More RIDE Analysis

Sofus Stray – Weekly NBI meeting 05/02/2021

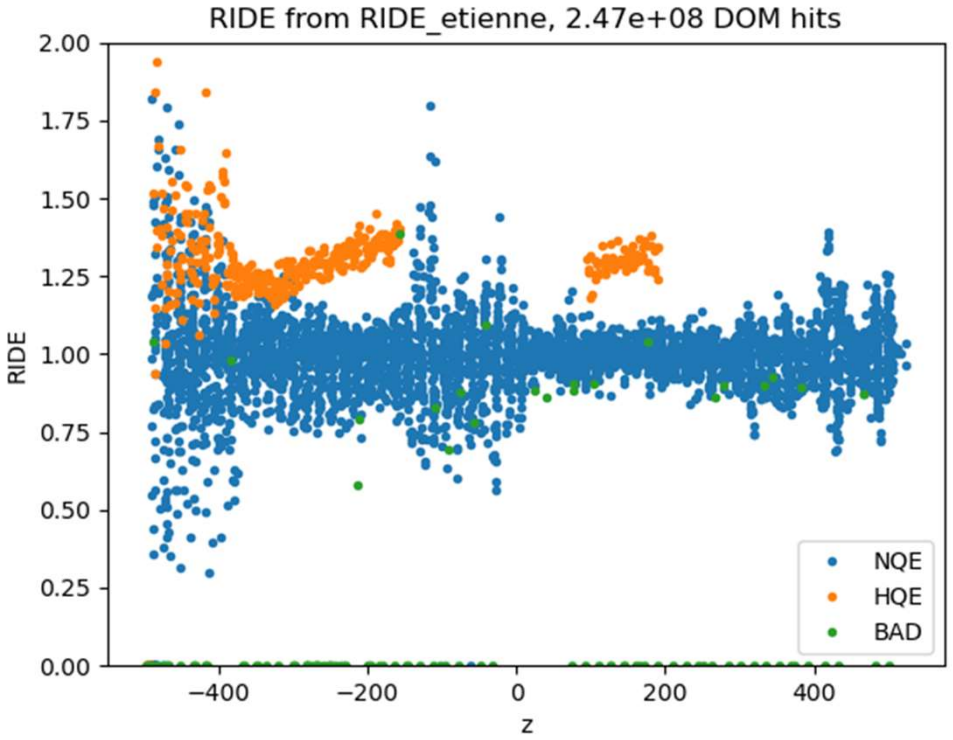
Cuts

- Go through 10000 Corsika 2012 level 2 files
- Follow Etienne's procedure
  - https://events.icecube.wisc.edu/event/100/contributions/522/attachments/36
- SMT8 filter (at least 8 DOM hits per event)
- 40° < event zenith angle < 70°
- Track endpoint < 50 m from detector edge
- Track endpoint.z < -400 m
- **Only count DOMs between 20 and 100m of track**

Important. Previously used 0 to 75m

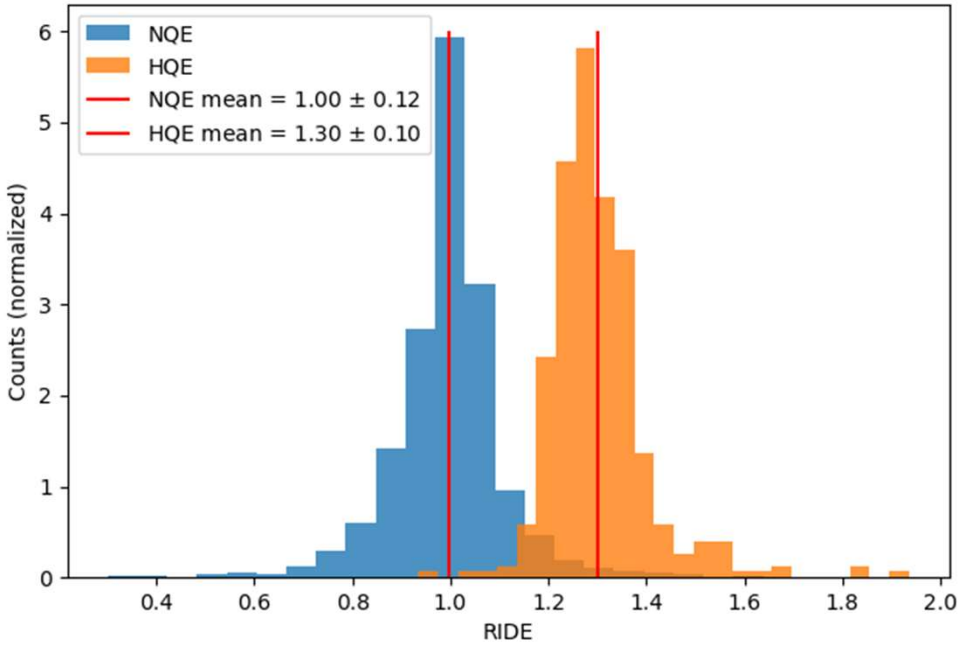
RIDE results

- Clear increase in scatter near the bottom of the detector and at the dust layer
- NQEs consistently around RIDE = 1
- HQEs have weird increase from z = -400 to -100
- HQEs nearer 1.3 than ideal 1.35
- Clear separation between NQEs and HQEs above the dust layer



RIDE histogram

- HQE has expected mean but very large standard deviation
- NQEs have a mean 0.05 less than expected and a similar large std

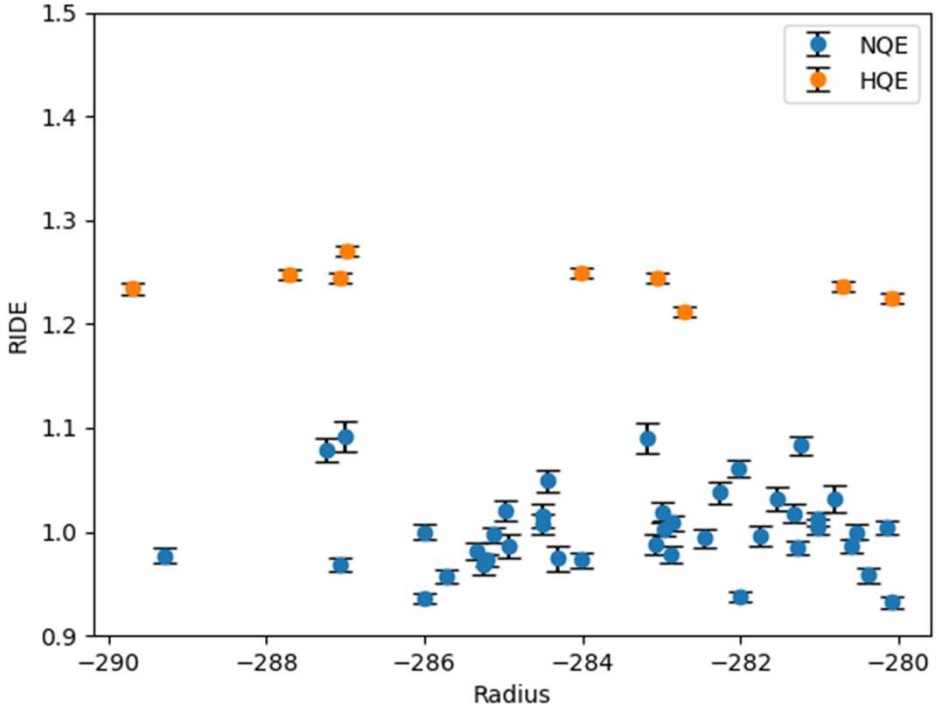


Single group

- Look through a single group
- Save every single event
- Change the dom radius (previously from 20 m to 100 m)
- See effect on said group

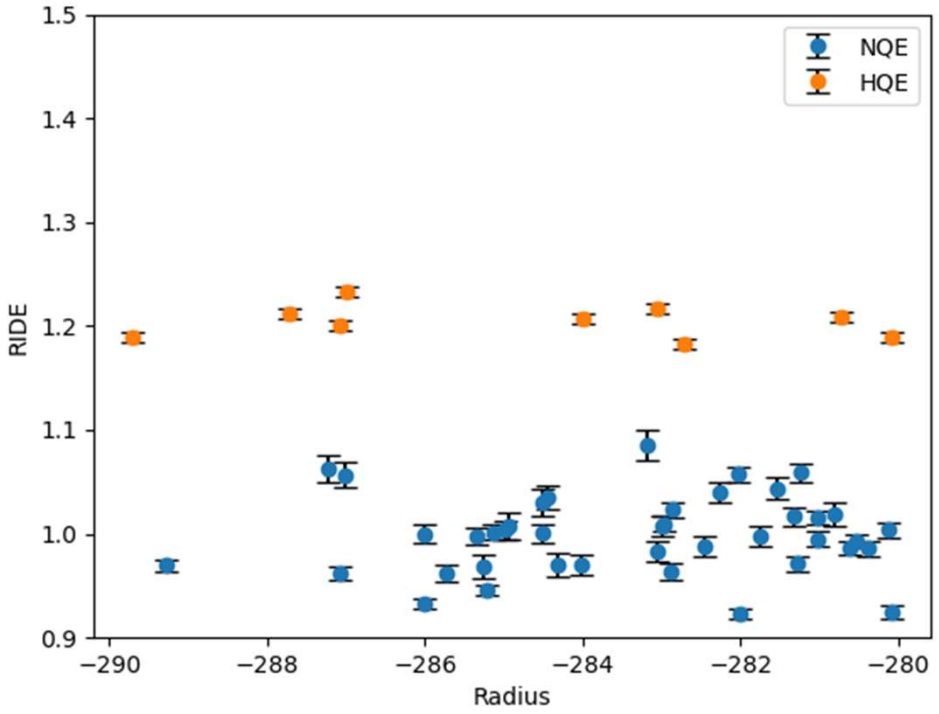
Single group

- Pick group 83 because it behaves nicely (below dust layer, lots of doms)
- **Start with 20m to 100m**
- Still hovering around **1.25**



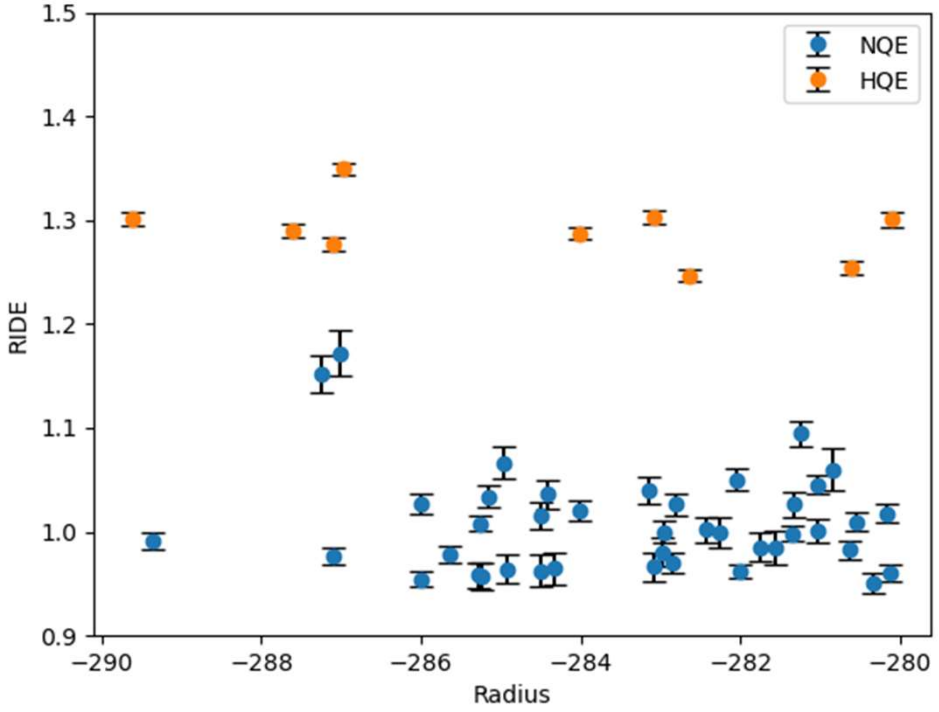
Single group

- Pick group 83 because it behaves nicely (below dust layer, lots of doms)
- **Change radius to 0 – 100m**
- Now hovering around **1.20**



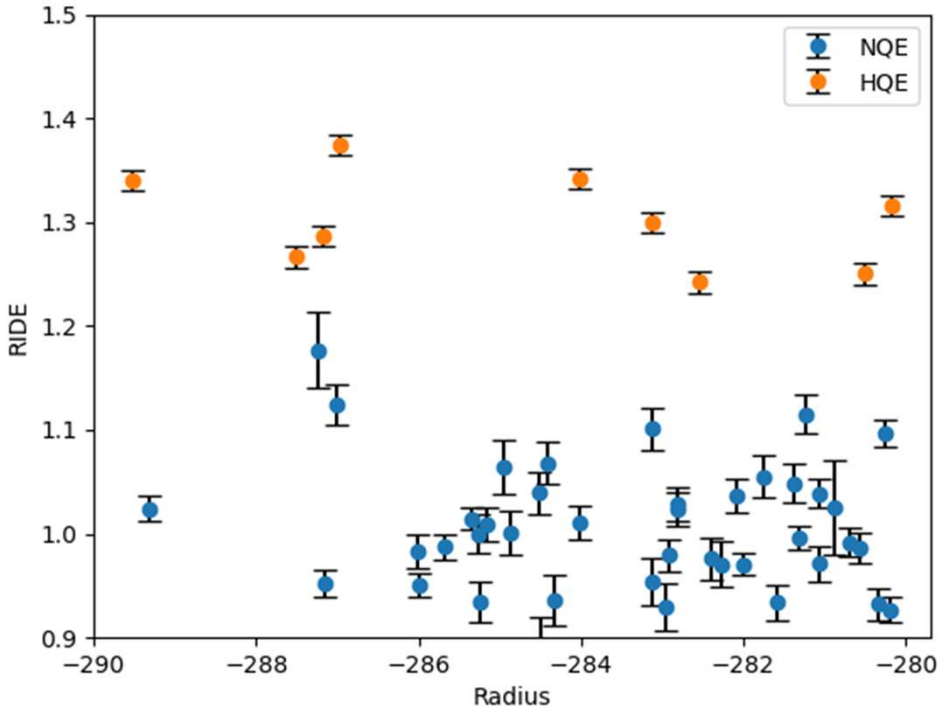
Single group

- Pick group 83 because it behaves nicely (below dust layer, lots of doms)
- **Change radius to 50 – 100m**
- Now hovering around **1.30**



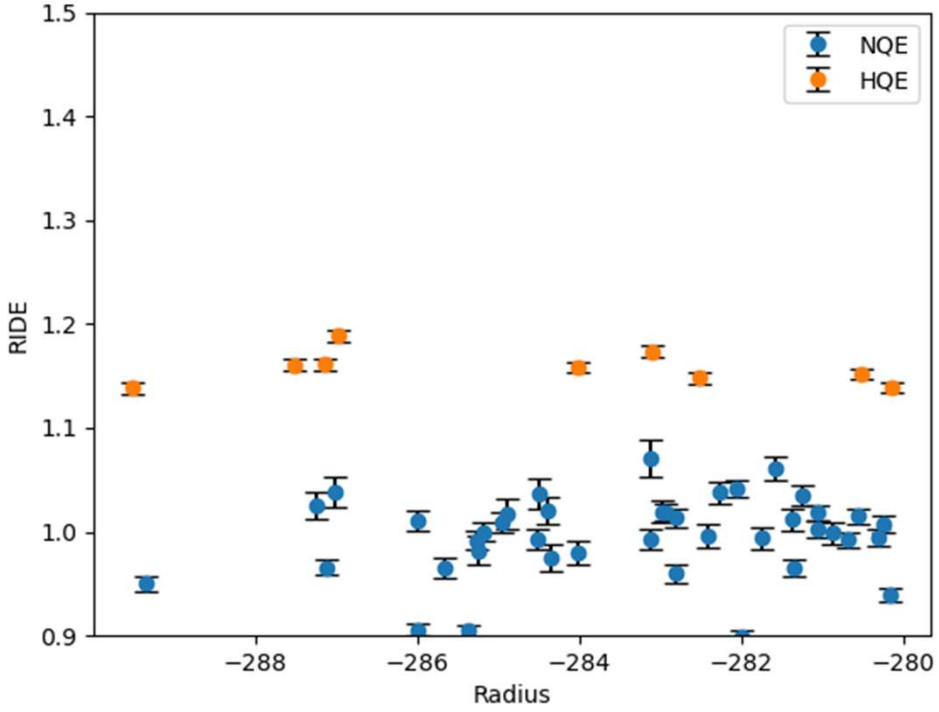
Single group

- Pick group 83 because it behaves nicely (below dust layer, lots of doms)
- **Change radius to 75 – 100m**
- Still hovering around **1.30**, but closer to **1.35**
- Larger statistical uncertainties due to less data



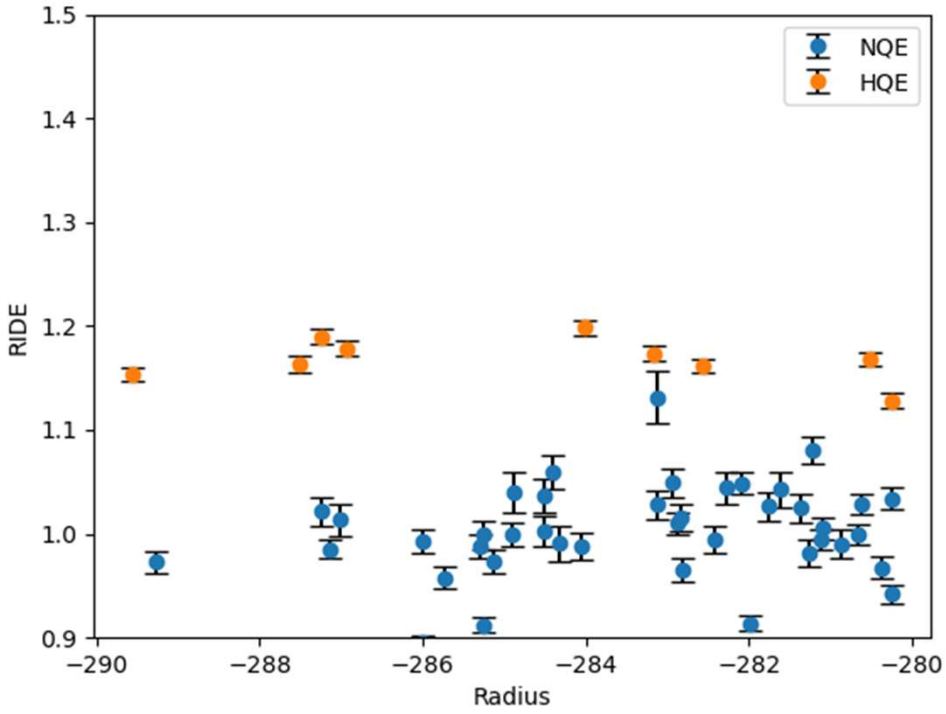
Single group

- Pick group 83 because it behaves nicely (below dust layer, lots of doms)
- **Change radius to 0 – 75**
- Now down **below 1.2**



Single group

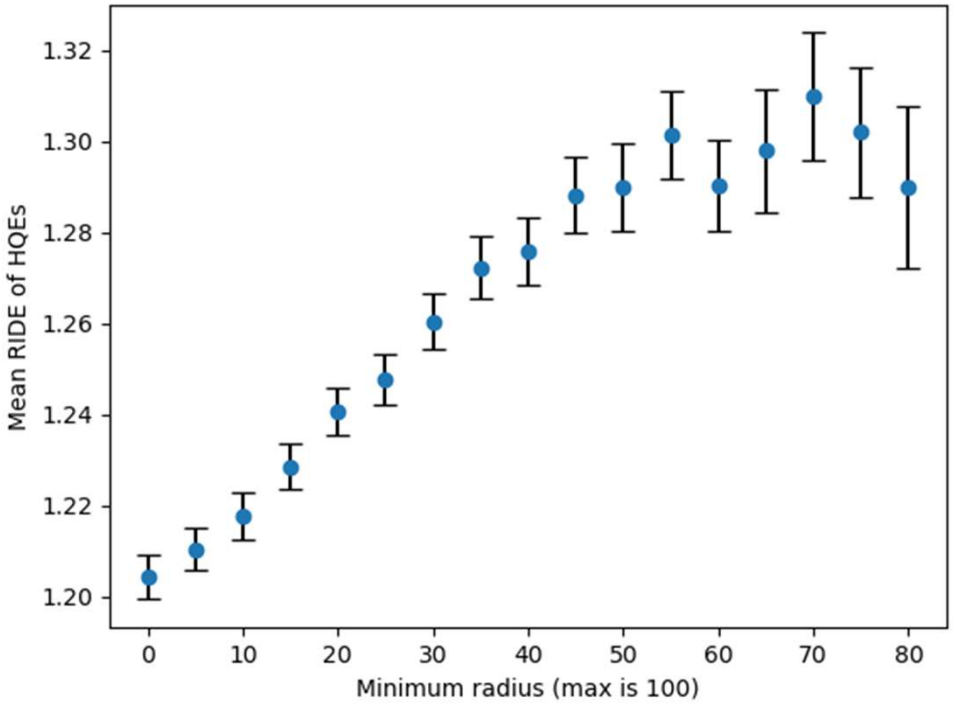
- Pick group 83 because it behaves nicely (below dust layer, lots of doms)
- **Change radius to 20 – 50**
- Below **1.2** again



Analysis

- Can do this for various ranges of trackradius
- How does the mean of the HQEs change with this value?

- Near linear increase with minimum radius
- Above ~45 meters it gets less monotonous
- Increase in errorbars with higher minimum as expected
- Consistent with no increase in RIDE above 45 meters



Conclusion

- ???
- RIDE can easily be manipulated by simply changing the DOM radius from tracks
- What's the "correct" radius?
- Is it responsible to tweak the radius until we get as close to 1.35 as possible?