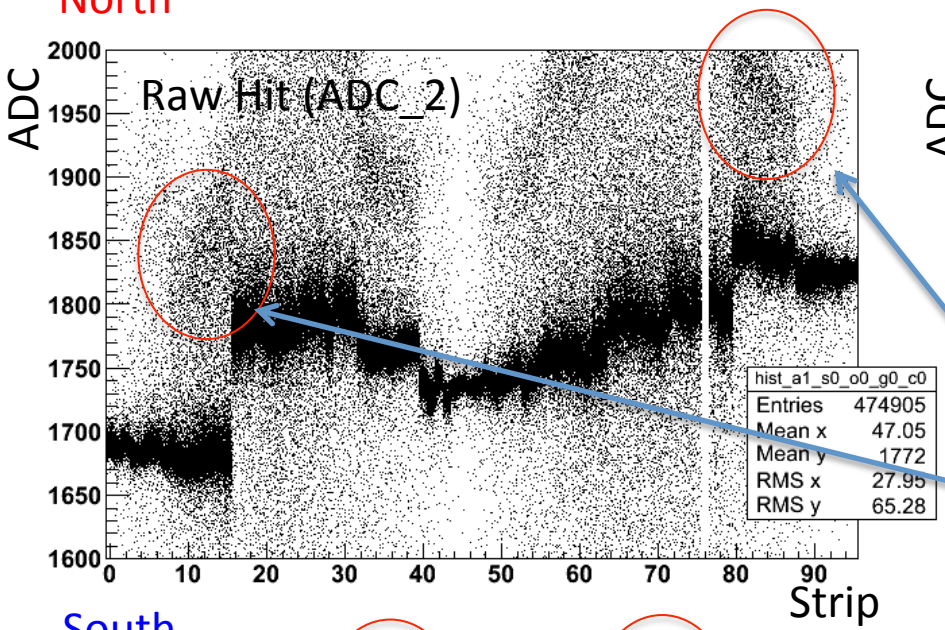
MuTr Pedestal Shift?

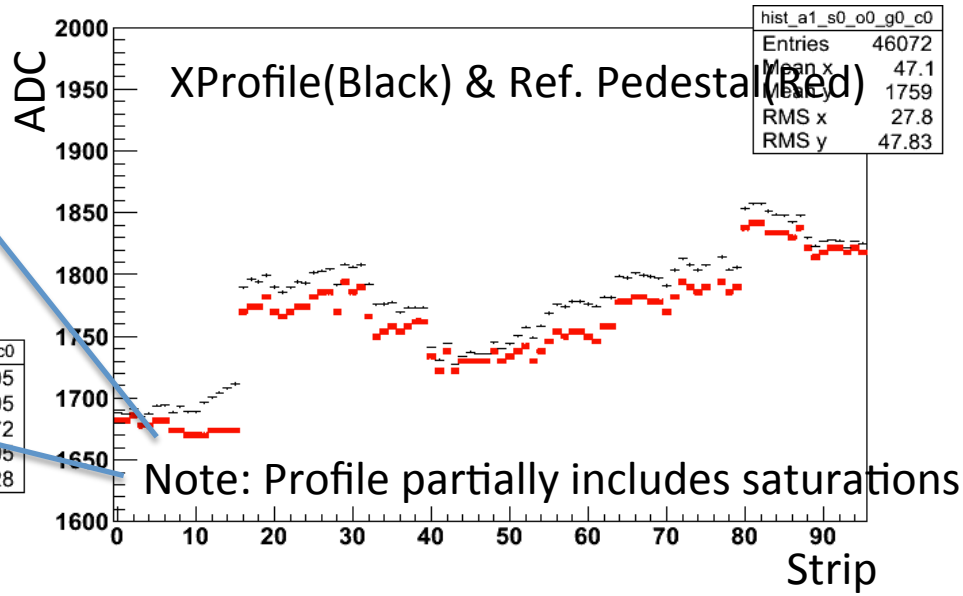
Yoshi-mitsu Imazu

Hit Distribution of Run12 non-zero suppressed data, ex. N (or S) st0 oct0 pl1 (non-stereo)

(Note: pl1 RECAPed for both N and S)

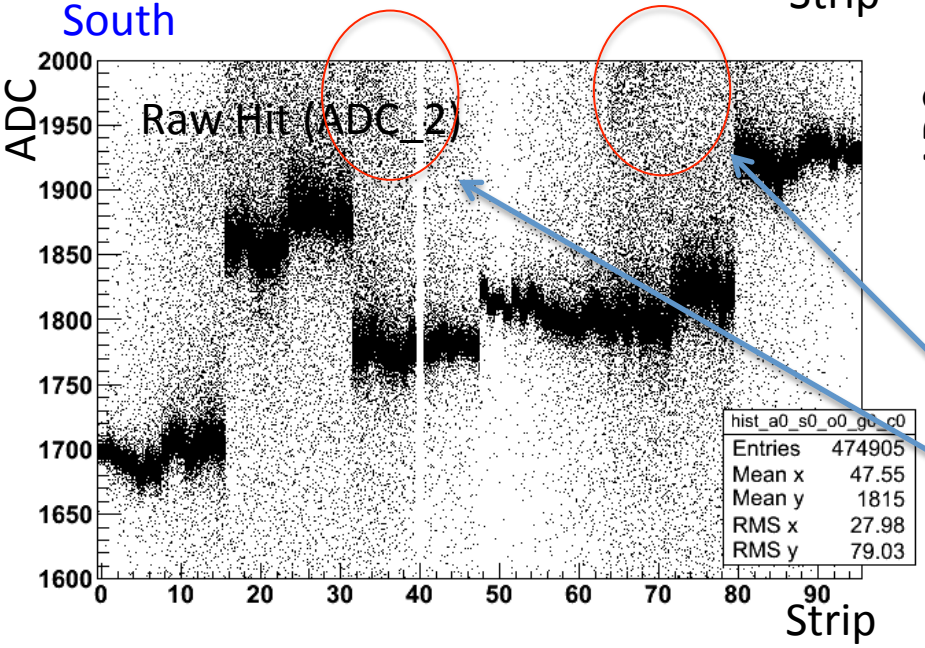
North

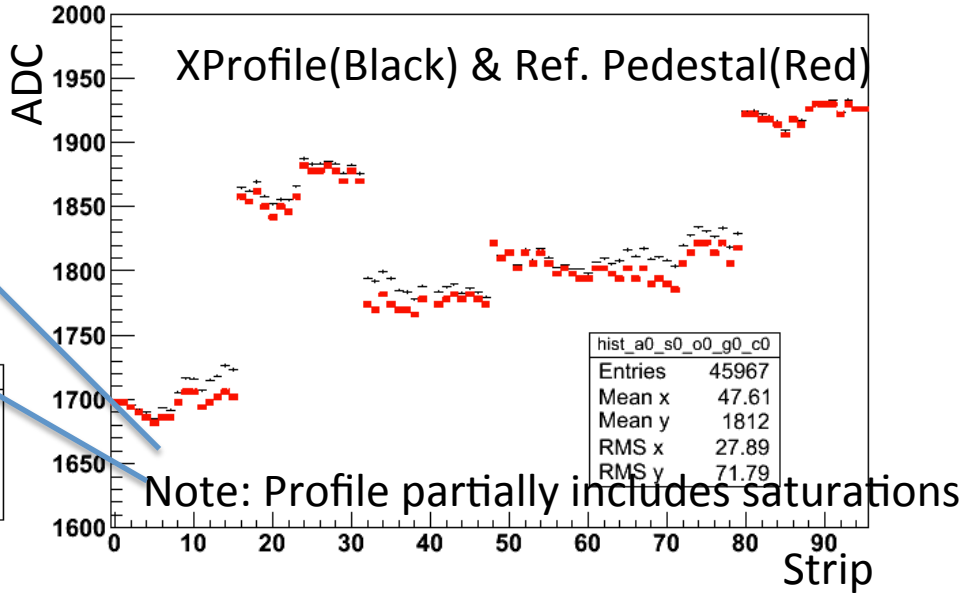




Note: Profile partially includes saturations

South

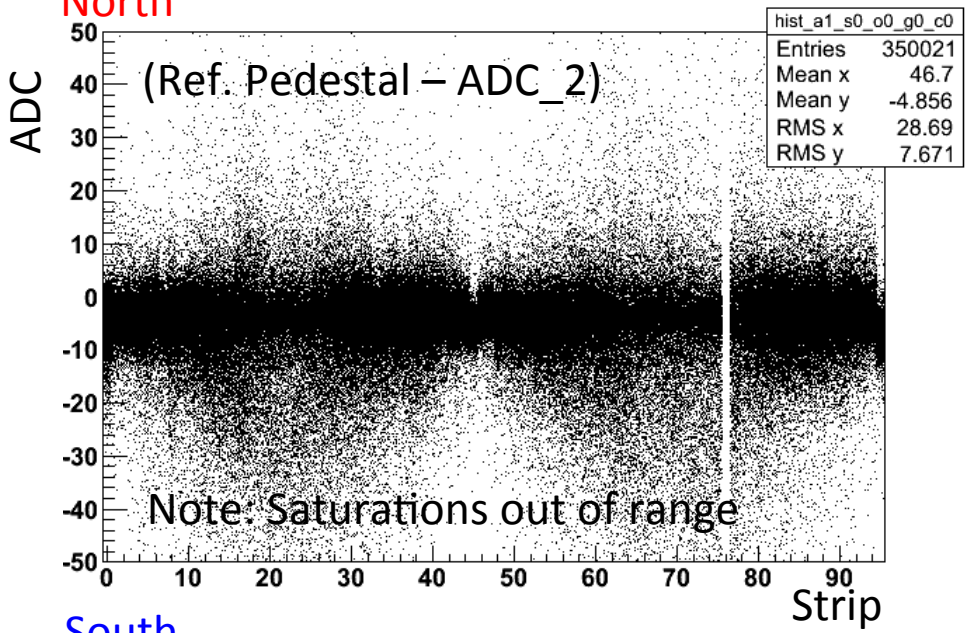


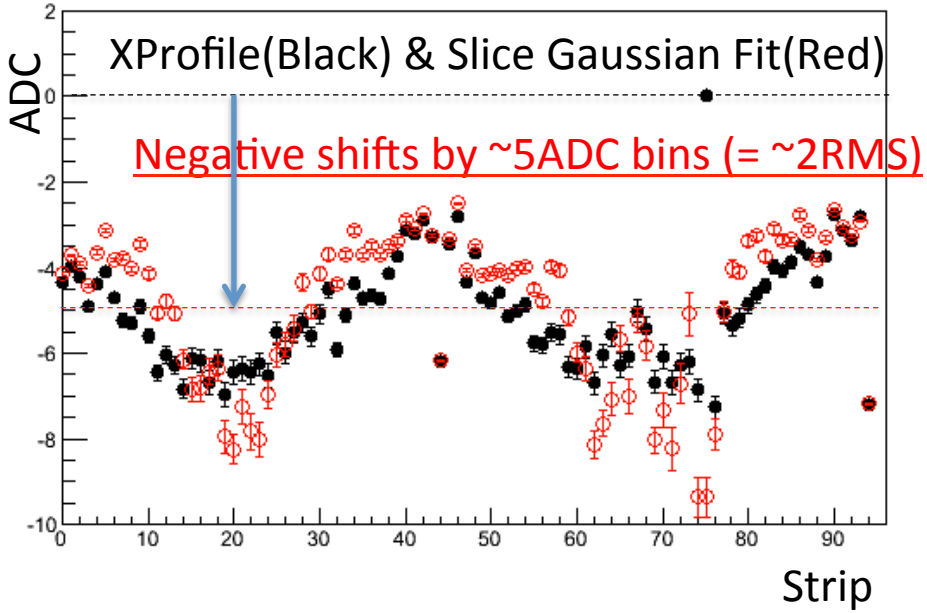


Note: Profile partially includes saturations

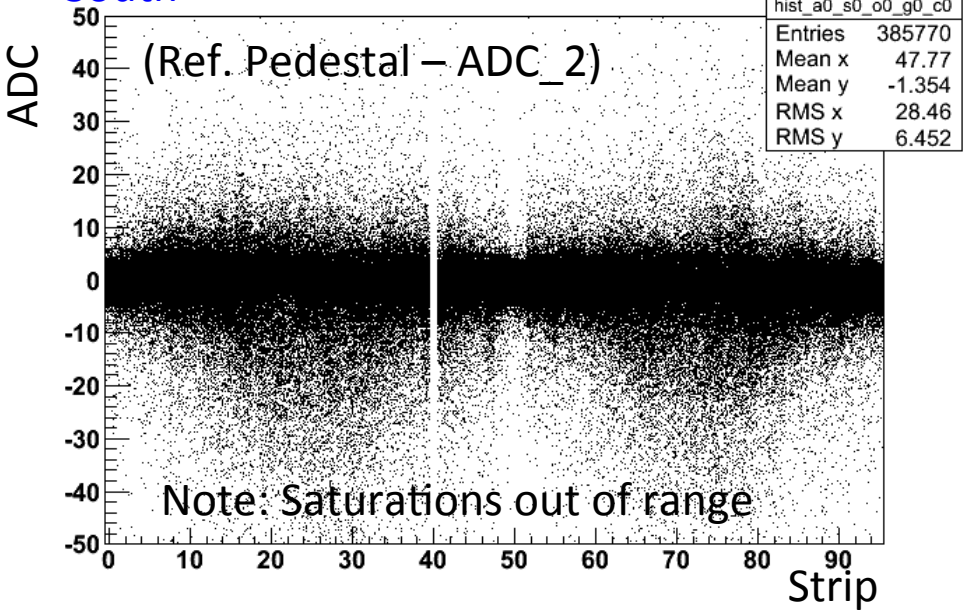
Hit Distribution of Run12 non-zero suppressed data, ex. N (or S) st0 oct0 pl1 (non-stereo)

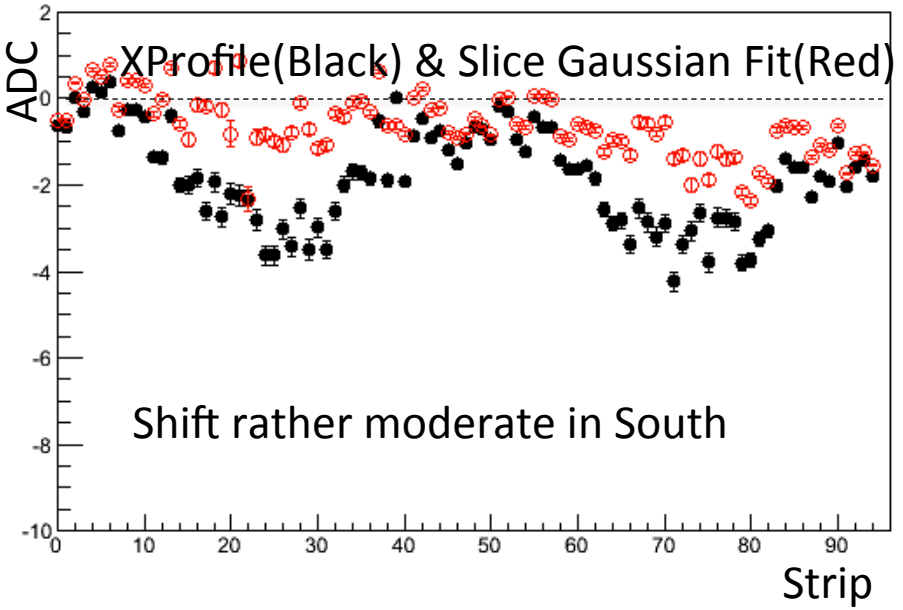
North





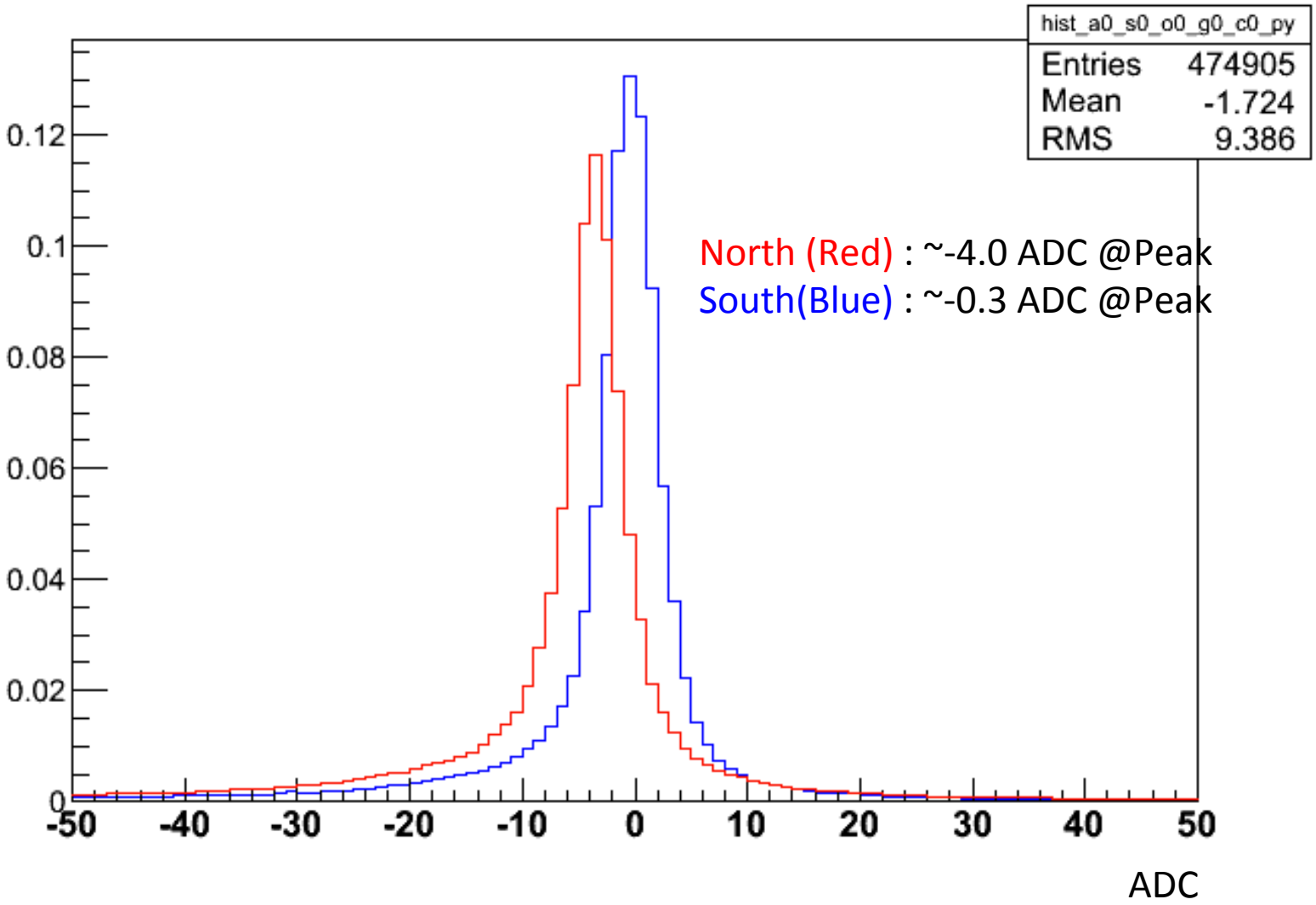
South





Hit Distribution of Run12 non-zero suppressed data, ex. N (or S) st0 oct0 pl1 (non-stereo)

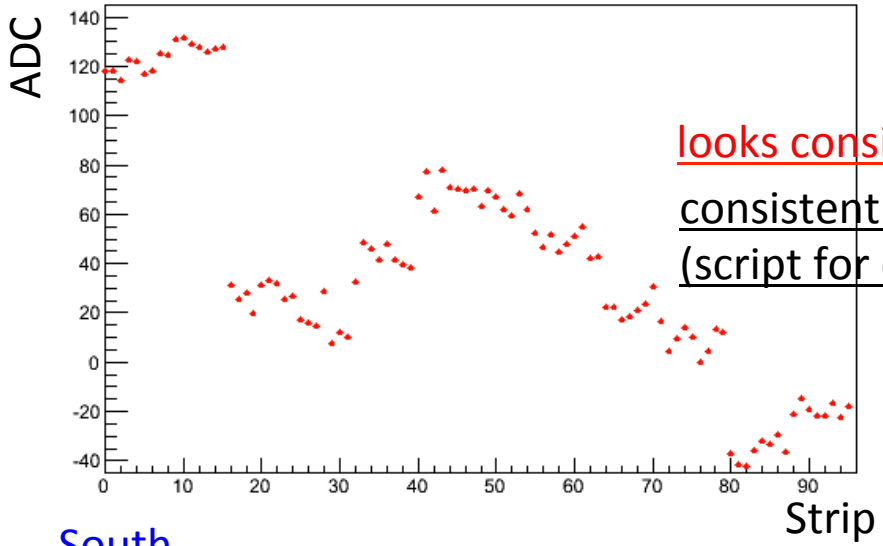
YProjection of (Ref. Pedestal – ADC_2)



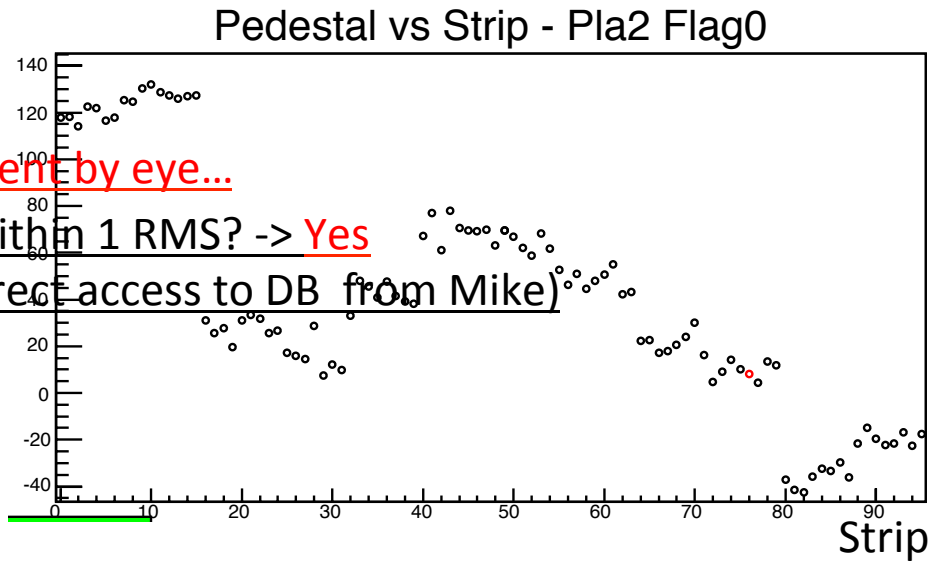
X-Check of Reference Pedestals in my analysis (compared with original source, web data base)

North

Red: (1800 - Ref. Pedestal)



From web (ps file, 20120402), num. val. available?



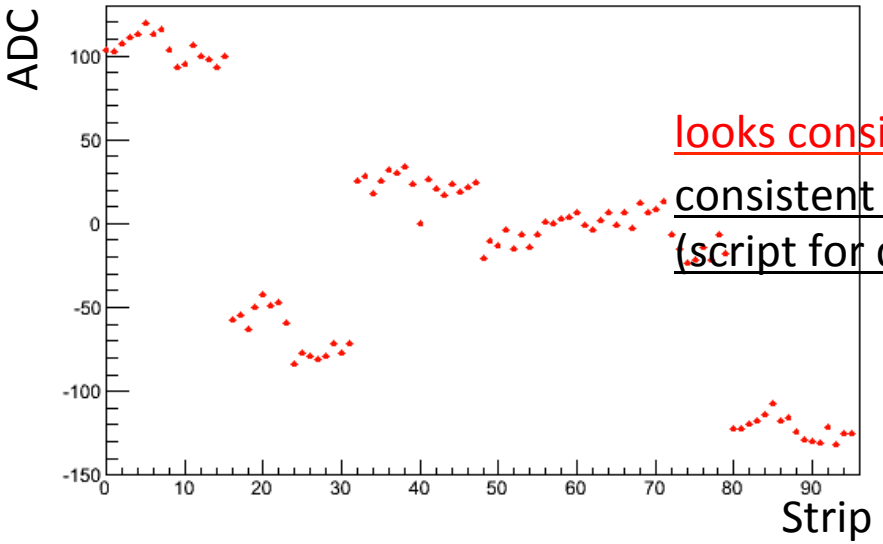
looks consistent by eye…

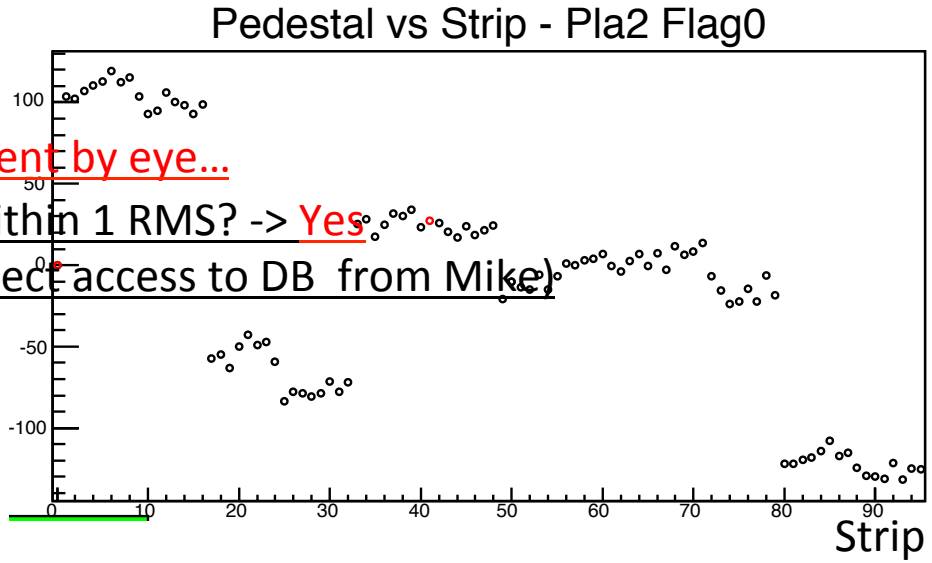
consistent within 1 RMS? -> Yes

(script for direct access to DB from Mike)

South

Red: (1800 - Ref. Pedestal)





looks consistent by eye…

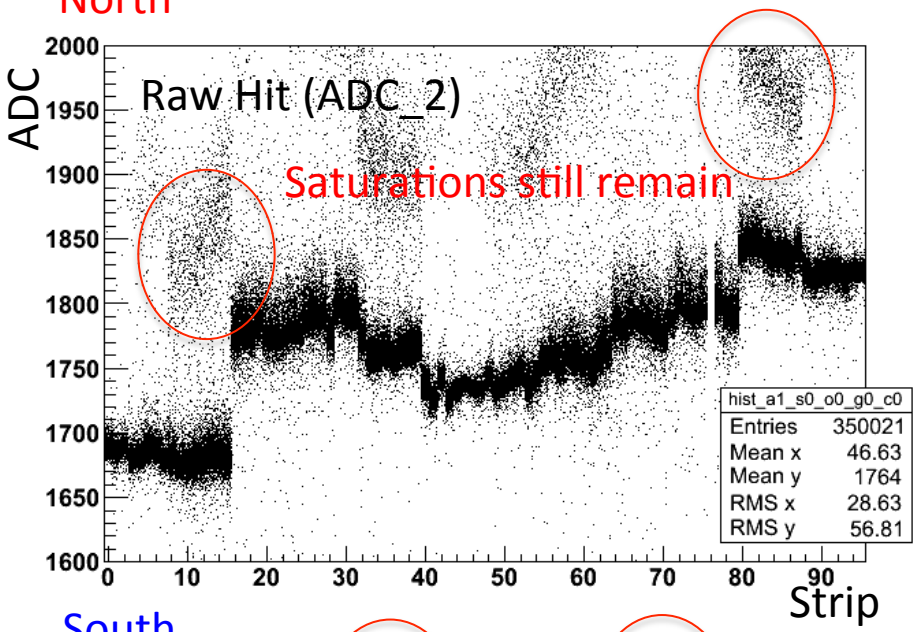
consistent within 1 RMS? -> Yes

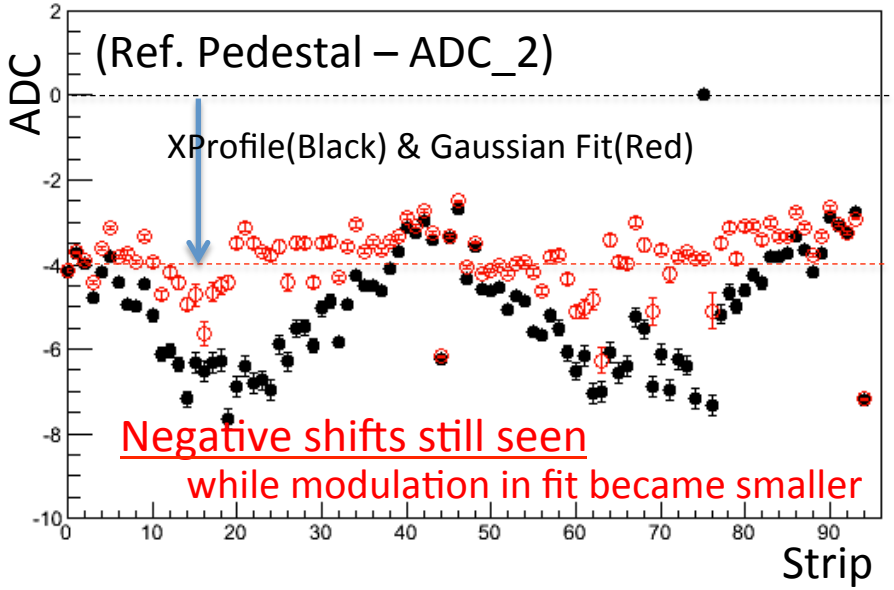
(script for direct access to DB from Mike)

Hit Distribution of Run12 non-zero suppressed data, ex. N (or S) st0 oct0 pl1 (non-stereo)

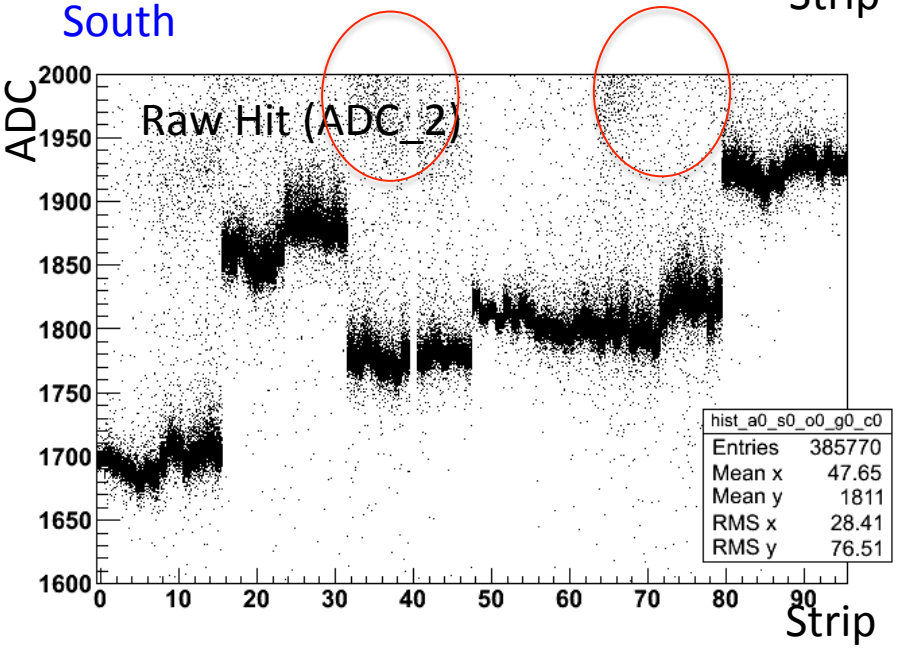
with some cleanup by a condition of |ADC 0 – ADC 2| < 5RMS)

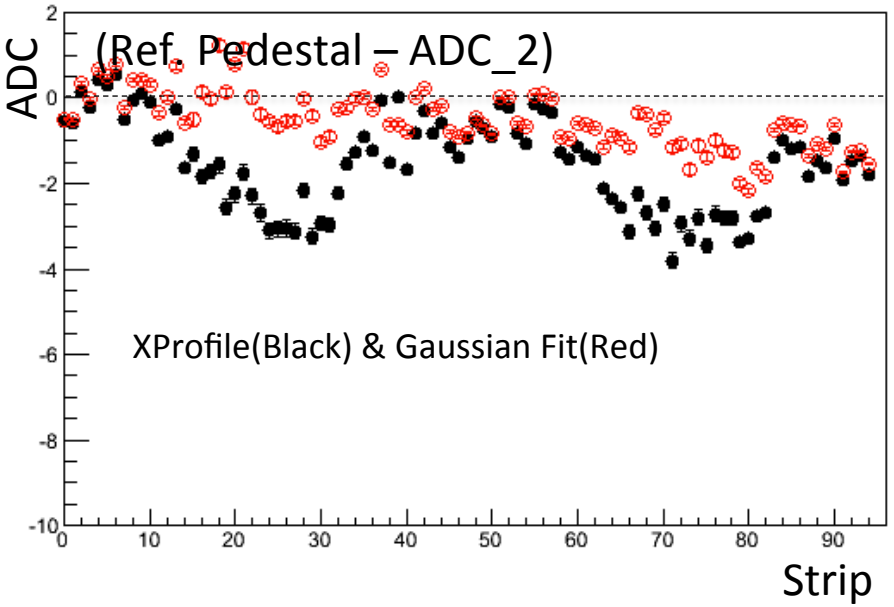
North





South

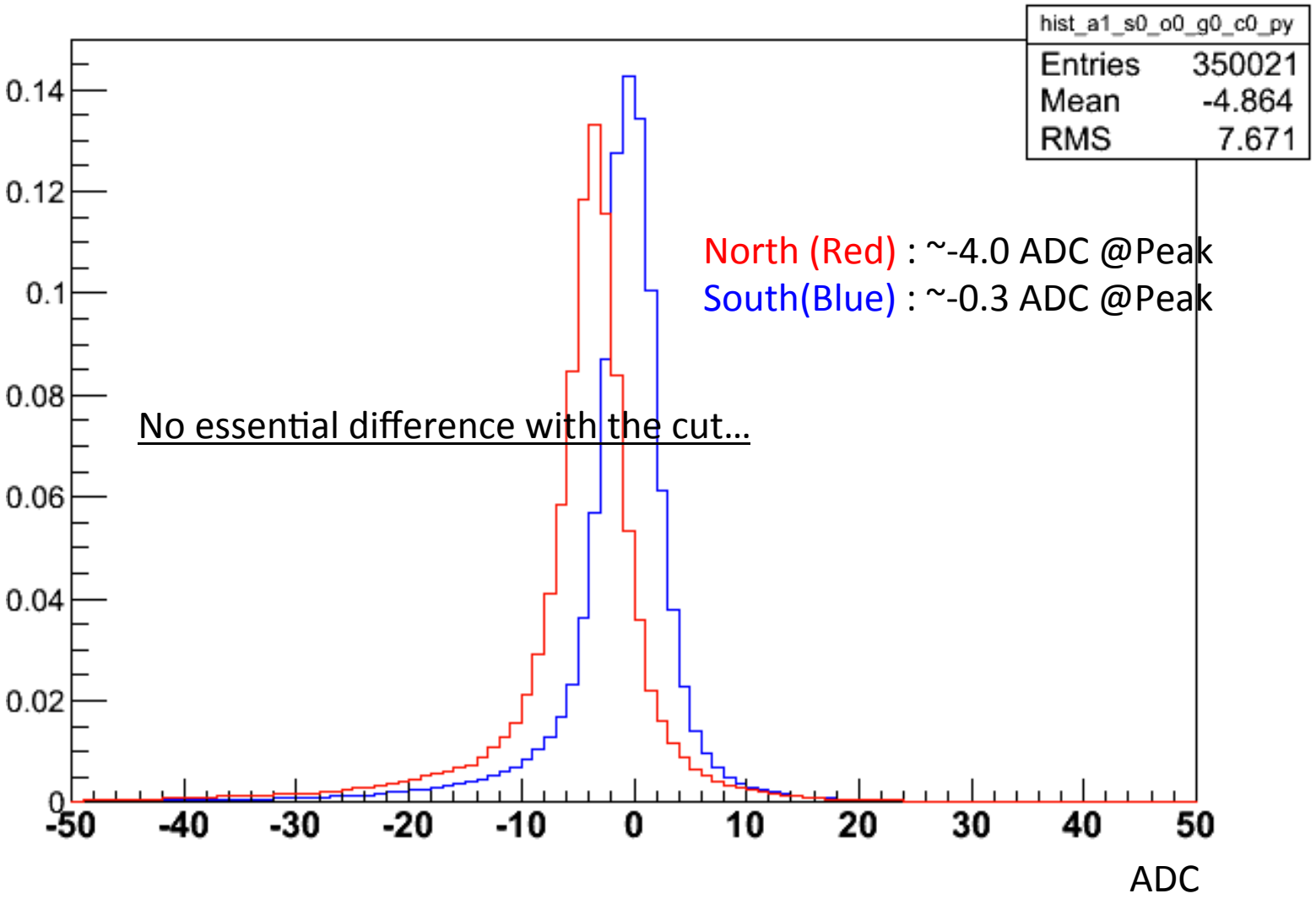




Hit Distribution of Run12 non-zero suppressed data, ex. N (or S) st0 oct0 pl1 (non-stereo)

with some cleanup by a condition of |ADC 0 – ADC 2 | < 5RMS)

YProjection of (Ref. Pedestal – ADC_2)



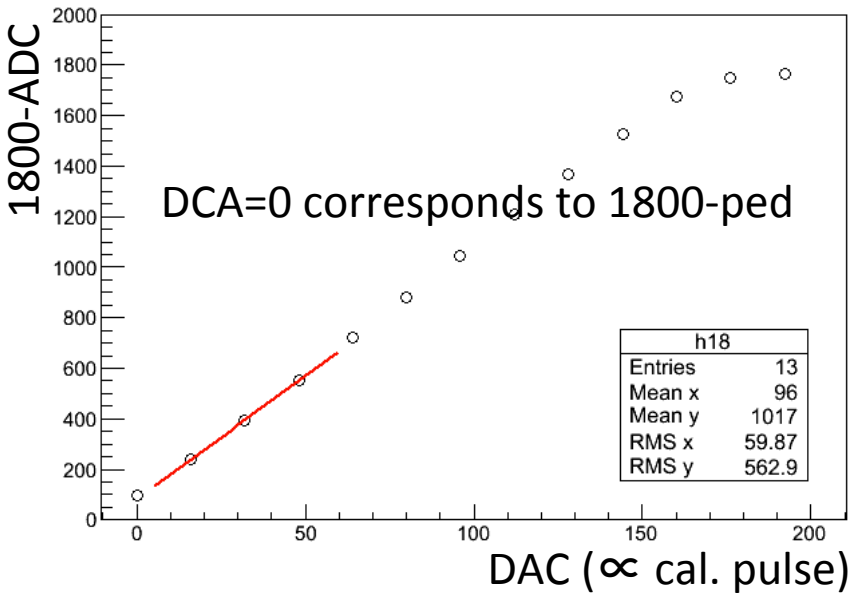
North (Red) : ~-4.0 ADC @Peak

South(Blue) : ~-0.3 ADC @Peak

No essential difference with the cut…

Short play with stepping calibration pulse…

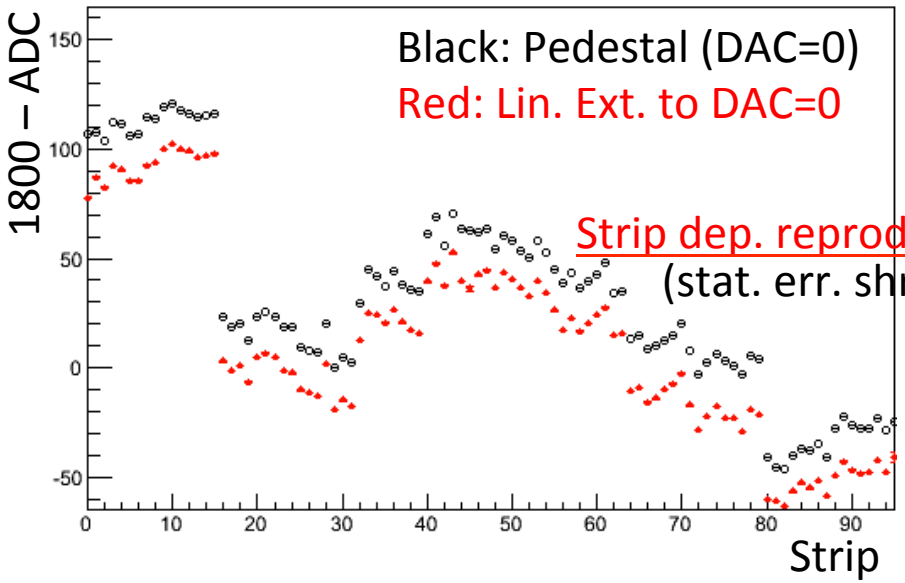
Implemented for fine calib. to reproduce linearity
Not applied for practical use.



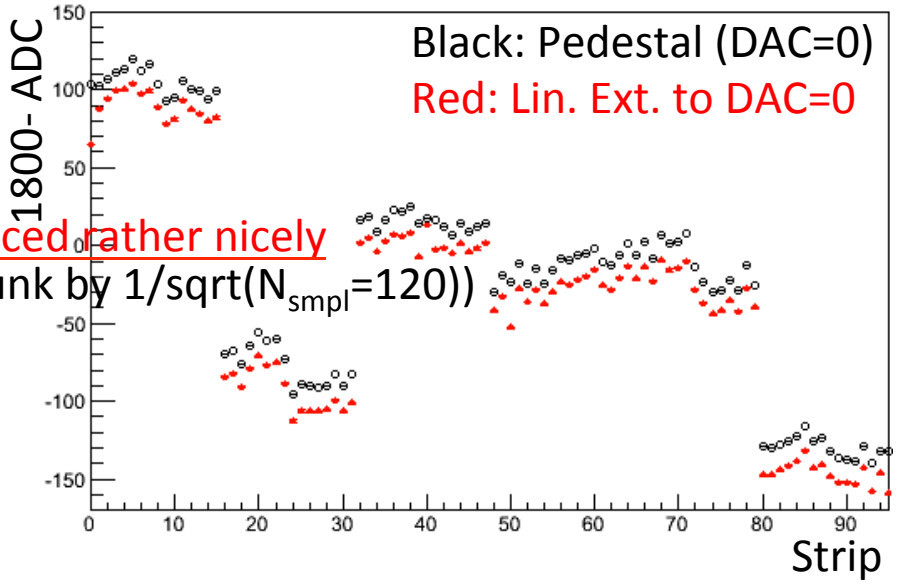
Q. Continuous connection to DAC=0 (ped.)?

→ Linear extrapolation with closer samples

North

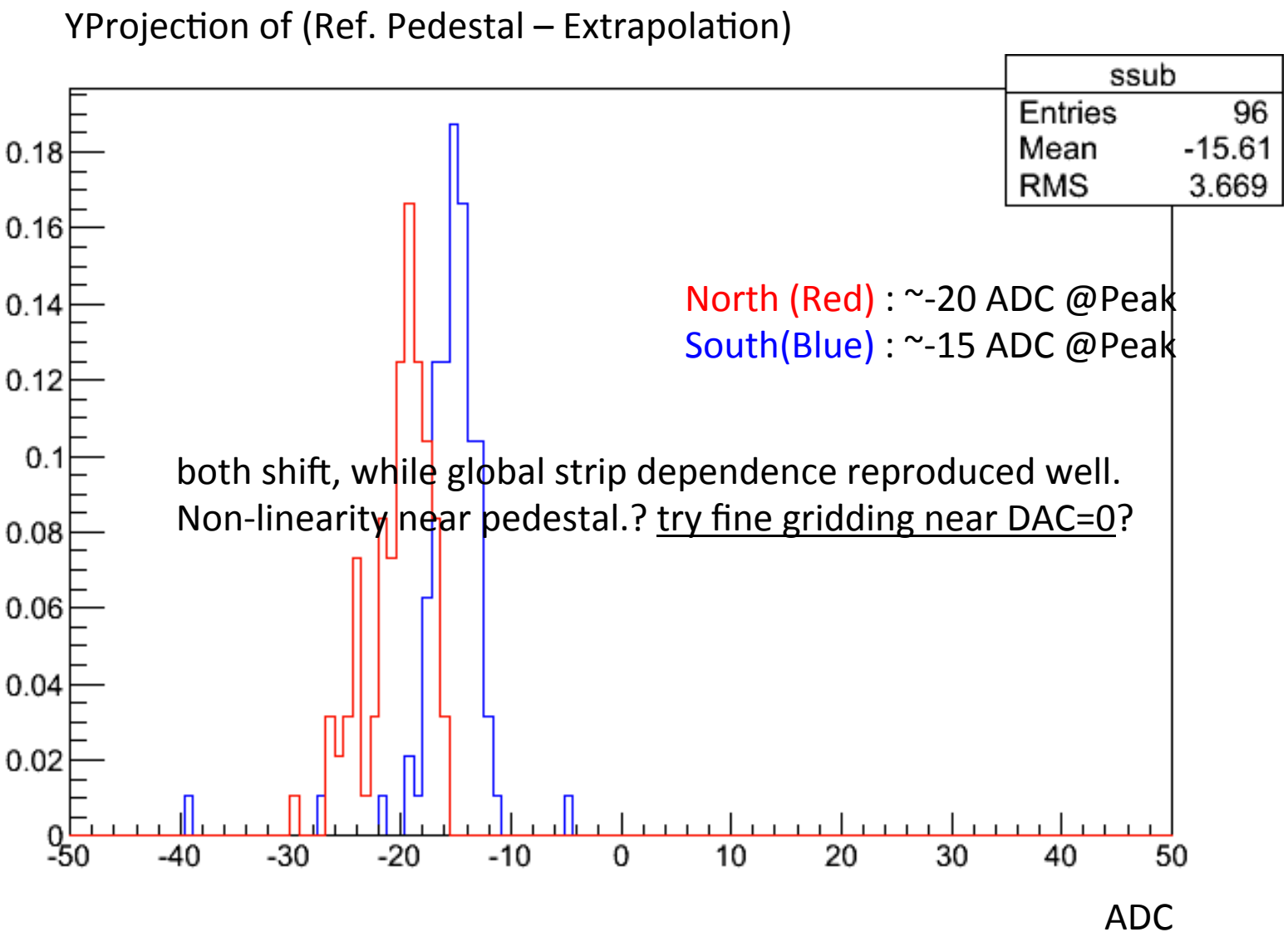


South

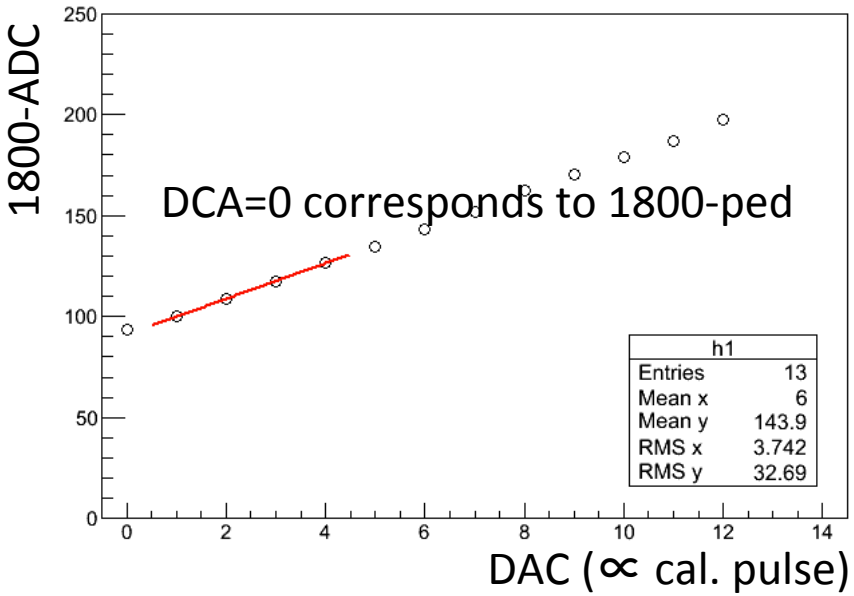


Strip dep. reproduced rather nicely
(stat. err. shrunk by 1/sqrt(N_{smpl}=120))

Short play with stepping calibration pulse…

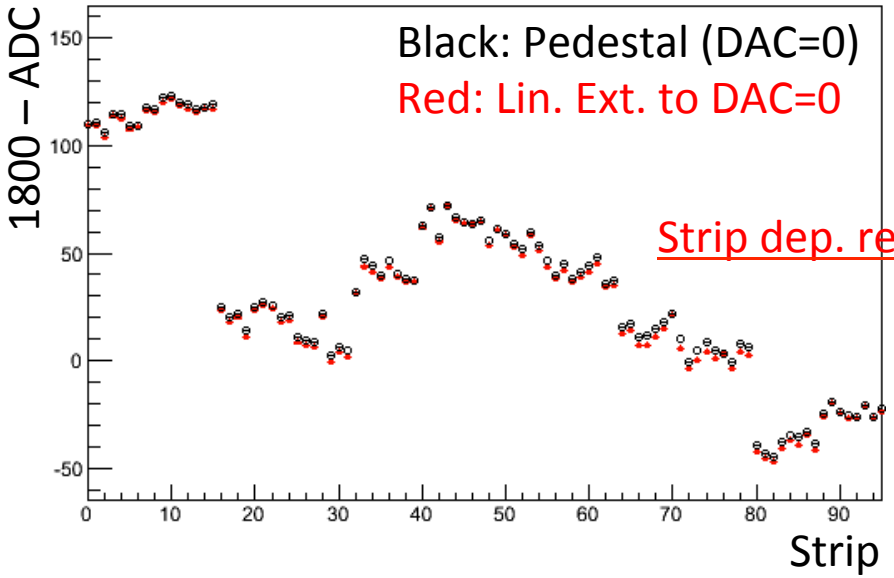


Short play with stepping calibration pulse (w/ finer steps)… Many thanks to Mike!

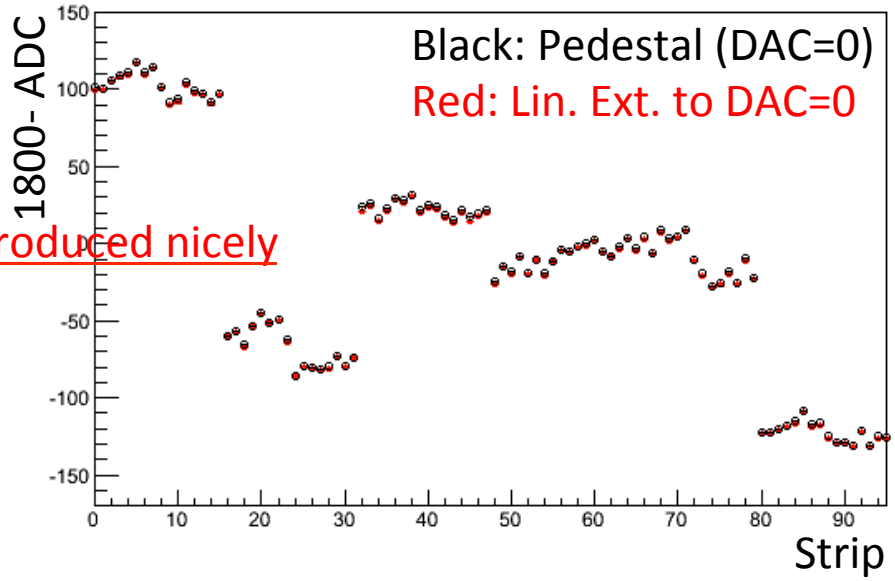


→ Linear extrapolation to DCA=0 (ped) to confirm the connectivity (nothing strange happens for ped. estimation)

North



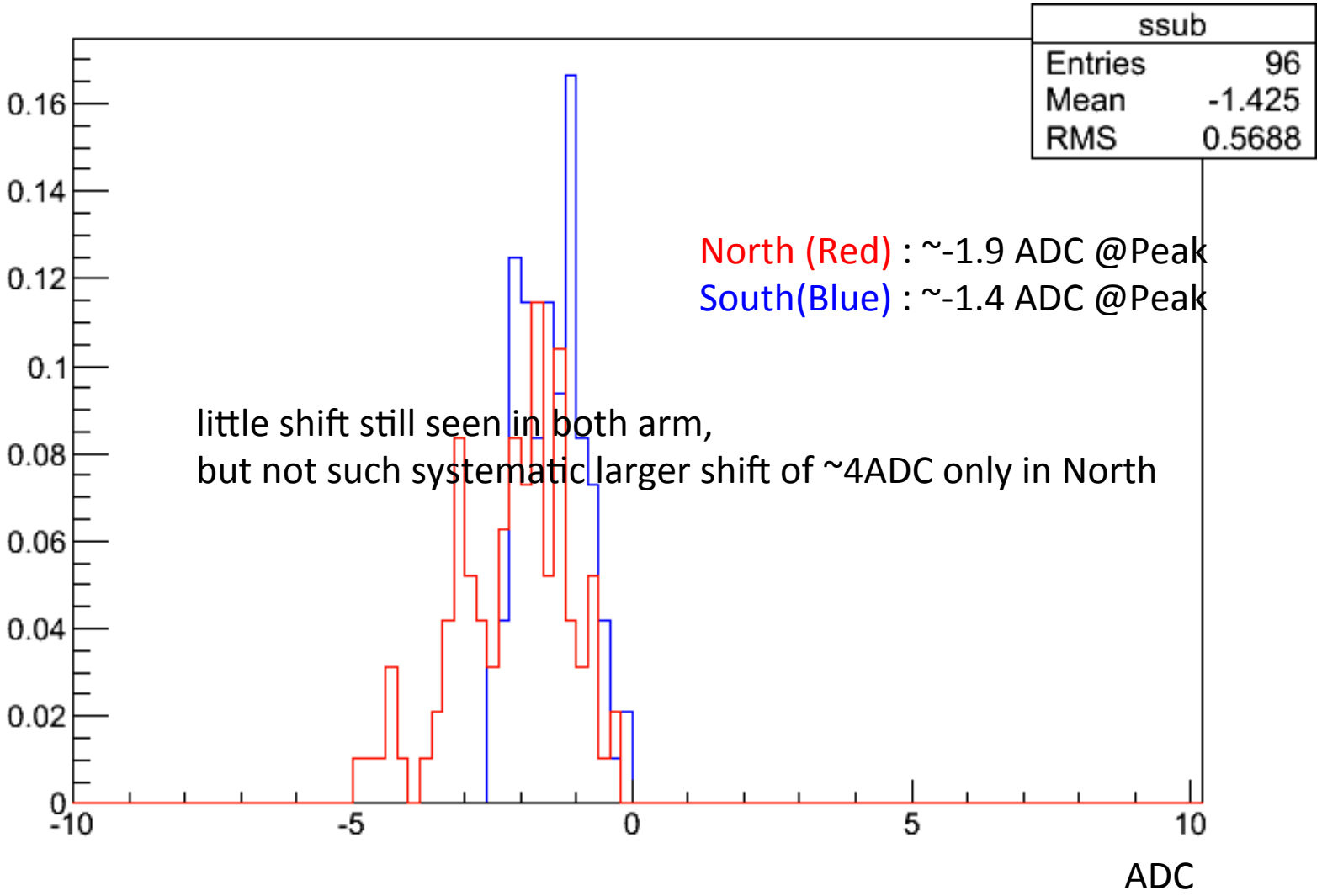
South



Strip dep. reproduced nicely

Short play with stepping calibration pulse (w/ finer steps)… Many thanks to Mike!

YProjection of (Ref. Pedestal – Extrapolation)



North (Red) : ~-1.9 ADC @Peak
South(Blue) : ~-1.4 ADC @Peak

little shift still seen in both arm,
but not such systematic larger shift of ~4ADC only in North

ADCs continuously connected to dac=0 (pedestal)
→ DB pedestals well evaluated at least against calib. pulse/circumstances

- Tendencies basically all true for other stations, octants, non-stereo planes
  → negative baseline shift of pedestals observed only in North
  of order of ~2RMS (note: cluster hit > 3RMS)
  → essential difference in its estimation method?

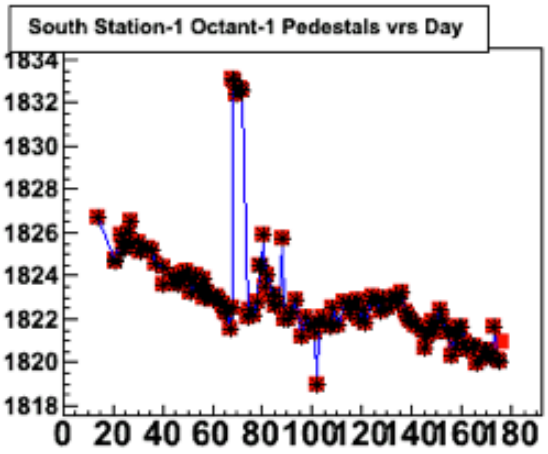
- Sample: Run12 non-zero suppressed run 367133 (BBC=3.4MHz), clock trigger
  → same tendency for other non-zero run (365329@BBC=2.2MHz, 328750@BBC=0.3MHz)

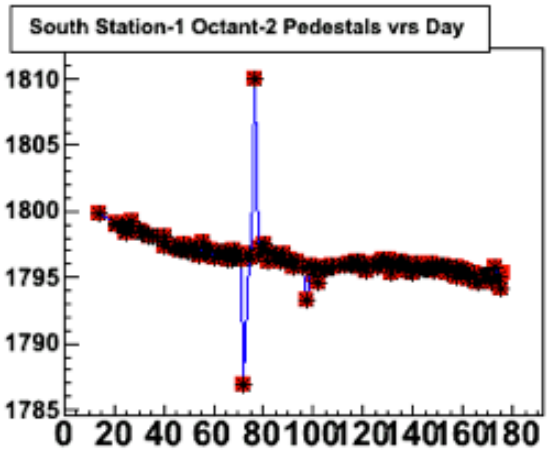
- Ref. pedestals in my code (looks) consistent with the original source
  (data (20120403) vs calib (20120402), date dependence ~ 2-4 ADC bins)
  → no bug in ref. pedestals in my code to make systematic shift in north ✔
  → direct numerical comparison preferable, but original data gone already… ✔
  → no misunderstanding on counting convention, like that of strip no.? ✔

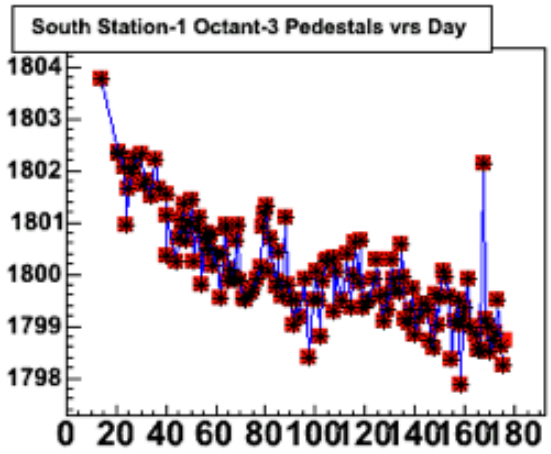
- Some trial with ADC cuts on sample didn't improve the shift…

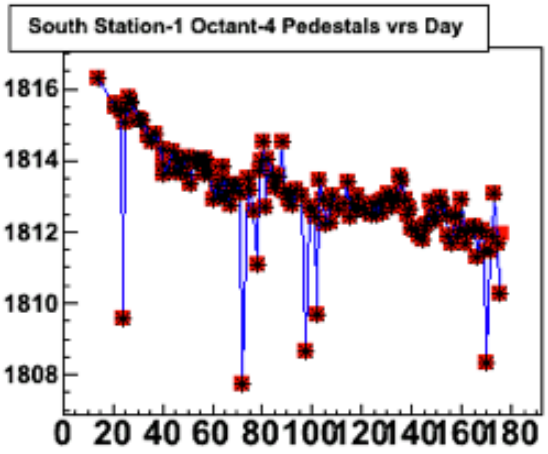
- Played with the stepping calibration pulses to see connectivity to ref. pedestals
  → seems like not linear enough, fine grid stepping possible? ✔
  → finer step results showed no large systematic shift in north
  → DB pedestals well evaluated at least in calib. circumstances

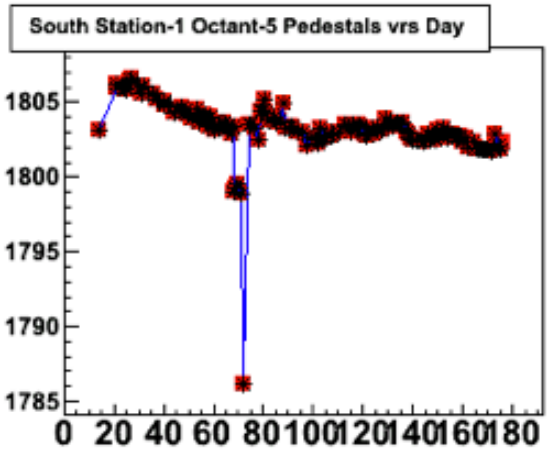
What is the source of the systematic shift I observed in non-zero suppressed data, then…?

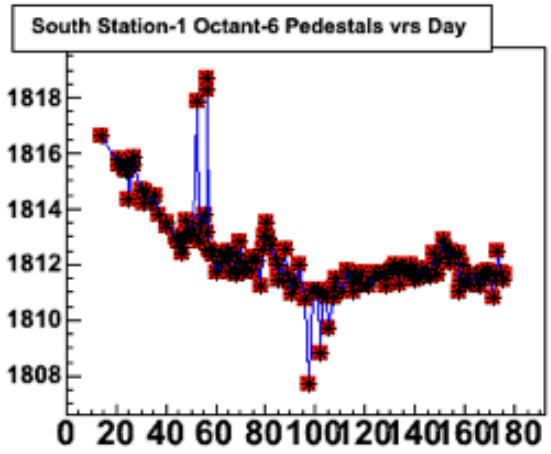

South Station-1 Octant-1 Pedestals vrs Day
1834
1832
1830
1828
1826
1824
1822
1820
1818
0 20 40 60 80 100 120 140 160 180

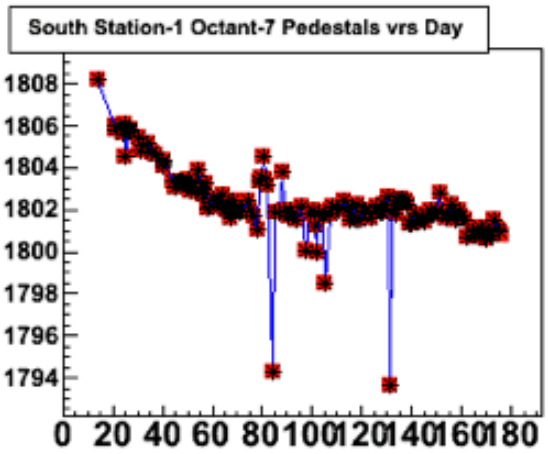

South Station-1 Octant-2 Pedestals vrs Day
1810
1805
1800
1795
1790
1785
0 20 40 60 80 100 120 140 160 180

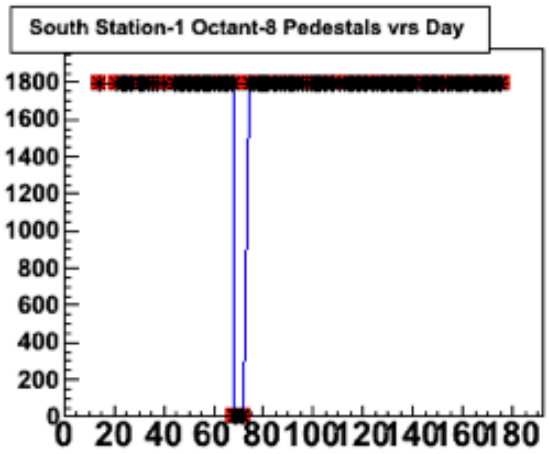

South Station-1 Octant-3 Pedestals vrs Day
1804
1803
1802
1801
1800
1799
1798
0 20 40 60 80 100 120 140 160 180

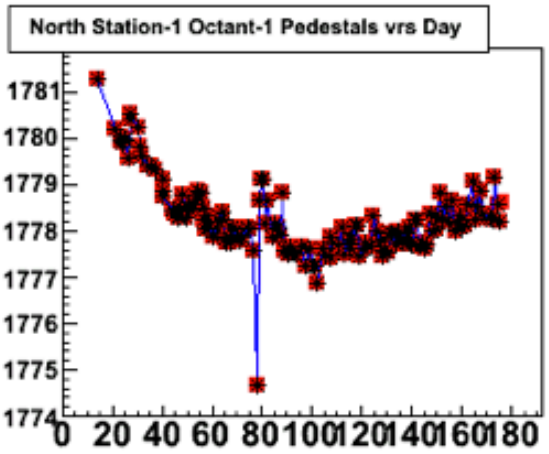

South Station-1 Octant-4 Pedestals vrs Day
1816
1814
1812
1810
1808
0 20 40 60 80 100 120 140 160 180

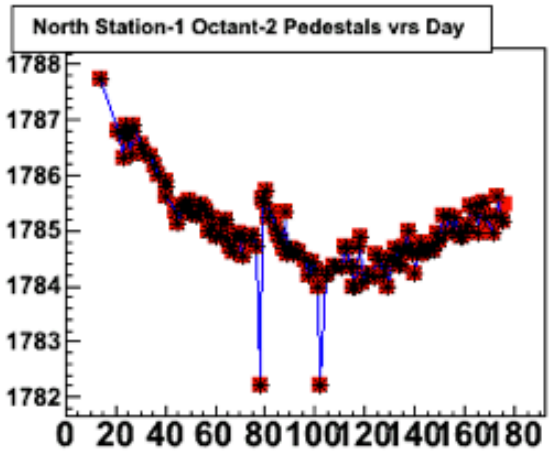

South Station-1 Octant-5 Pedestals vrs Day
1805
1800
1795
1790
1785
0 20 40 60 80 100 120 140 160 180

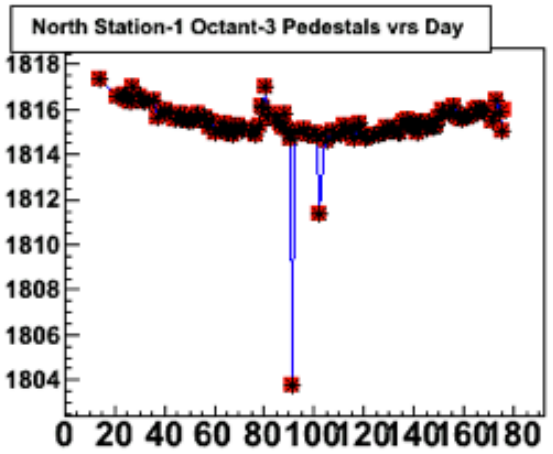

South Station-1 Octant-6 Pedestals vrs Day
1818
1816
1814
1812
1810
1808
0 20 40 60 80 100 120 140 160 180

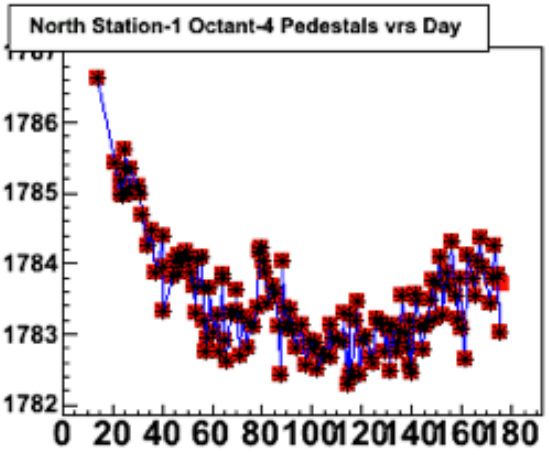

South Station-1 Octant-7 Pedestals vrs Day
1808
1806
1804
1802
1800
1798
1796
1794
0 20 40 60 80 100 120 140 160 180

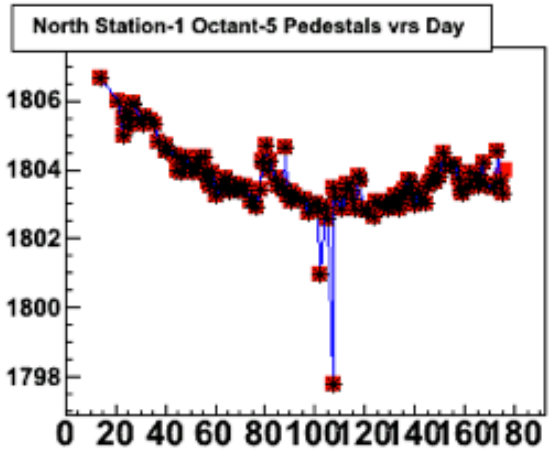

South Station-1 Octant-8 Pedestals vrs Day
1800
1600
1400
1200
1000
800
600
400
200
0
0 20 40 60 80 100 120 140 160 180

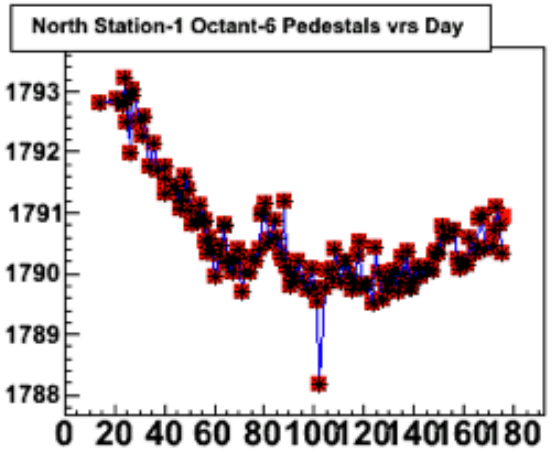

North Station-1 Octant-1 Pedestals vrs Day
1781
1780
1779
1778
1777
1776
1775
1774
0 20 40 60 80 100 120 140 160 180

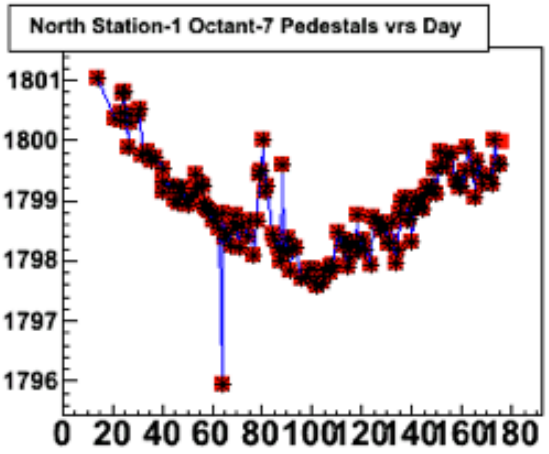

North Station-1 Octant-2 Pedestals vrs Day
1788
1787
1786
1785
1784
1783
1782
0 20 40 60 80 100 120 140 160 180

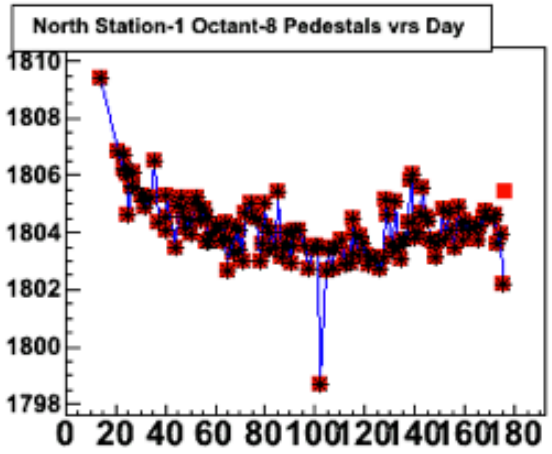

North Station-1 Octant-3 Pedestals vrs Day
1818
1816
1814
1812
1810
1808
1806
1804
0 20 40 60 80 100 120 140 160 180


North Station-1 Octant-4 Pedestals vrs Day
1786
1785
1784
1783
1782
0 20 40 60 80 100 120 140 160 180


North Station-1 Octant-5 Pedestals vrs Day
1806
1804
1802
1800
1798
0 20 40 60 80 100 120 140 160 180

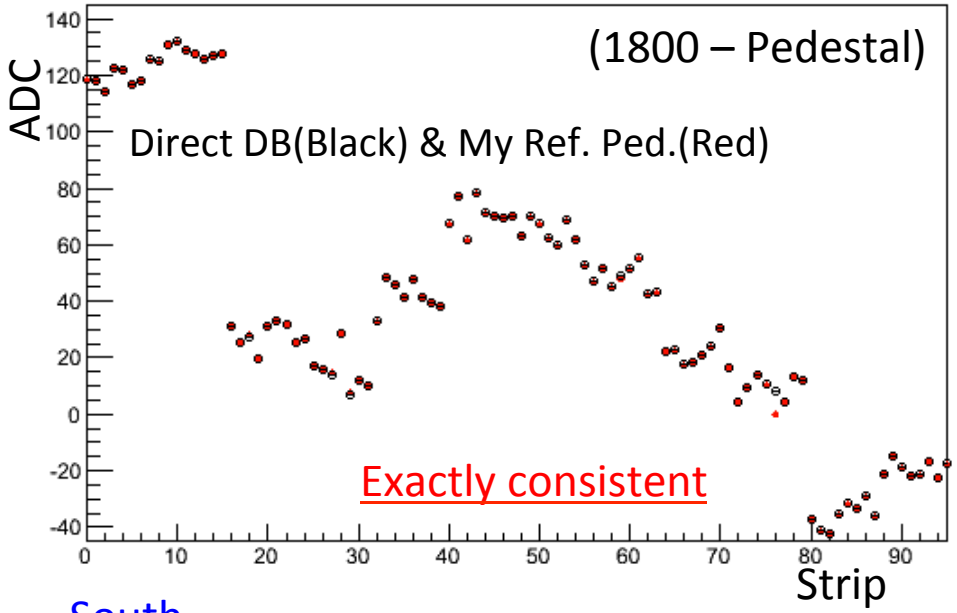

North Station-1 Octant-6 Pedestals vrs Day
1793
1792
1791
1790
1789
1788
0 20 40 60 80 100 120 140 160 180


North Station-1 Octant-7 Pedestals vrs Day
1801
1800
1799
1798
1797
1796
0 20 40 60 80 100 120 140 160 180

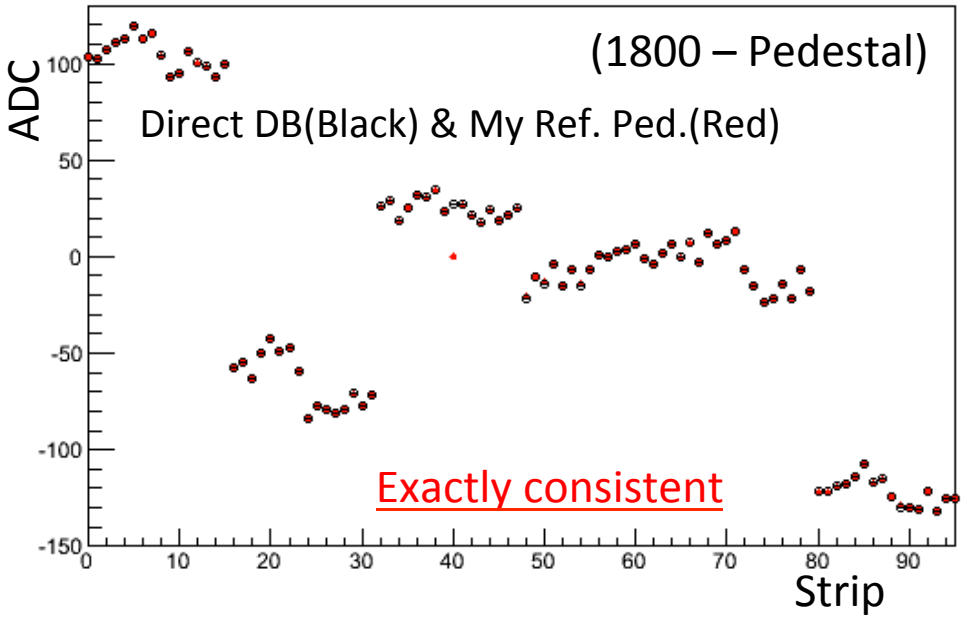

North Station-1 Octant-8 Pedestals vrs Day
1810
1808
1806
1804
1802
1800
1798
0 20 40 60 80 100 120 140 160 180

X-Check of Reference Pedestals in my analysis (compared with original source, web data base)

North

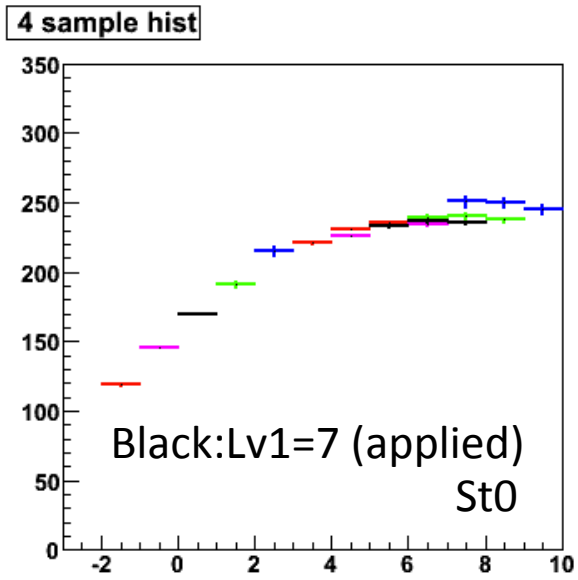


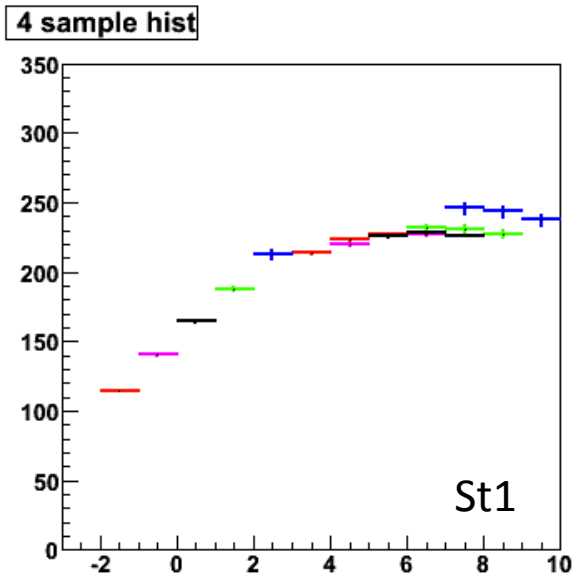
South

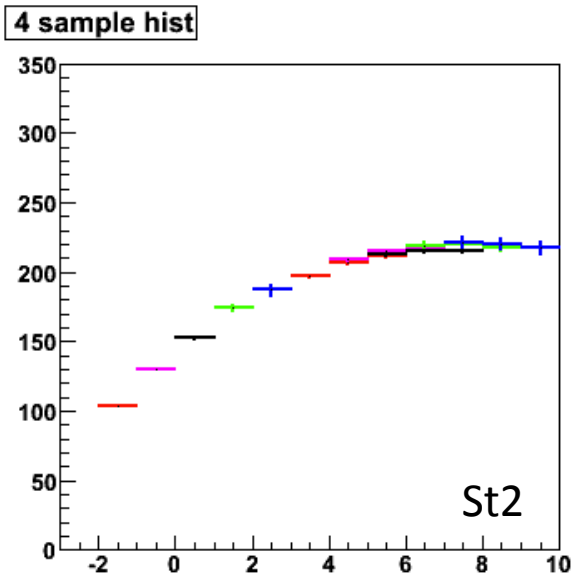


Run11 Lv1 Delay Scan (Pkstrp of TrkAss Clstr, all non-stereo plane & oct summed)

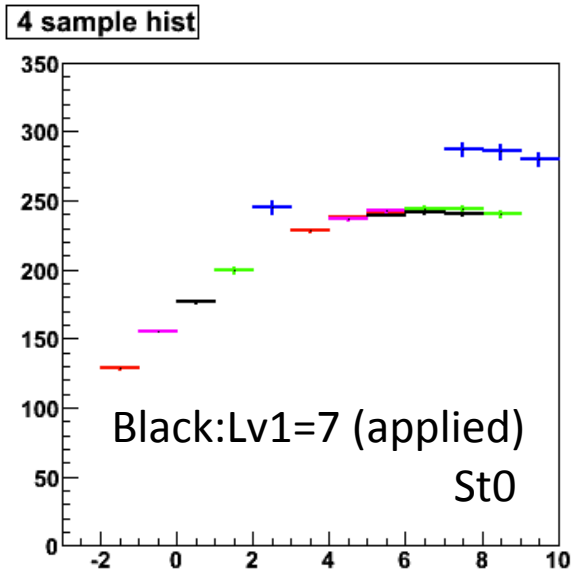
South

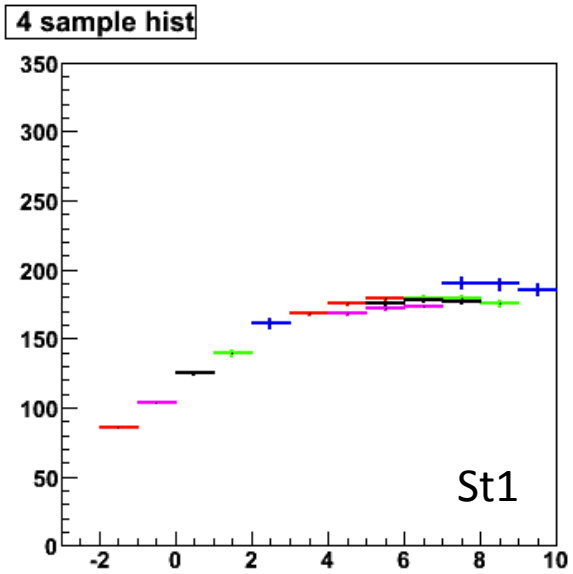


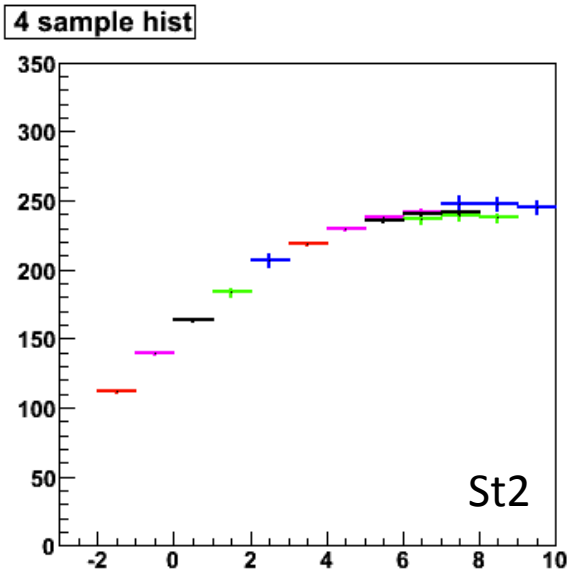




North

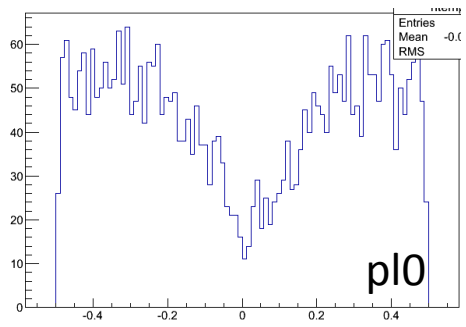


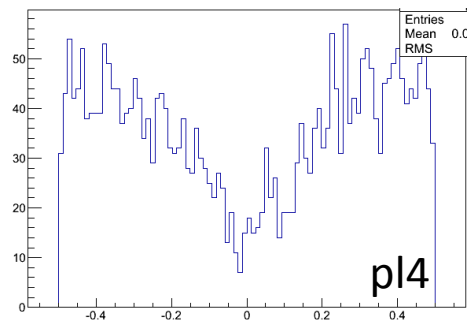


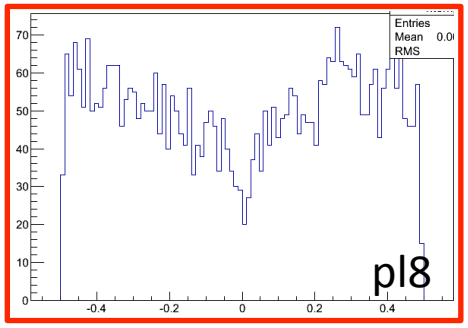


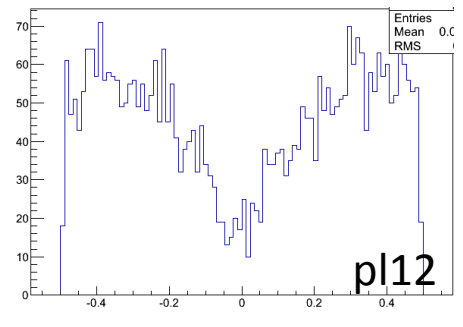
South Pkw of TrkAss Hit (Run11 Cosmic, Mgt off, all oct summed, clsz>1)

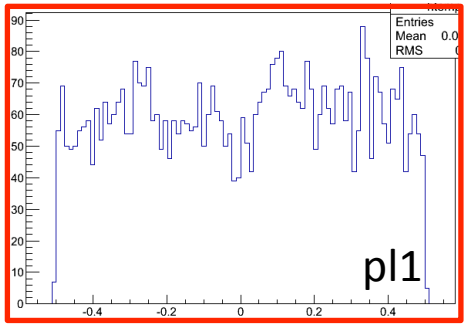
Red: non-stero planes

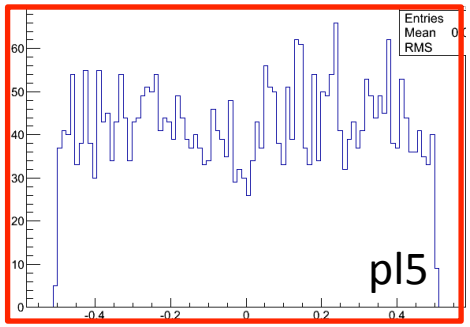


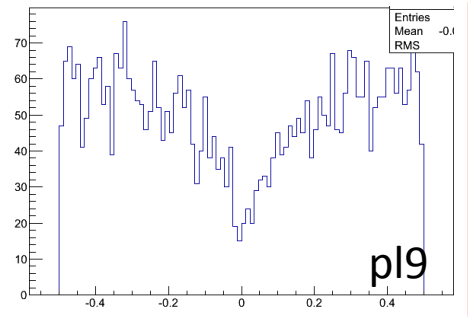


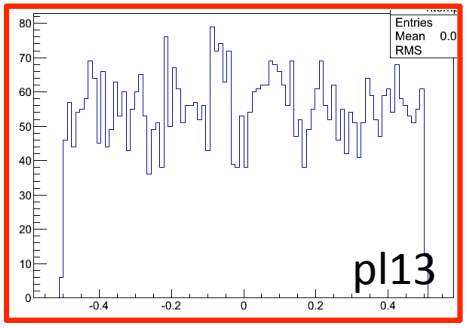


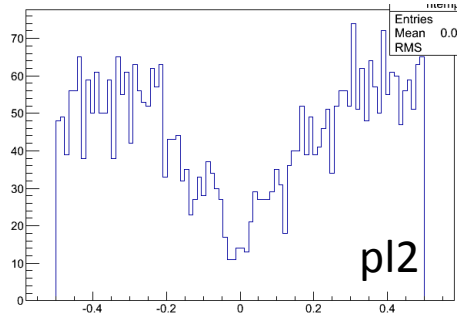


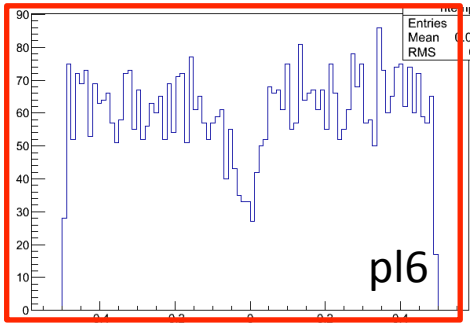


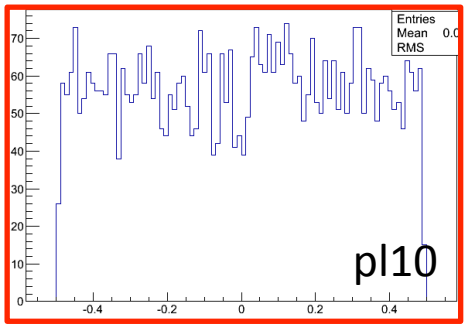


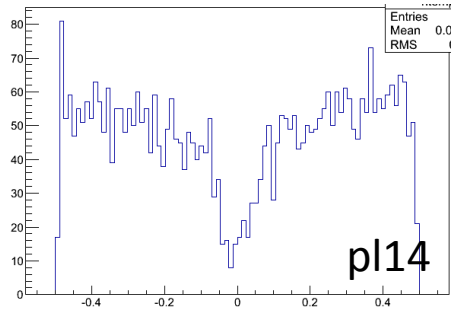


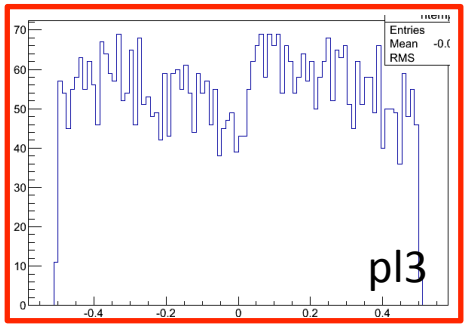


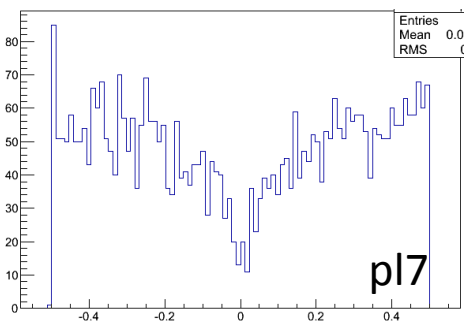


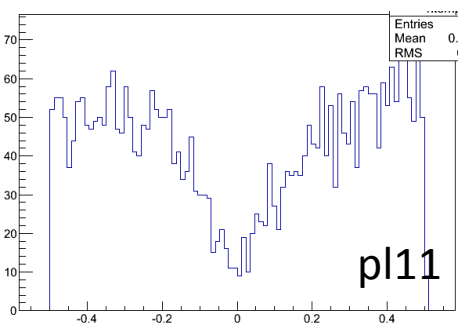


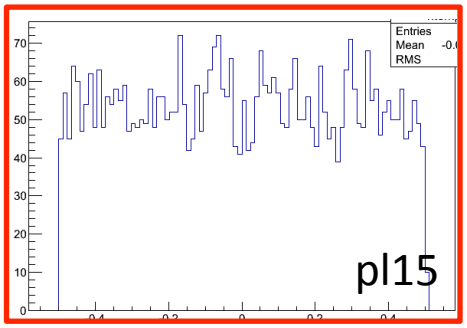






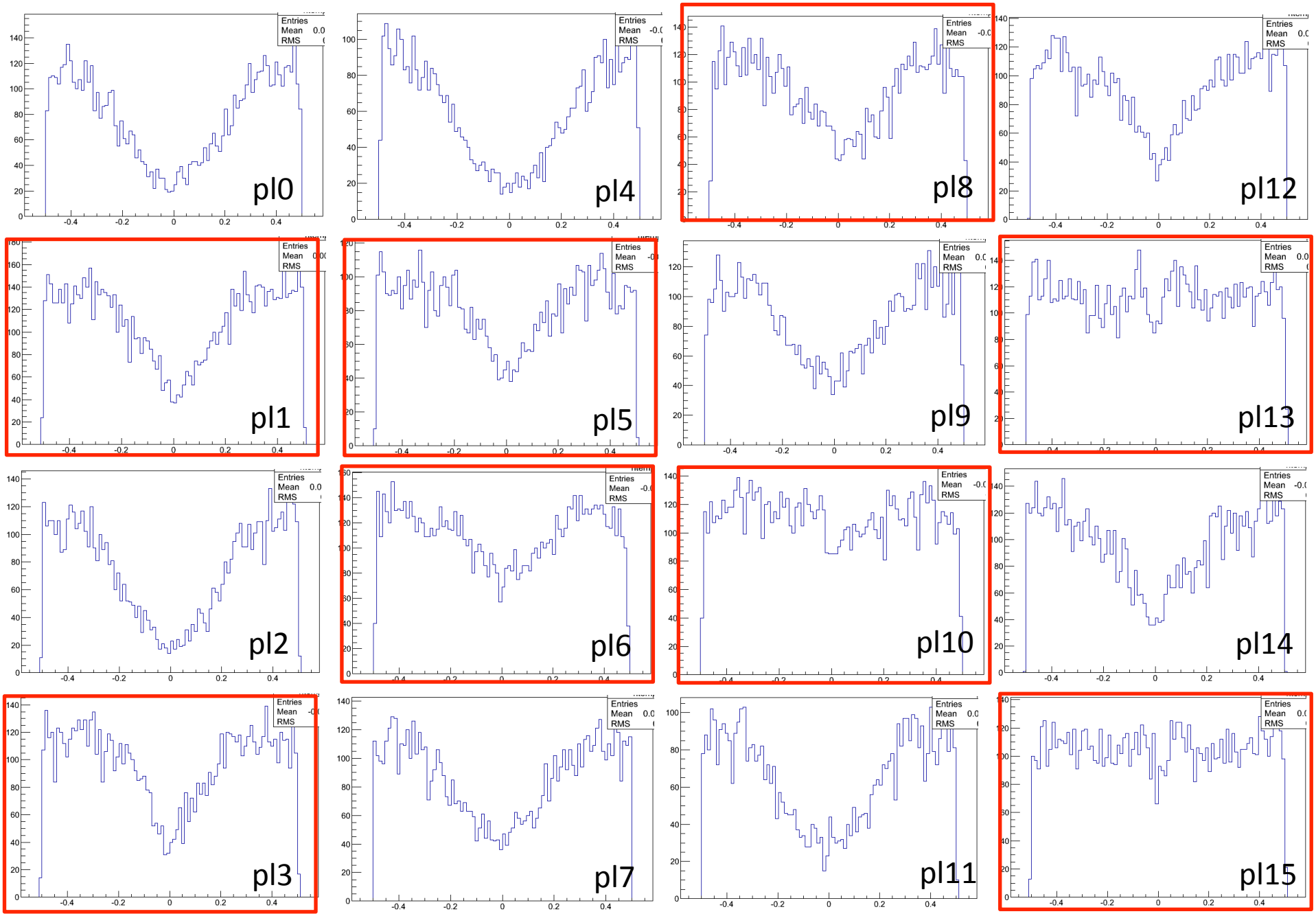






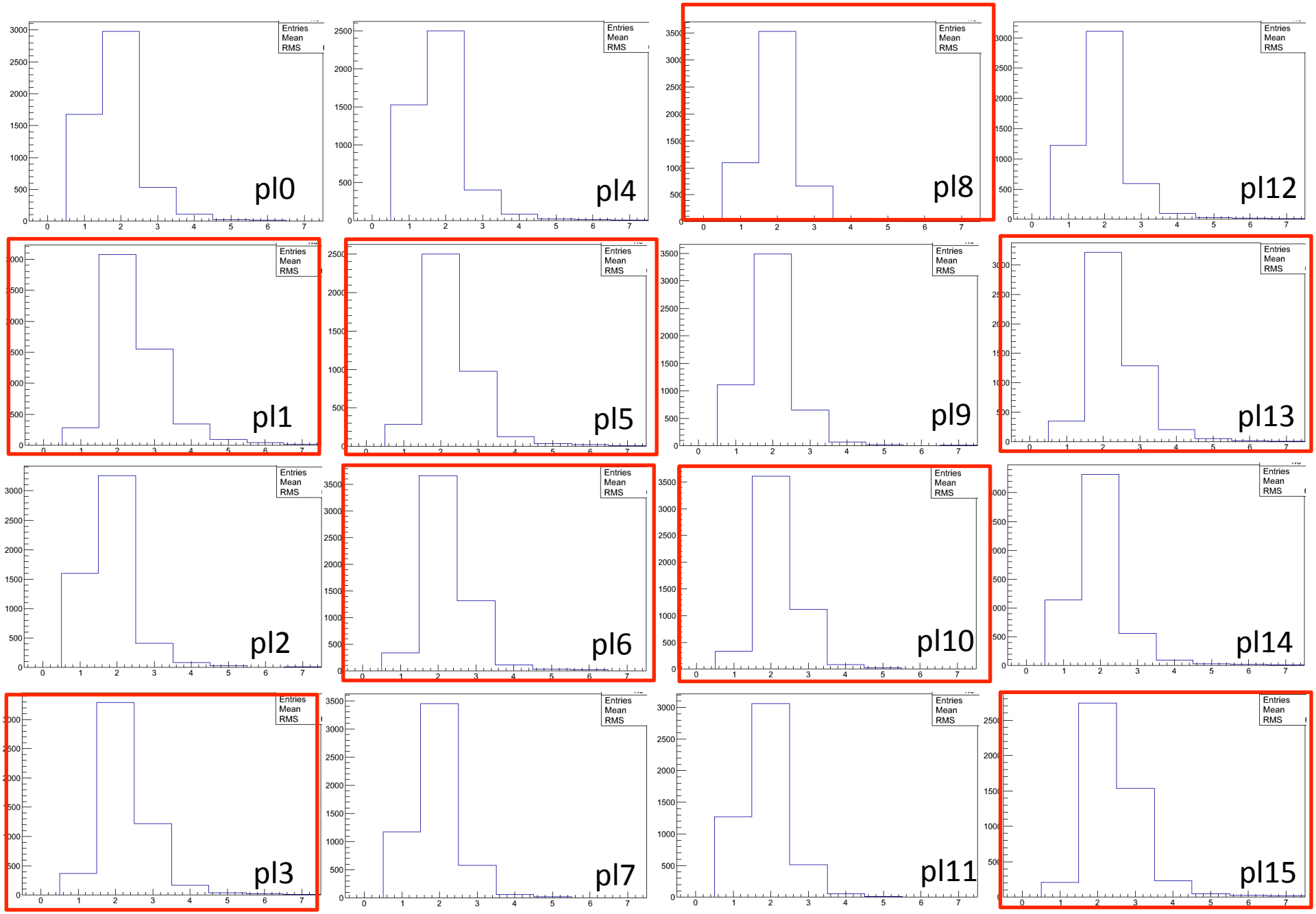
North Pkw of TrkAss Hit (Run11 Cosmic, Mgt off, all oct summed, clsz>1)

Red: non-stero planes



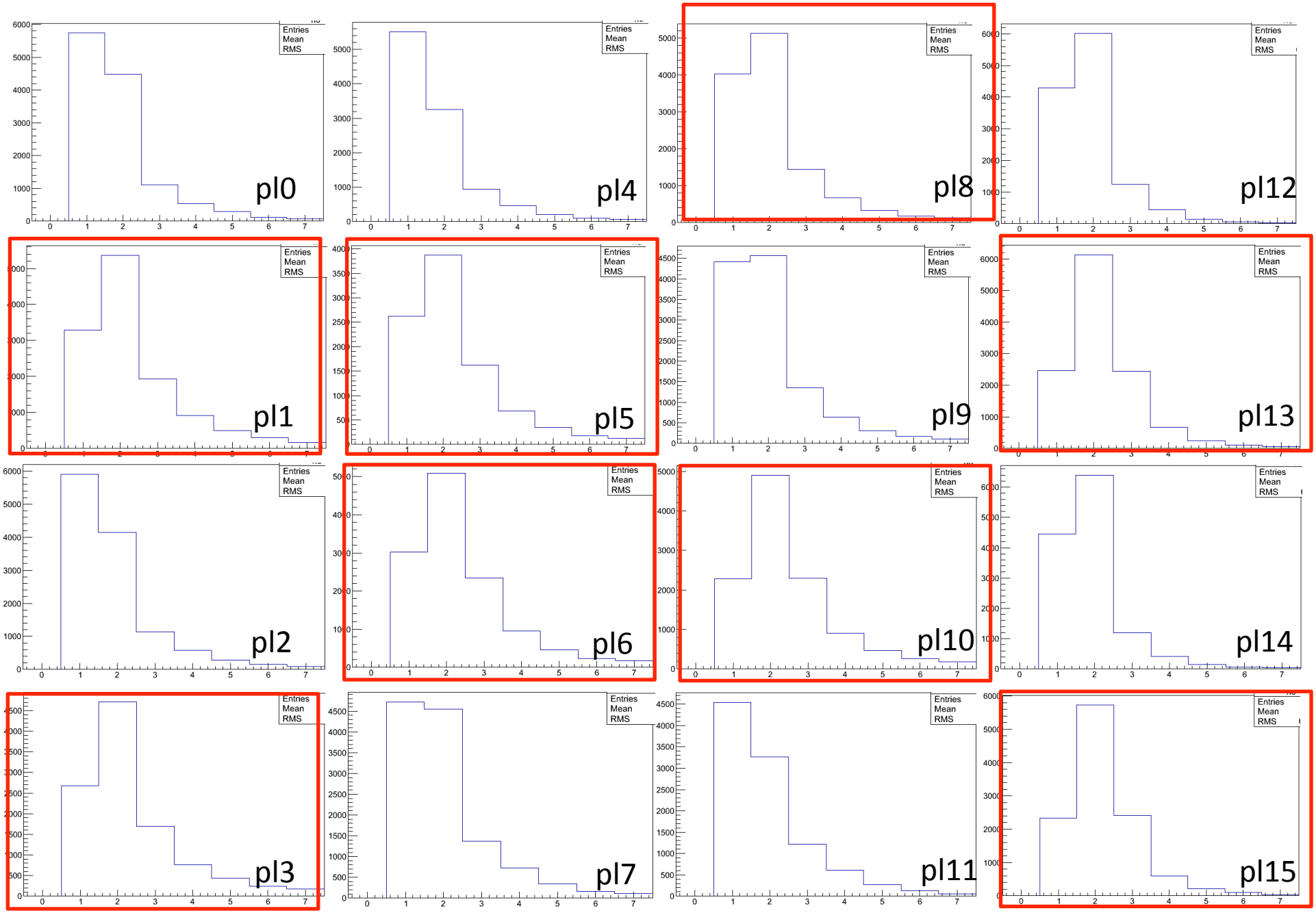
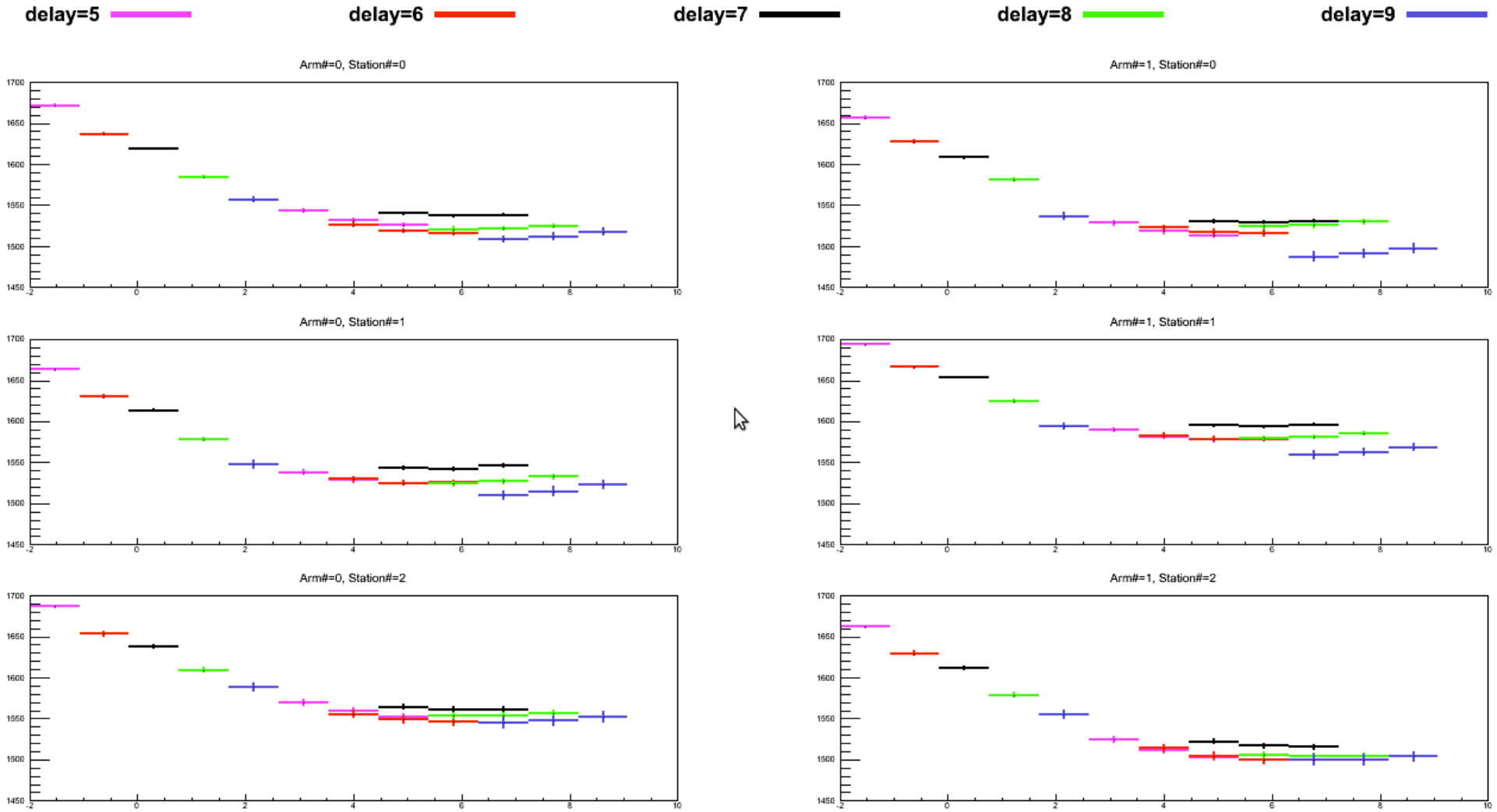
South Clsz of TrkAss Hit (Run11 Cosmic, Mgt off, all oct summed)

Red: non-stero planes



North Clsz of TrkAss Hit (Run11 Cosmic, Mgt off, all oct summed)

Red: non-stero planes



Run12 Lv1 Delay Scan (Pkstrp of TrkAss Clstr, all non-stereo plane & oct summed)