

LONG TERM PERFORMANCE OF THE PIERRE AUGER OBSERVATORY

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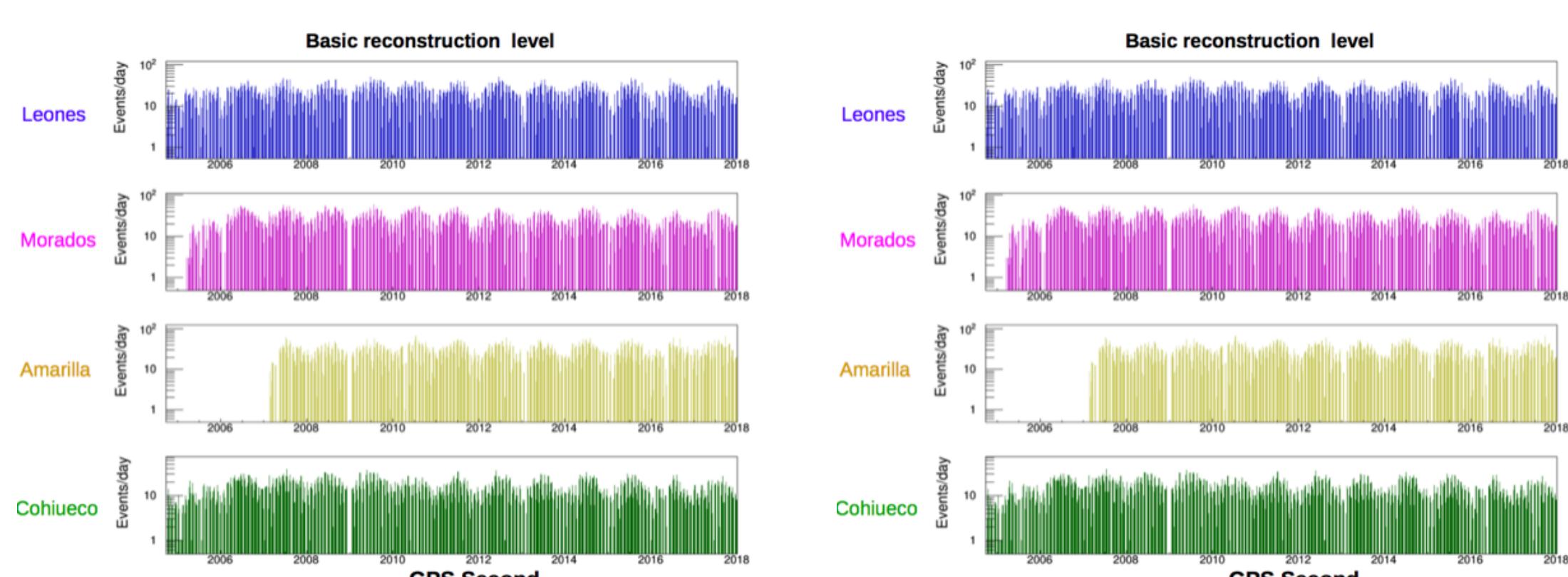


1. INTRODUCTION

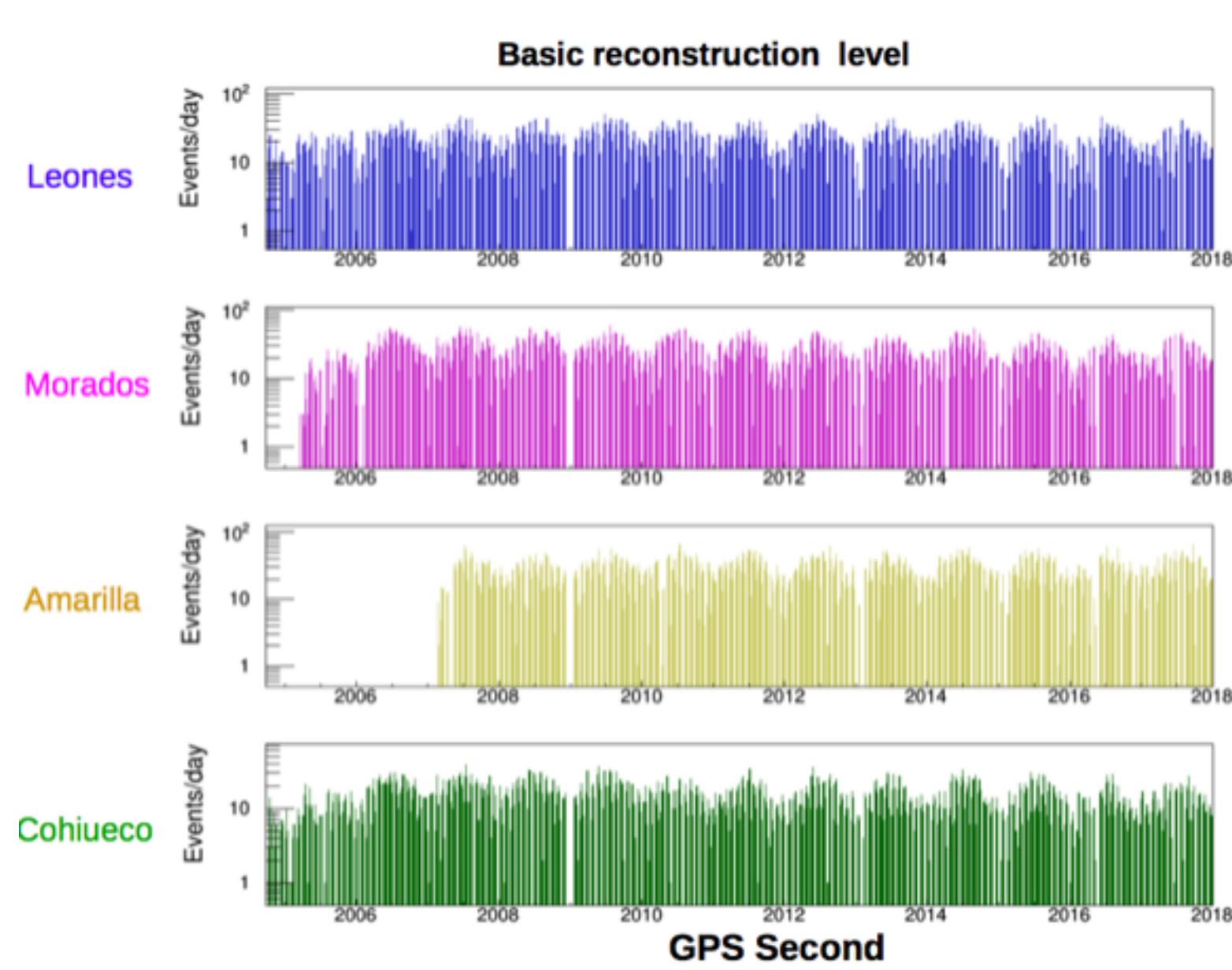
The Pierre Auger Observatory is the largest detector ever built to measure ultra high energy cosmic rays. It employs a hybrid technique combining a surface detector consisting of 1664 water-Cherenkov stations and a fluorescence detector composed of 27 Schmidt telescopes. The construction of the Observatory started in 2004 and since then it has been continuously taking data in a stable manner. We will present the behavior of the Observatory over more than 14 years and the expected response into the future with the AugerPrime upgrade now underway. Key performance indicators such as the up-time and the event rates will be presented. The instruments for calibration and monitoring of the detectors will also be reviewed.

2. FD EVENT RATE

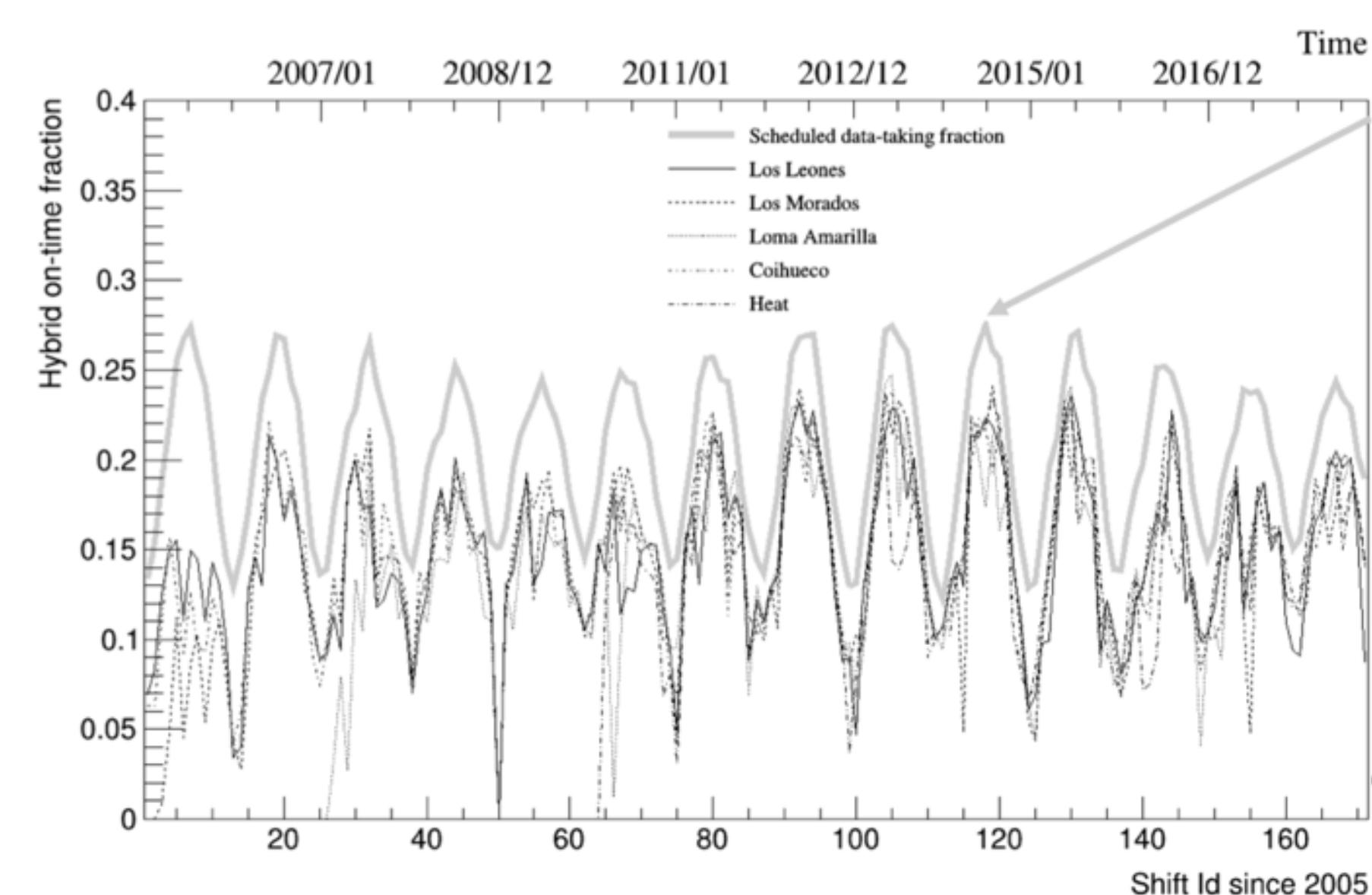
- Hybrid event rates



- FD event rate with X_{\max} selection



3. FD UP TIME

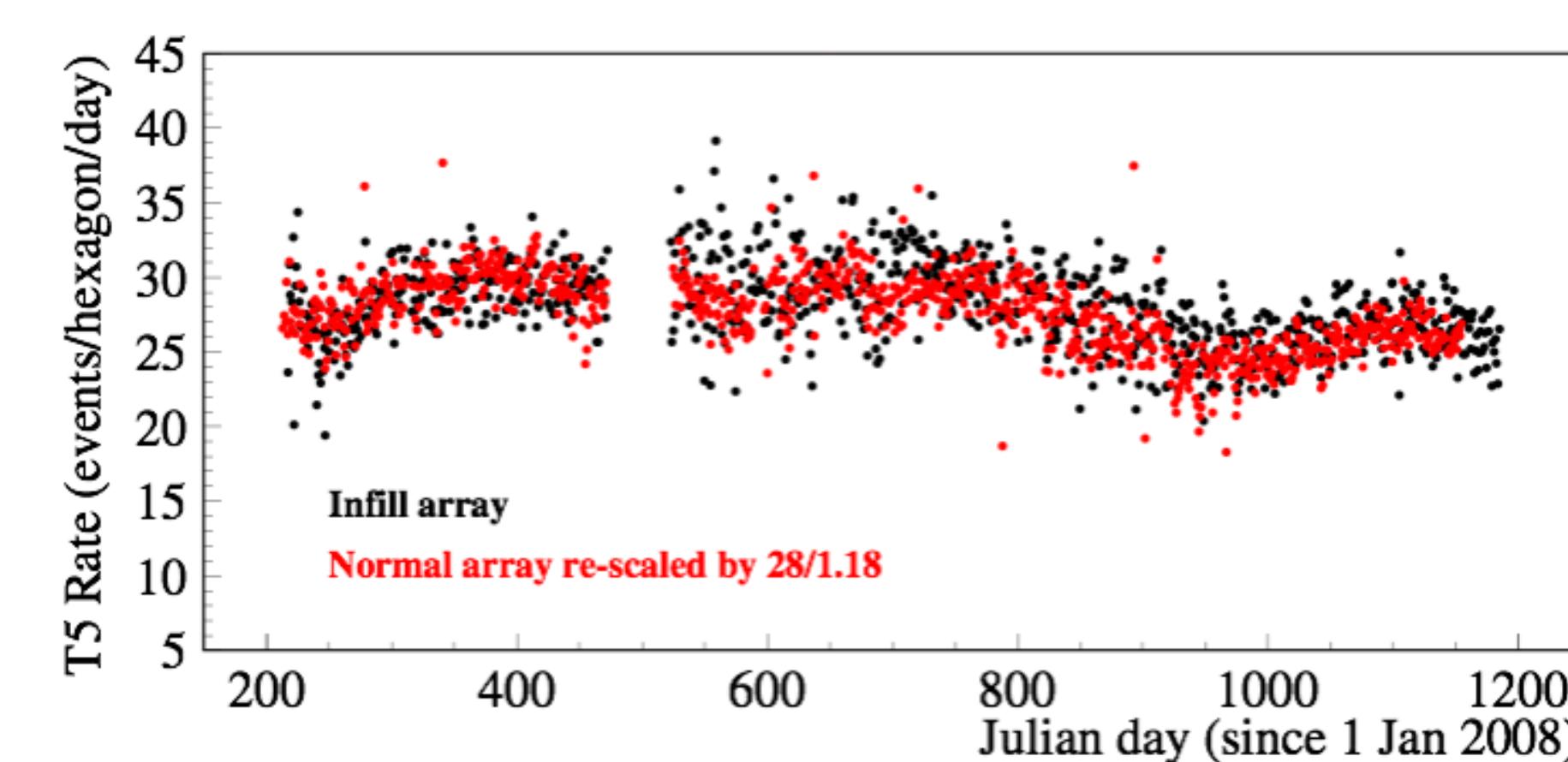


Z. LASER & CALIBRATION TOOLS

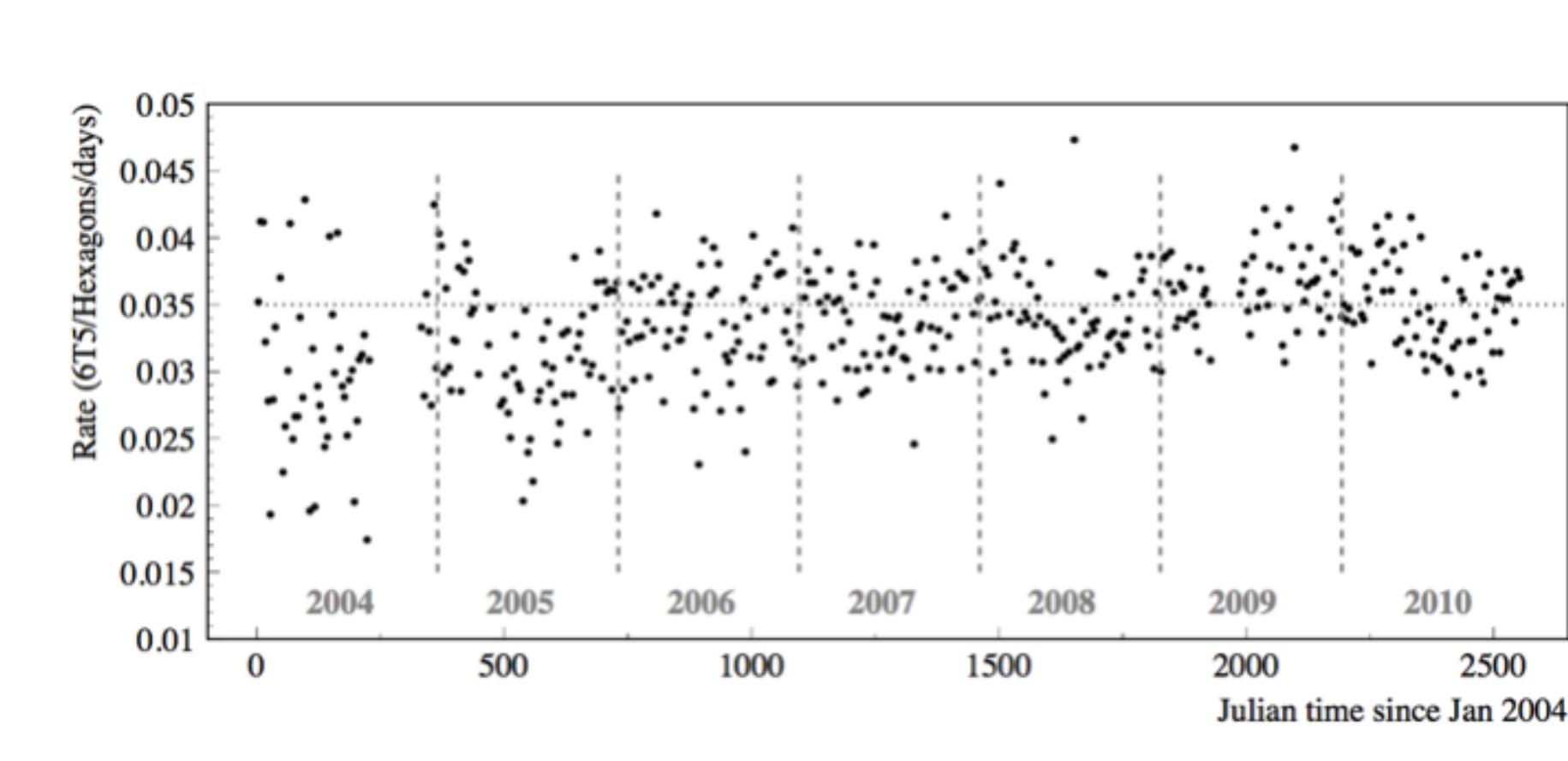
8. CONCLUSION

4. SD EVENT RATE

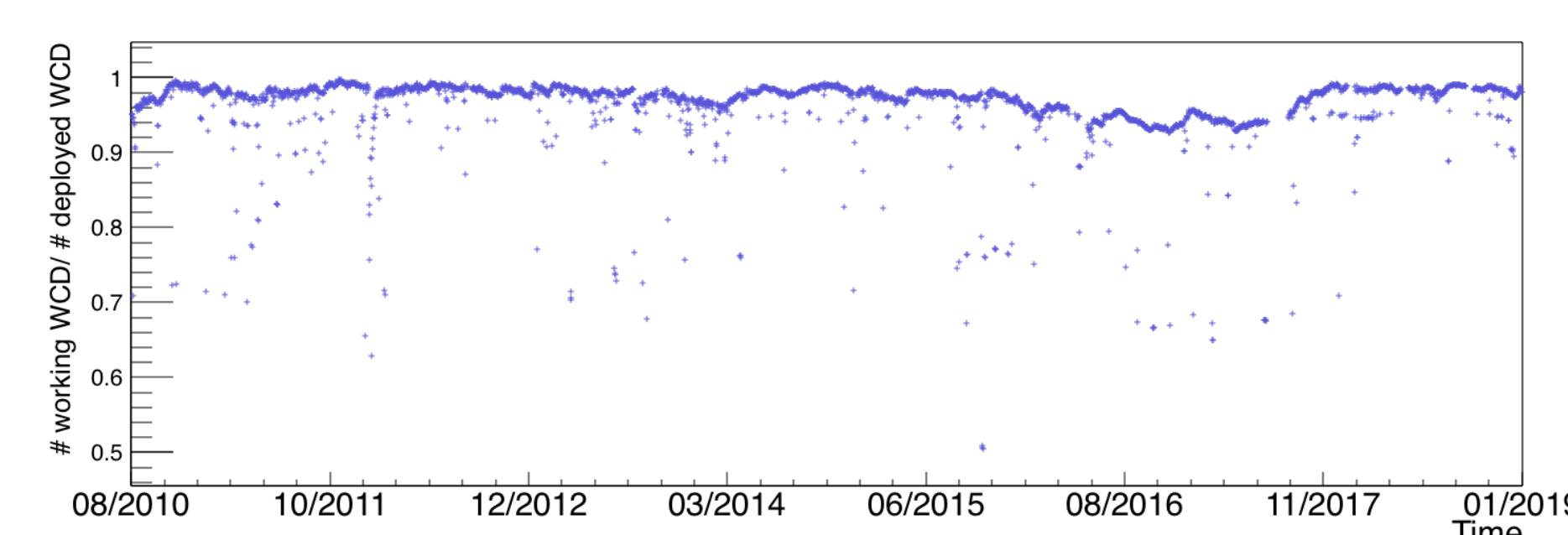
- T3-triggered event rate



- 6T5-triggered event rate (above 3EeV)

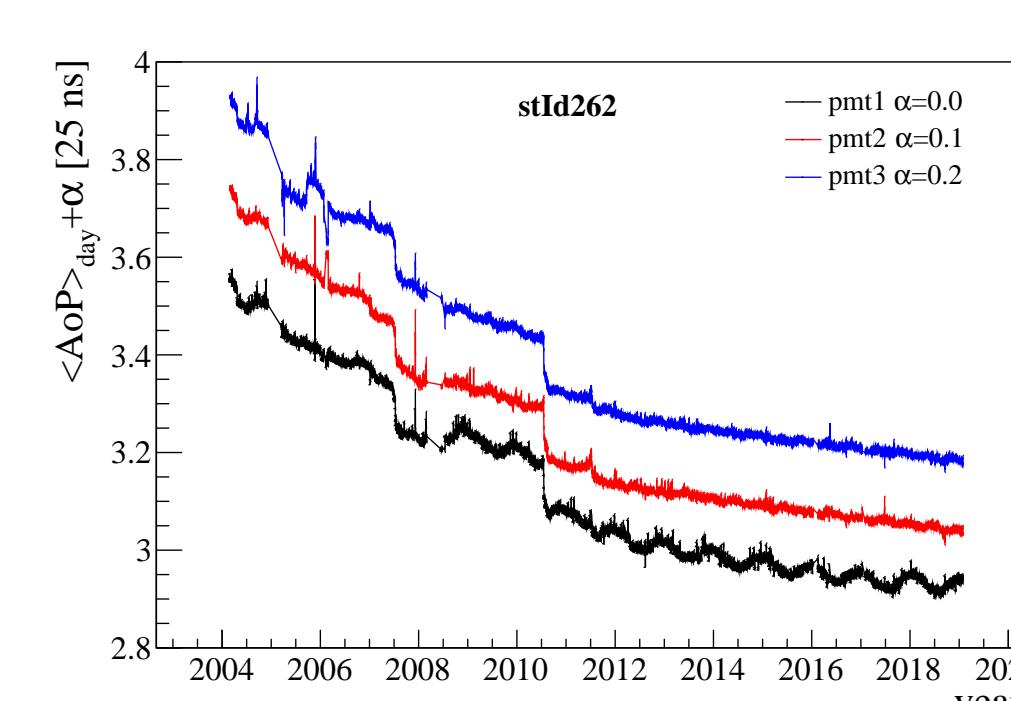


5. SD UPTIME



6. A/P EVOLUTION

Area over Peak (A/P) of the PMT output signal from the atmospheric muons is related to the reflectivity of the SD tank wall and the transparency of the water, therefore has been used to monitor SD detector response.



Over the data taking history, the A/P's have been continuously decreasing with a few sudden drops, some of which are corelated to freezing temperature in winter.

Monitoring of the A/P value allows us to track the aging of the SD detectors. Currently, 18.4% of the PMTs shows a decrease larger than 15% of their initial values. A prediction of the A/P values of each PMT in future can be made by extrapolating their fitted trend in the recent data. In 2030, 85% of the PMTs are expected to remain at $>95\%$ of their current A/P

