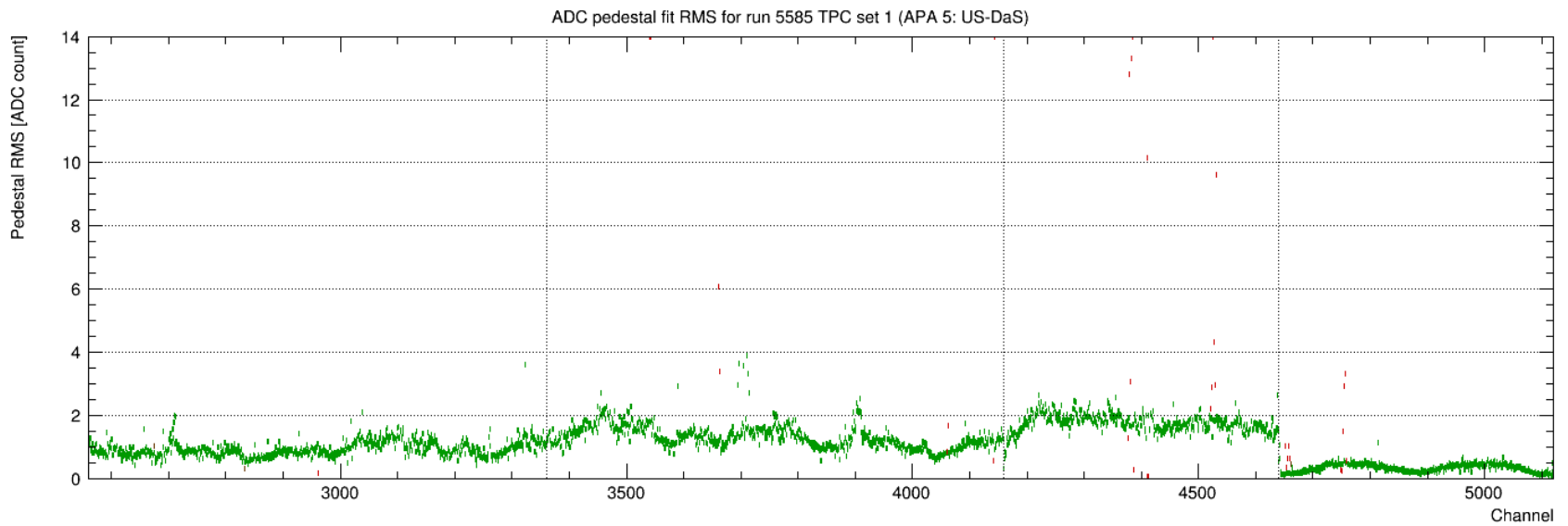
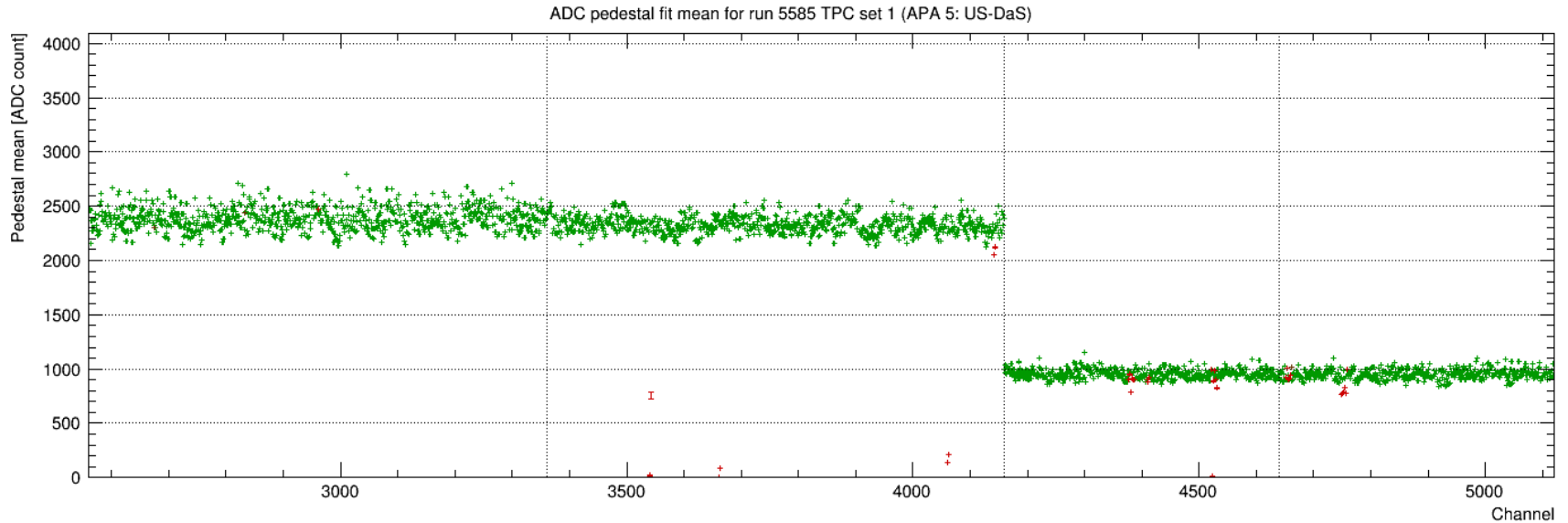
APA 5380 run events 1-999



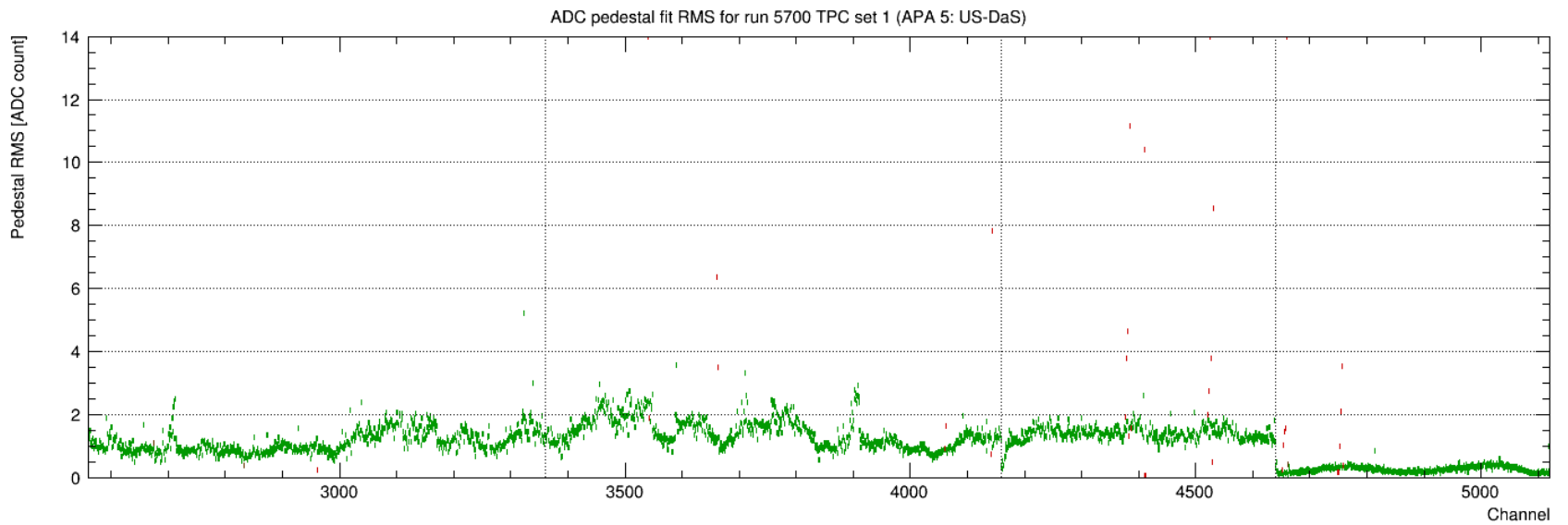
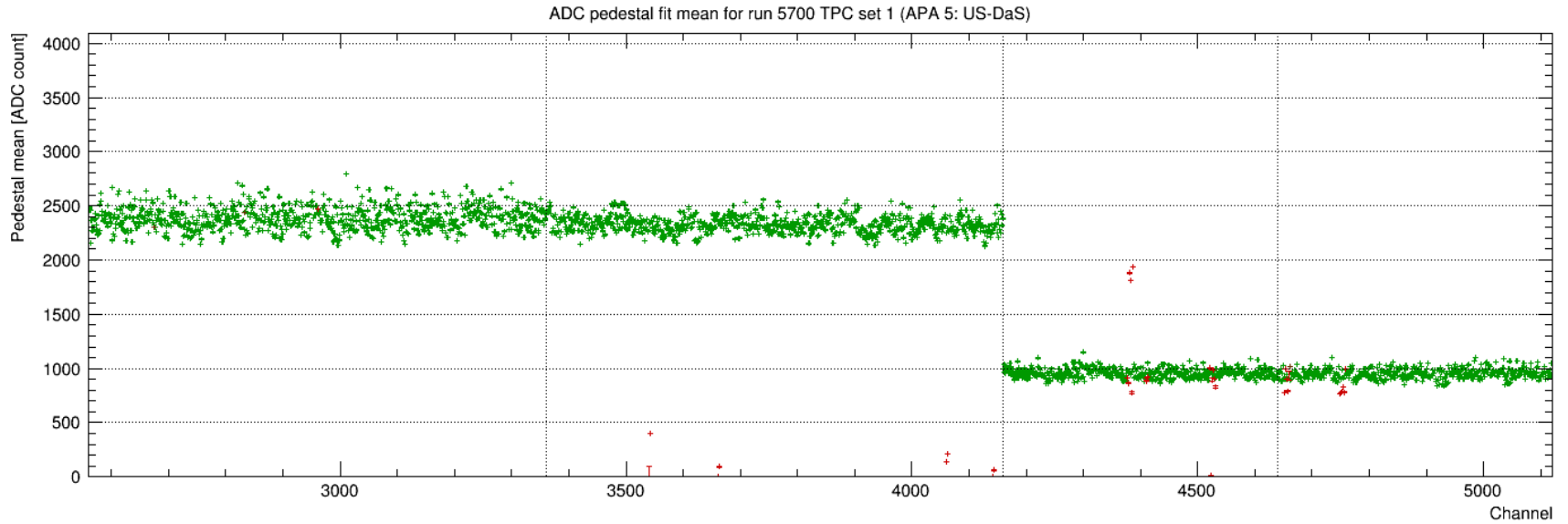
APA 5 run 5461 events 1-999



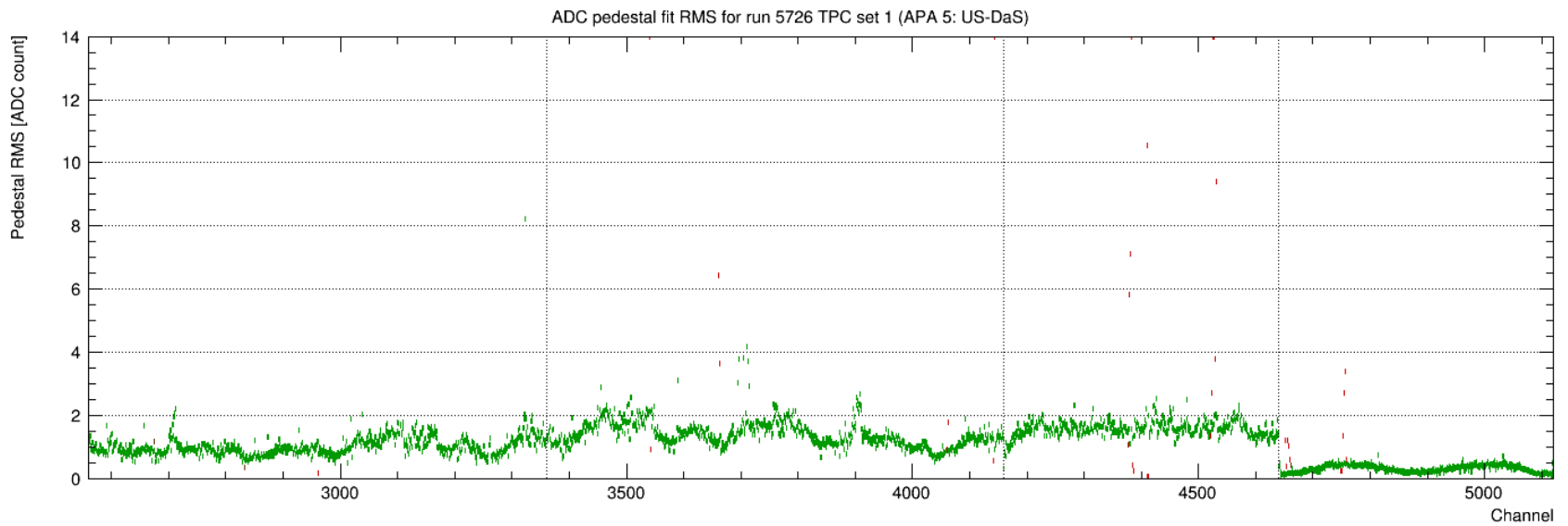
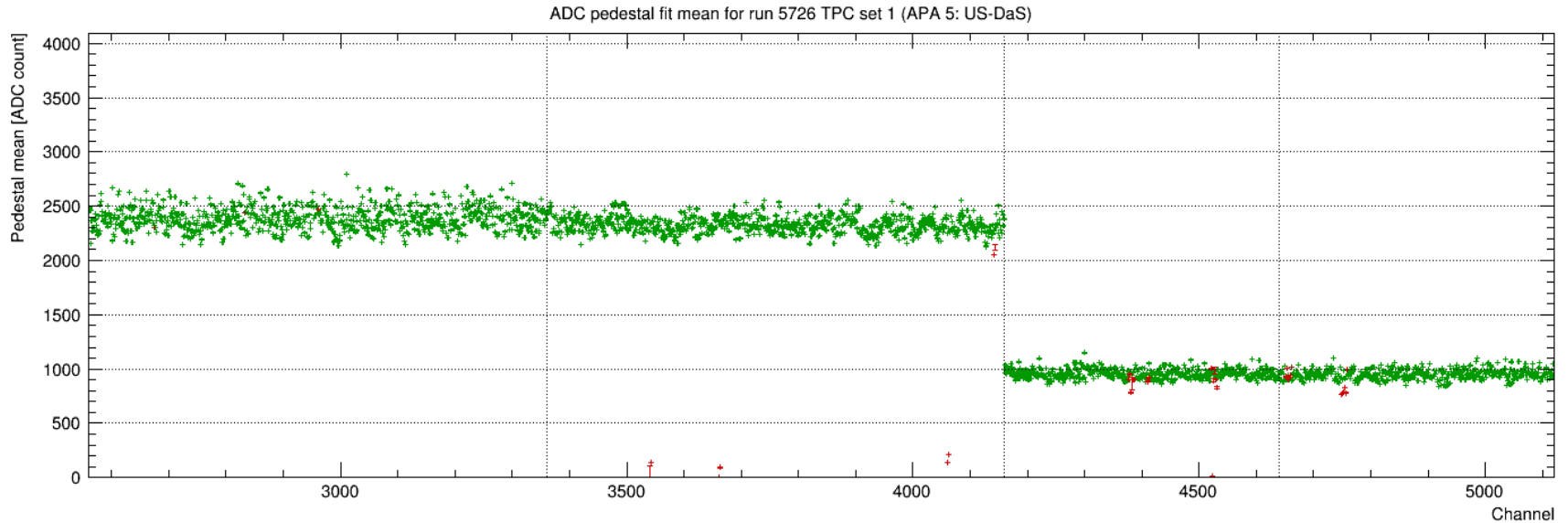
APA 5 run 5585 events 1-999



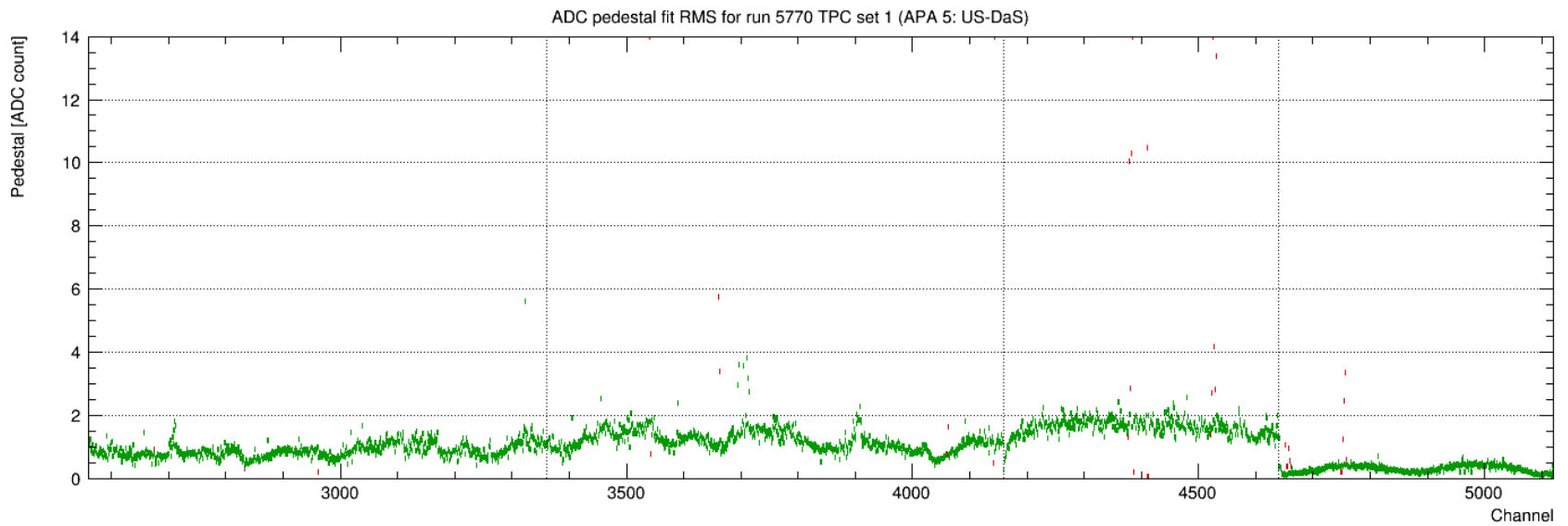
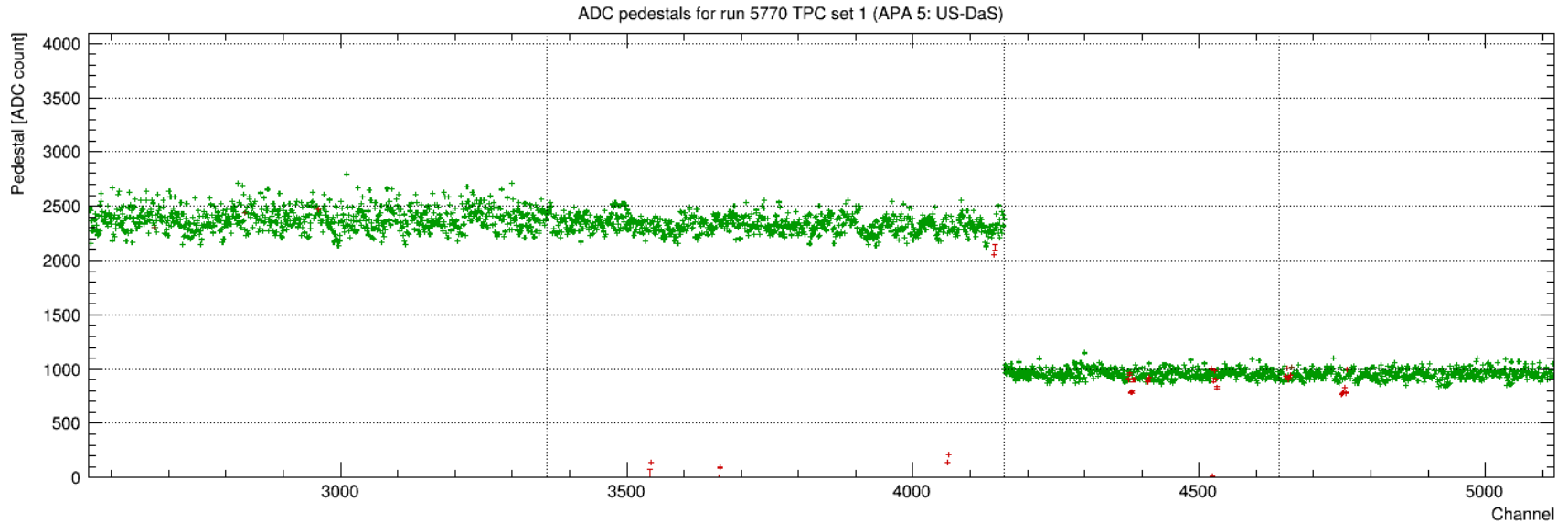
APA 5 run 5700 events 1-999



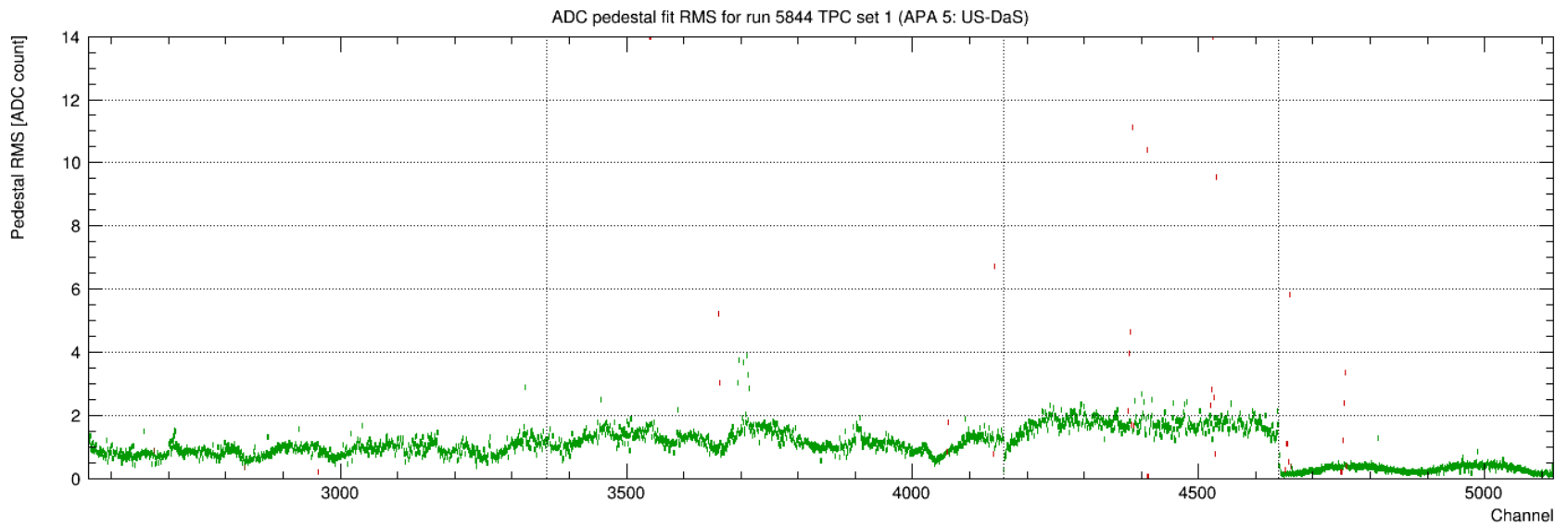
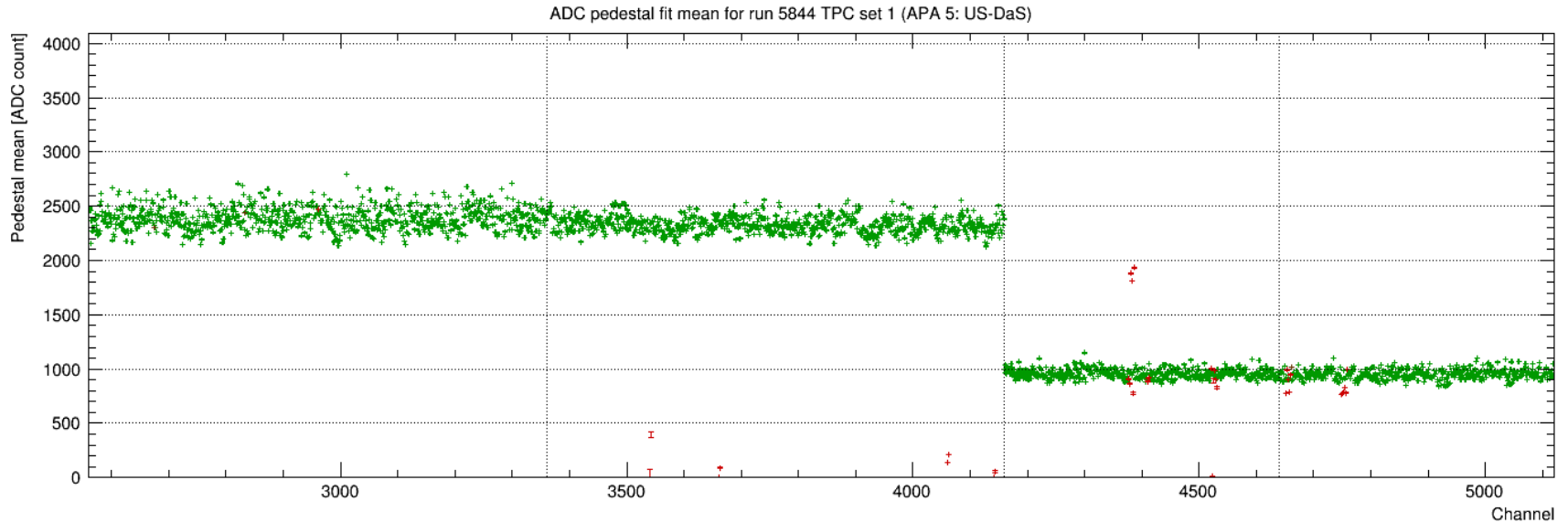
APA 5 run 5726 events 1-999



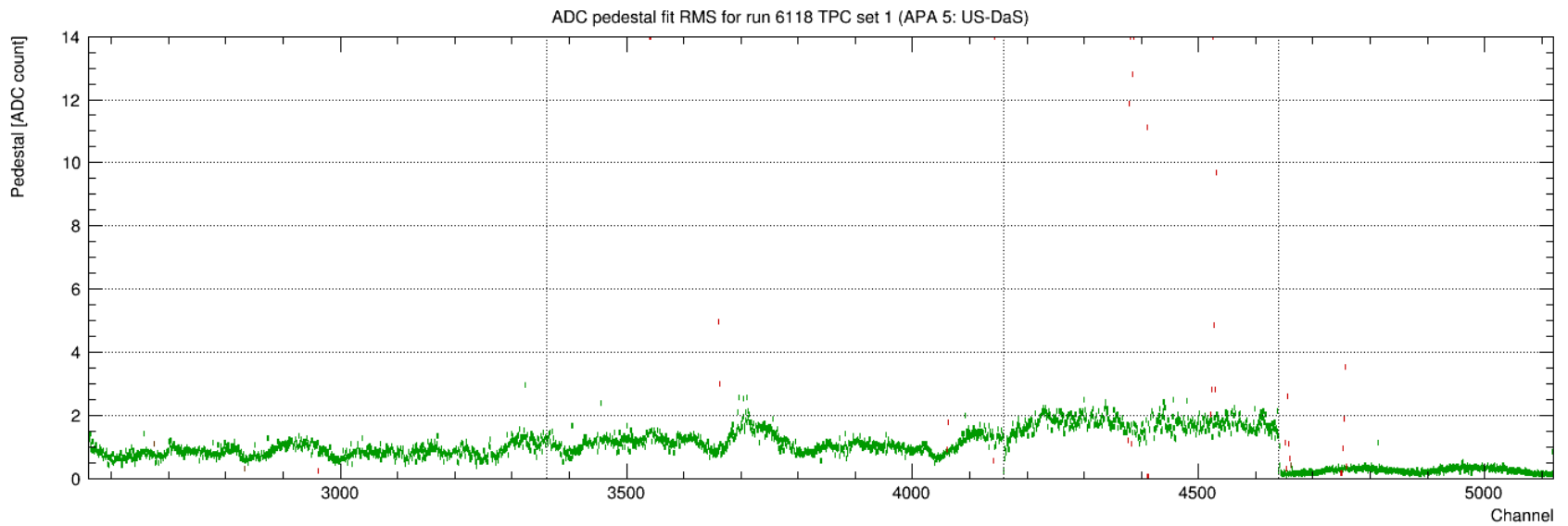
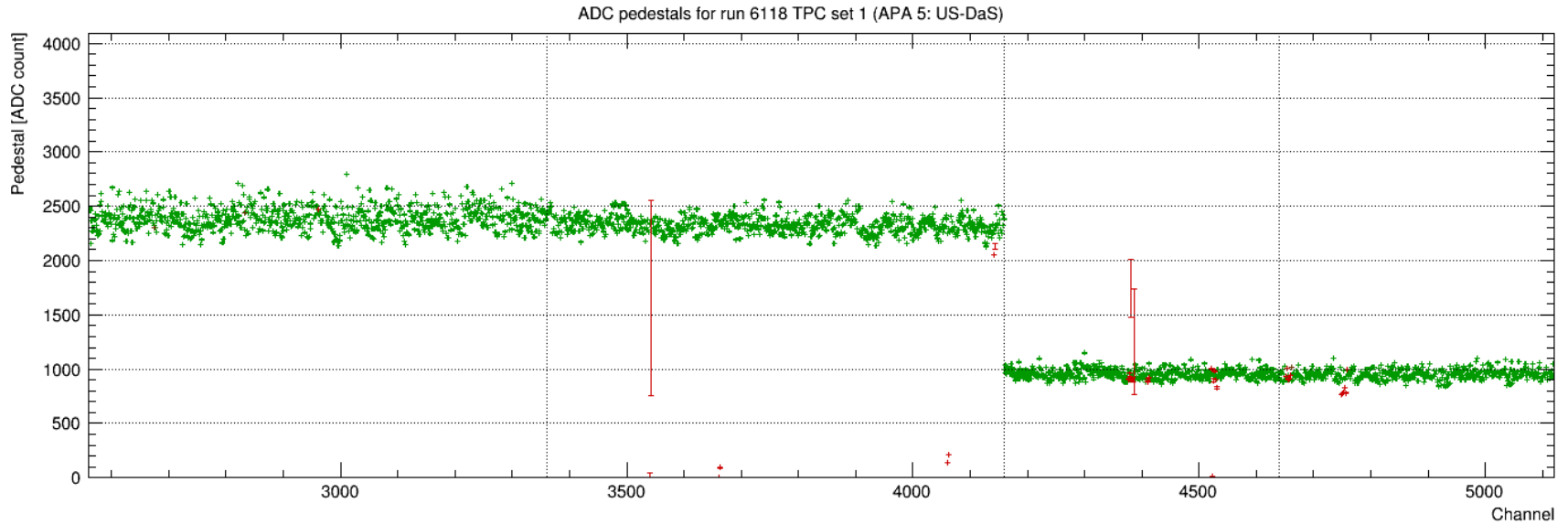
APA 5 run 5770 events 1-999



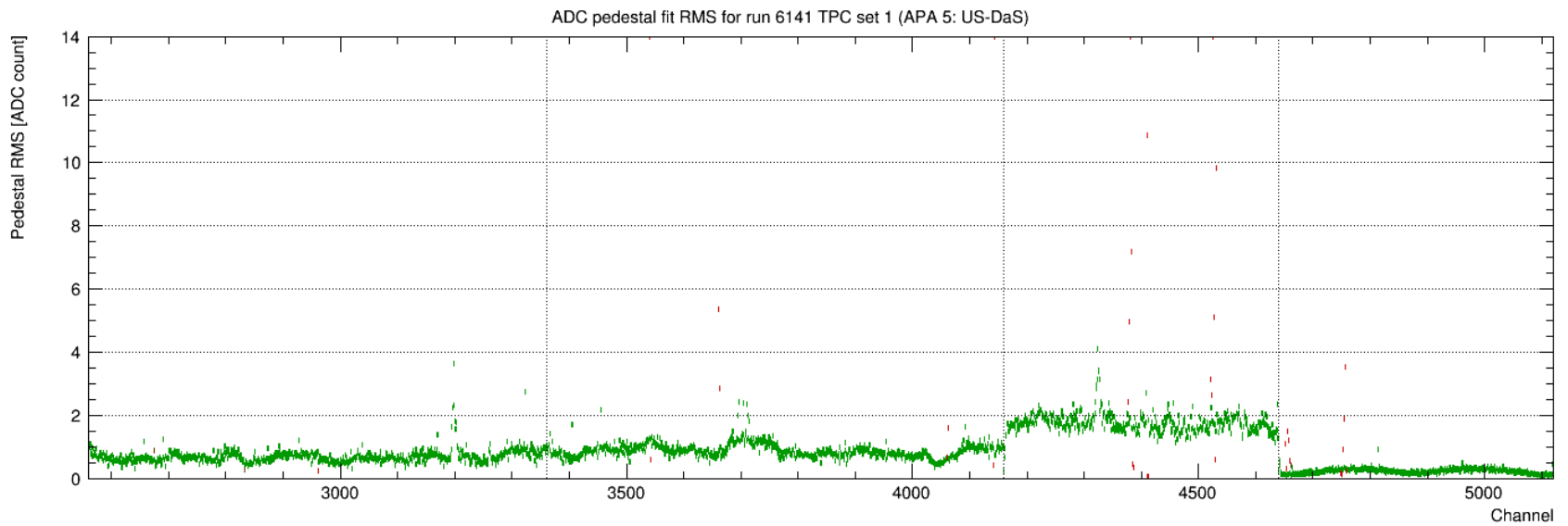
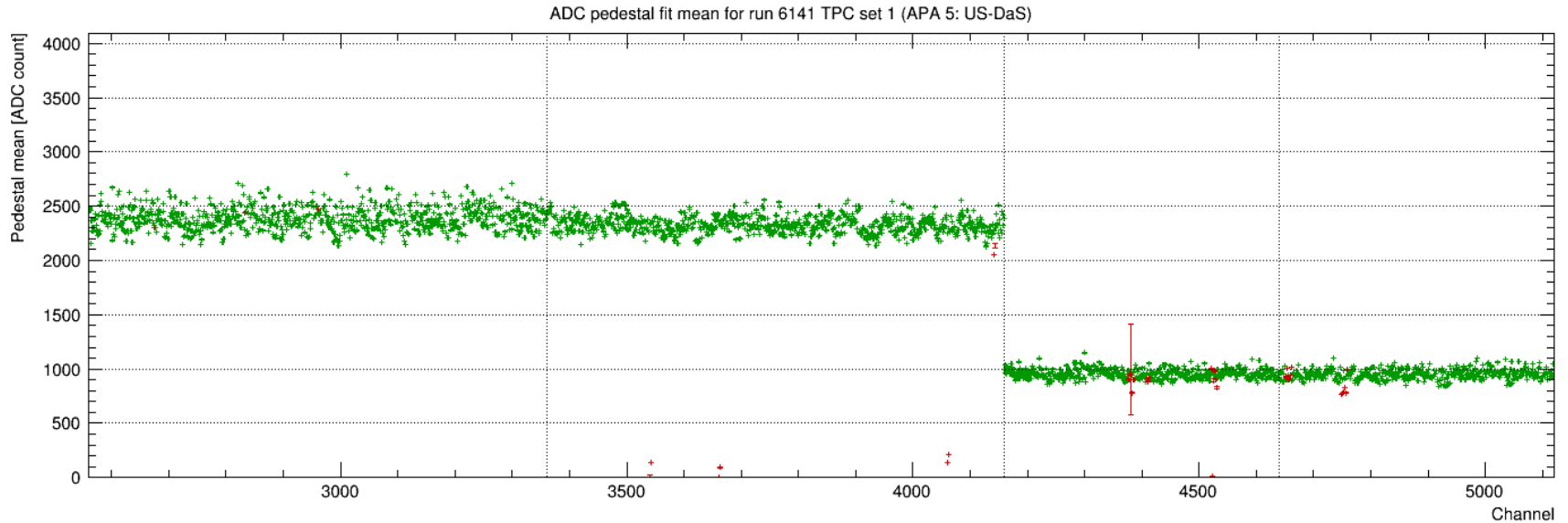
APA 5 run 5844 events 1-999



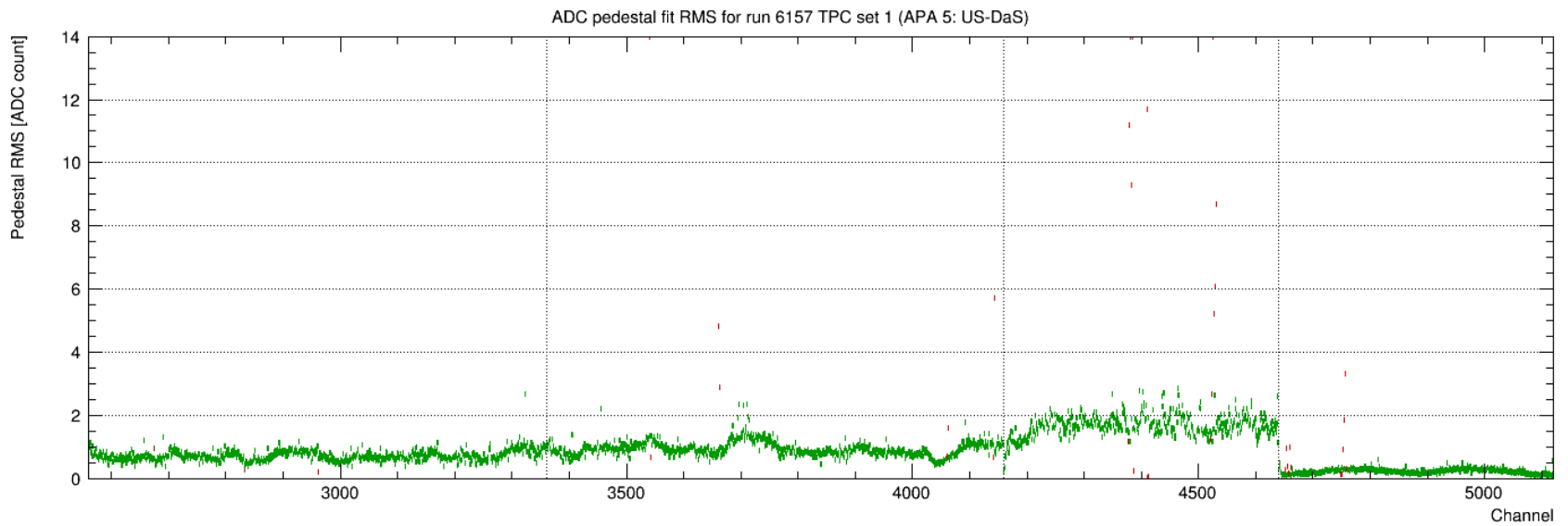
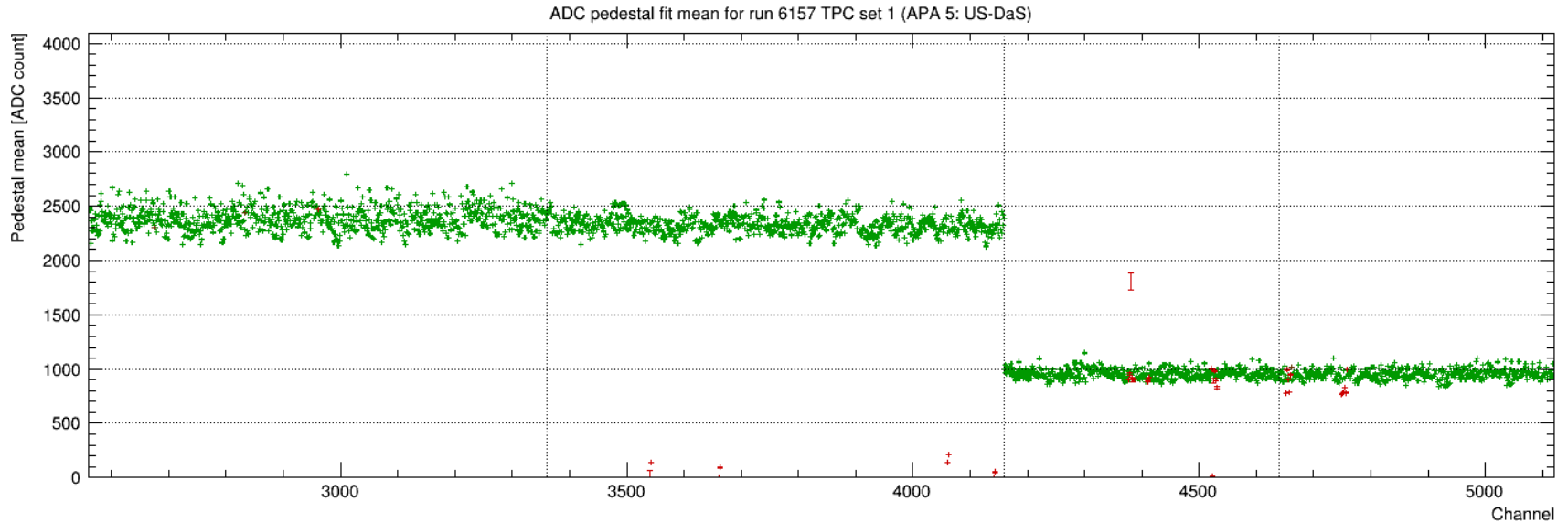
APA 5 run 6118 events 1-999



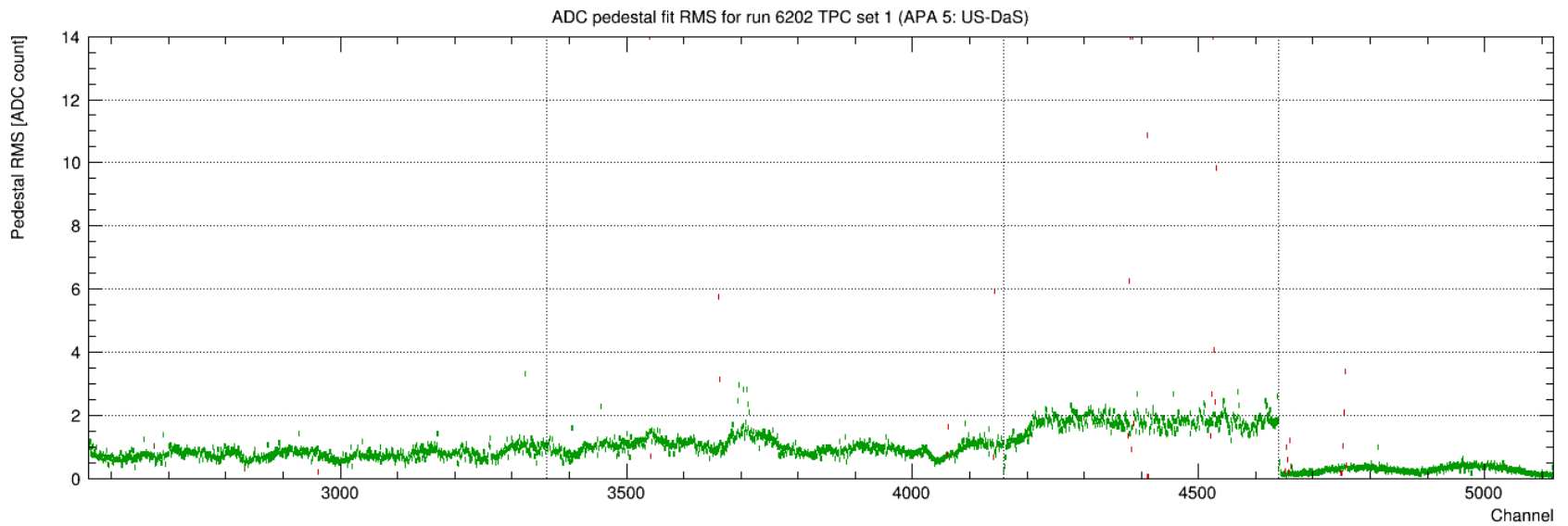
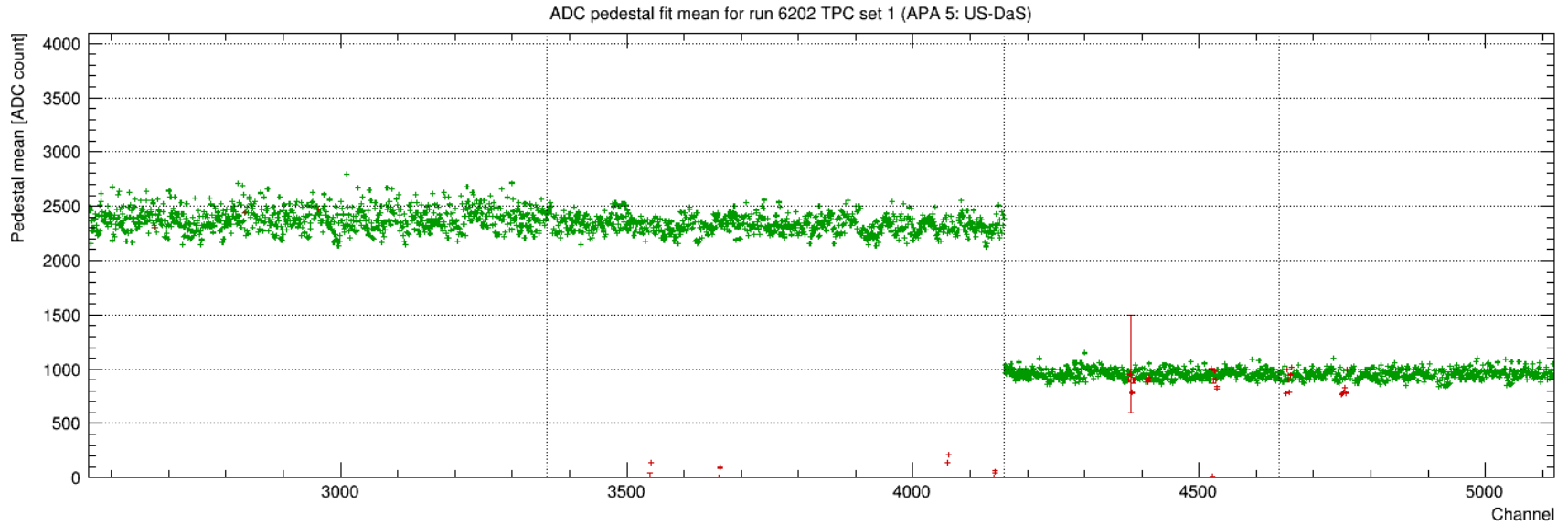
APA 5 run 6141 events 1-999



APA 5 run 6157 events 1-999

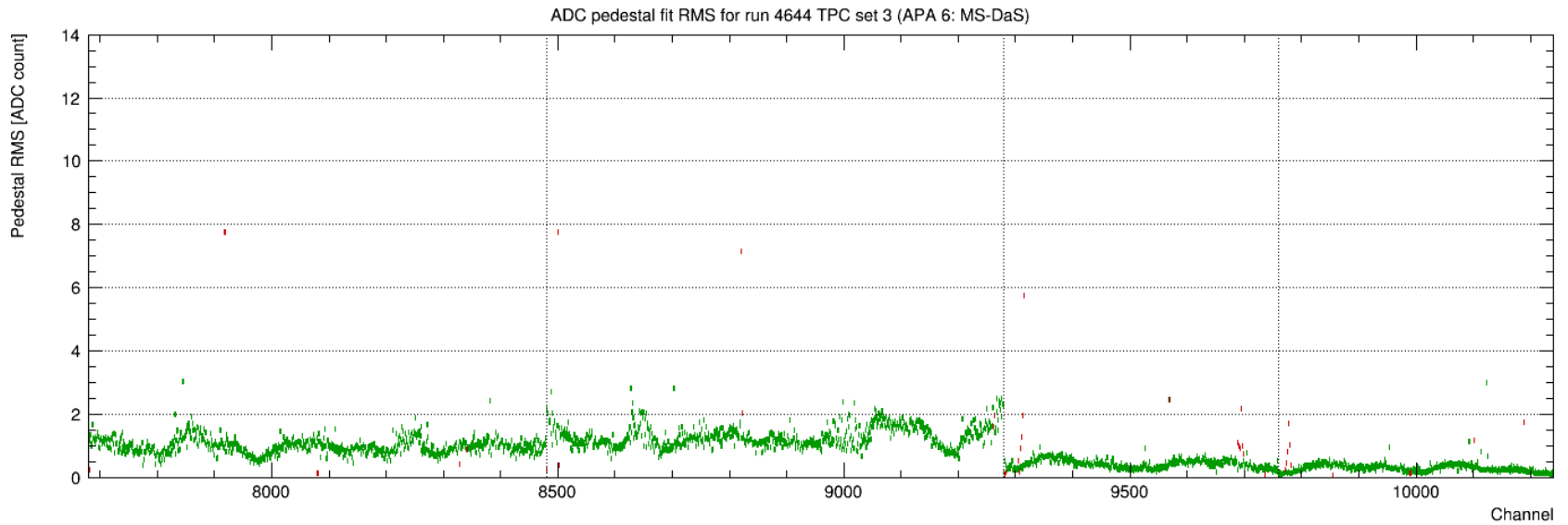
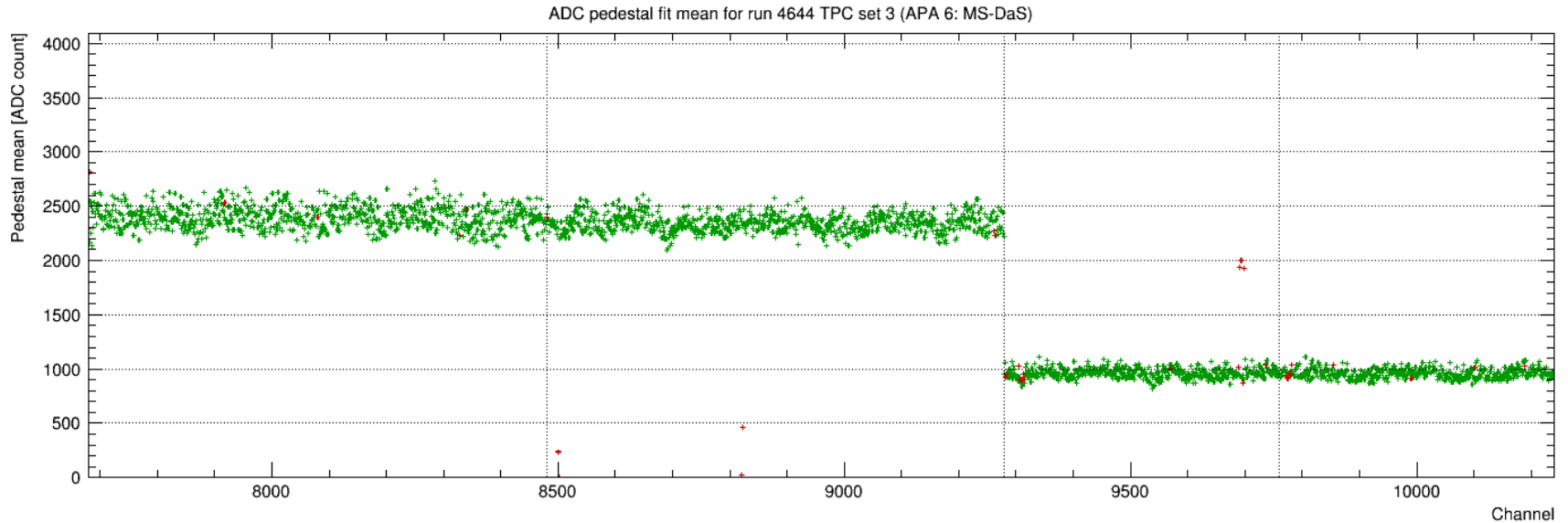


APA 5 run 6202 events 1-999

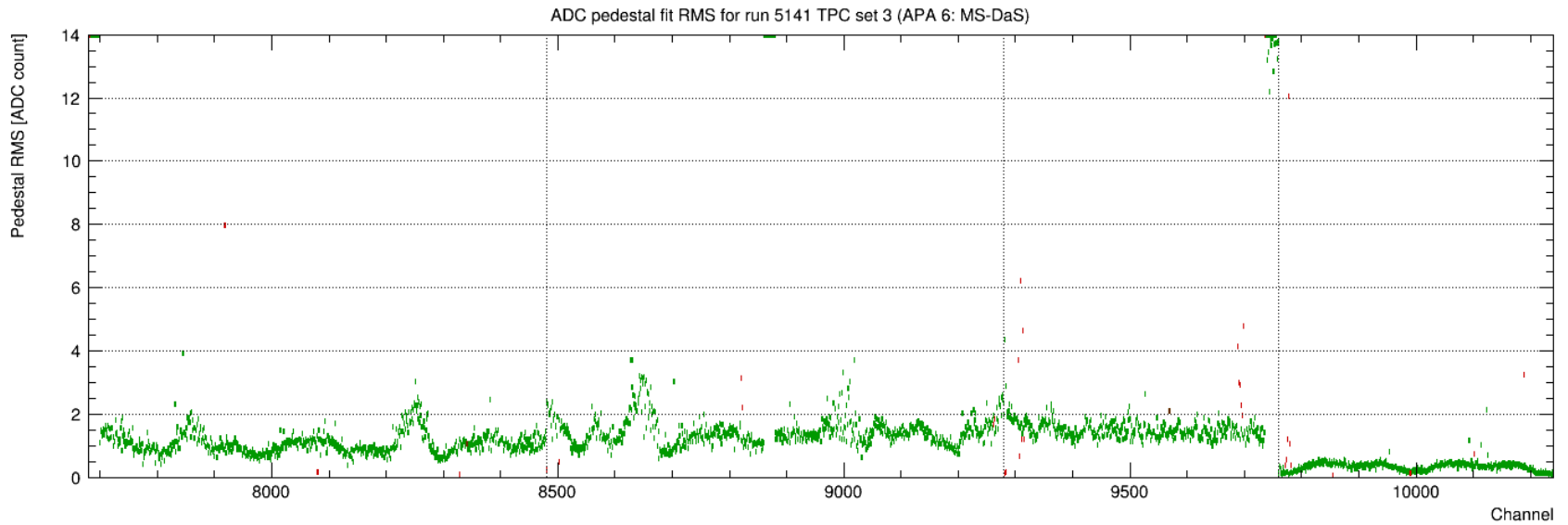
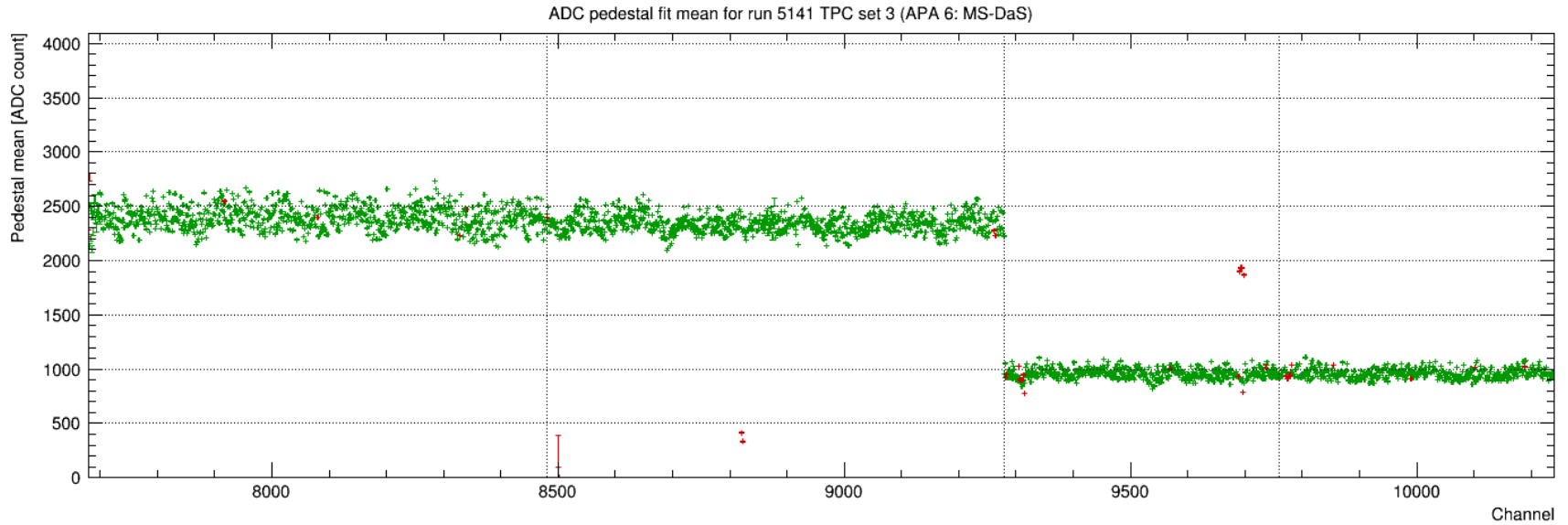


APA 6

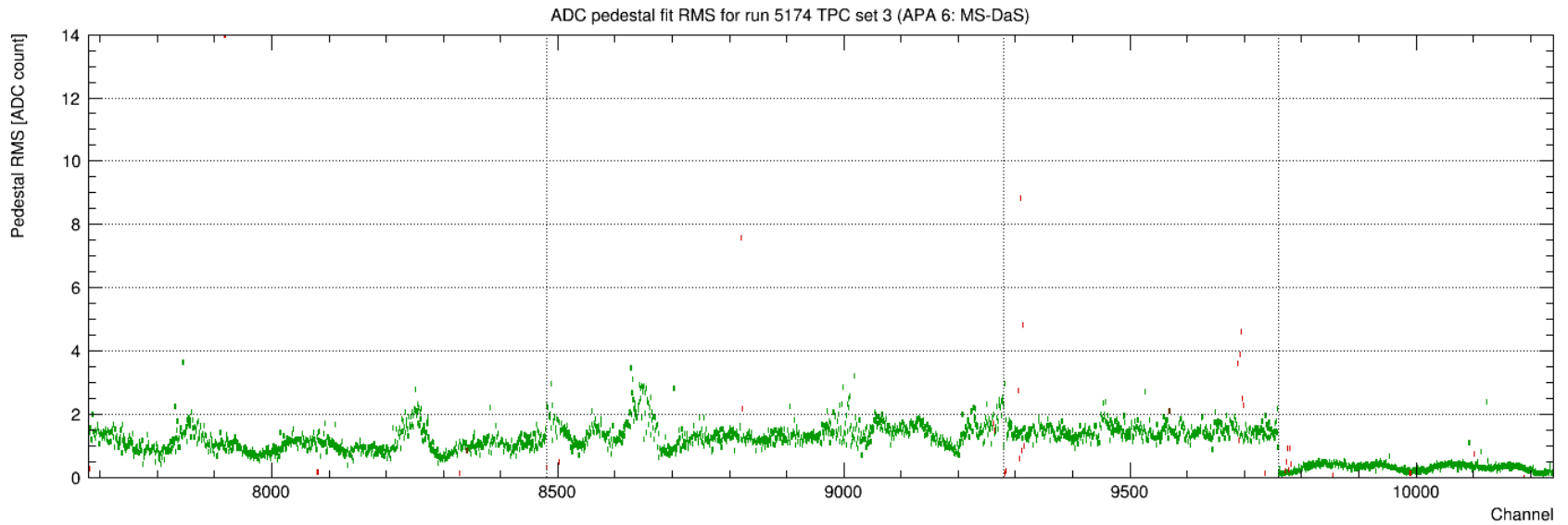
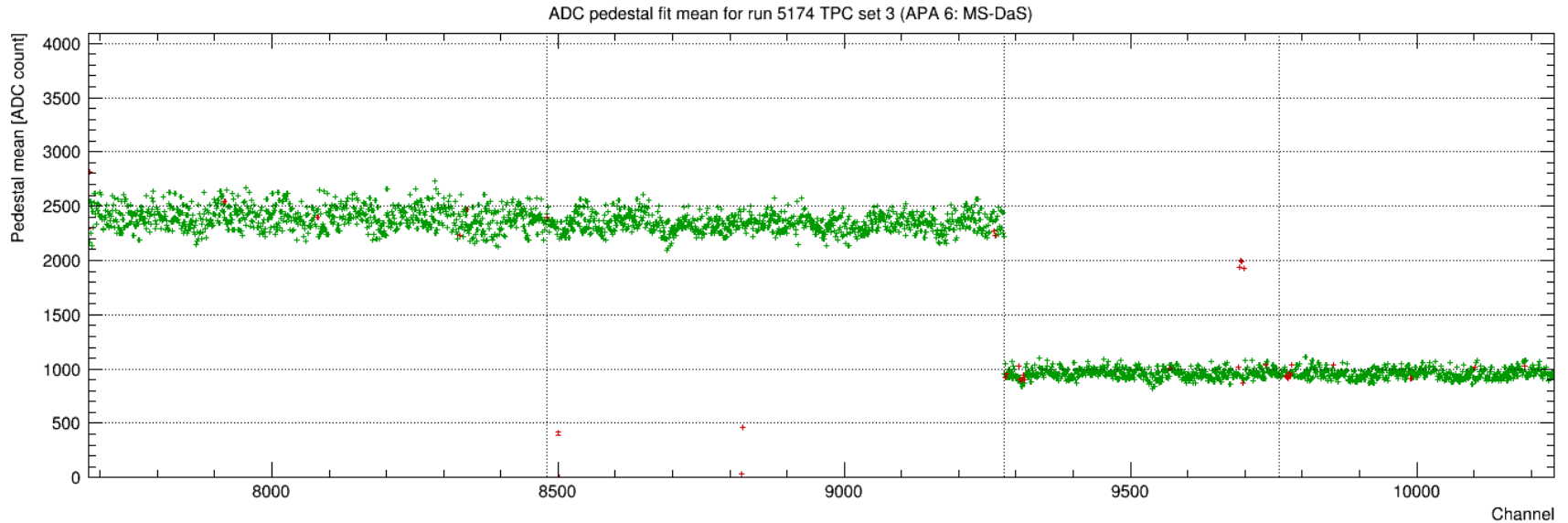
APA 6 run 4644 events 1-999



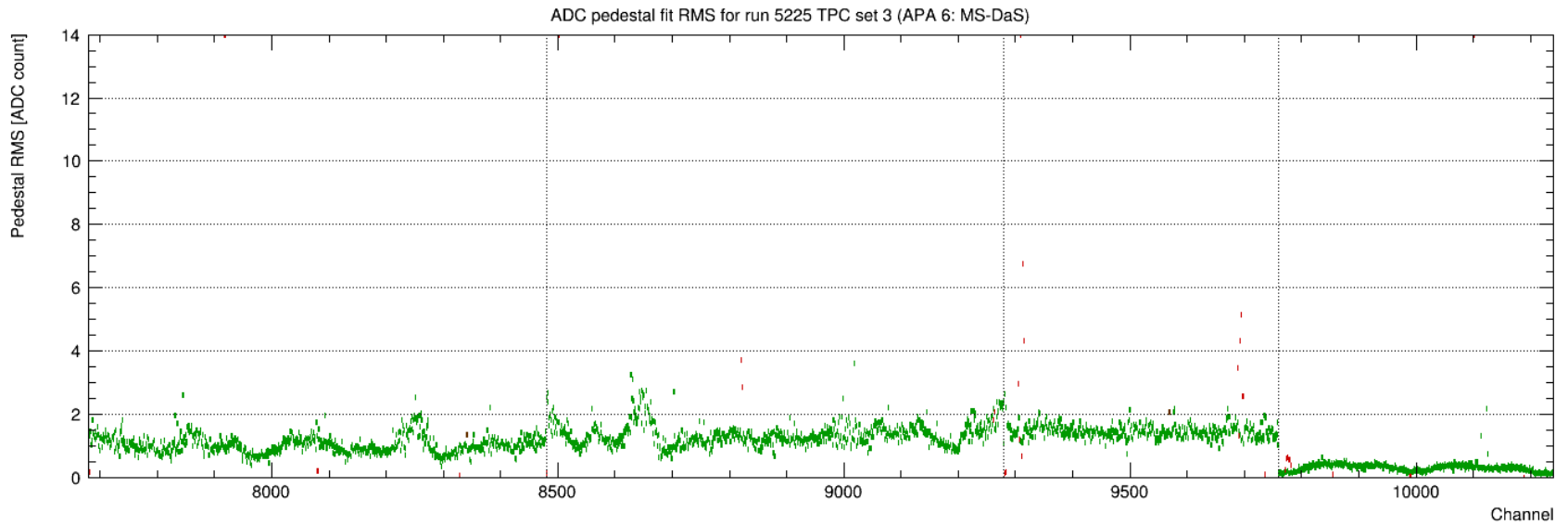
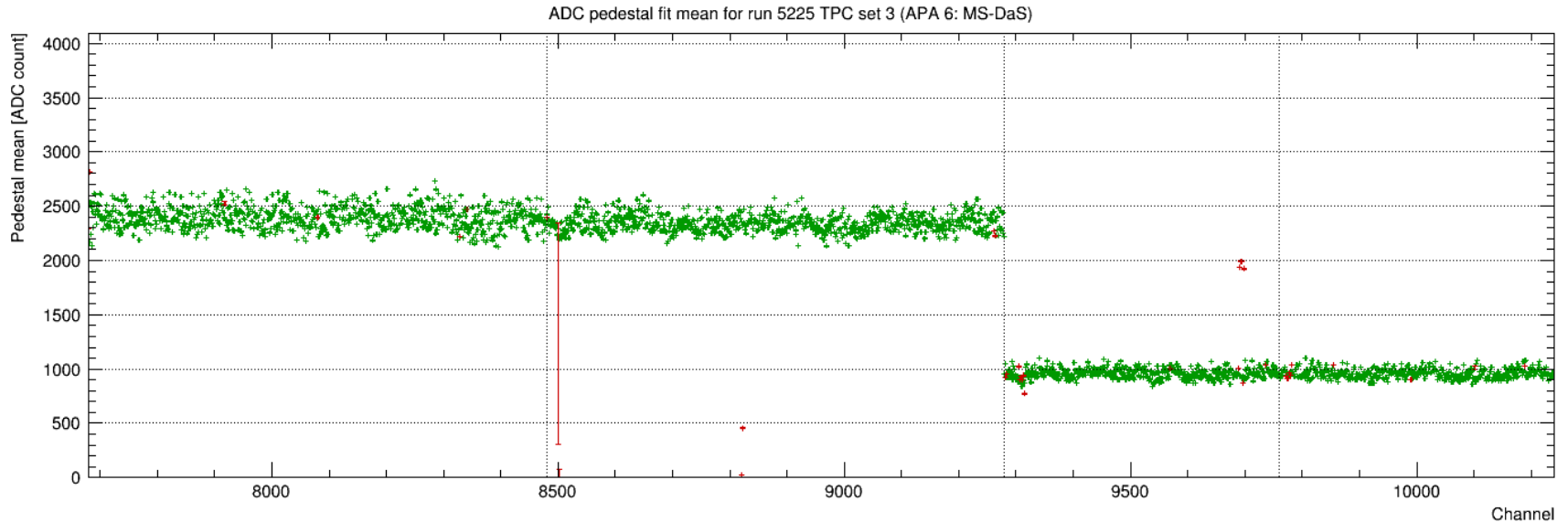
APA 6 run 5141 events 1-999



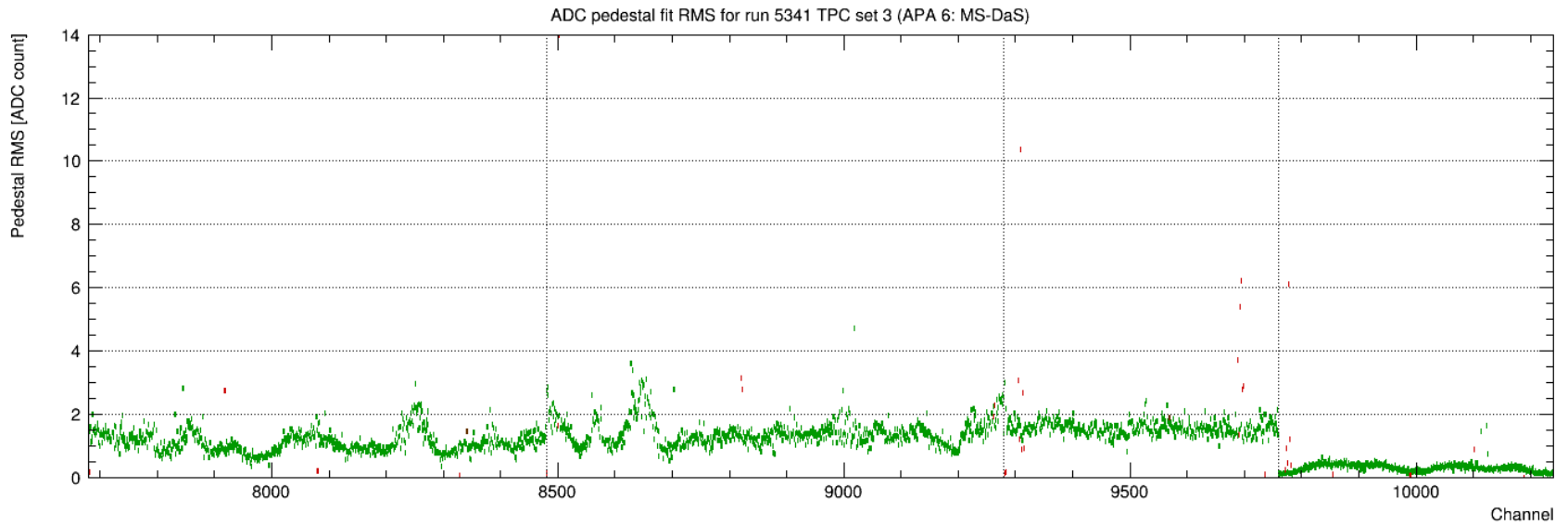
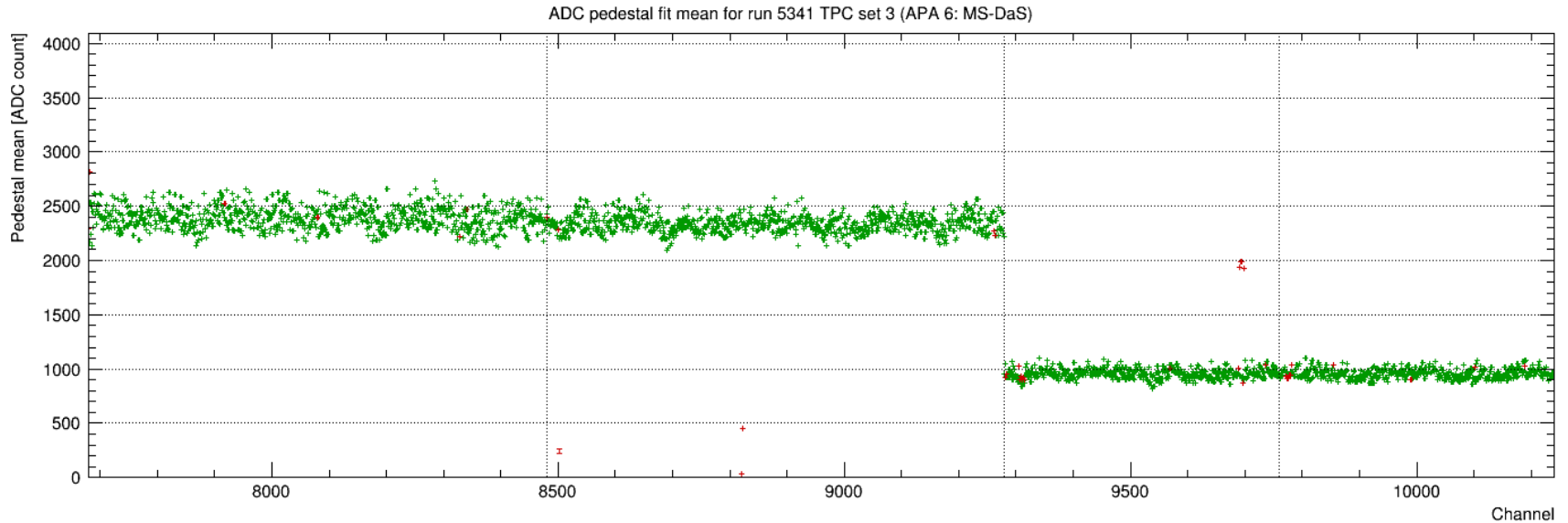
APA 6 run 5174 events 1-999



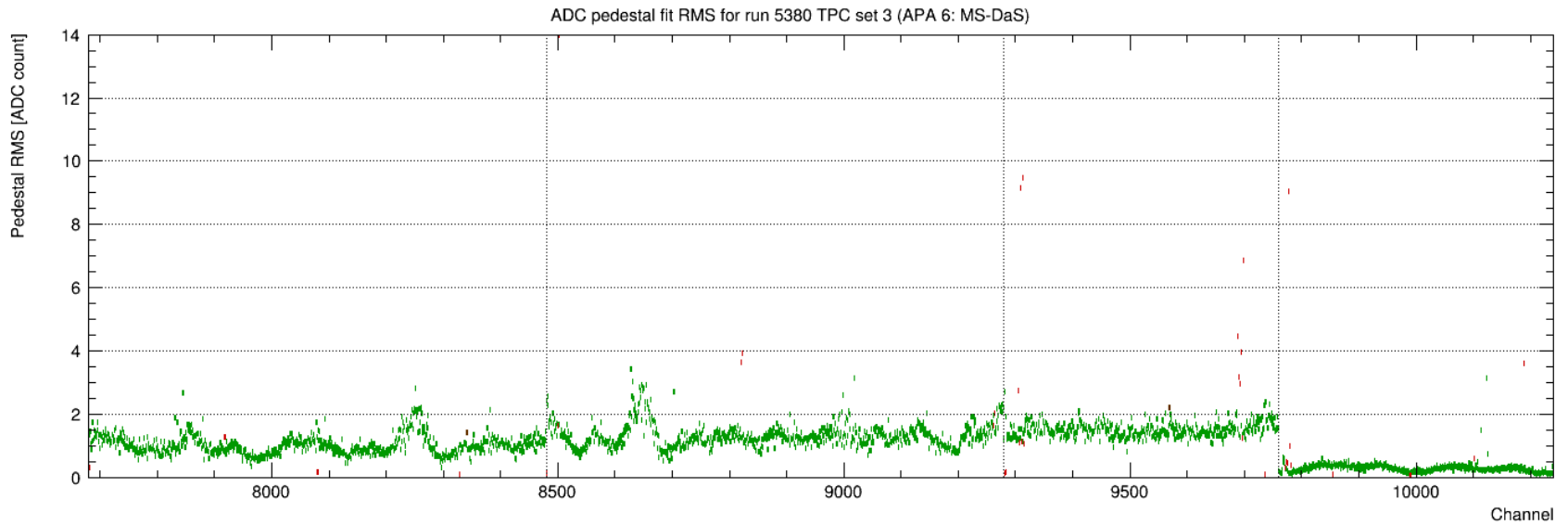
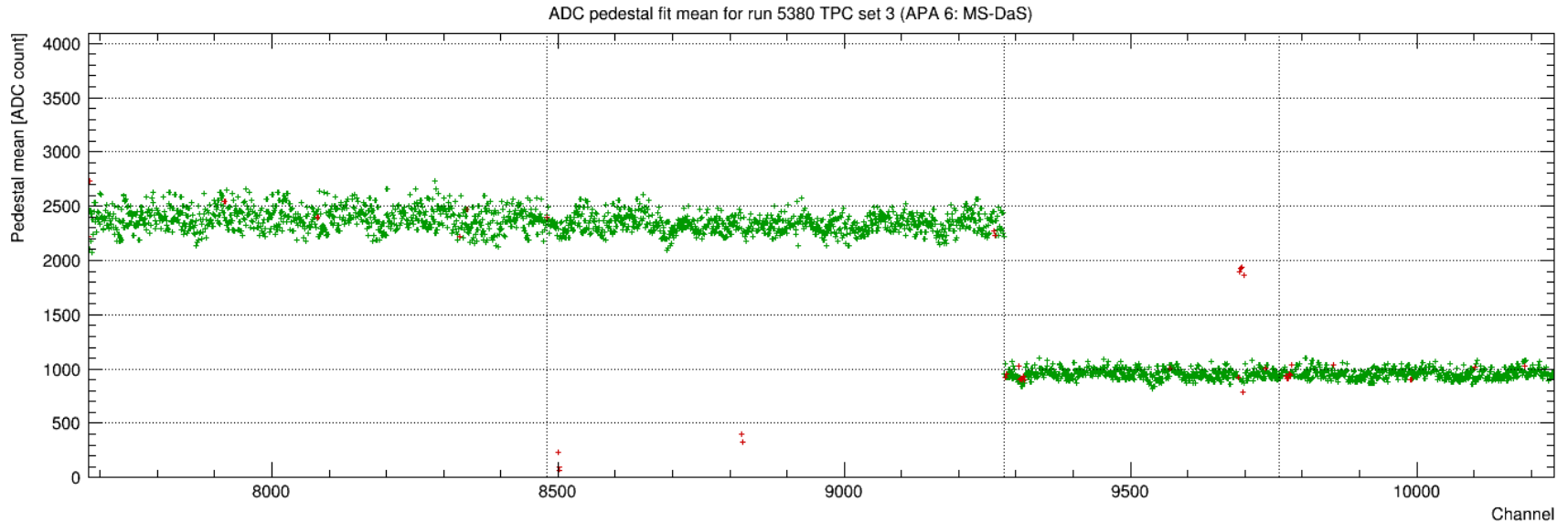
APA 6 run 5225 events 1-999



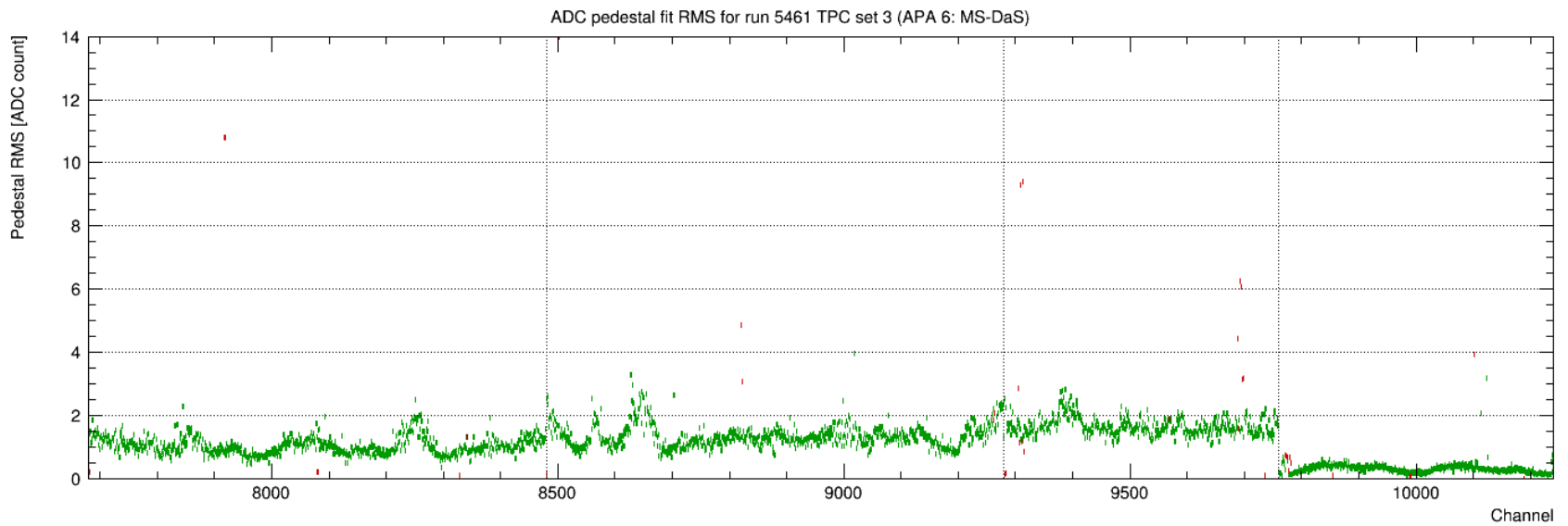
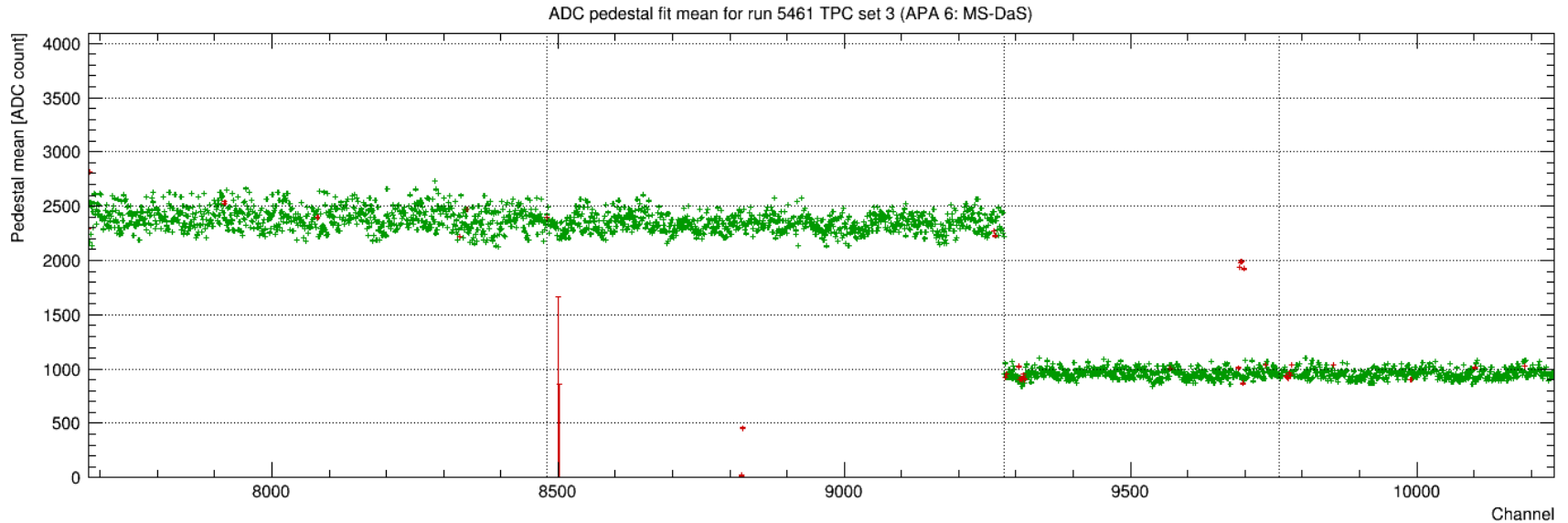
APA 6 run 5341 events 1-999



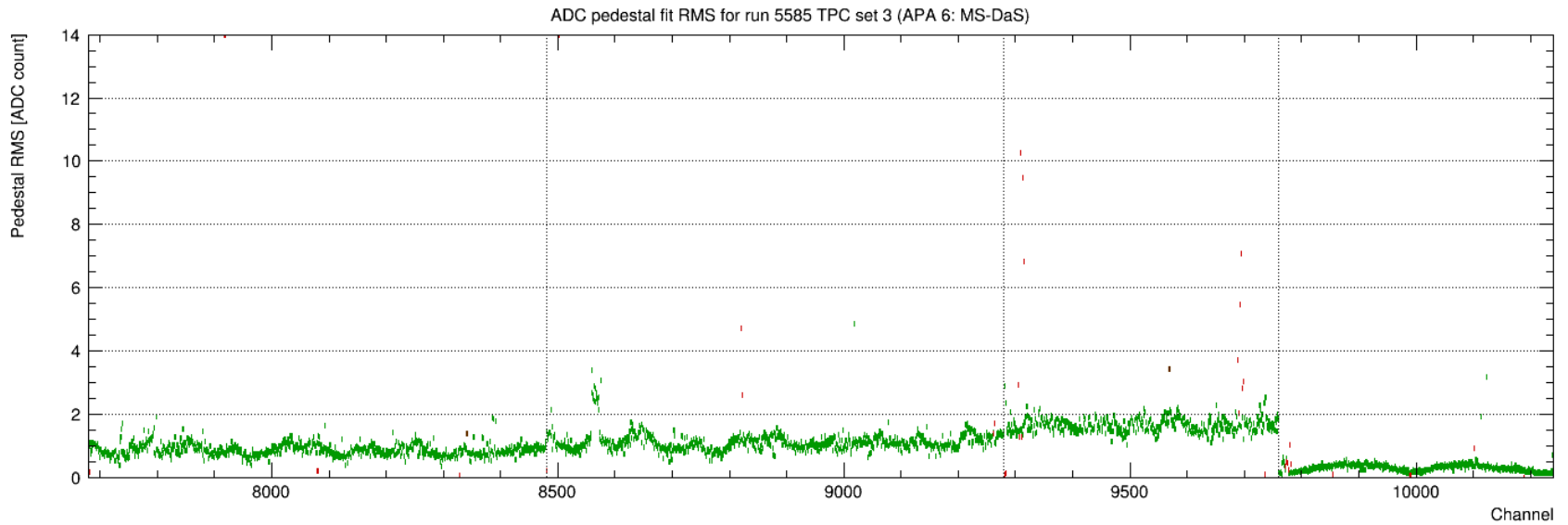
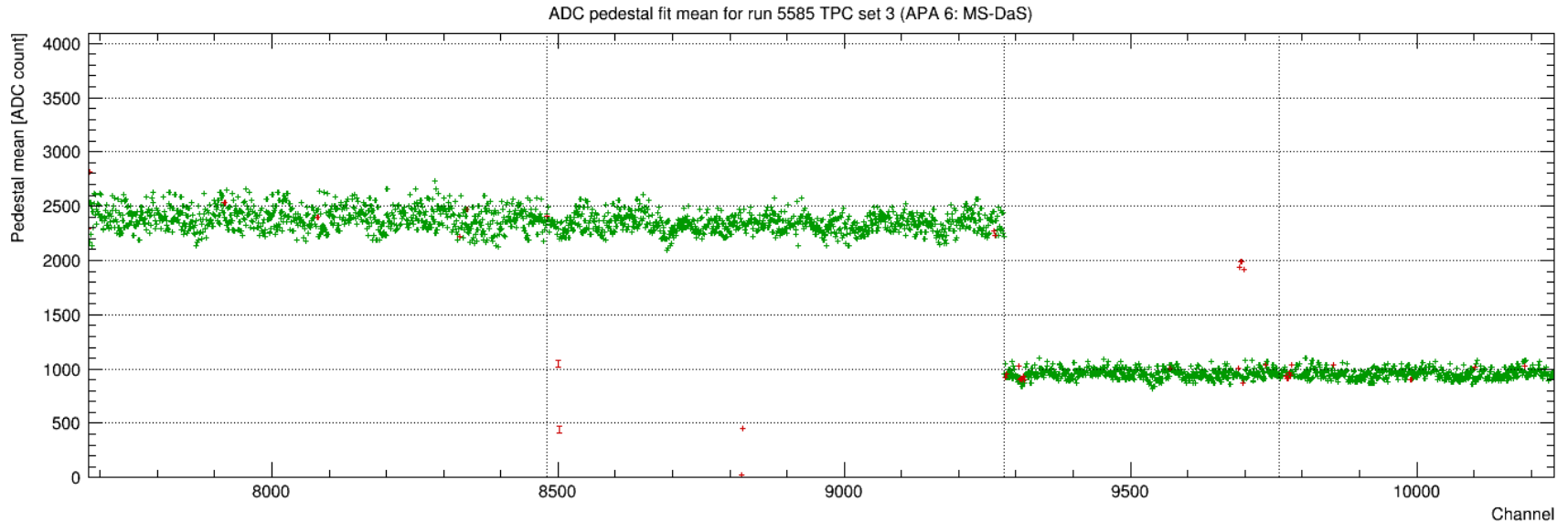
APA 6 run 5380 events 1-999



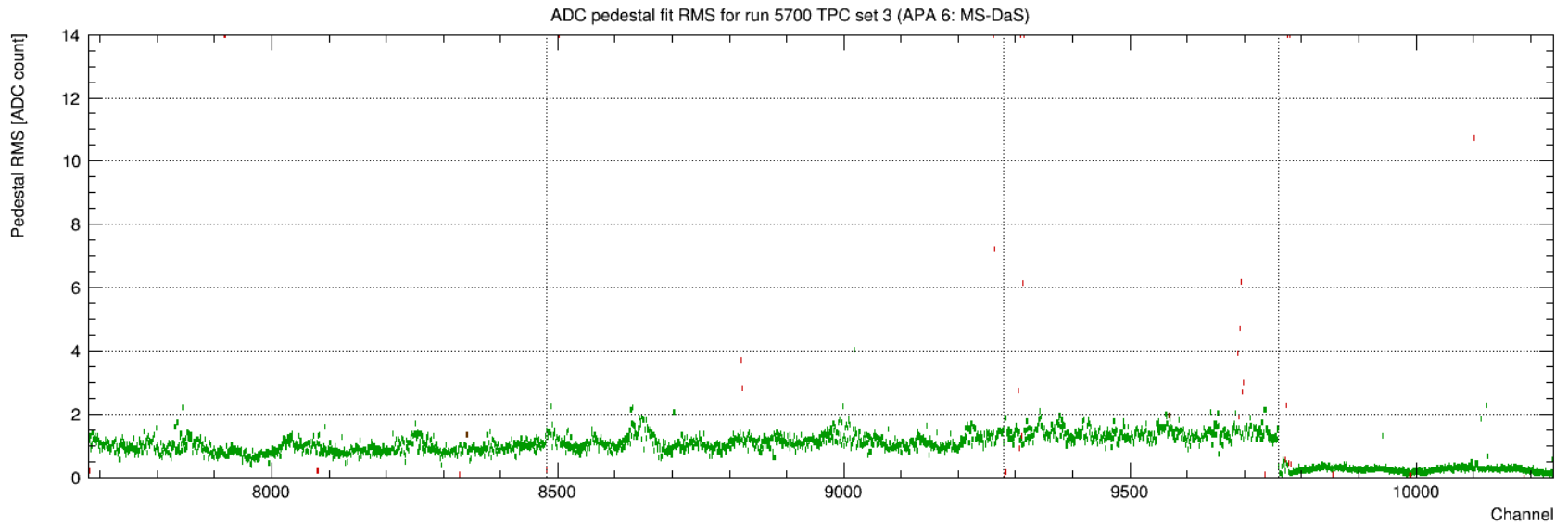
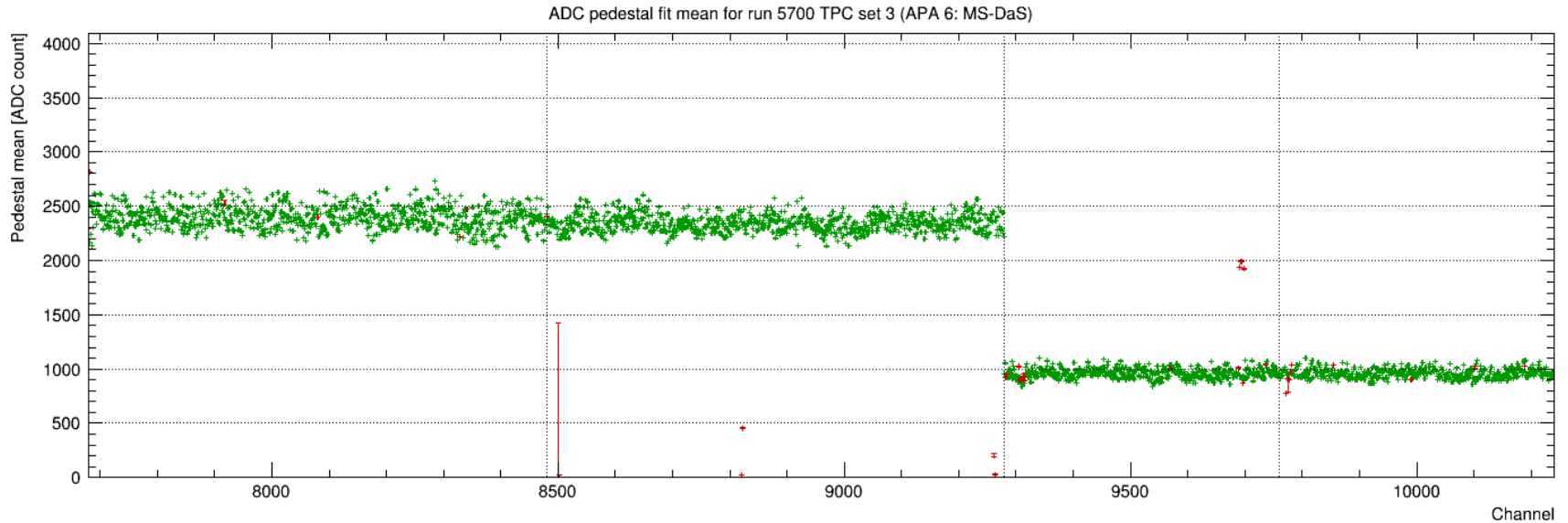
APA 6 run 5461 events 1-999



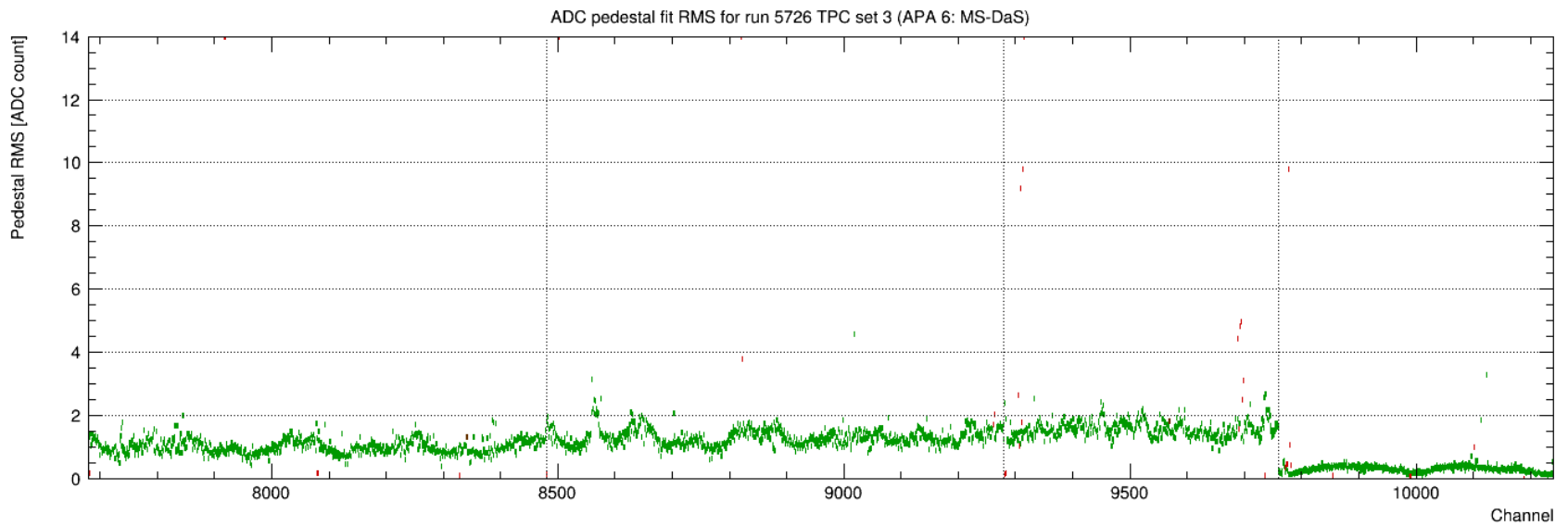
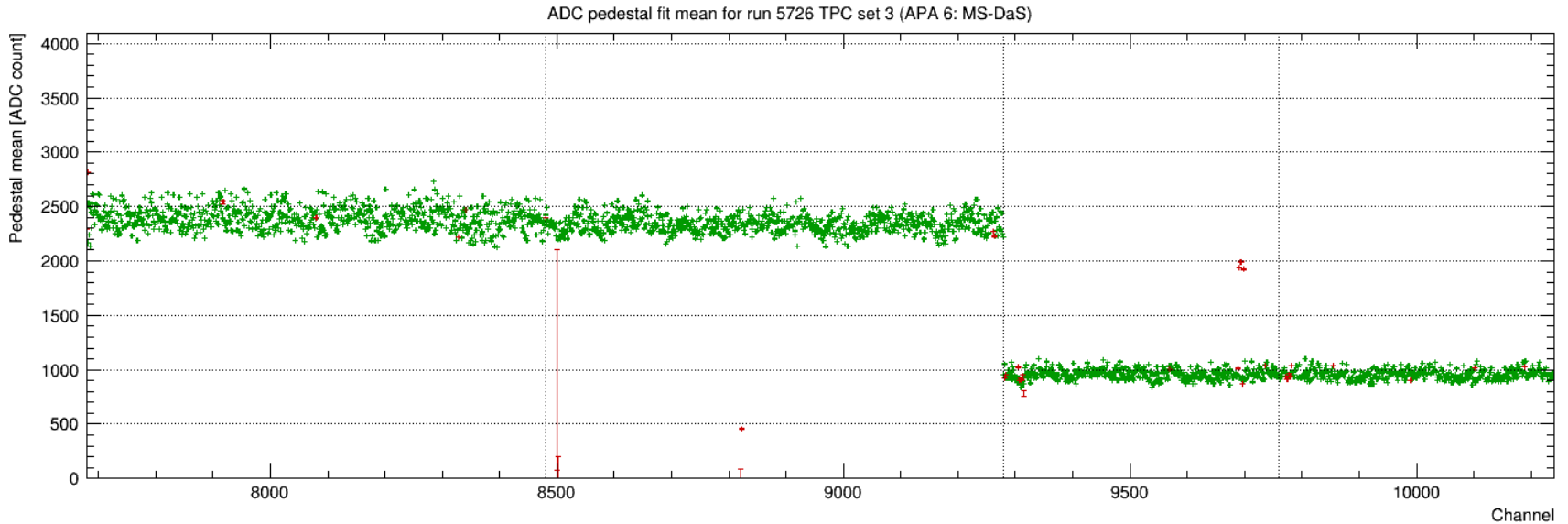
APA 6 run 5585 events 1-999



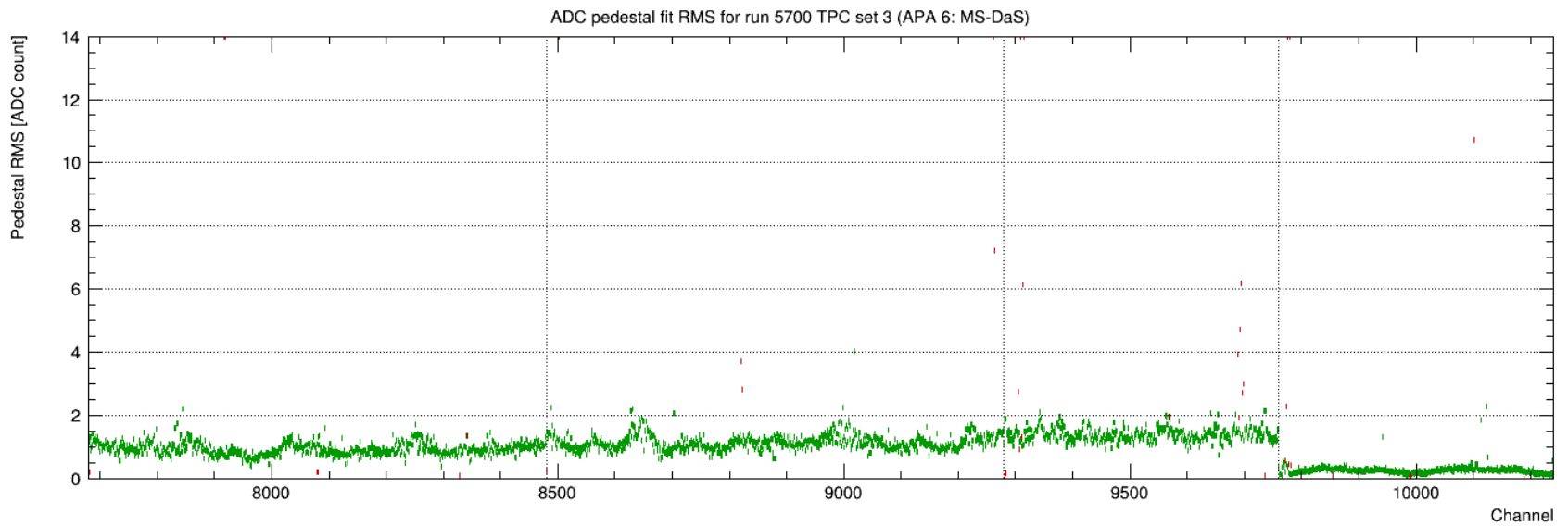
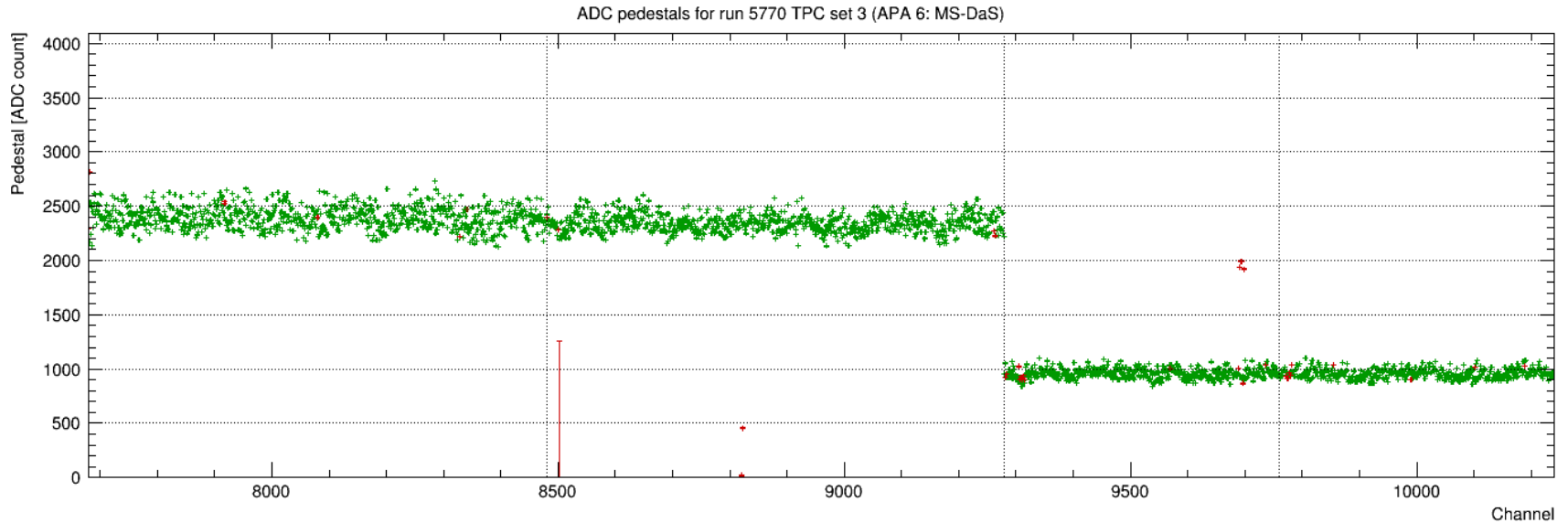
APA 6 run 5700 events 1-999



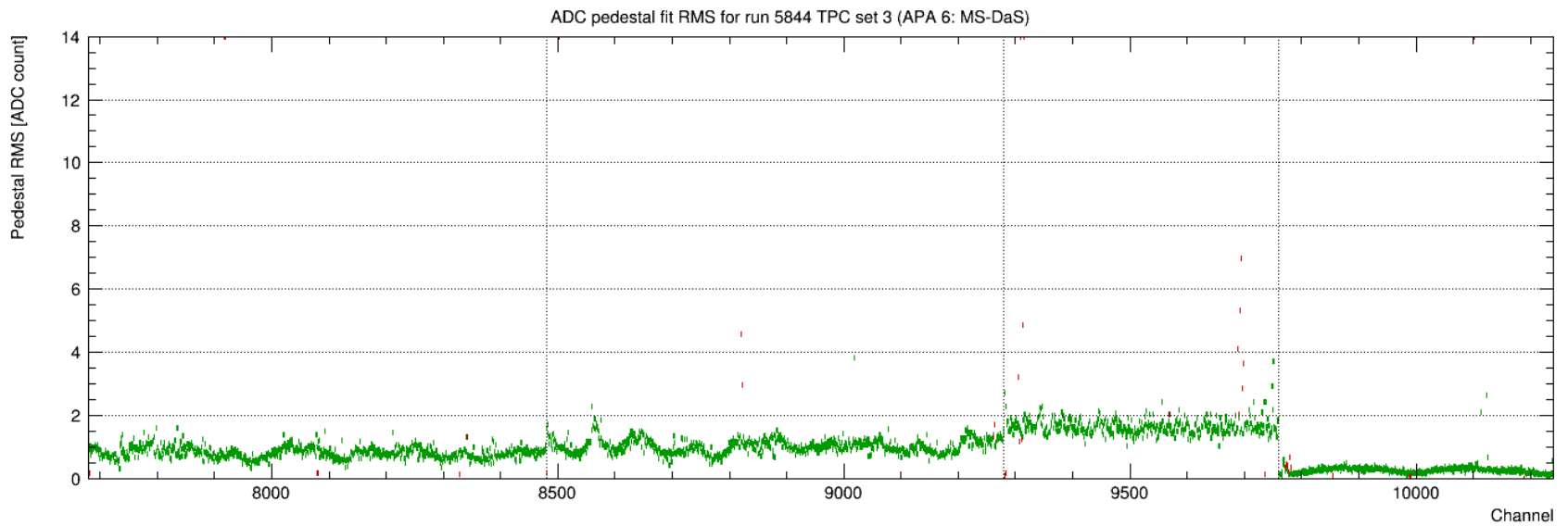
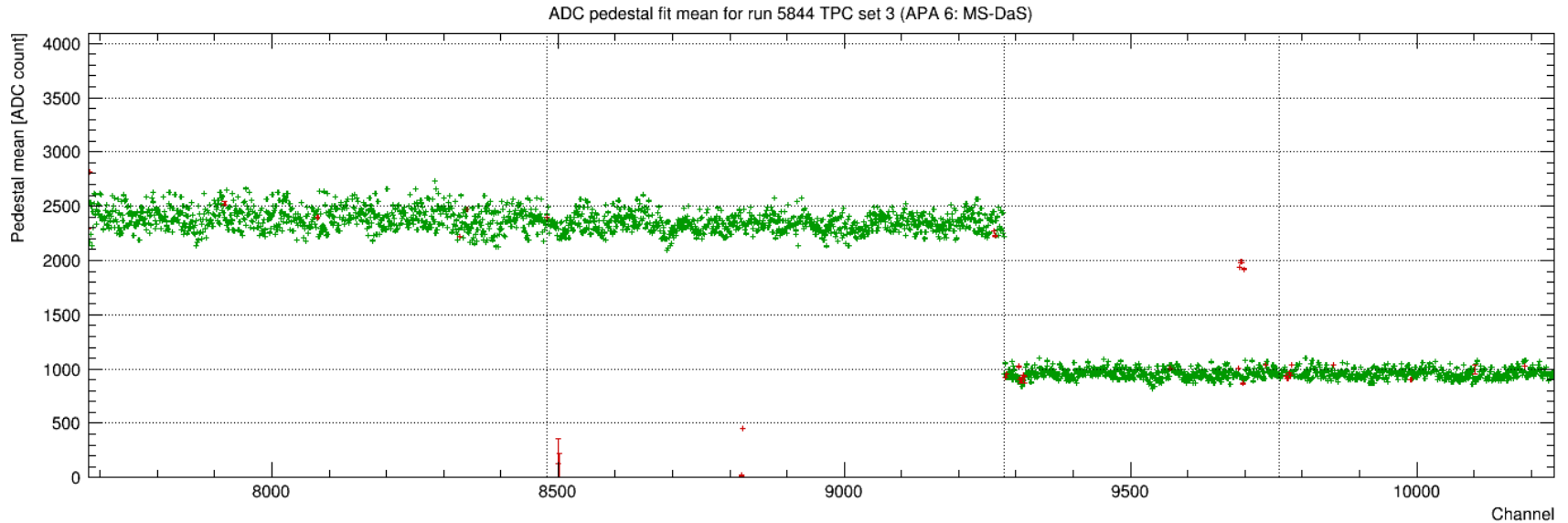
APA 6 run 5726 events 1-999



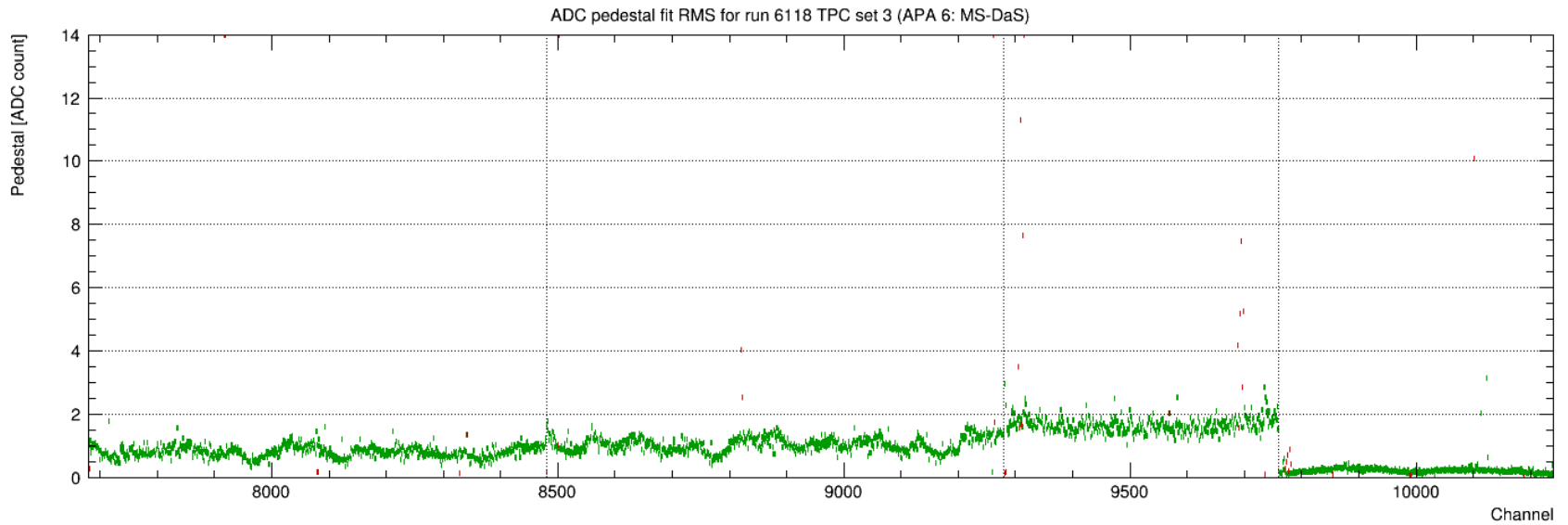
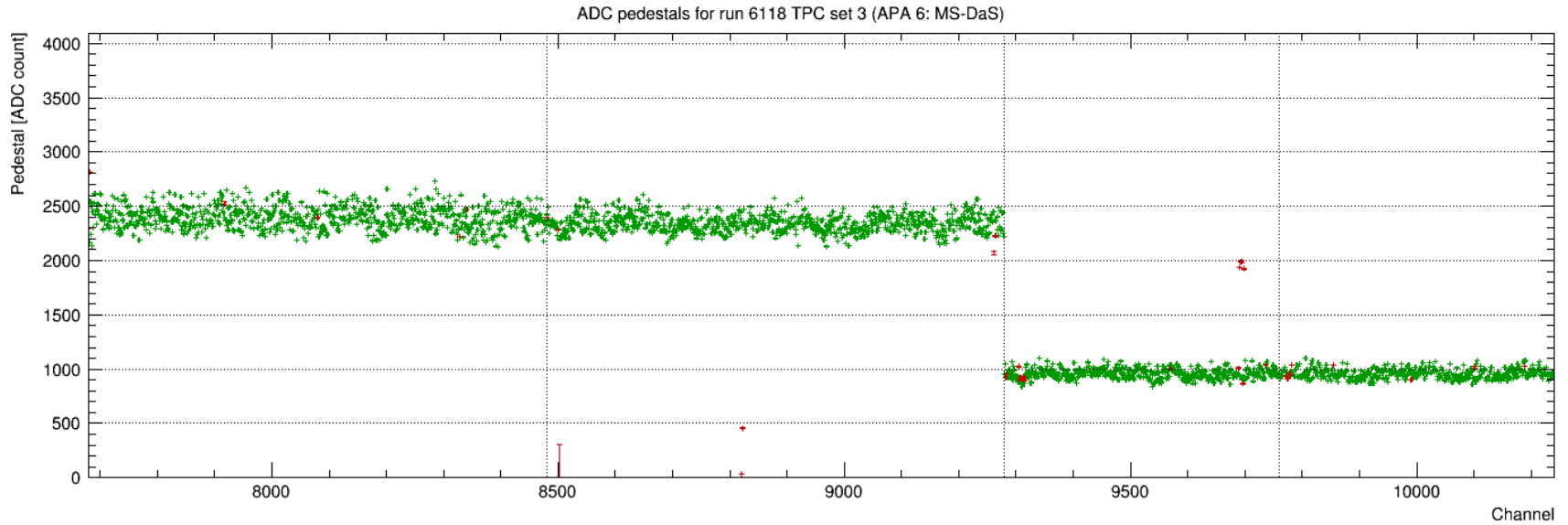
APA 6 run 5770 events 1-999



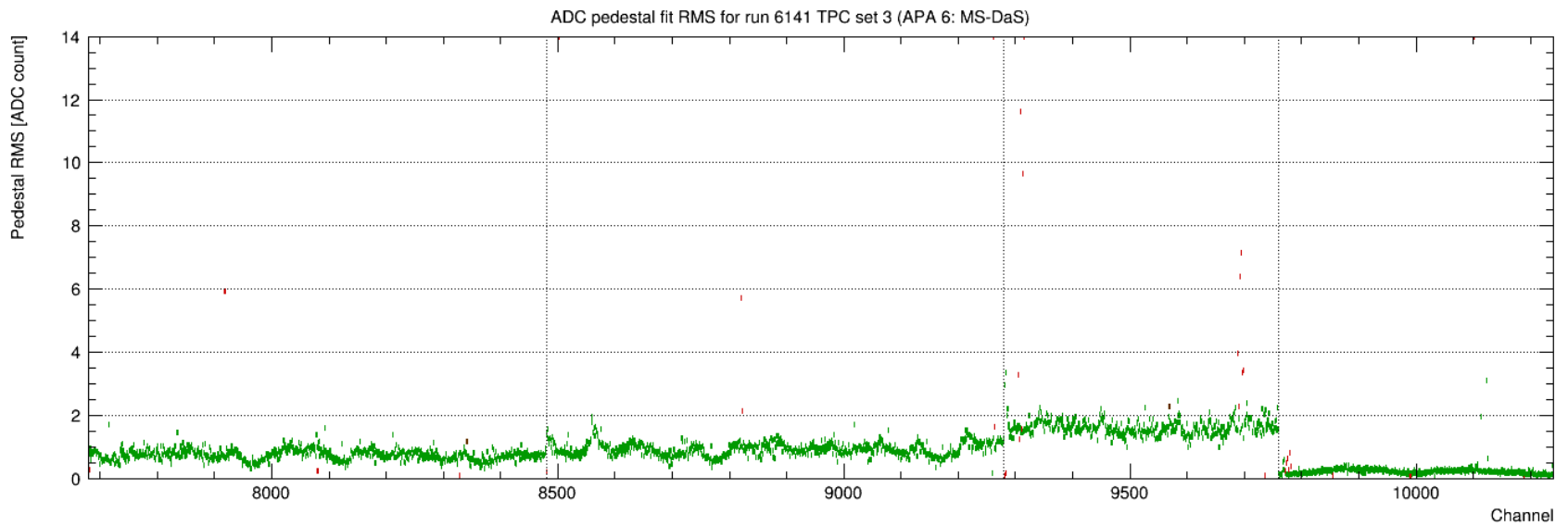
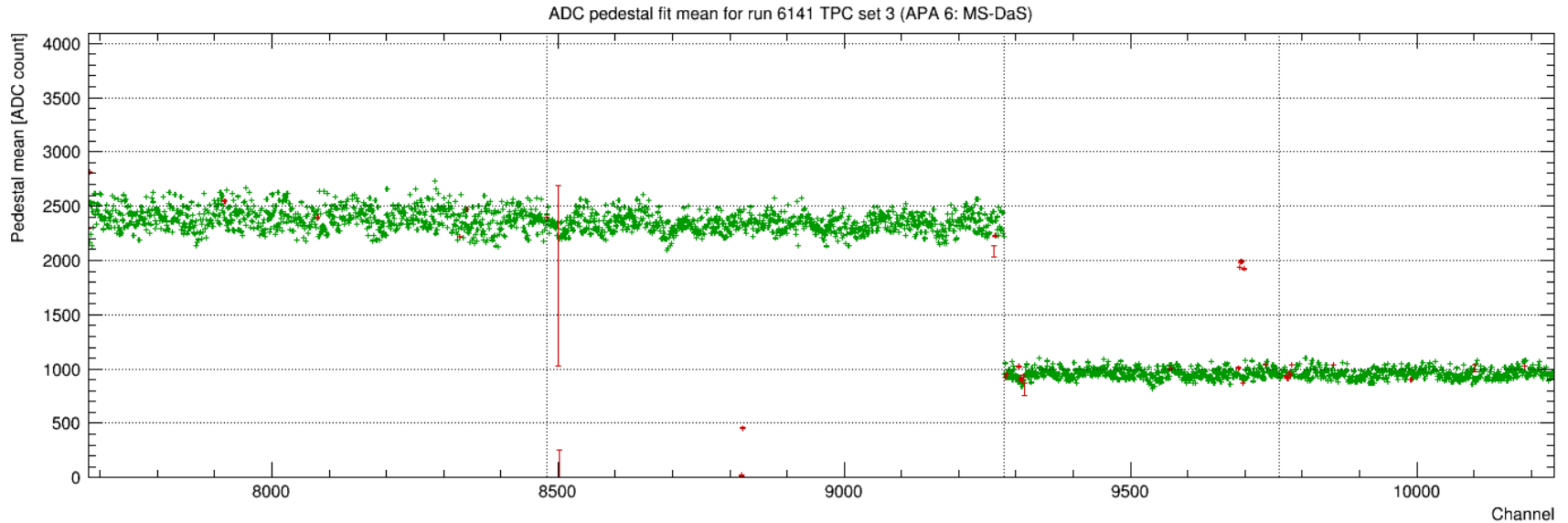
APA 6 run 5844 events 1-999



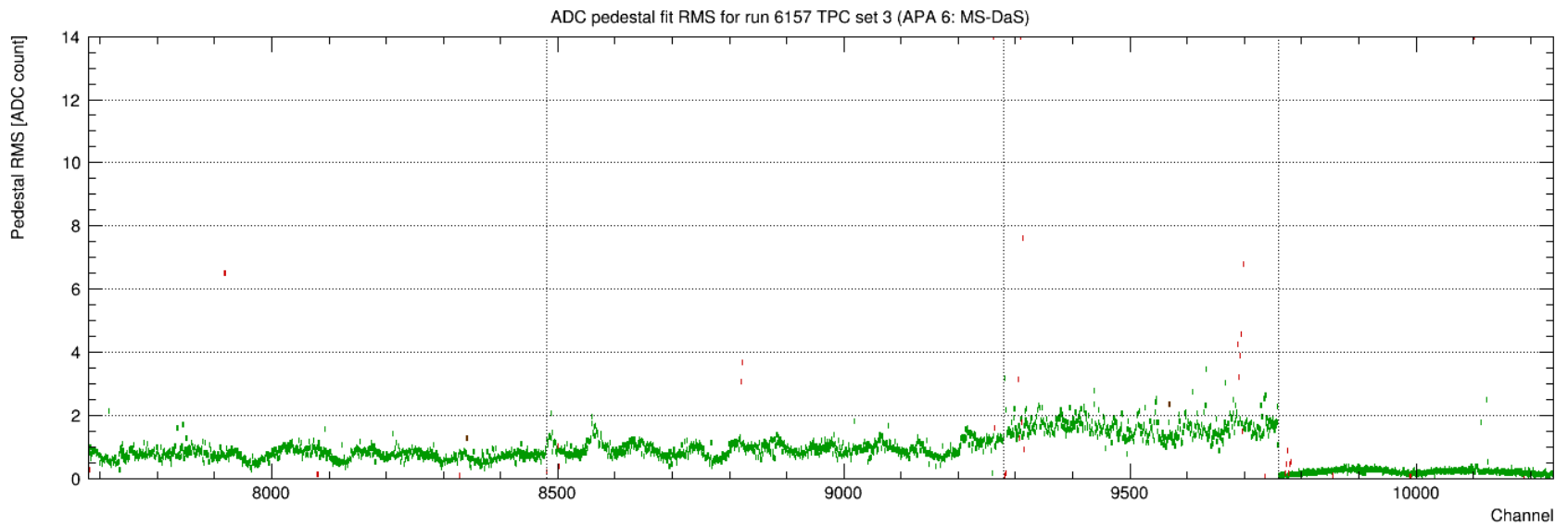
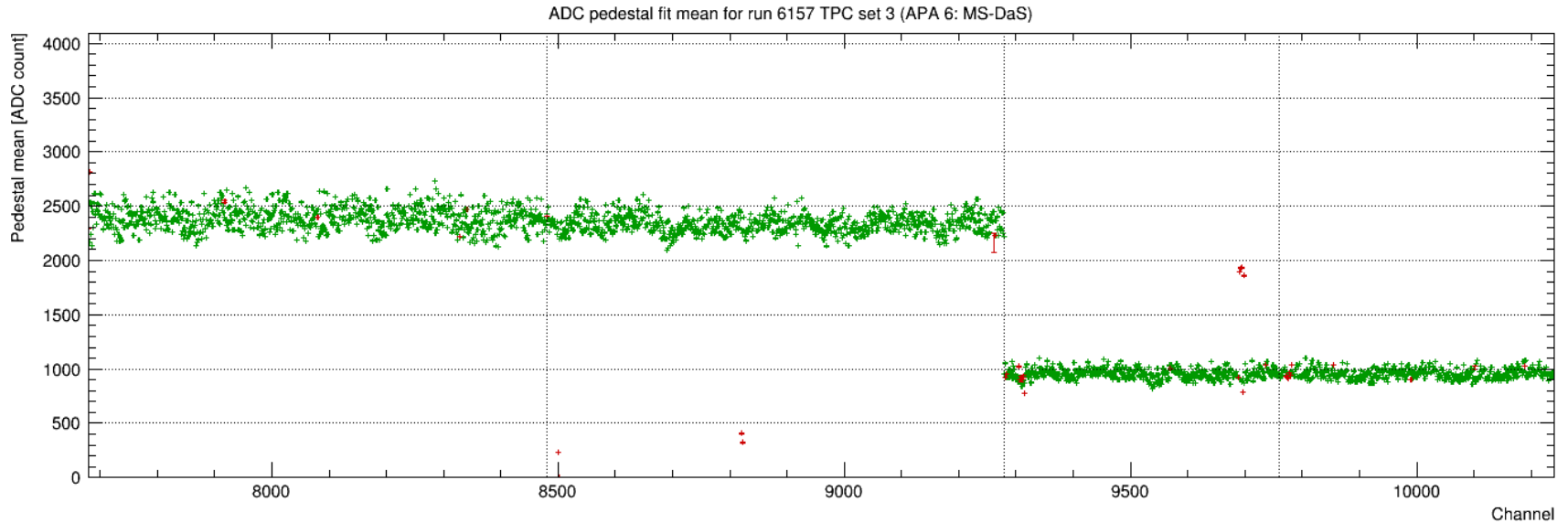
APA 6 run 6118 events 1-999



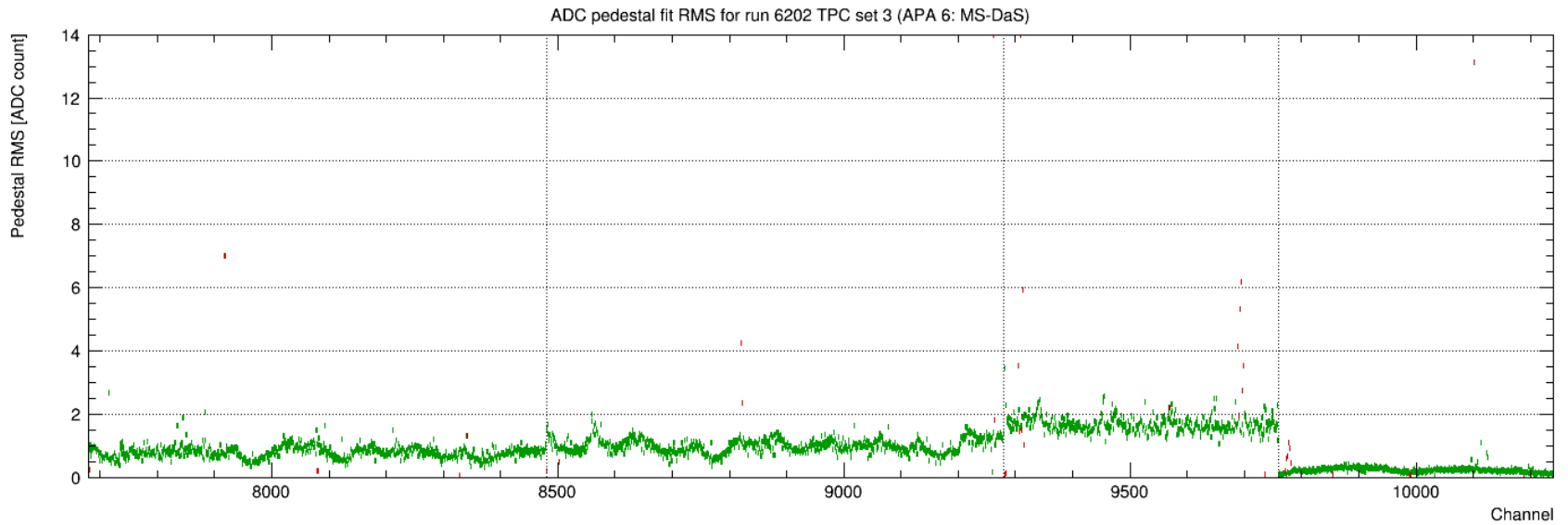
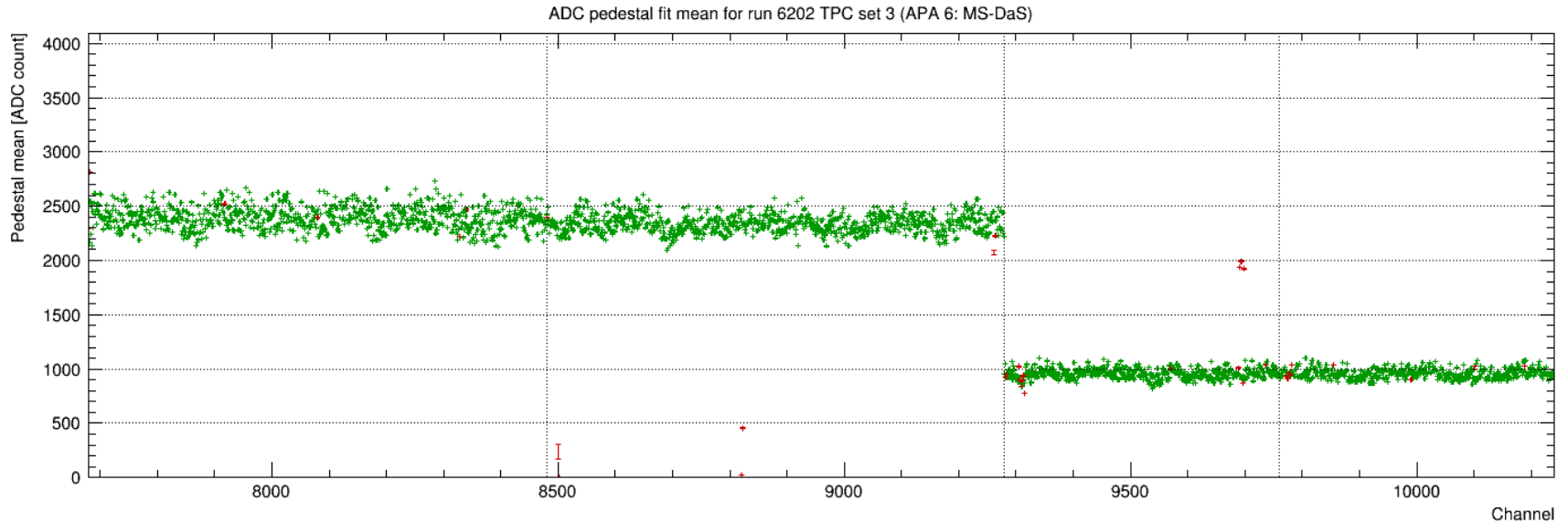
APA 6 run 6141 events 1-999



APA 6 run 6157 events 1-999



APA 6 run 6202 events 1-999



Comments conclusions

Pedestals stability

- Often stable
- Some jumps (FEMB level?) seen

Induction planes show slow noise early in run

- Including most of beam data

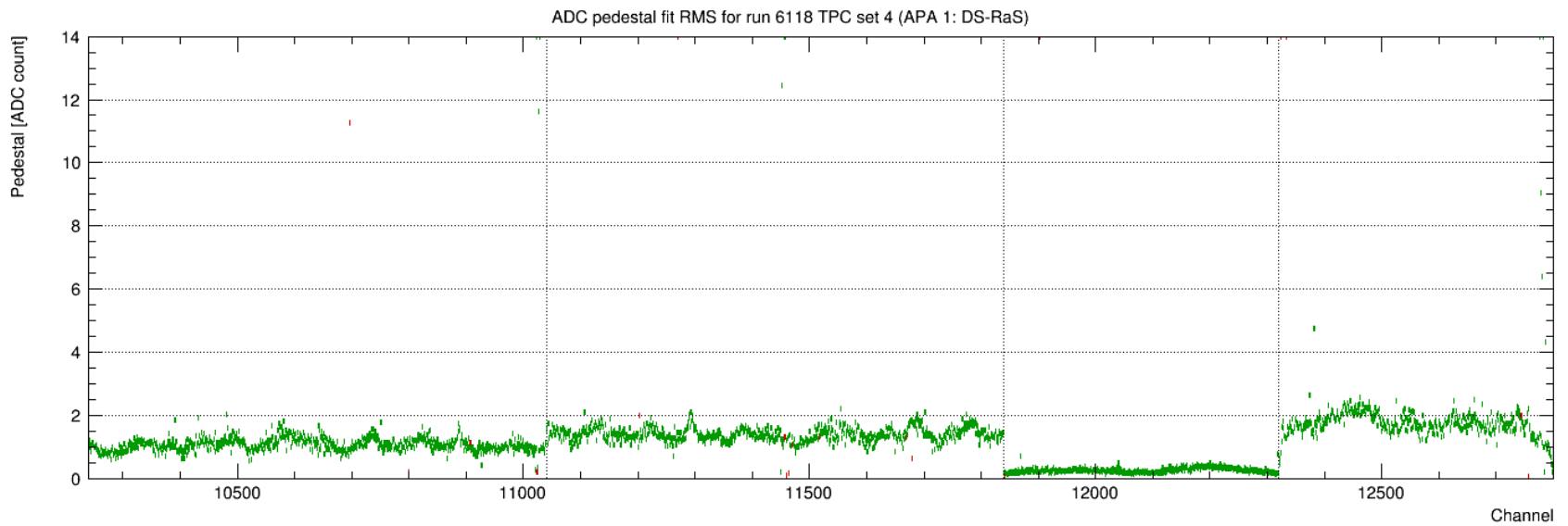
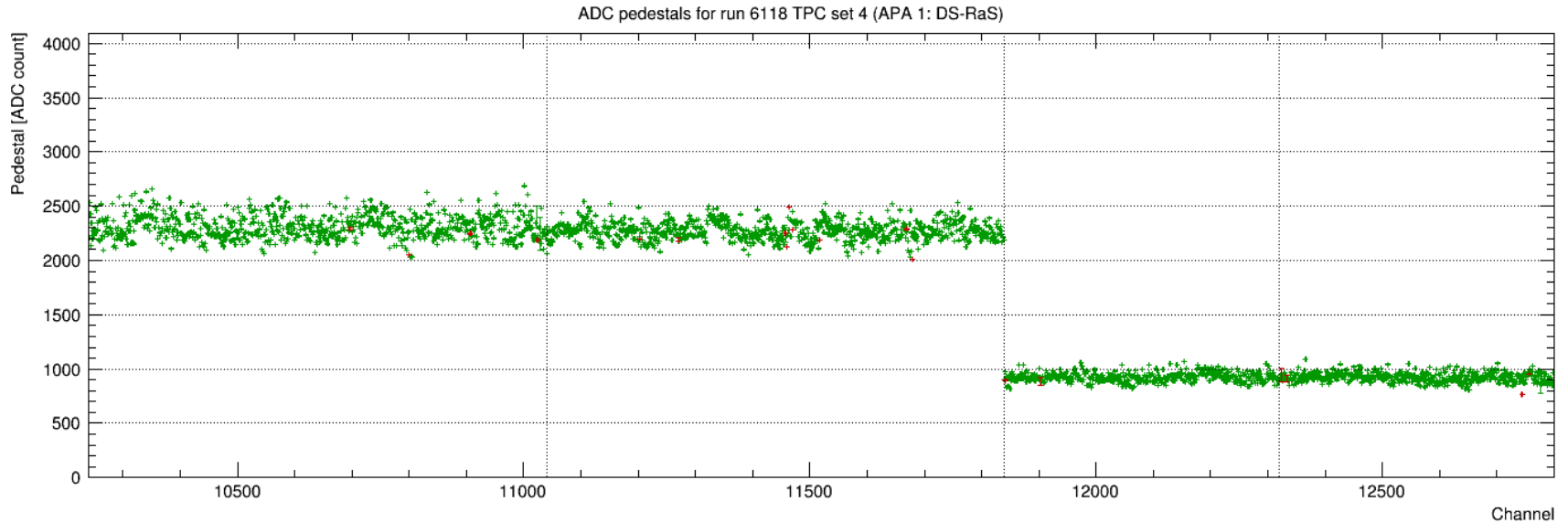
Two significant drops in induction slow noise

- Run 5585 (Oct 26)
 - HV off Oct 25
- Run 6118 (Dec 10)
 - Beam off
 - Look at runs between Nov 212 and Dec 10?

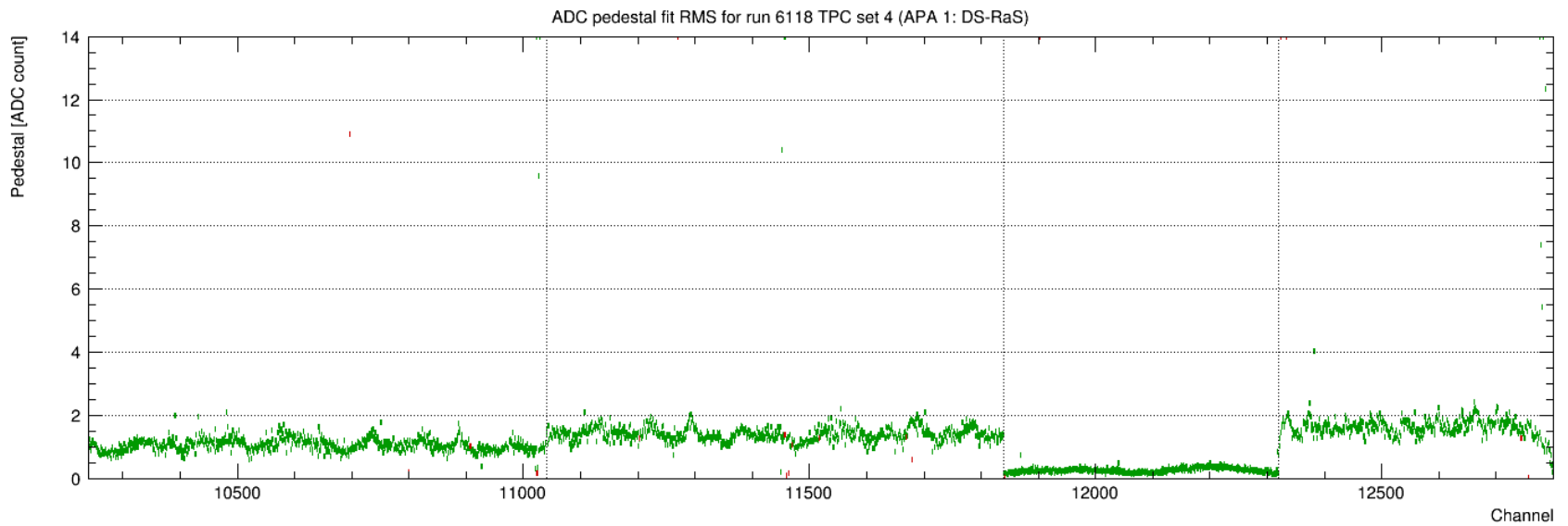
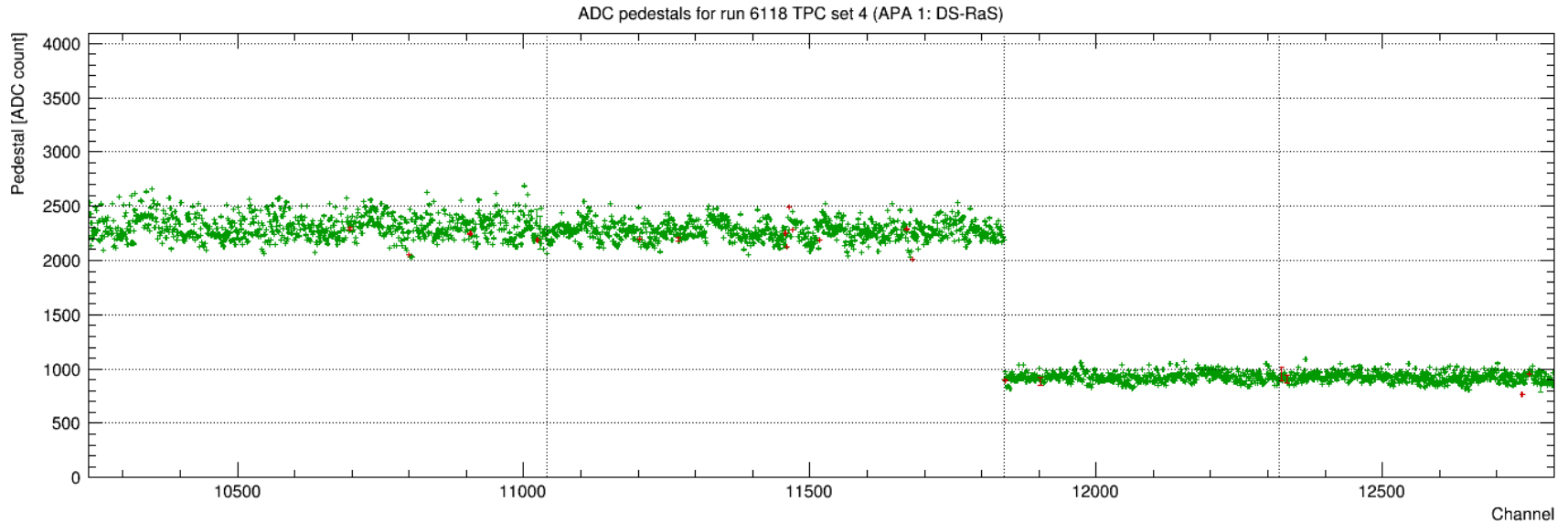
Extras

Pedestal stability within a run

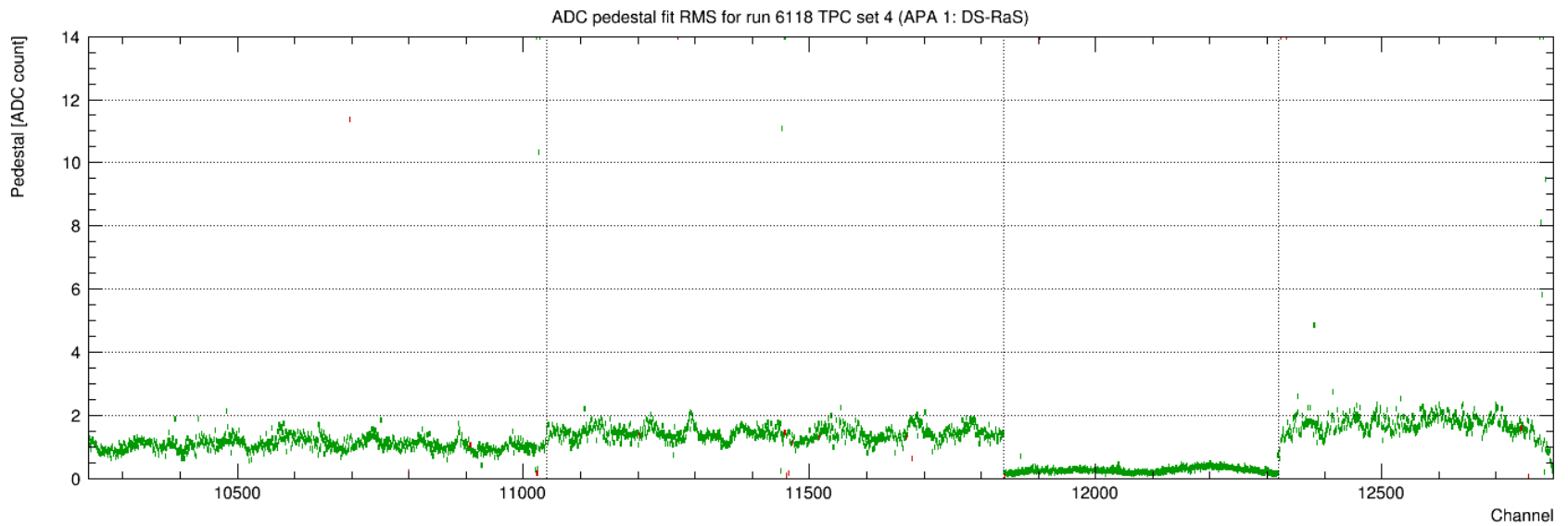
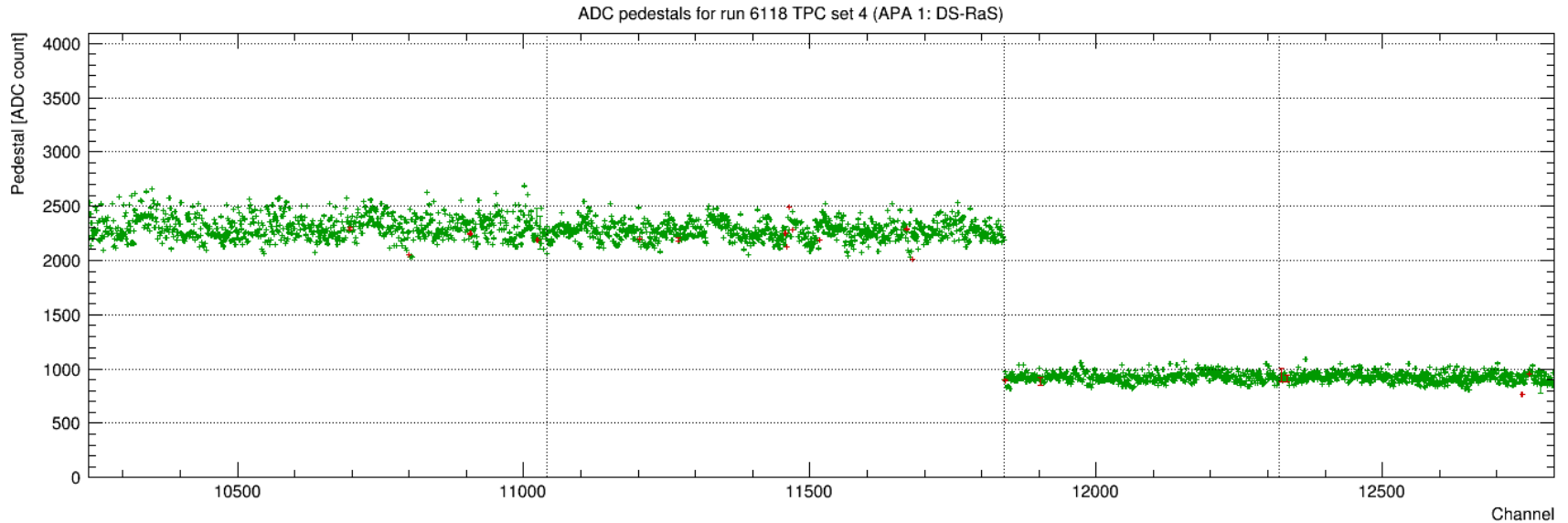
APA 1 run 6118 events 1-999



APA 1 run 6118 events 1000-1999



APA 1 run 6118 events 2000-2999



APA 1 run 6118 events 4000-4999

