



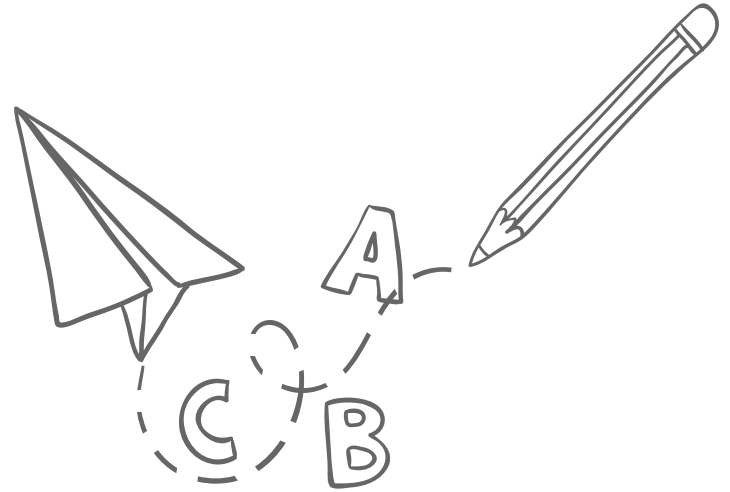
A first glance to Hybrid Data Production v16r0

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LTP Meeting, 03 June 2020

Outline

- A. v16r0 production
- B. Hybrid cuts reminder
- C. dNdE
- D. Highest Energy events
- E. E_{FD}/E_{SD} vs time
- F. Xmax
- G. CO6 issue



Hybrid Data Production v16r0

<https://web.i kp.kit.edu/augeroracle/doku.php?id=auger:observer>

/data/v16r0/

Reconstructed data from 2018 and 2019 with updated bad periods and GOES data (status as of 20.05.2020)

This dataset augments the 2019-ICRC data set.

SD data set can be used until 2019-12-31

Hybrid data set can be used until 2018-12-01

CAVEAT: no cloud/calibration/aerosol DB for 2019

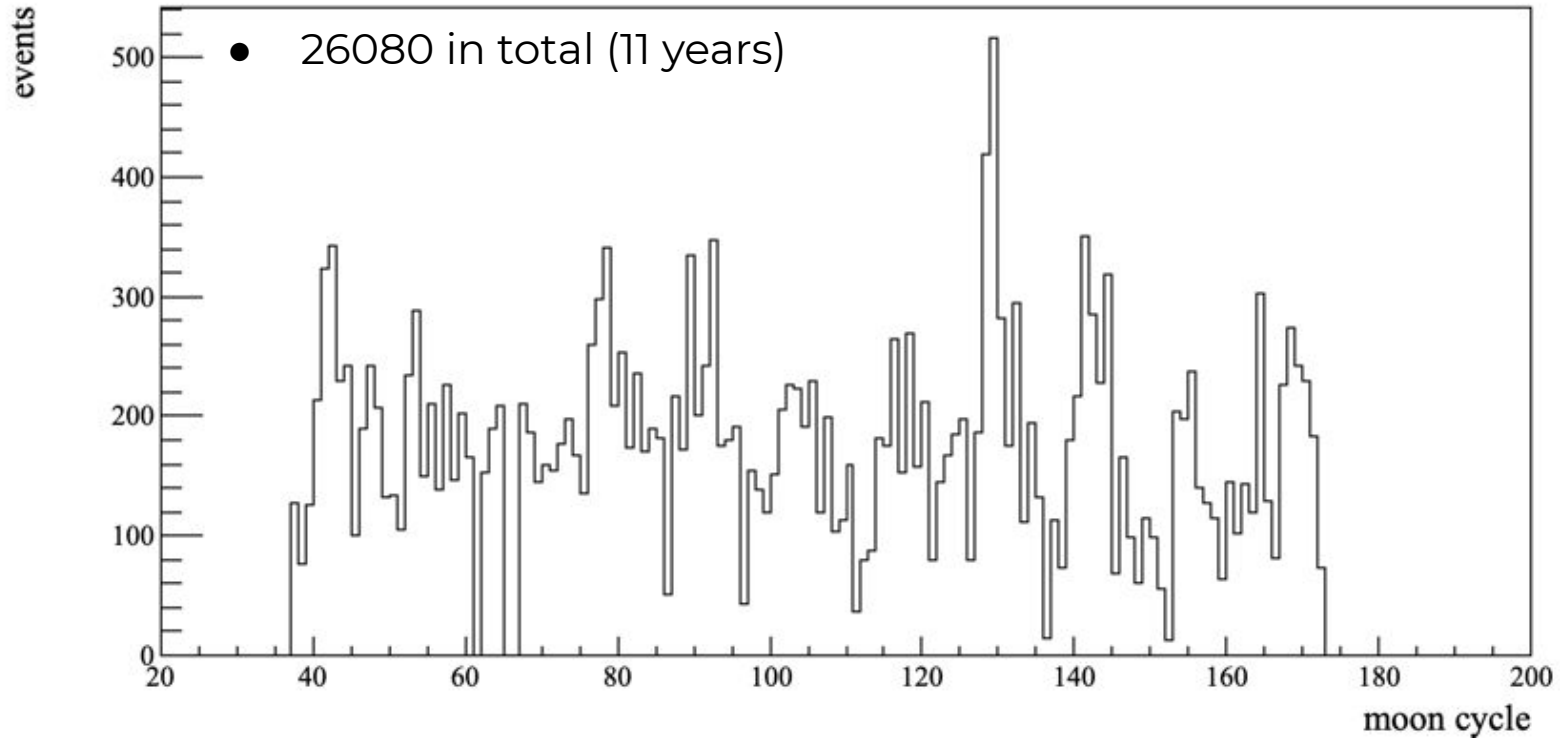
Pre-production from L. Perrone also available for cross-check

Thanks to people at KIT(Max Stadelmaier, Steffen Hahn) and Lecce (L. Perrone)

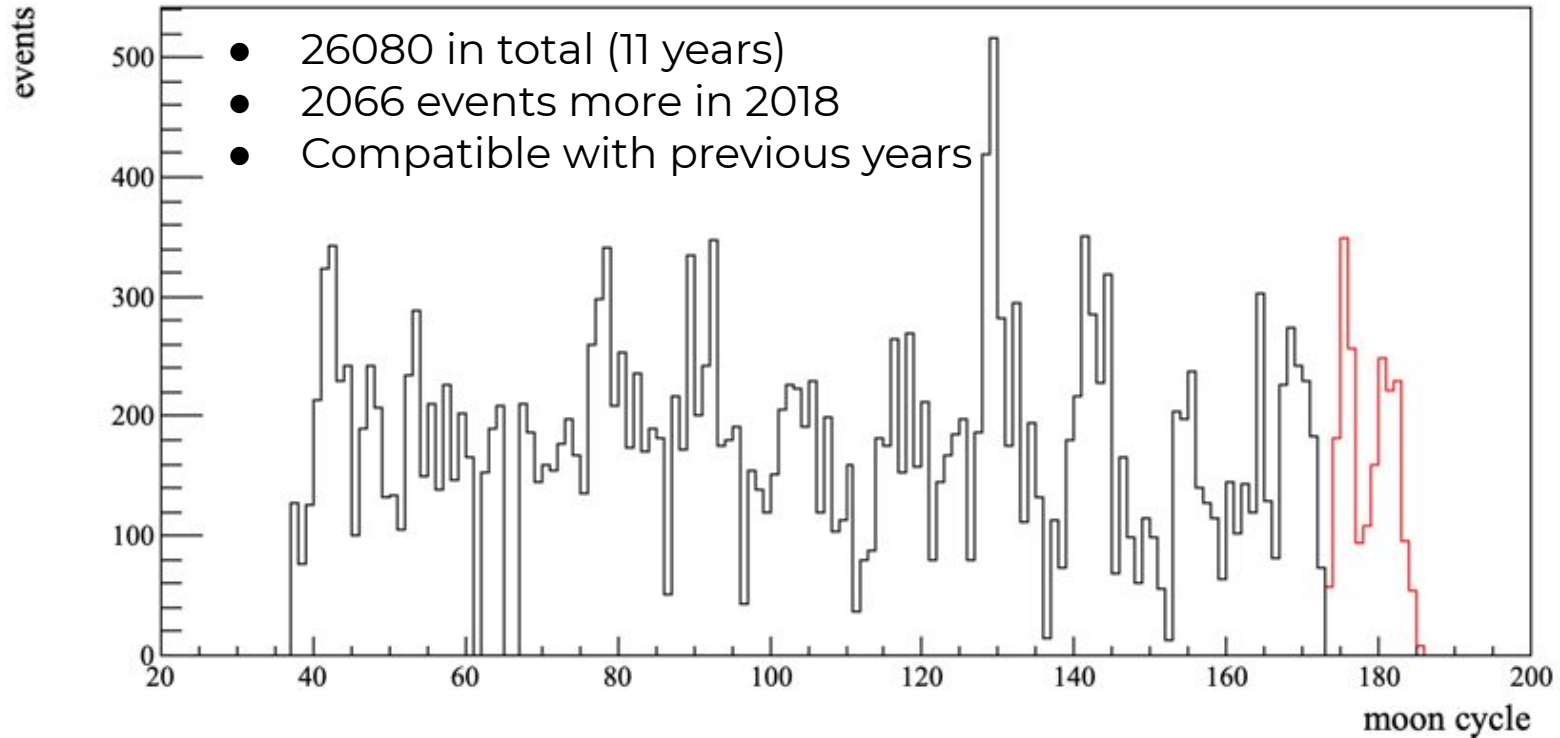
Hybrid cuts

- skipSaturated
- T3TimeAtGround
- T3Class 1.
- badFDPeriodRejection
- noBadPixelsInPulse (**substitute the cut !badPixels 1**)
- hasMieDatabase
- maxVAOD 0.1
- cloudCutXmaxPRD14 { params: 1 nMinusOne: 21 -10.5 10.5 }
- maxCoreTankDist 1500.
- maxZenithFD 60.
- xMaxObsInExpectedFOV { params: 40 20 }
- maxDepthHole 20.
- energyError .2
- profileChi2Sigma { params: 3 -1.1 nMinusOne: 400 -20 20 }
- maxDepthHole 20.
- HDSpectrumDistance 1
- FidFOVICRC13 40 20

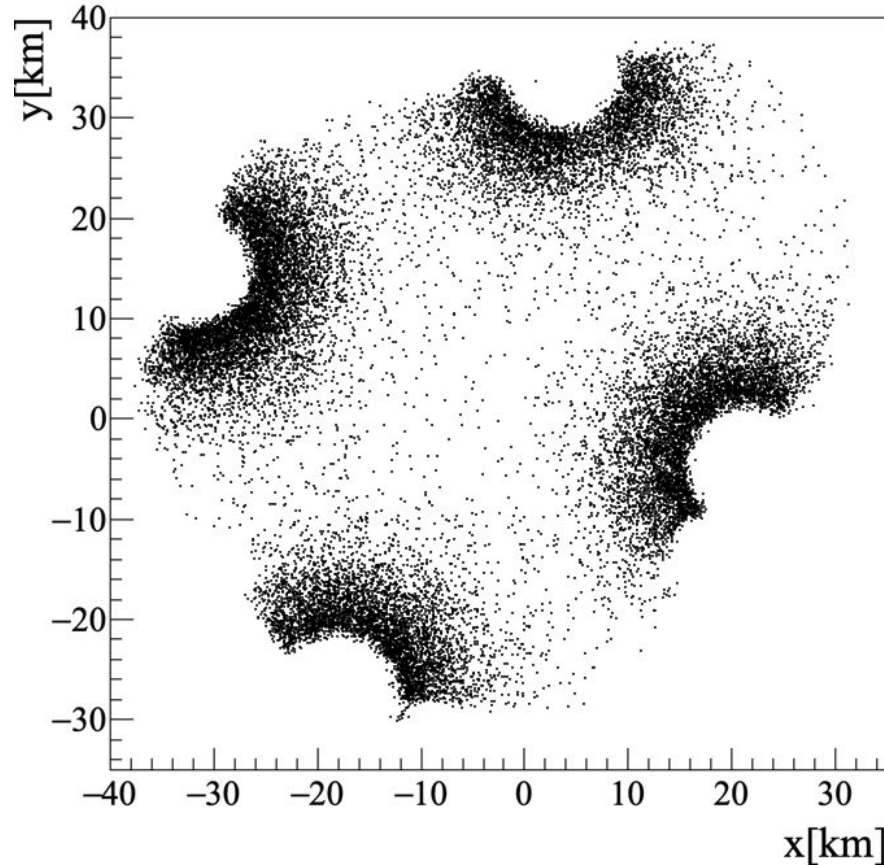
Events for Hybrid Spectrum



Events for Hybrid Spectrum

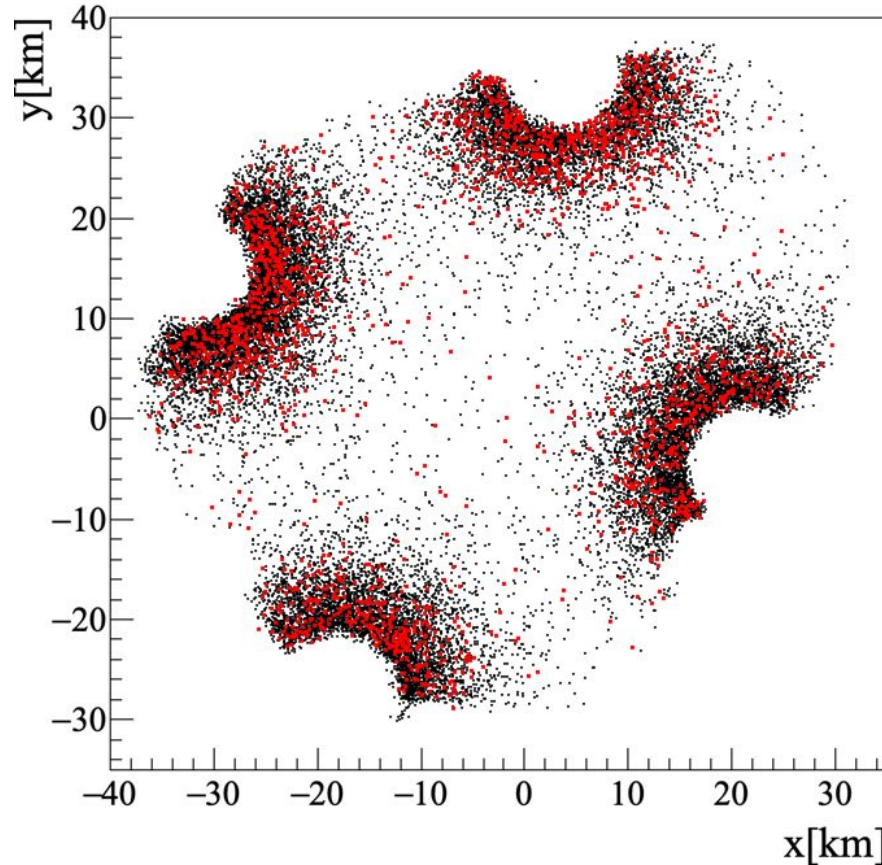


Core distribution at ground

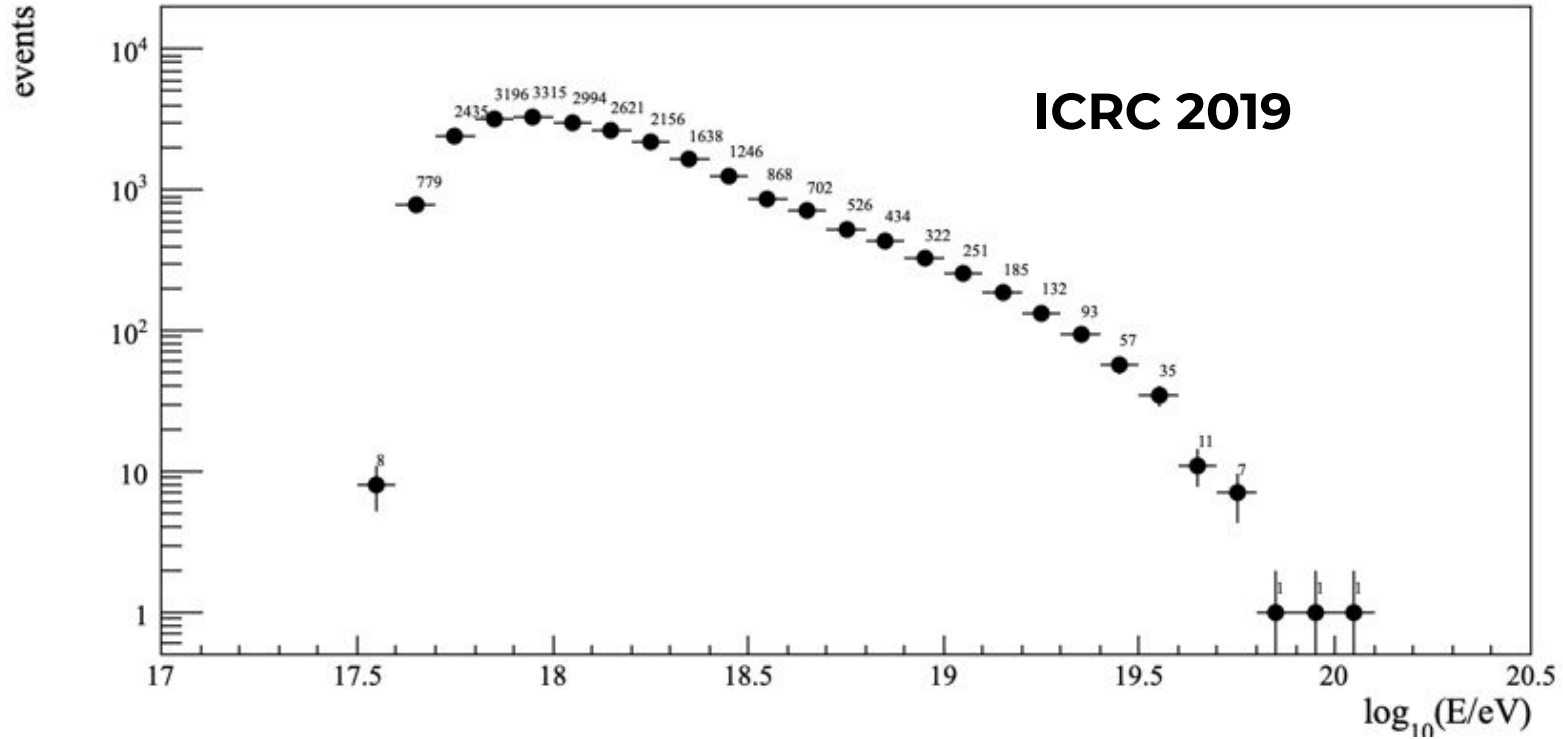


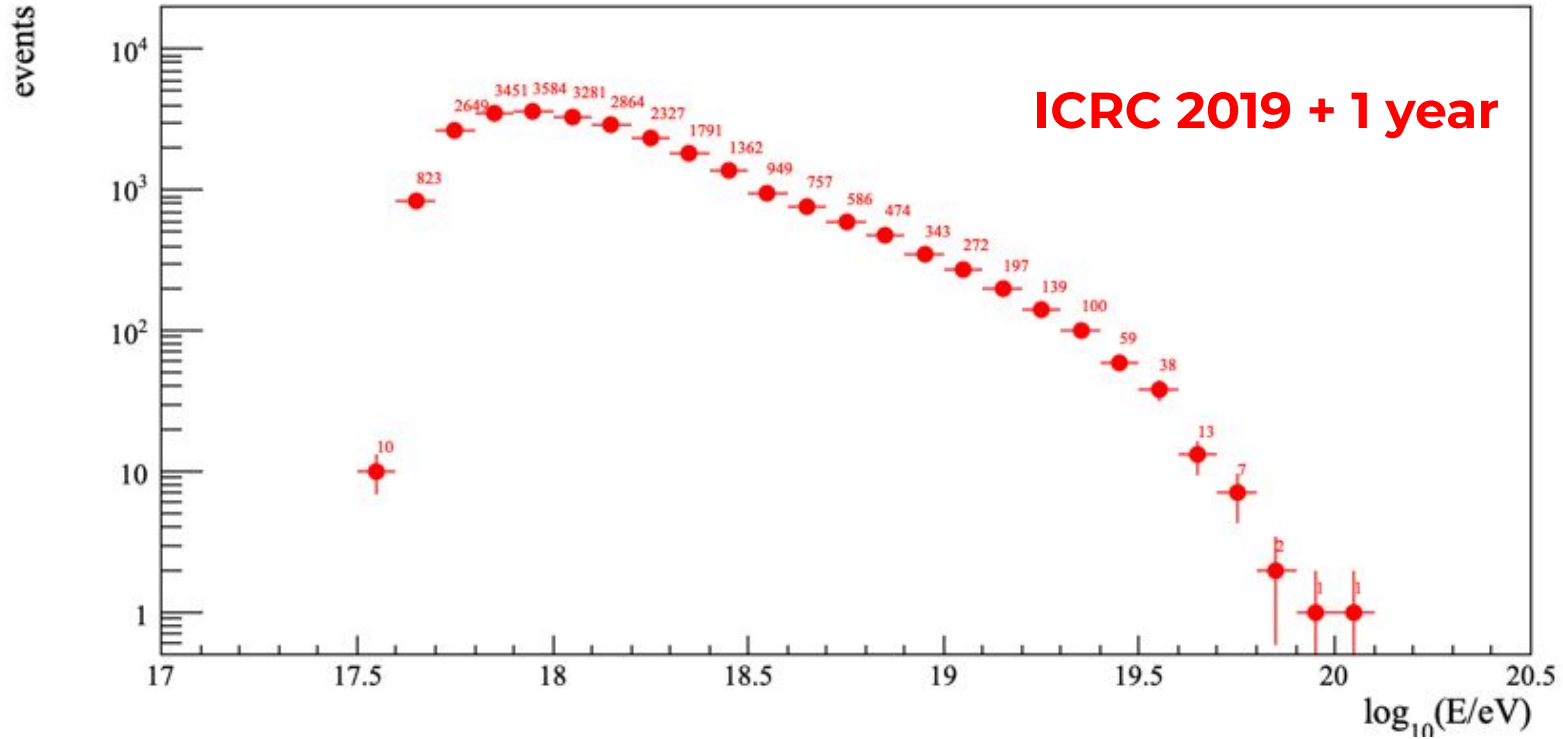
ICRC 2019

Core distribution at ground

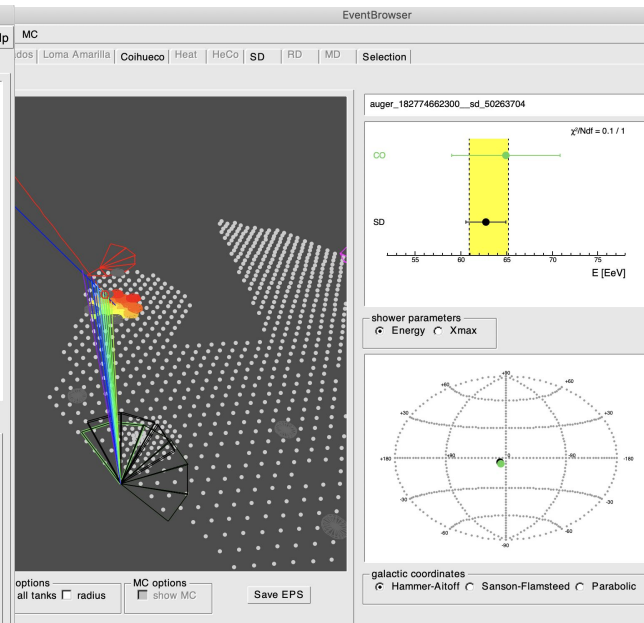
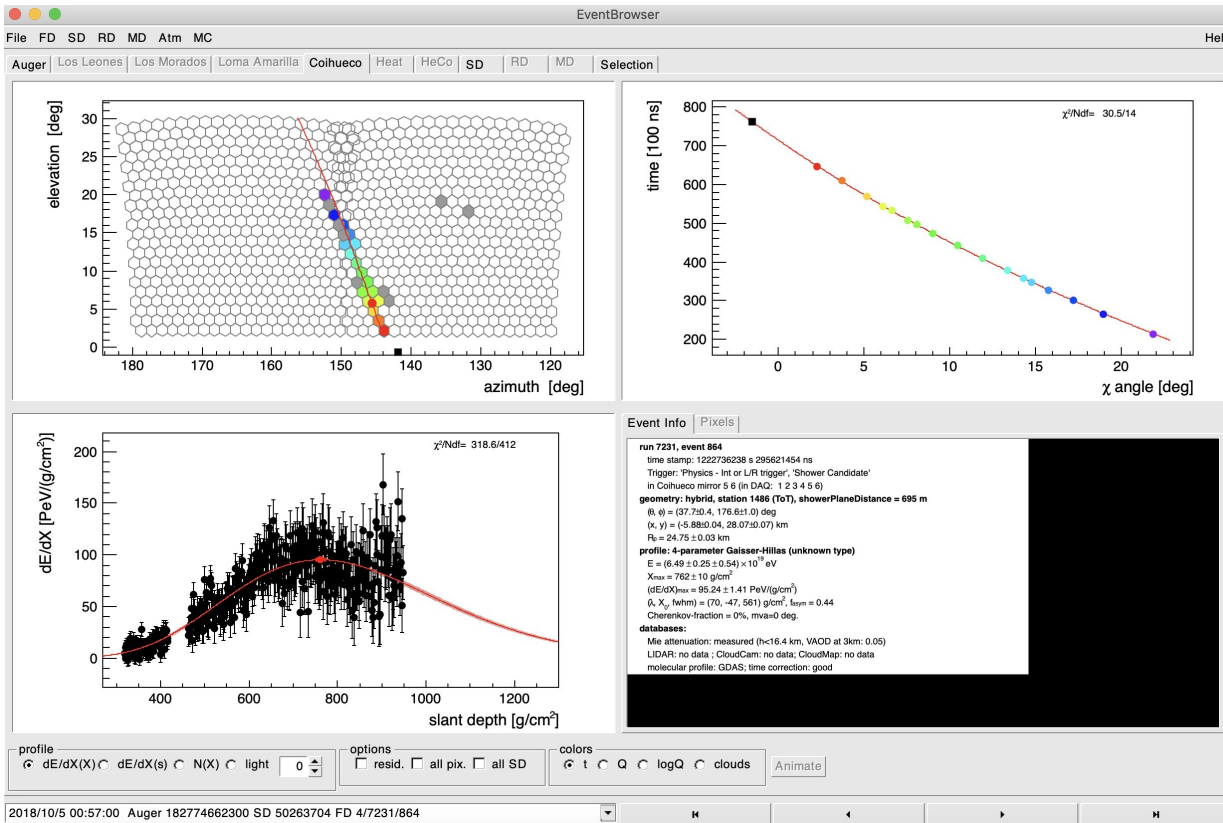


2018 events



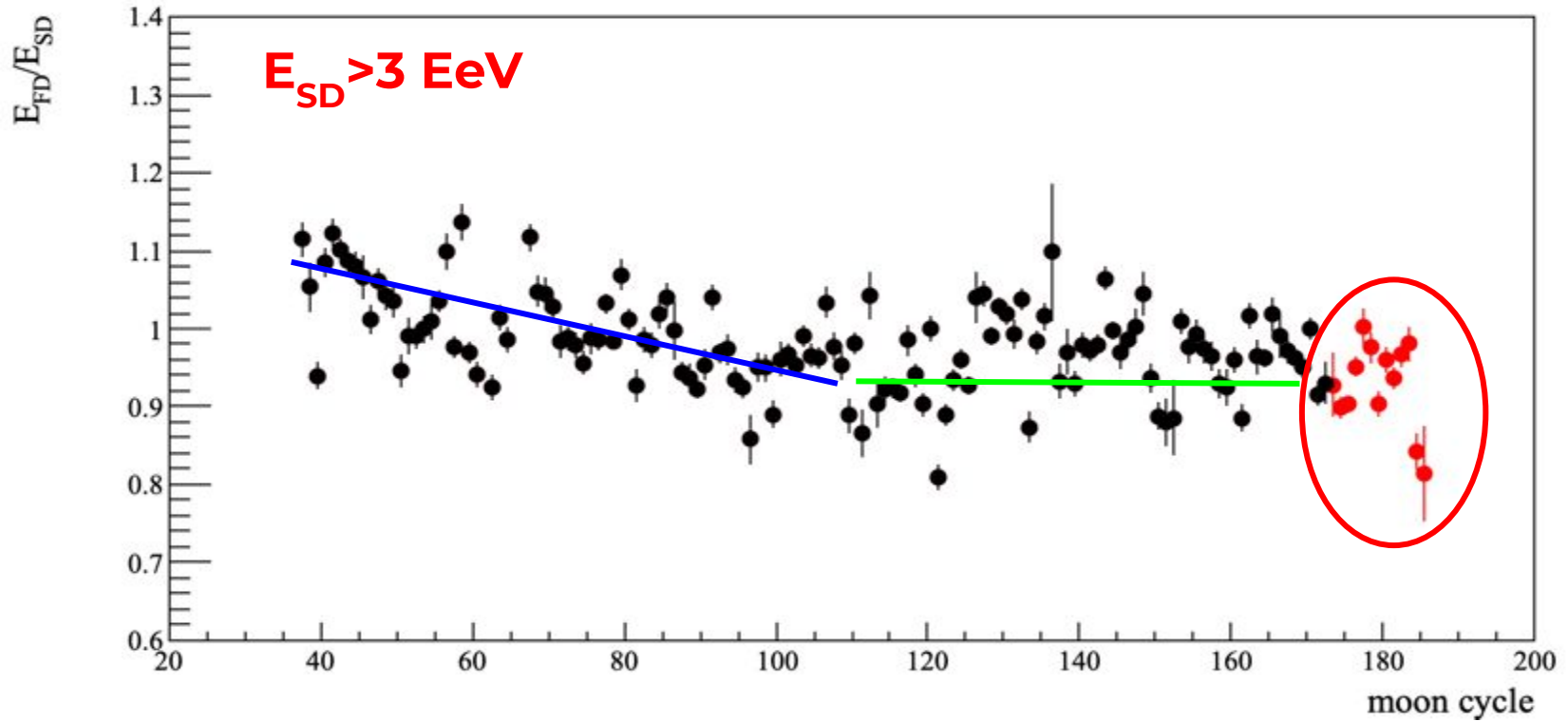


The highest energy event of 2018



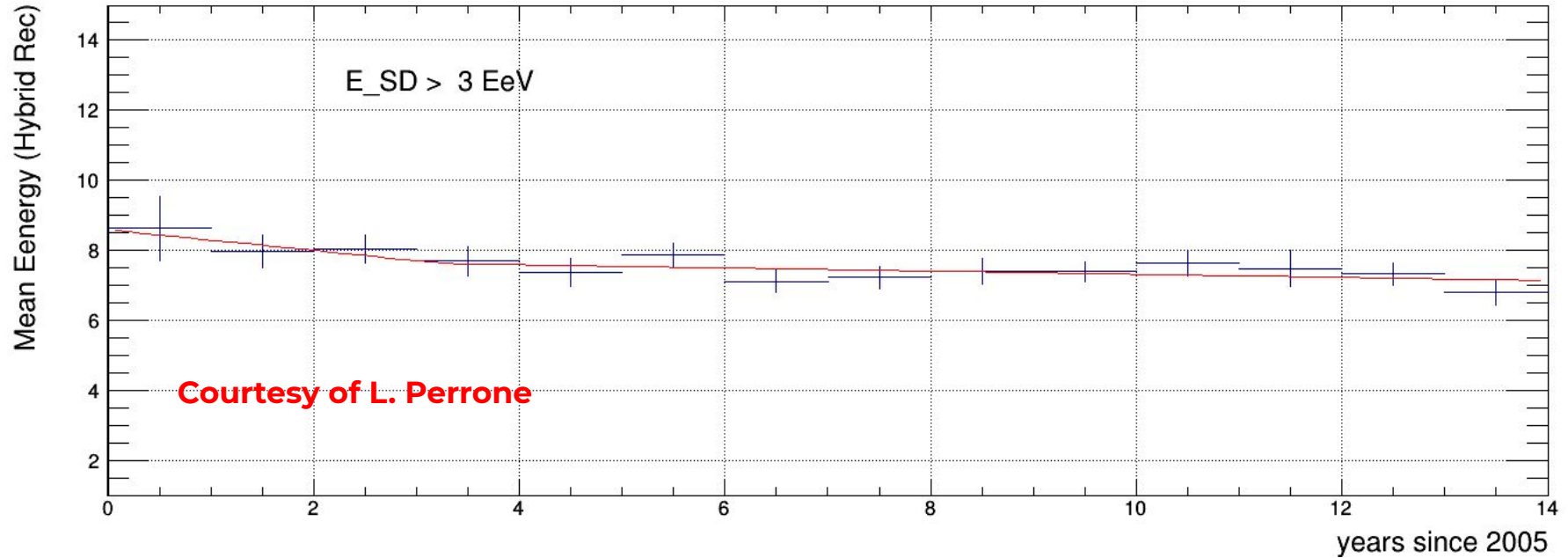
5 Oct 2018 CO 5(hottest)-6
 E_{FD} [EeV] = 64.93 +/- 5.94
 E_{SD} [EeV] = 62.75 +/- 2.21
 X_{max} [g/cm²] = 761.7 +/- 9.5

Energy drift

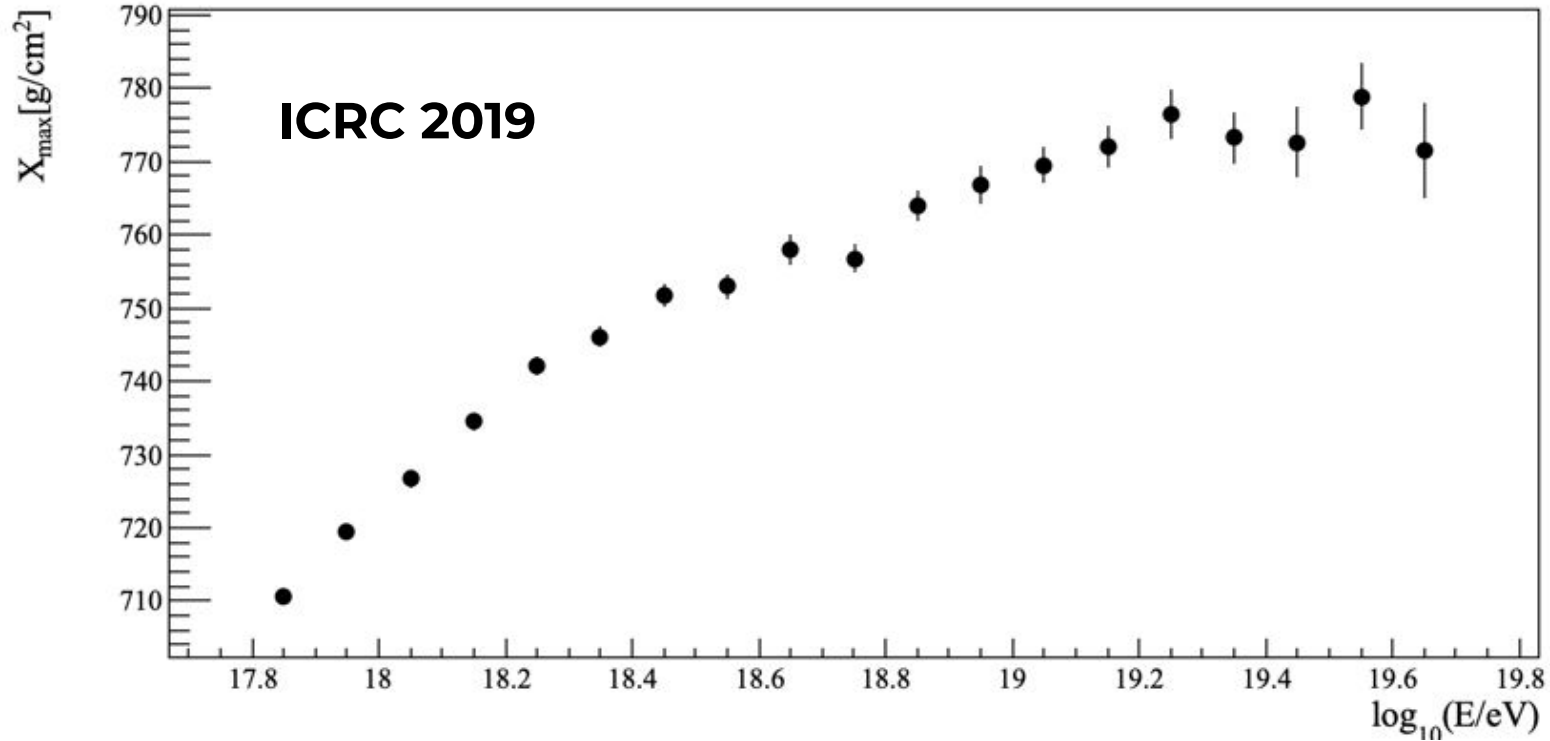


Energy drift

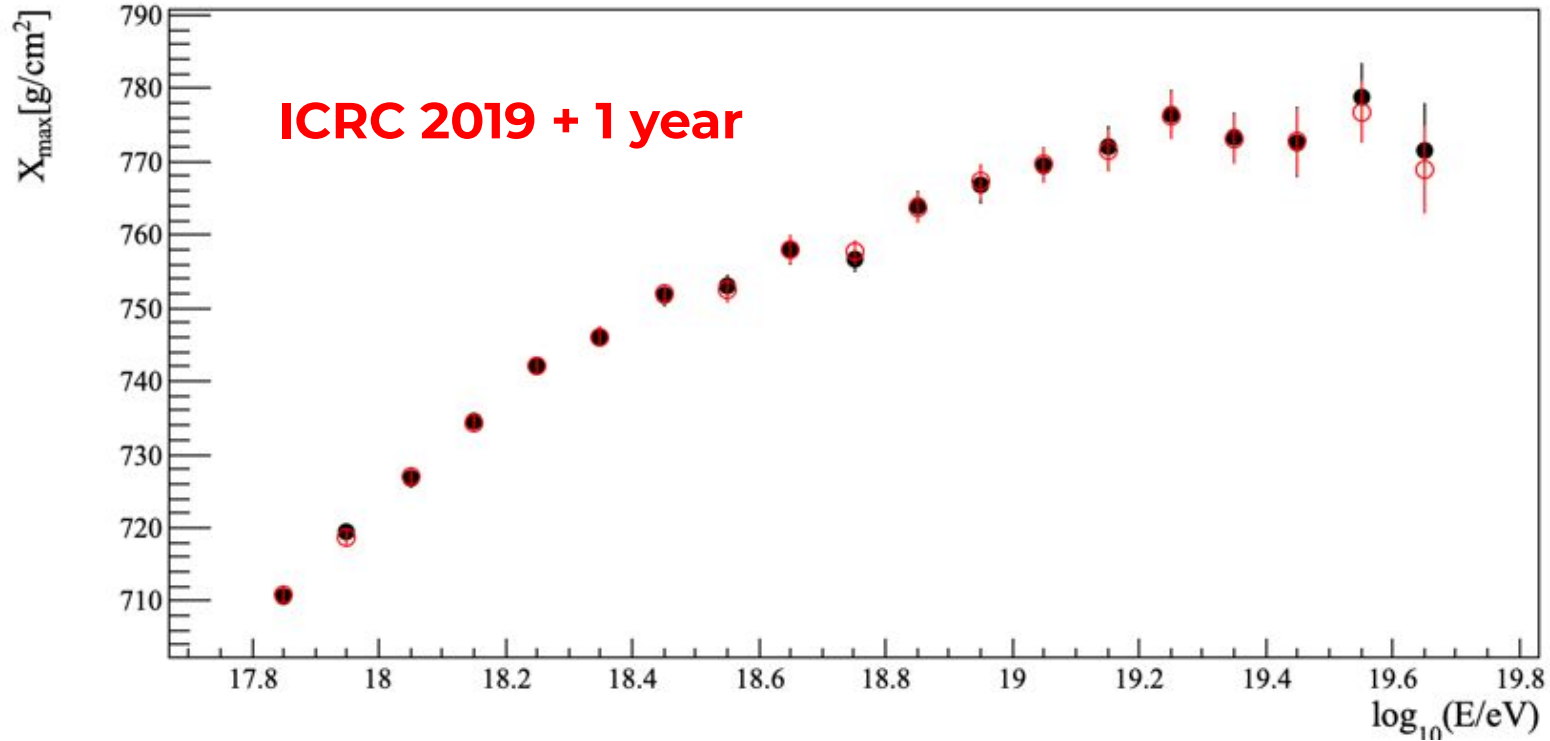
Same plot as before but on a yearly basis, done with Lecce pre-production



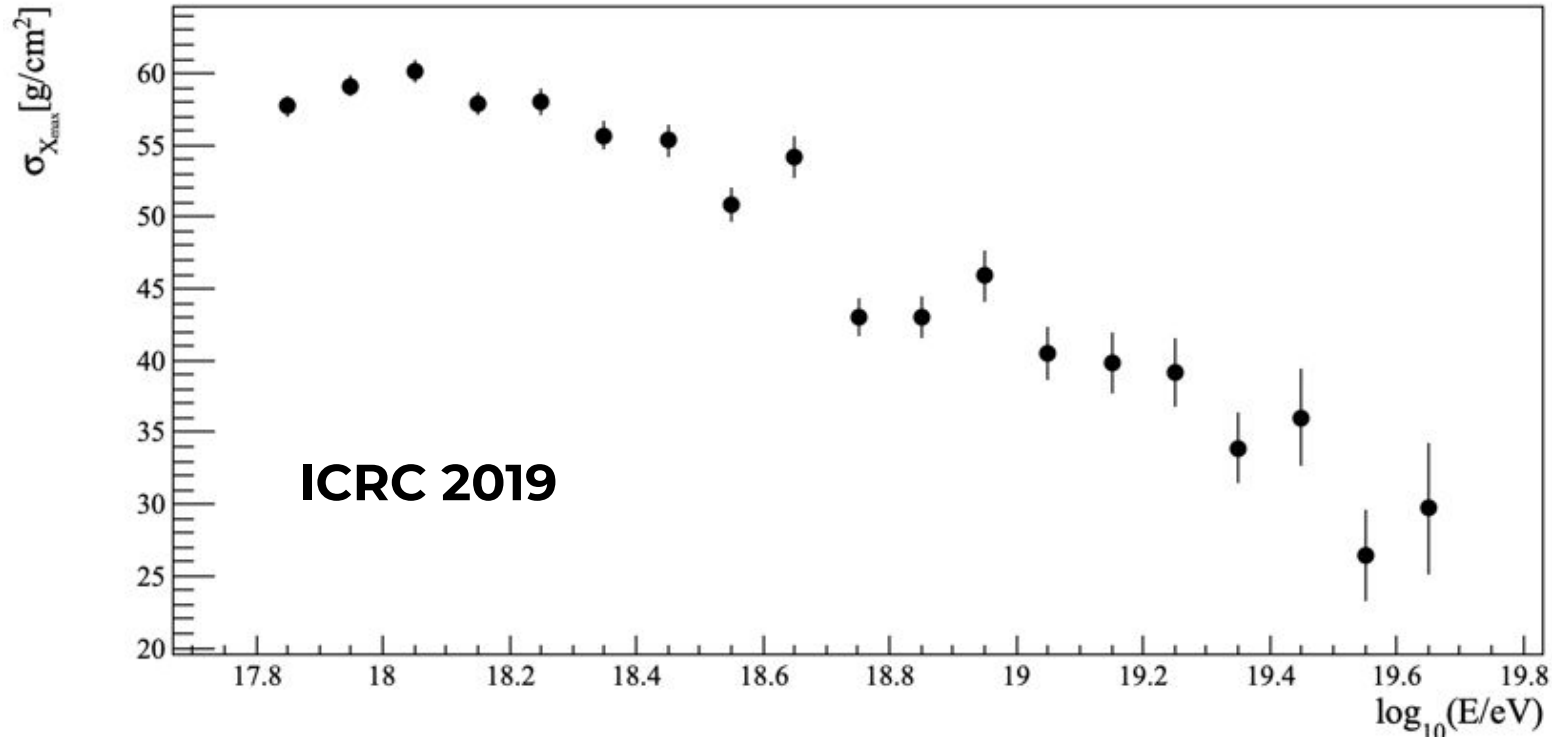
X_{max} (just a consistency check)



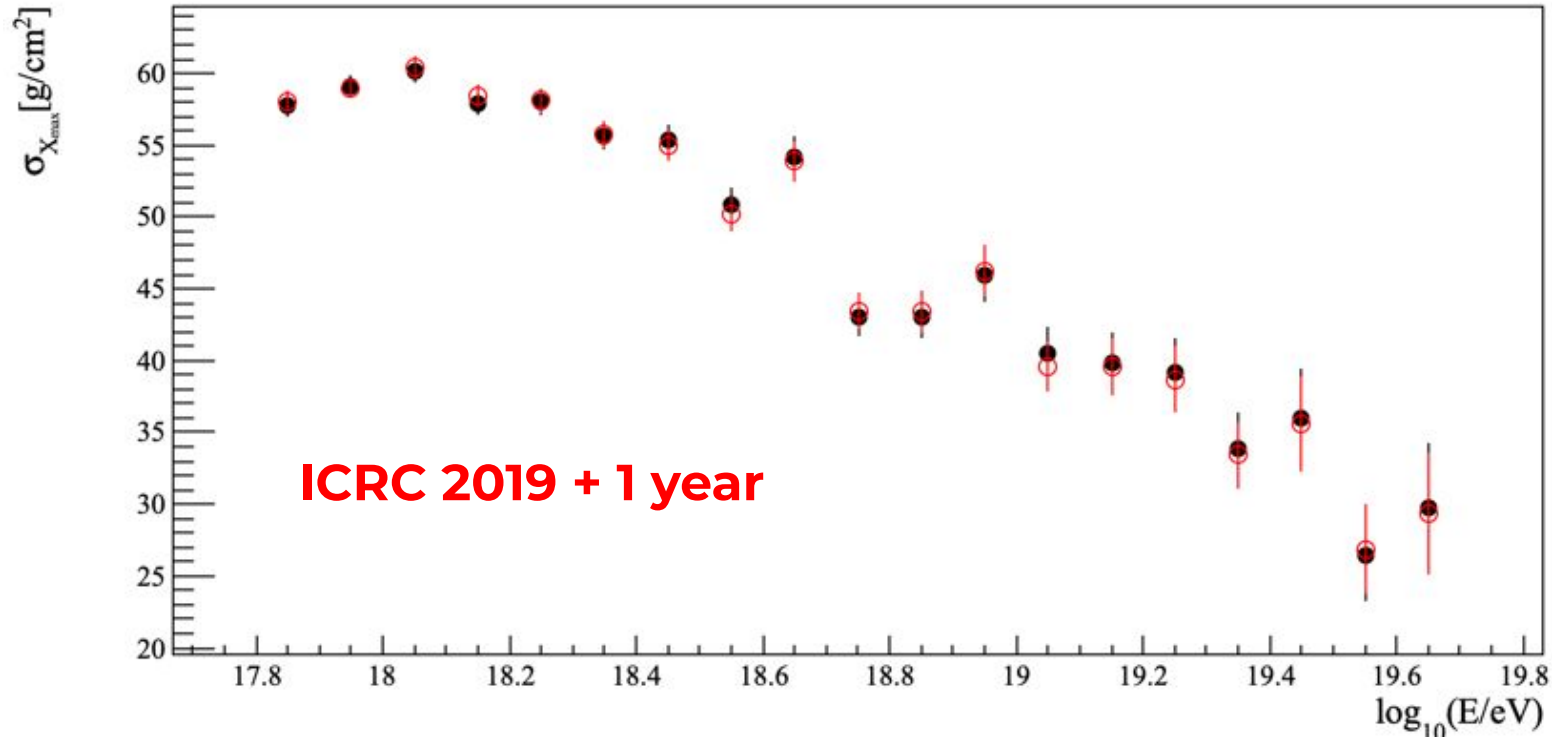
Xmax (just a consistency check)



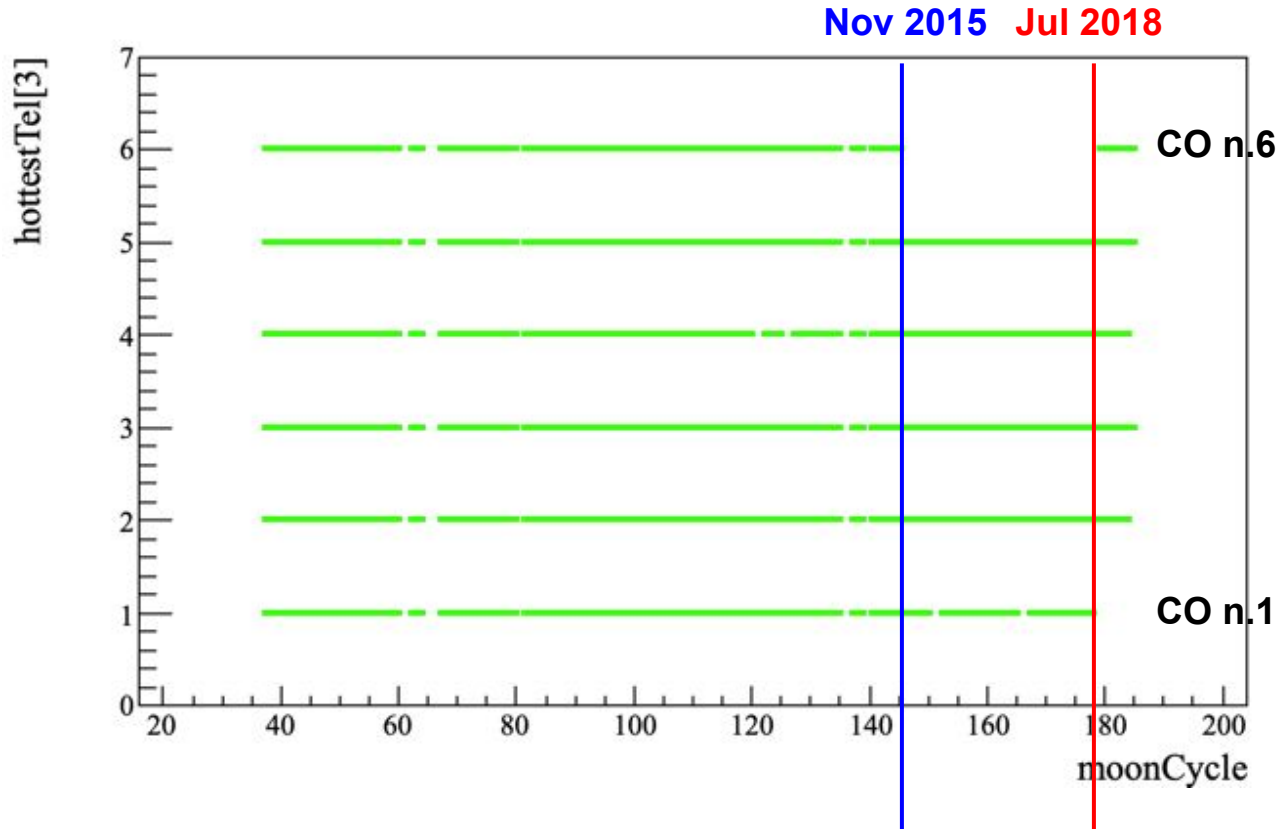
Xmax RMS (just a consistency check)



Xmax RMS (just a consistency check)



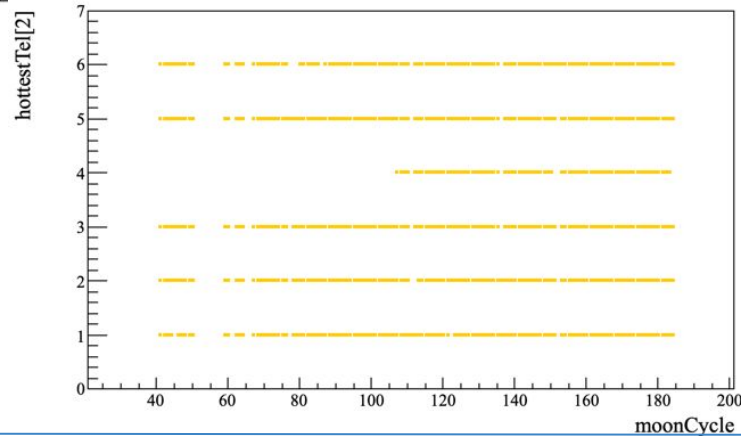
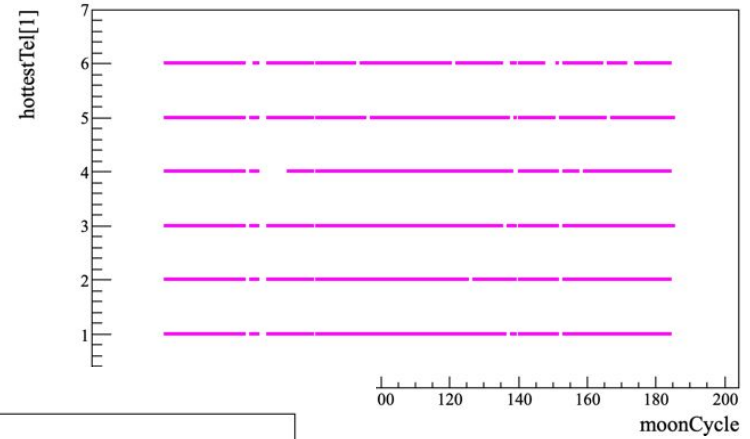
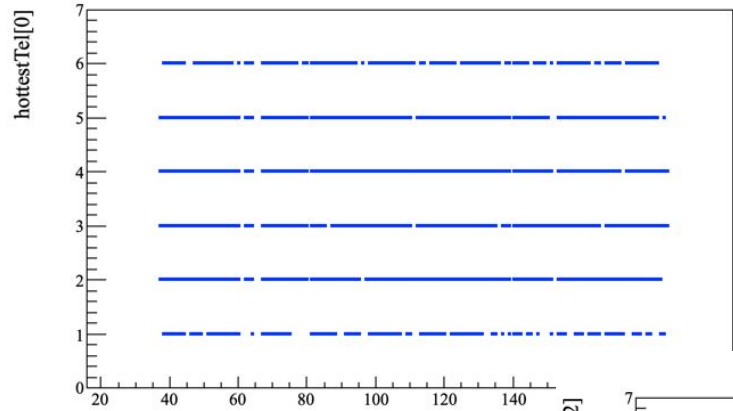
CO SLT module issue

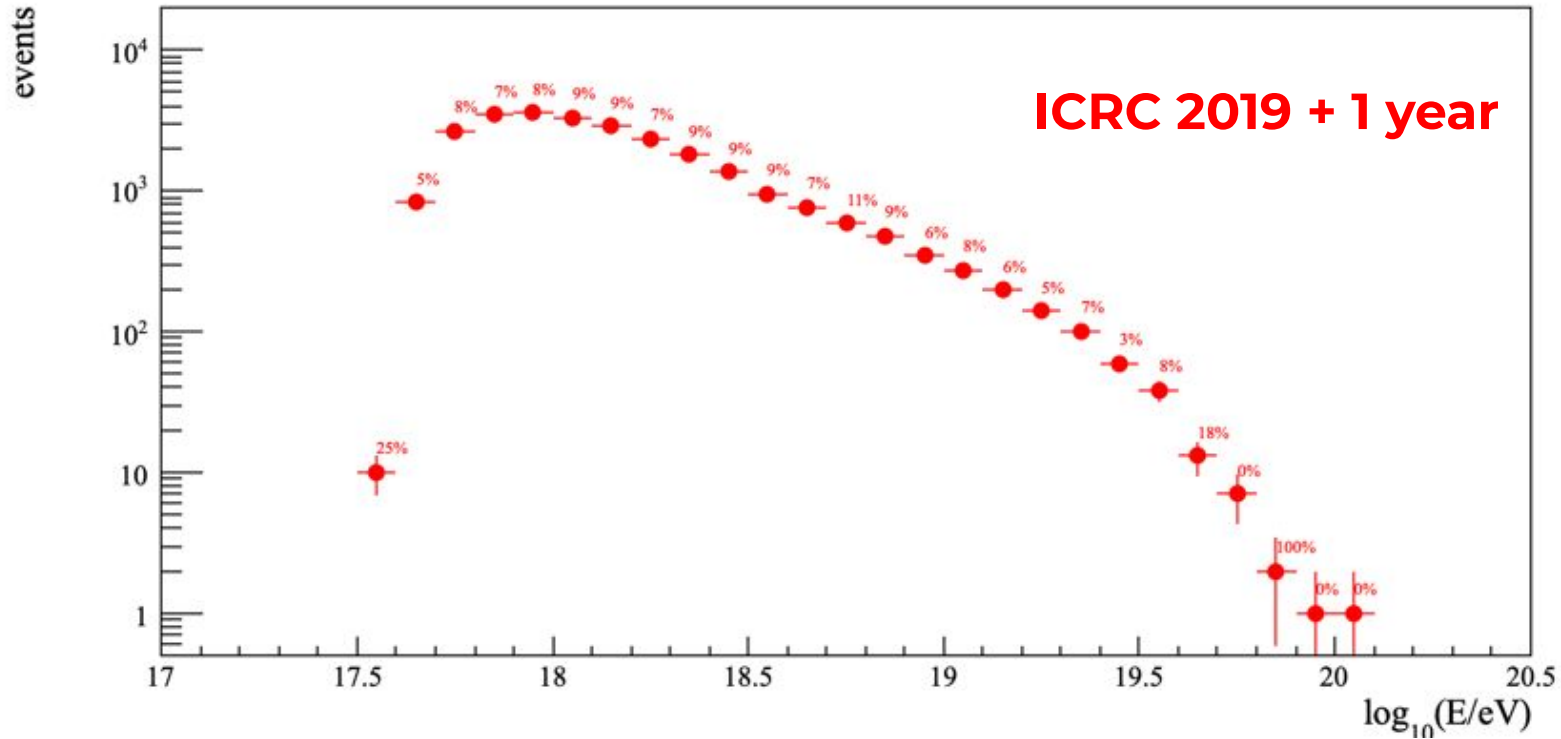


Summary

- A. v16r0 production available
- B. Hybrid data available till Dec 2018
- C. 1 new highest energy event in Hybrid data,
E= 65 EeV
- D. E_{FD}/E_{SD} vs time shows a possible issue in
2018 data. To be investigated
- E. CO6 issue: solution under study (more
important for HEAT analysis)

SLT module issue (other FD sites)





Xmax

