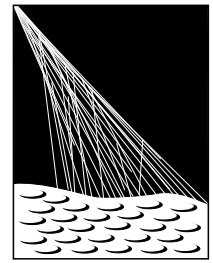


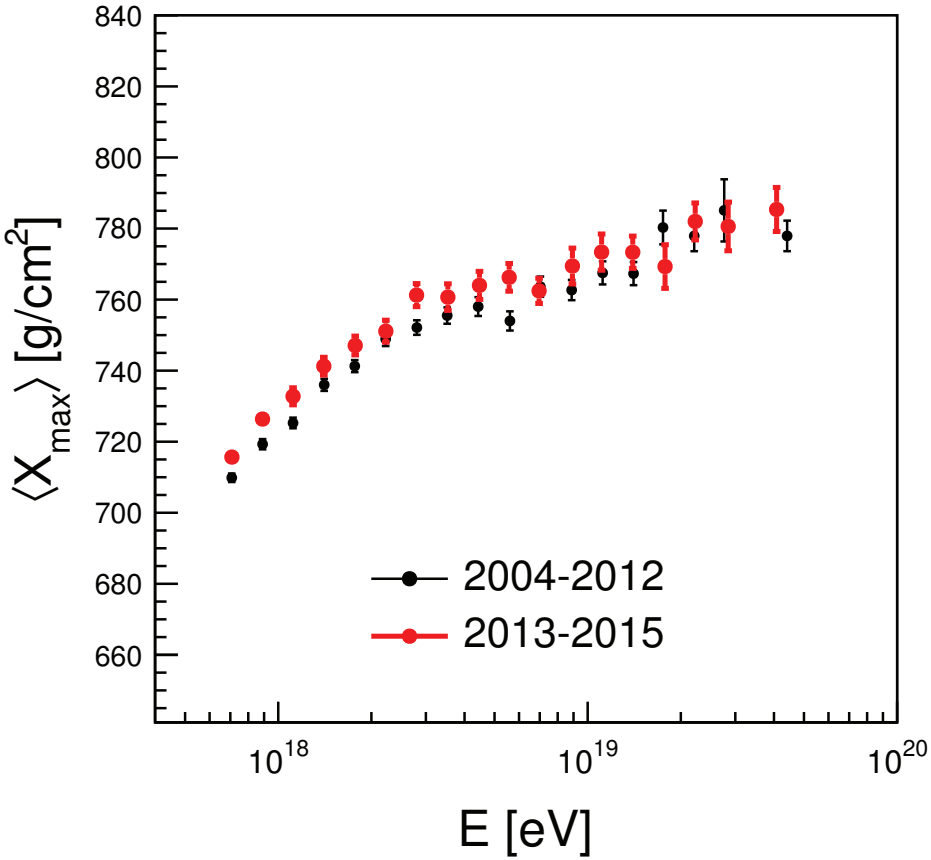
Hybrid long term performance

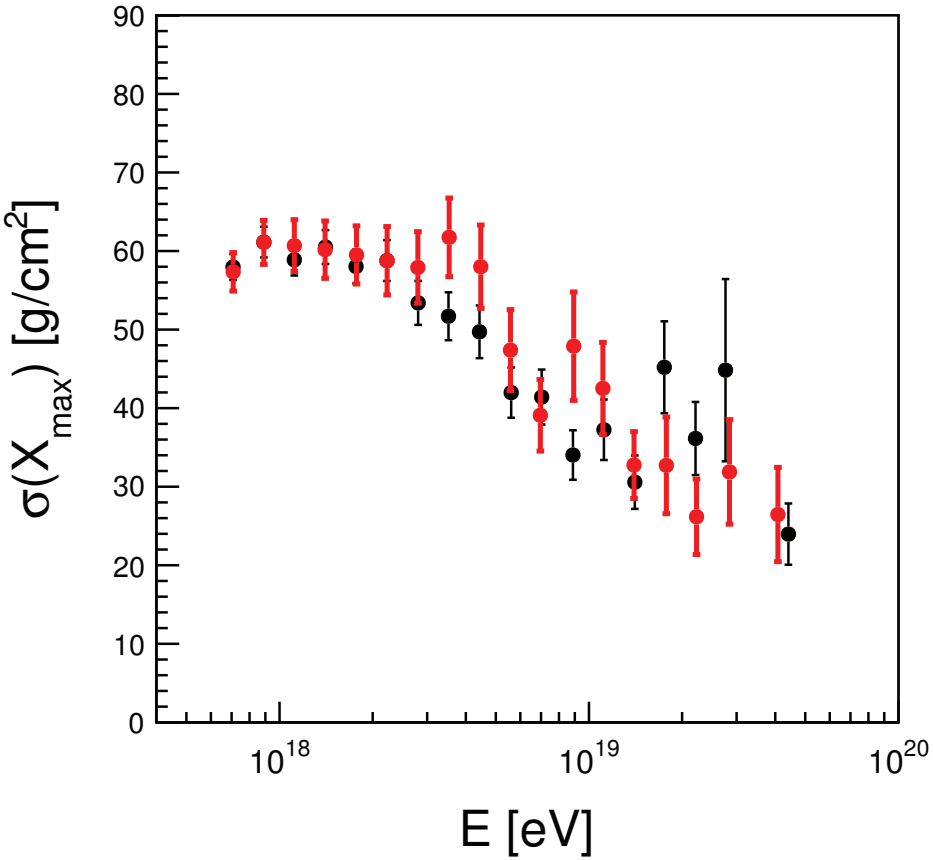
collection of plots

Alexey Yushkov

Fyzikální ústav AV ČR

X_{max}: PRD (2014) vs 2013 – 2015

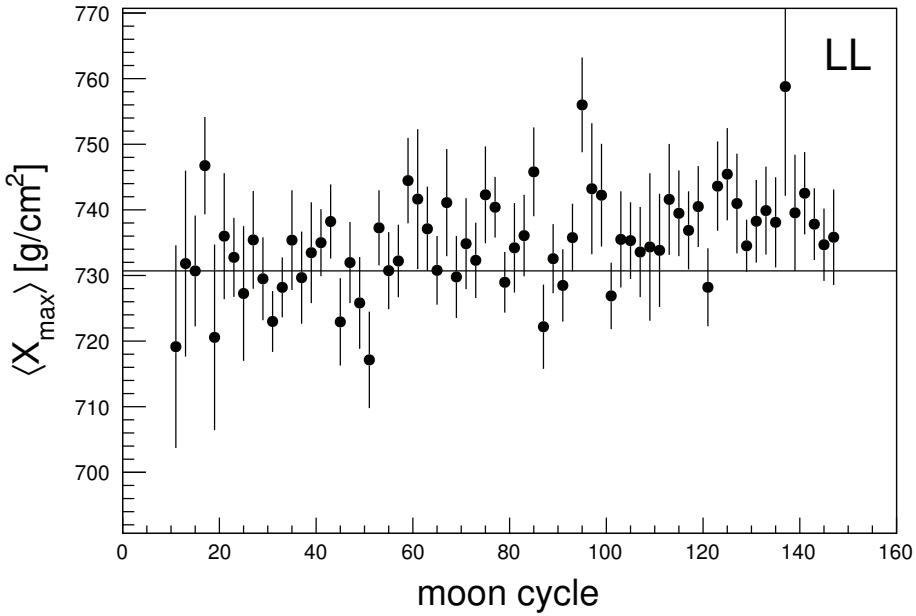


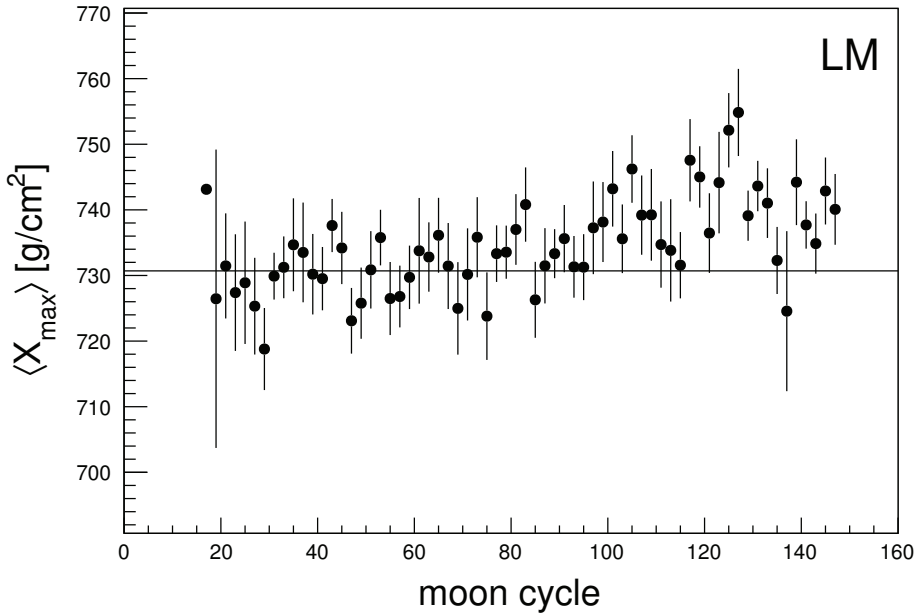


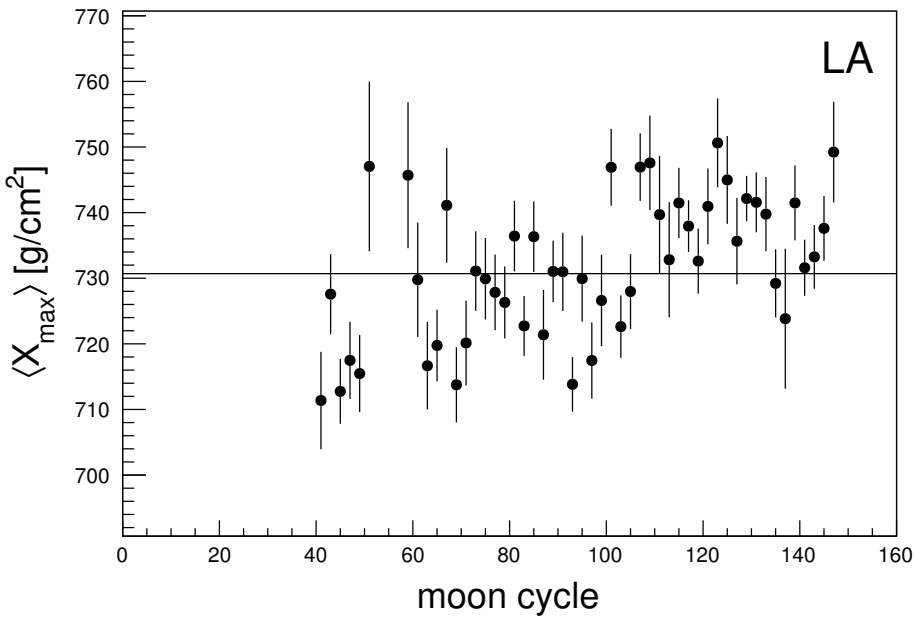
new data are deeper: "X_{max} drift" with time of unknown origin

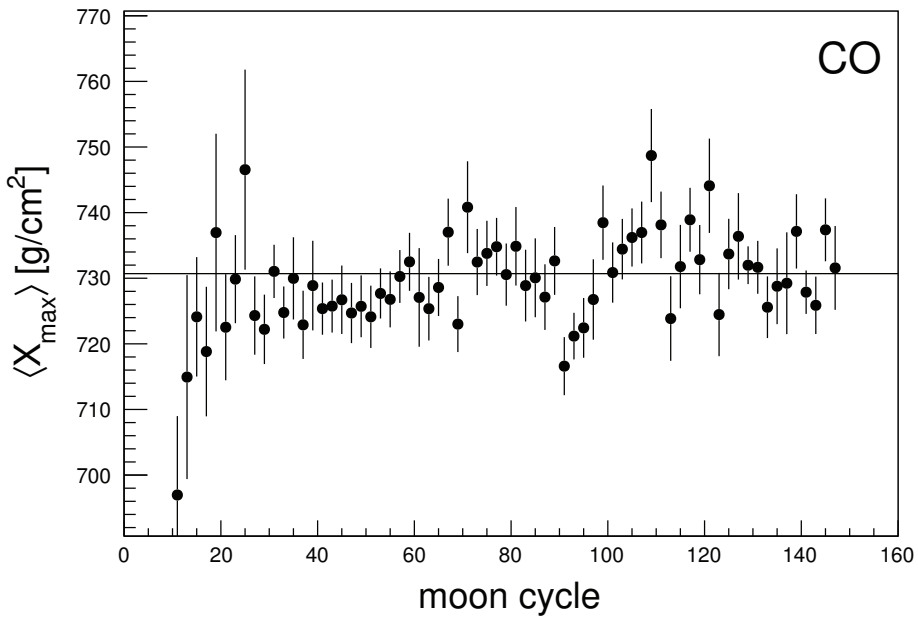
M. Unger, Analysis meeting, Paris 2017

Time Dependence of $\langle X_{\max} \rangle$, $E > 10^{17.8}$ eV





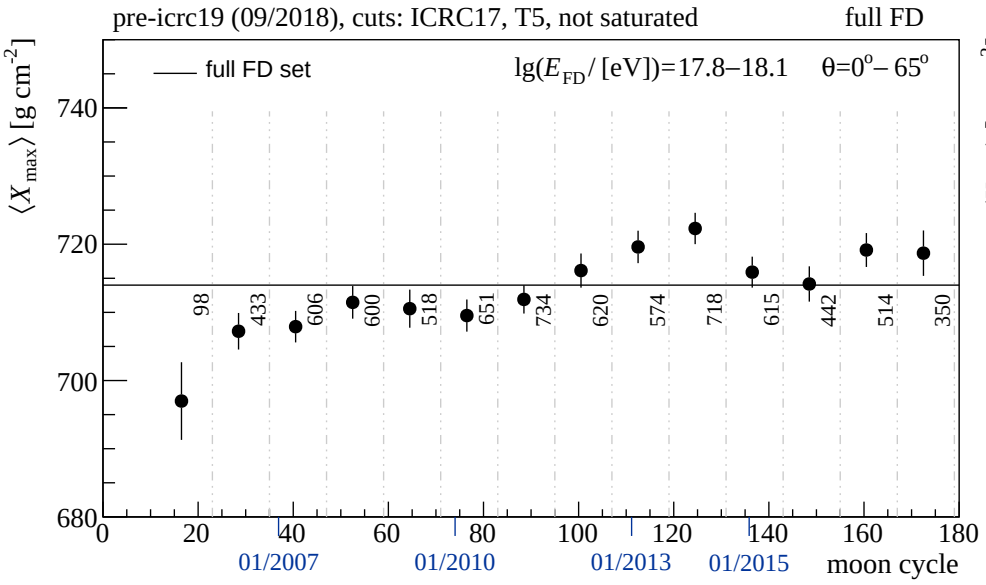


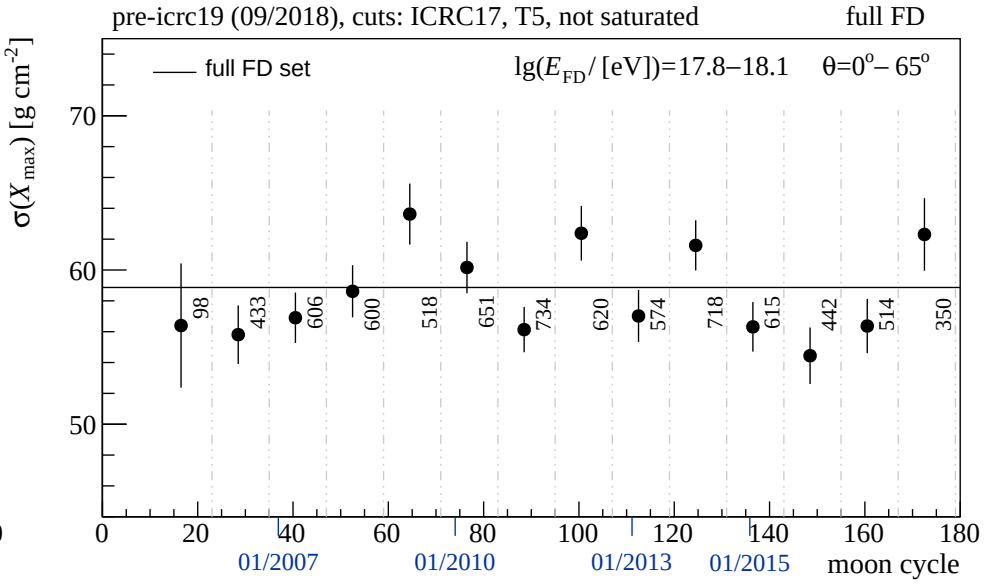


M. Unger, Analysis meeting, Paris 2017

$X_{\max}$, $\lg(E/\mathrm{eV}) = 17.8 - 18.1$

each point — 12 moon cycles



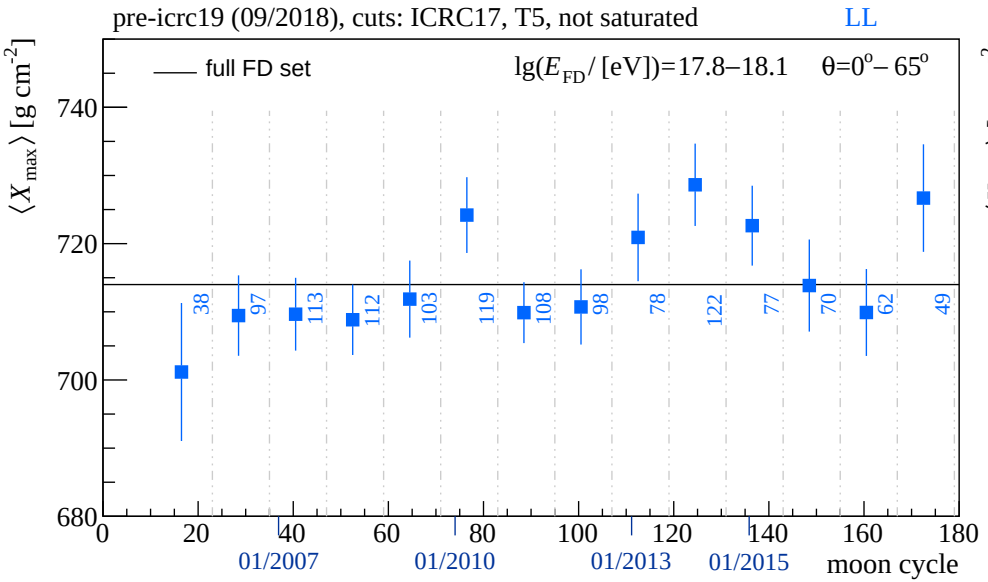


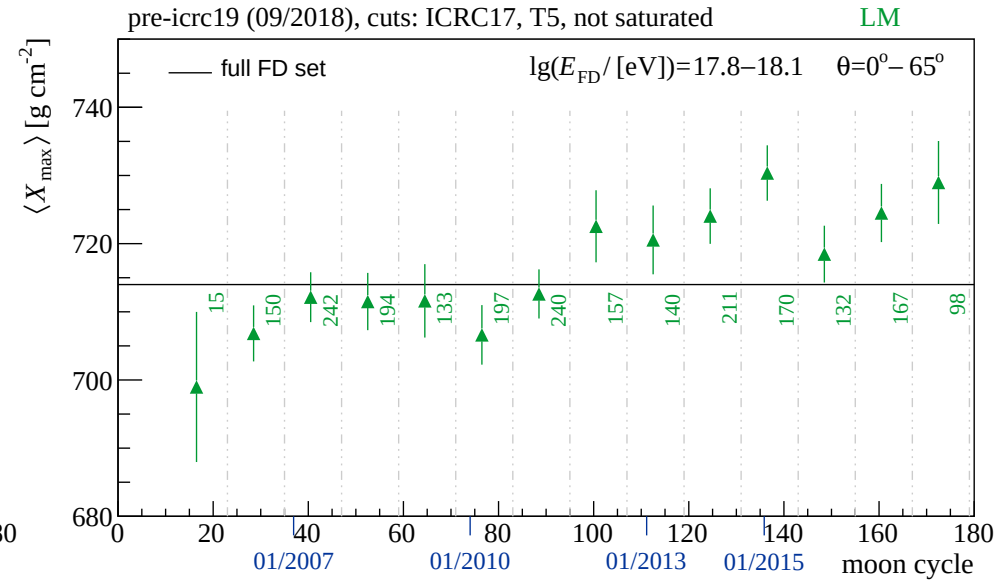
pre-production from 09/2018: aerosol, clouds, calibration DBs are far from final!

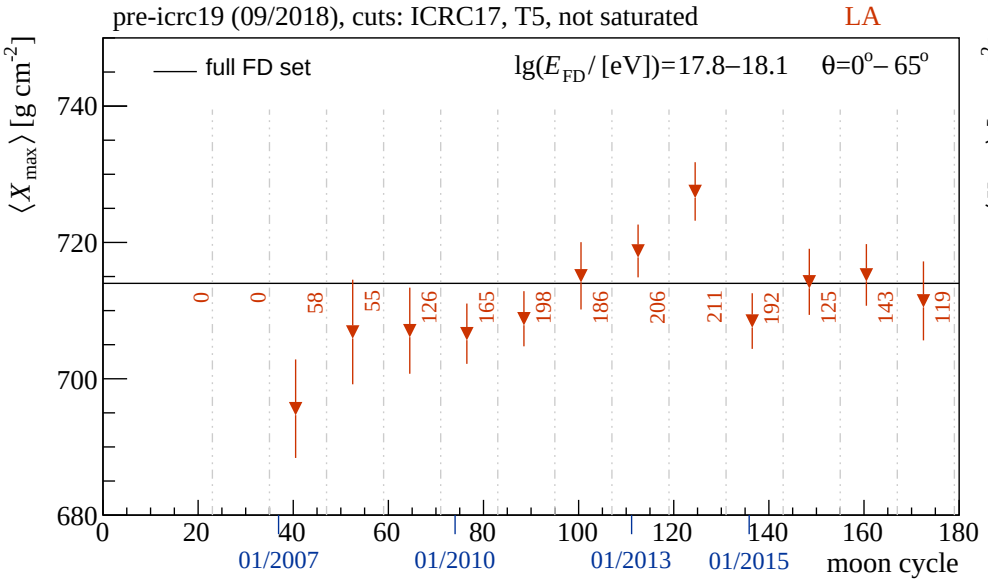
Many thanks to Lorenzo Perrone for providing the data

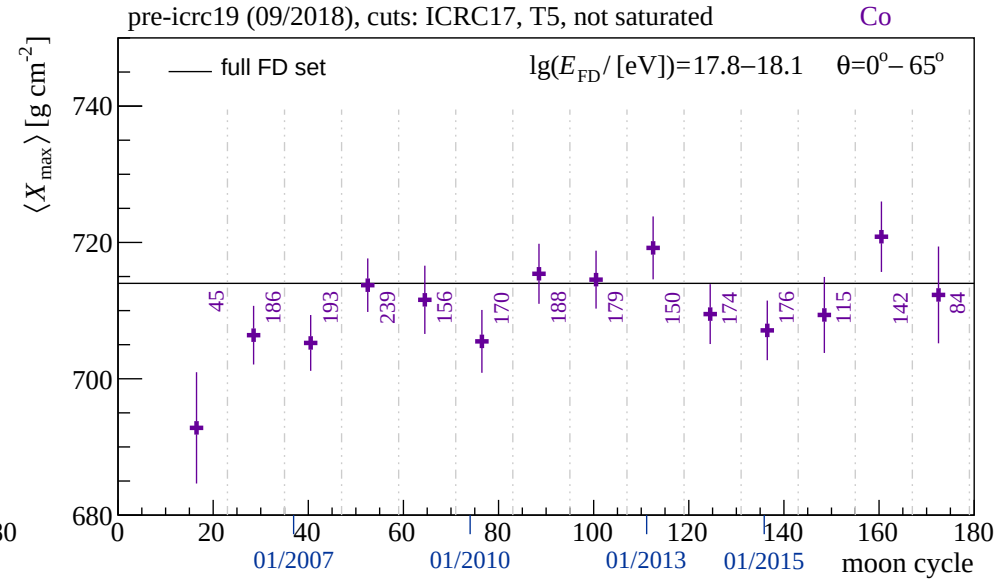
ICRC 2017 $X_{\max}$ cuts, T5 non-saturated events, $0^\circ - 65^\circ$ ($r_G(X^*_{\max}, S^*_{38})$ selection, PLB (2016))

$X_{\max}$, $\lg(E/\mathrm{eV}) = 17.8 - 18.1$

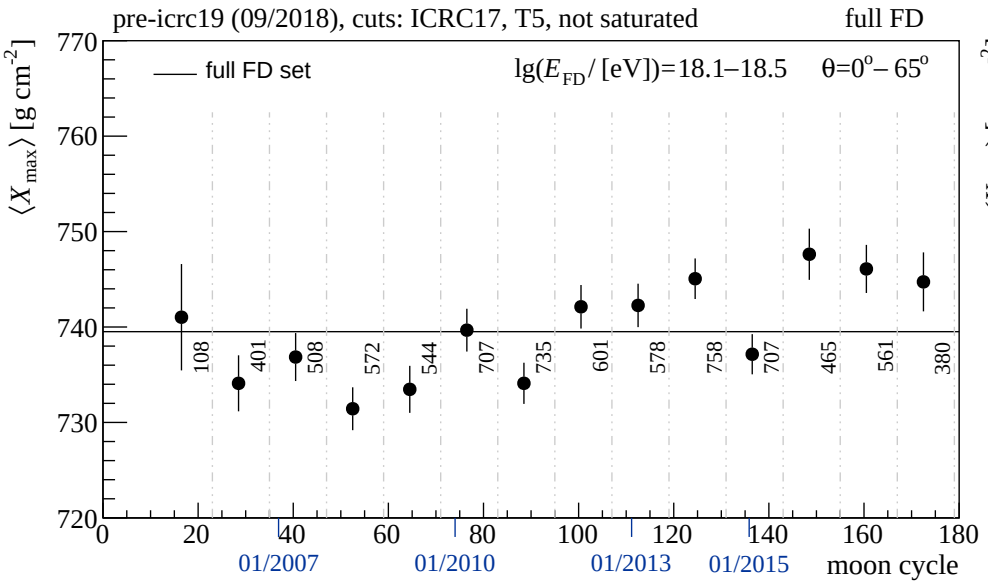


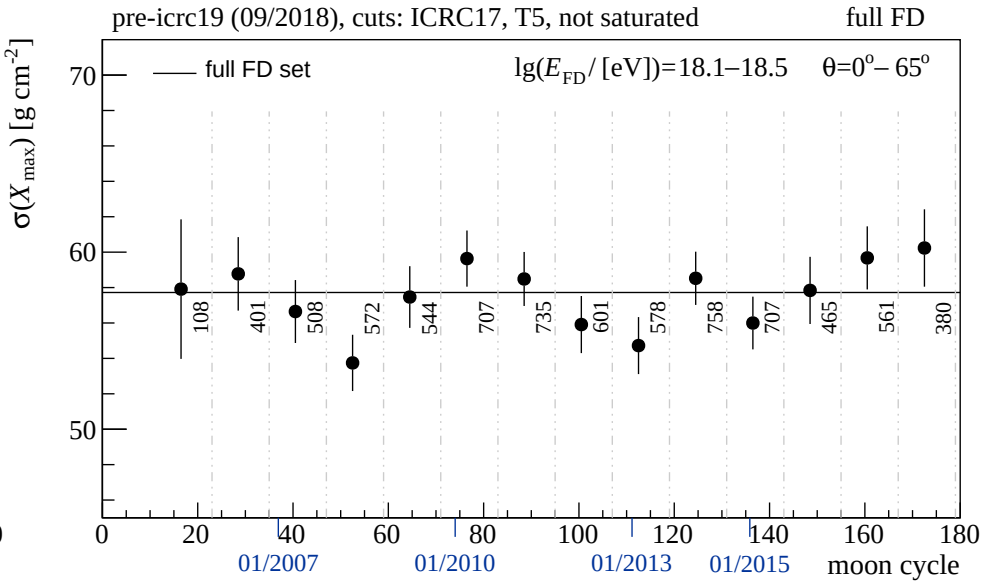




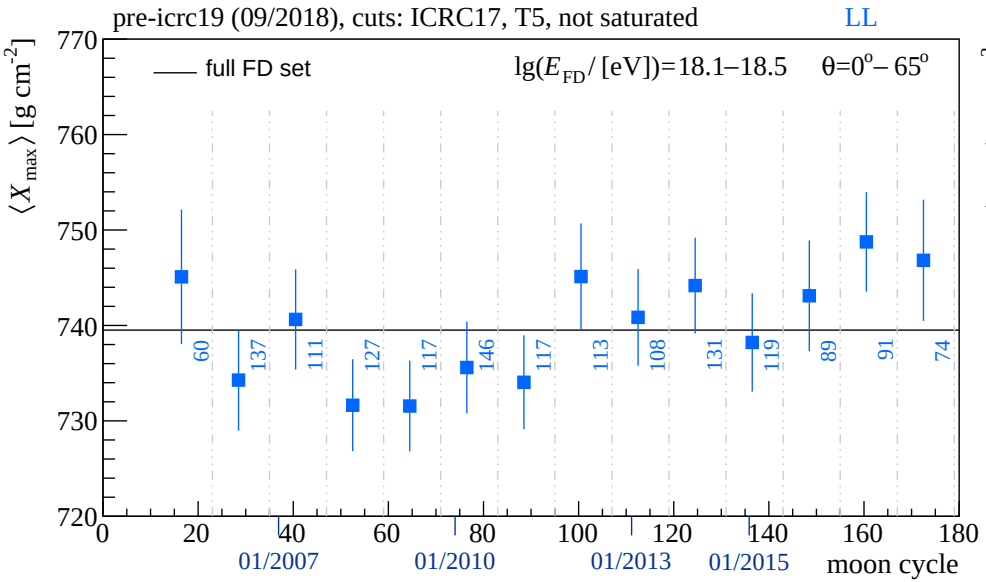


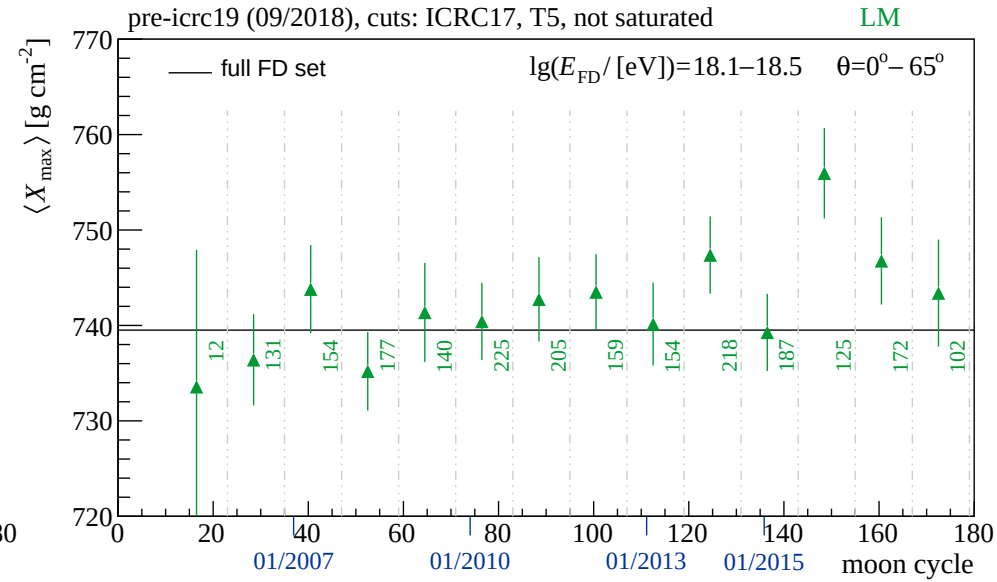
X_{max}, $\lg(E/\mathrm{eV}) = 18.1 - 18.5$

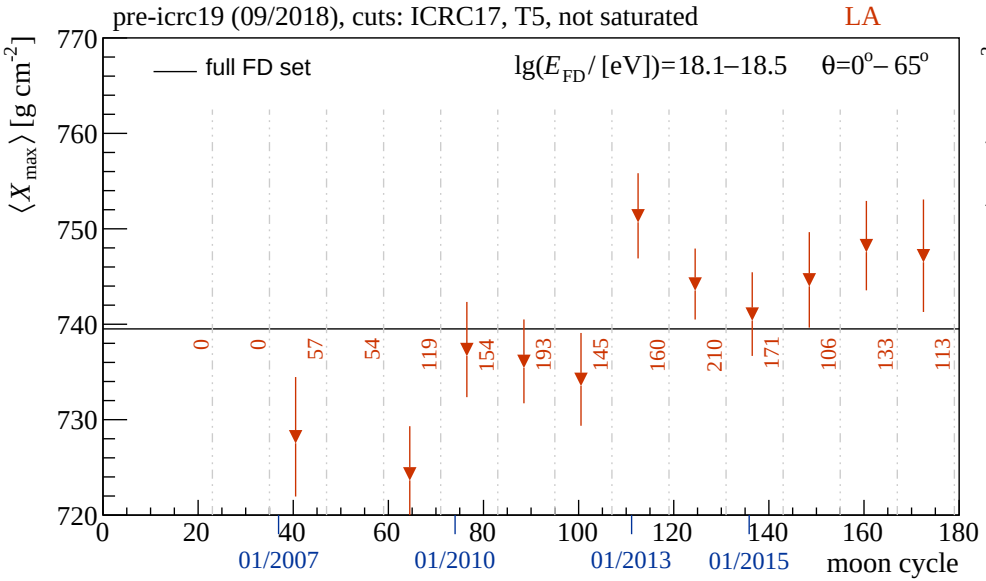


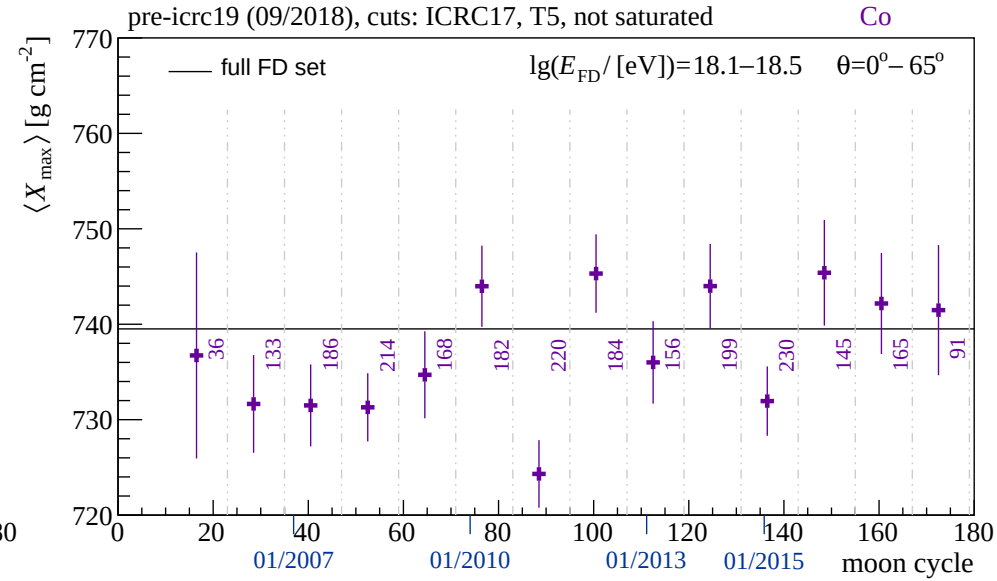


$X_{\max}$, $\lg(E/\mathrm{eV}) = 18.1 - 18.5$

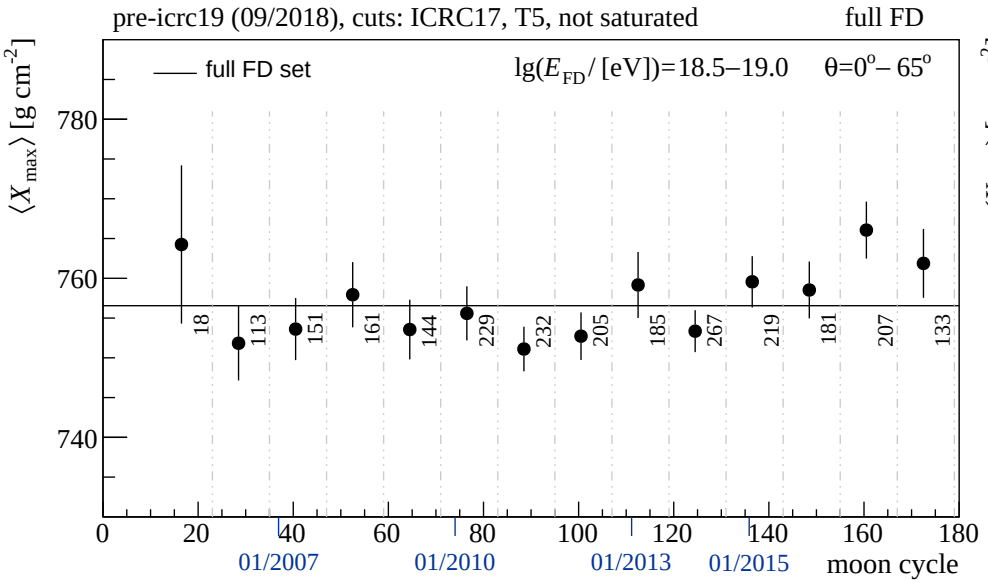


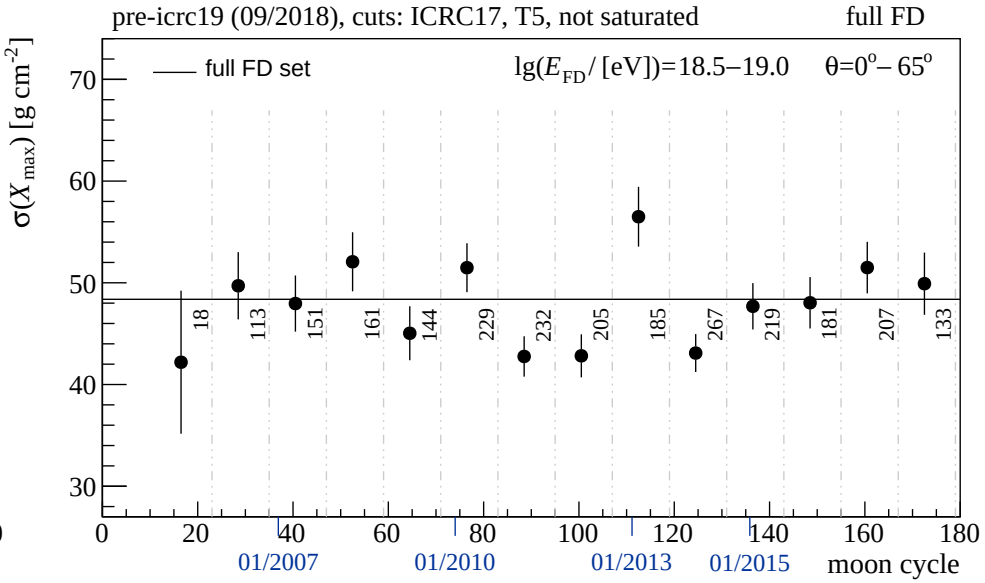




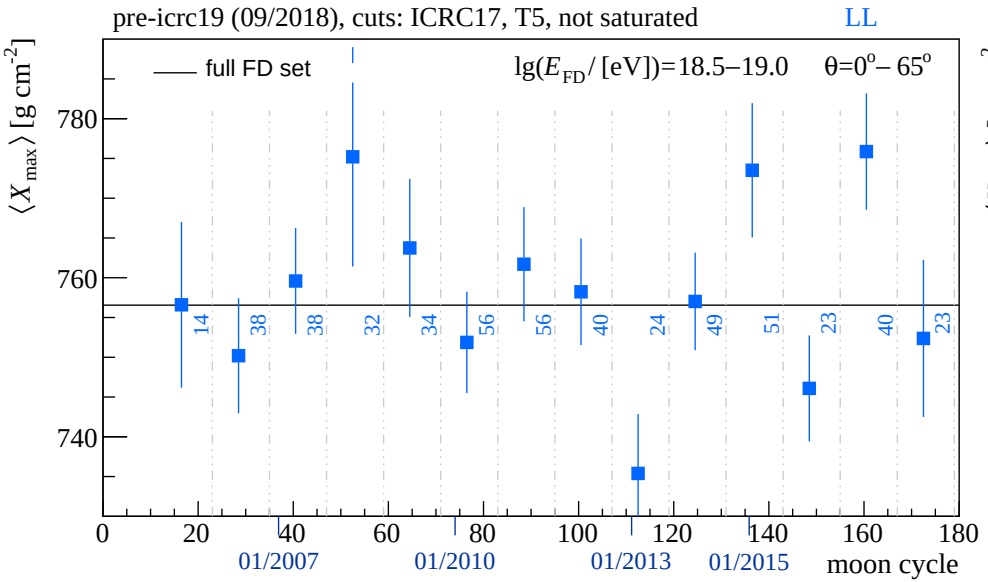


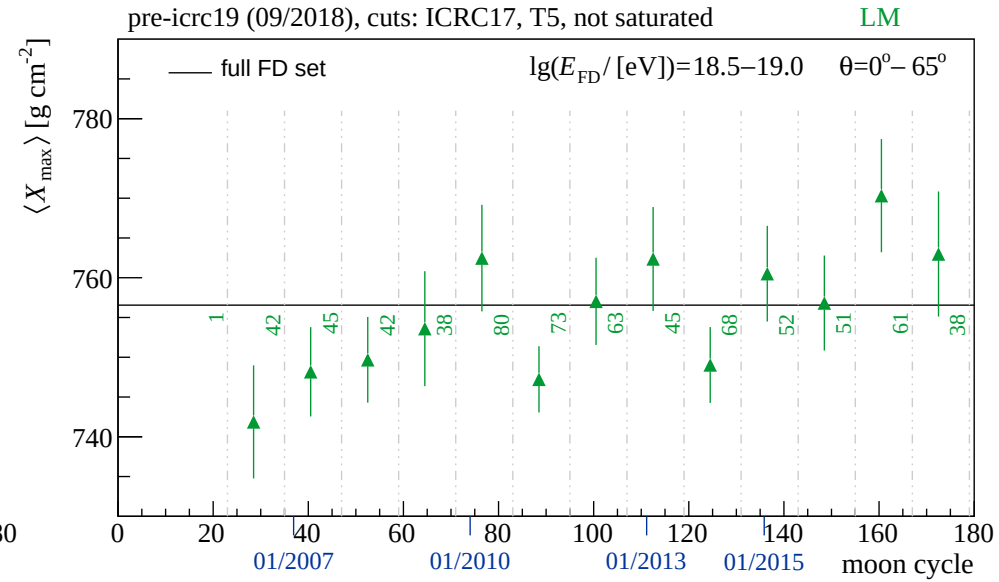
X_{max}, $\lg(E/\mathrm{eV}) = 18.5 - 19.0$

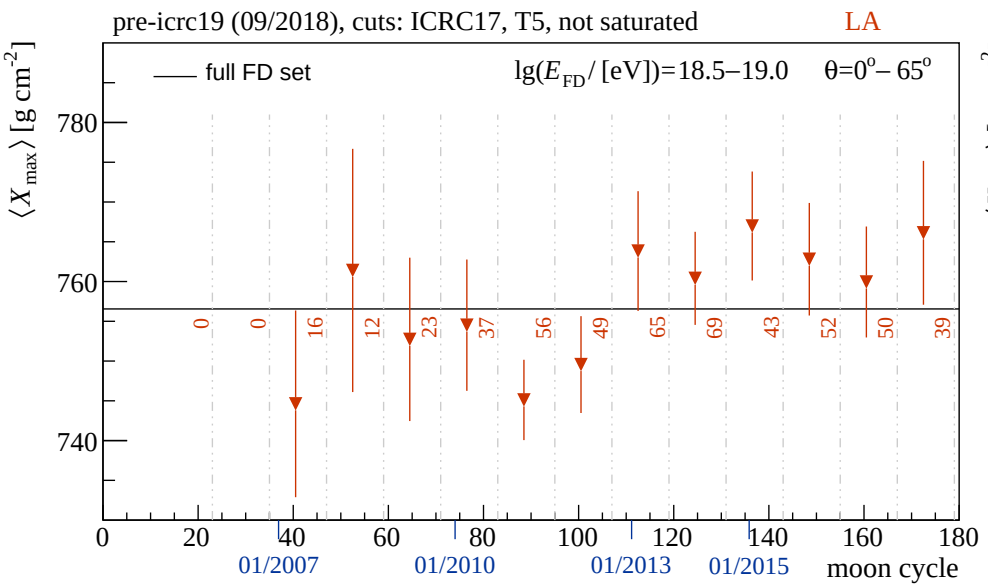


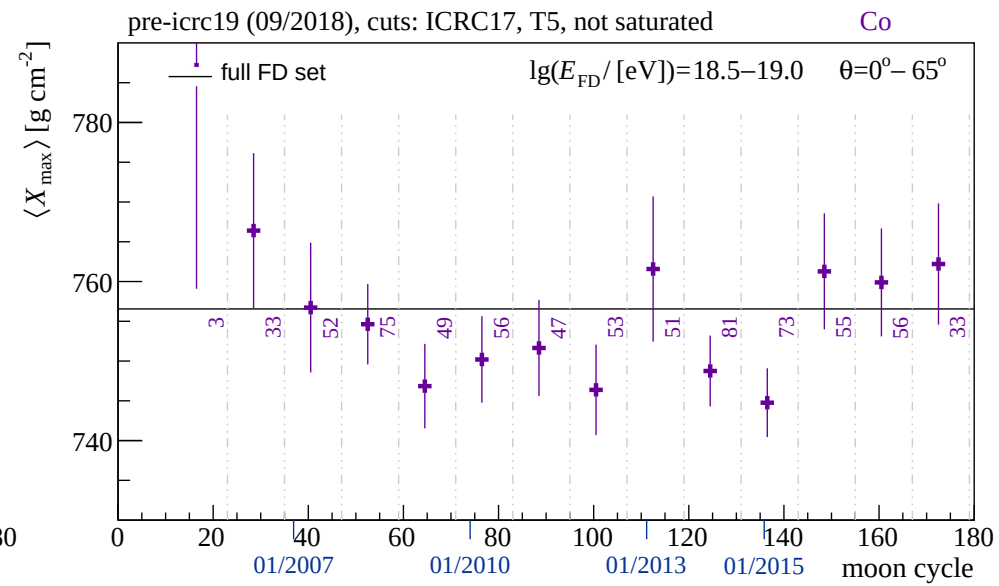


$X_{\max}$, $\lg(E/\mathrm{eV}) = 18.5 - 19.0$

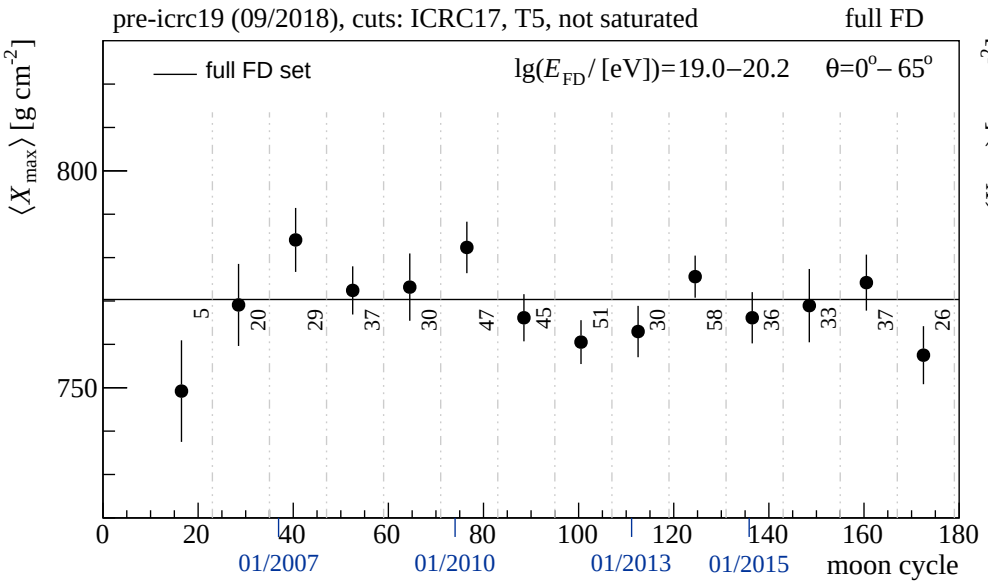


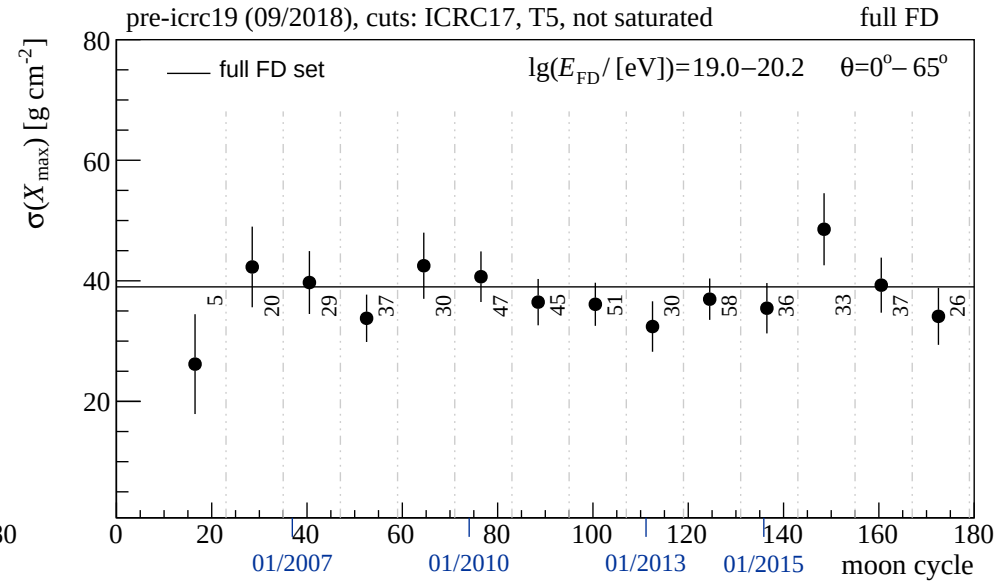




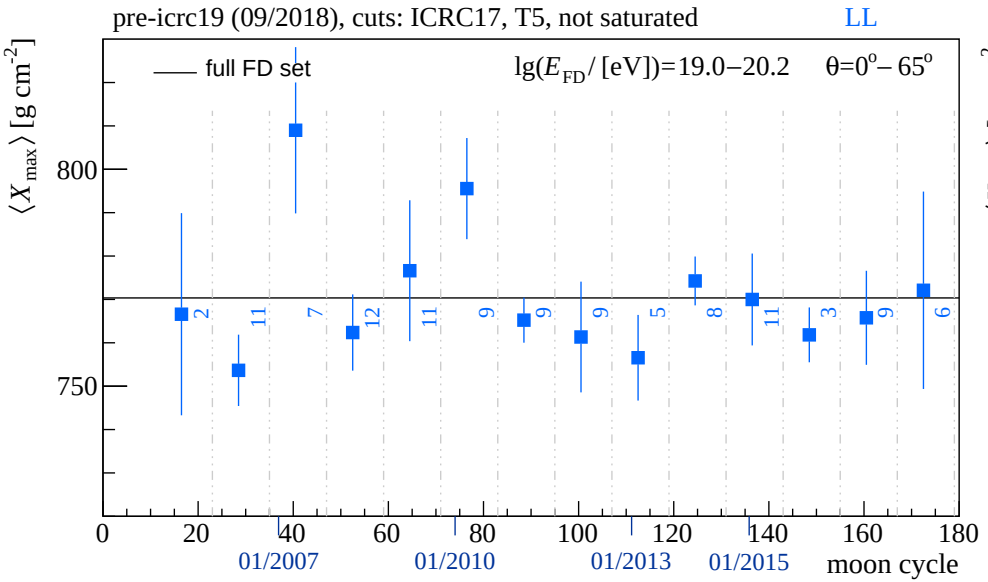


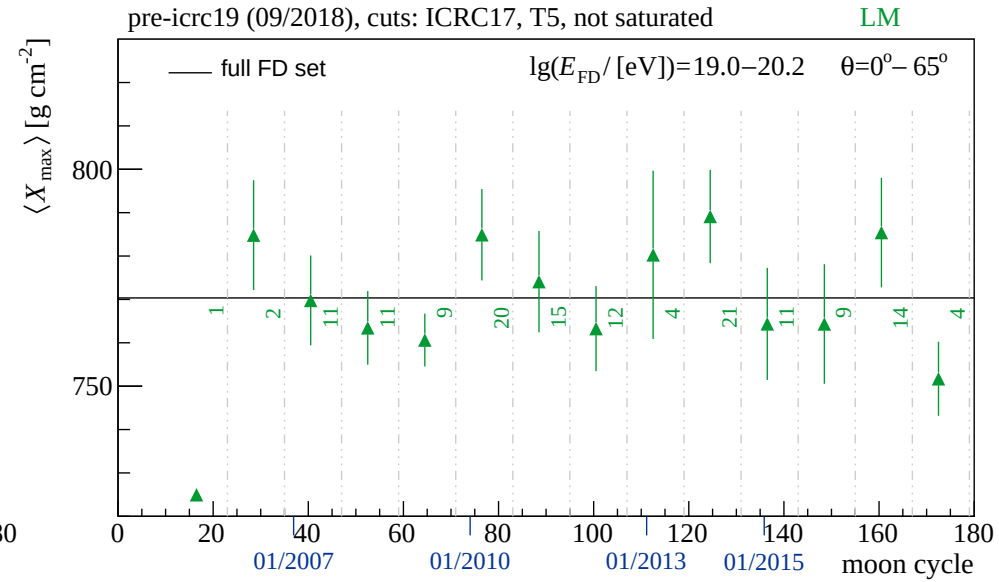
$X_{\max}$, $\lg(E/\mathrm{eV}) = 19.0 - 20.2$

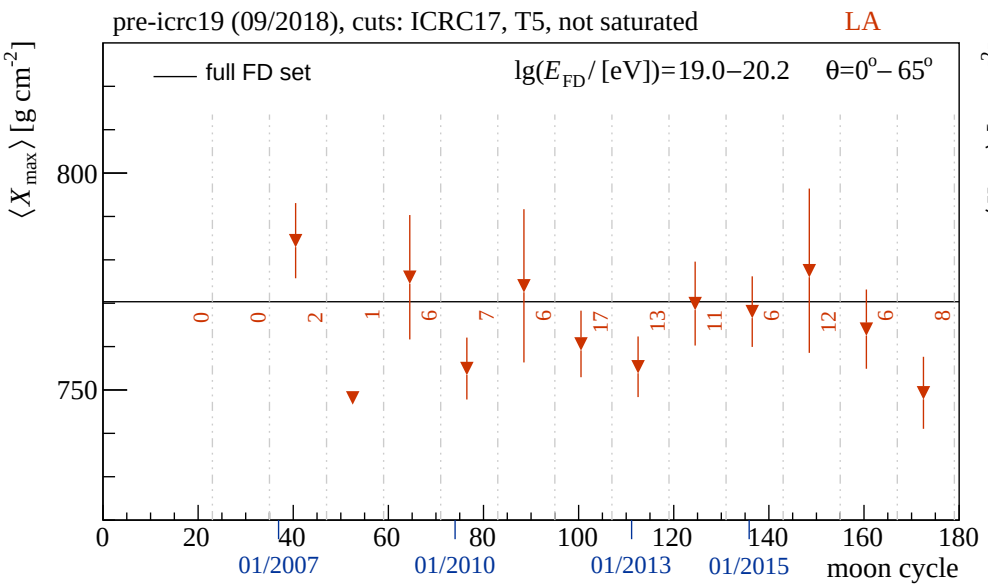


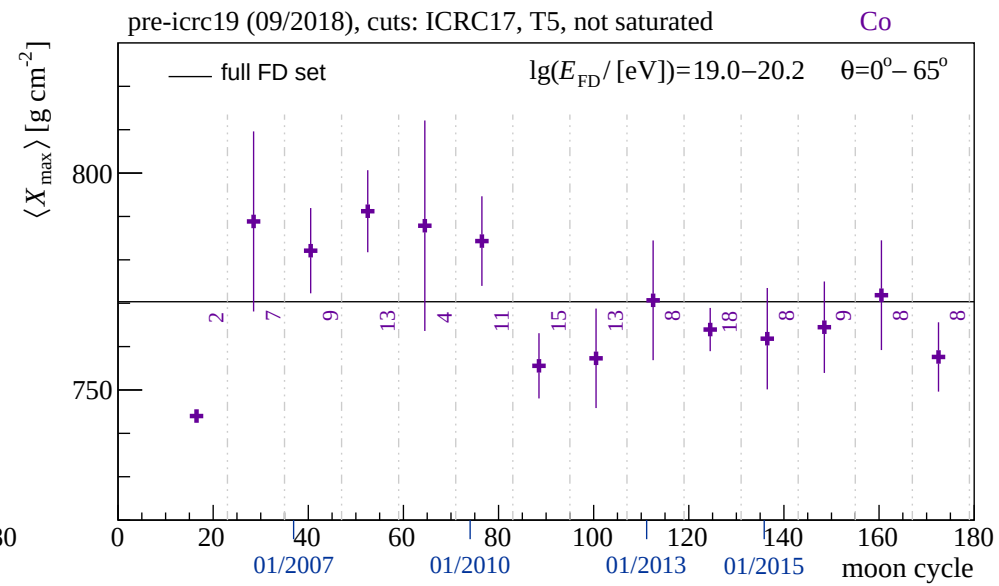


$X_{\max}$, $\lg(E/\mathrm{eV}) = 19.0 - 20.2$

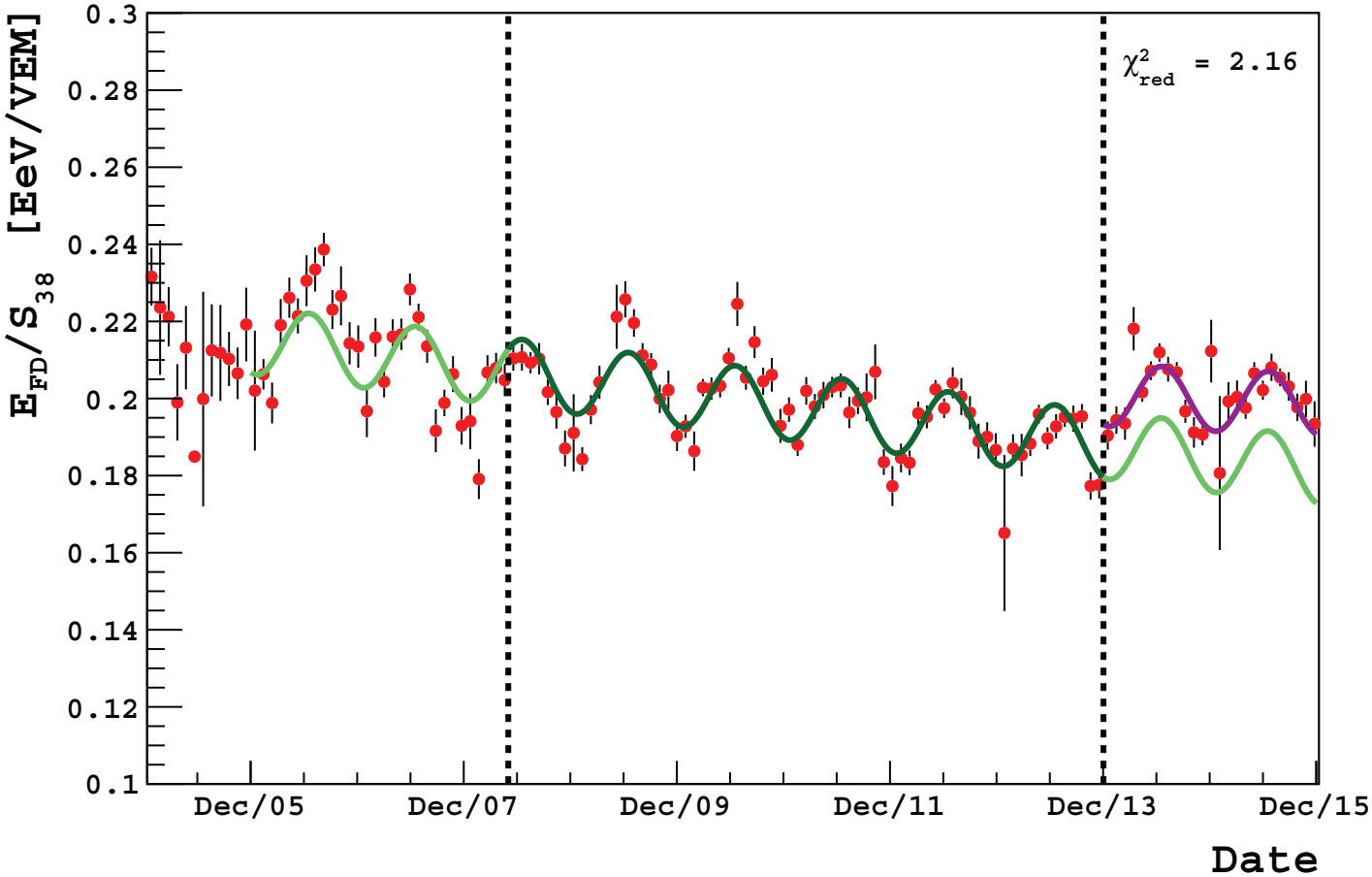








Energy scale evolution (for $E > 3$ EeV)

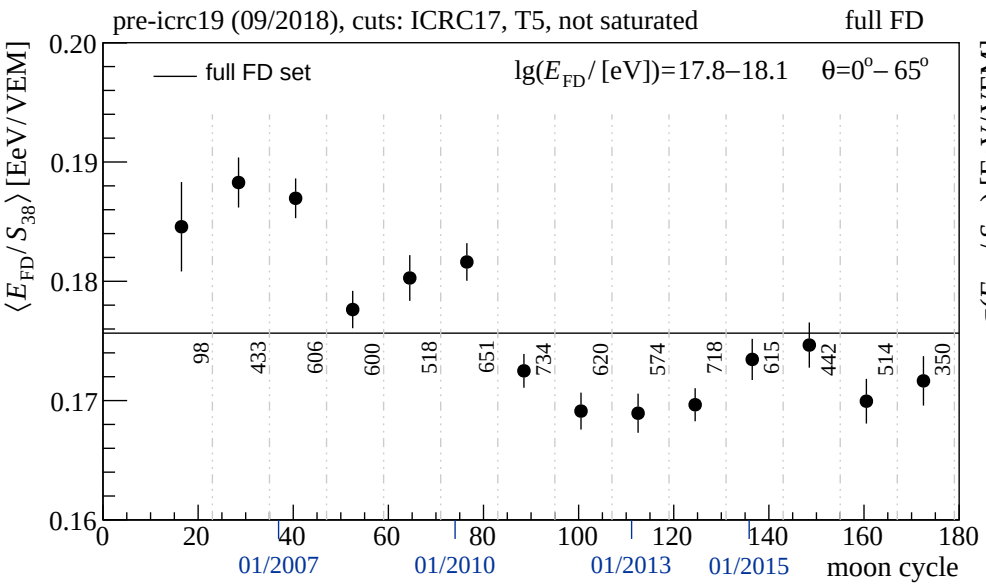


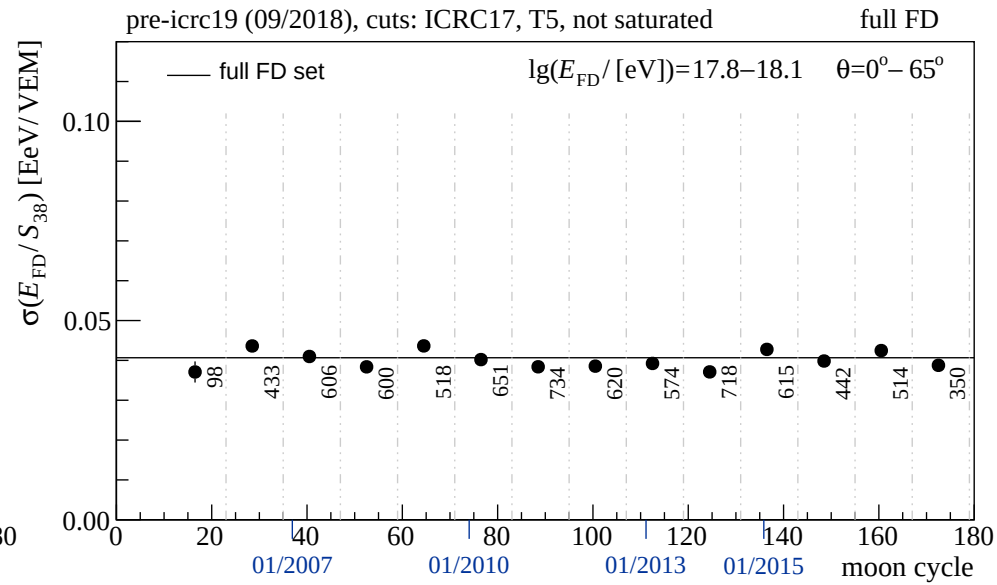
Phong Huy Nguyen, PhD thesis, GAP 2018 – 011

E_{FD}/S_{38} jump: might be related to the UV filter cleaning at all FD sites in 03/2014?
https://www.auger.unam.mx/AugerWiki/ListOfCleanings

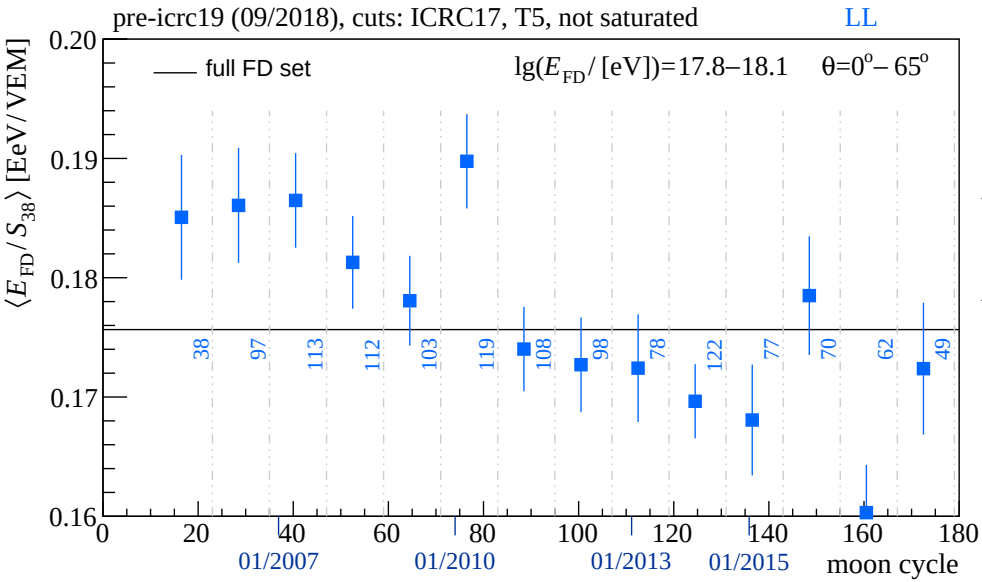
E_{FD}/S_{38}, $\lg(E/\mathrm{eV}) = 17.8 - 18.1$

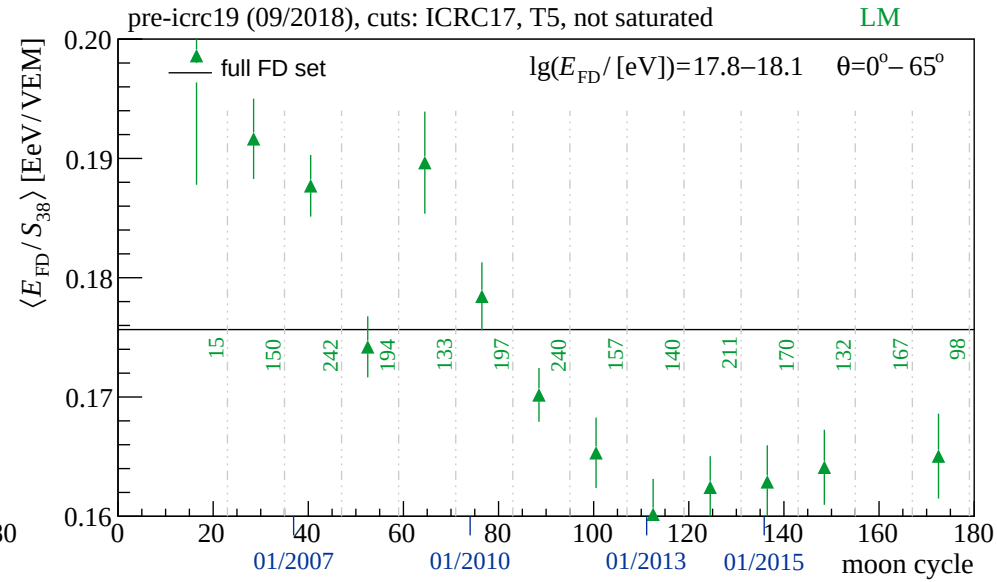
each point — 12 moon cycles

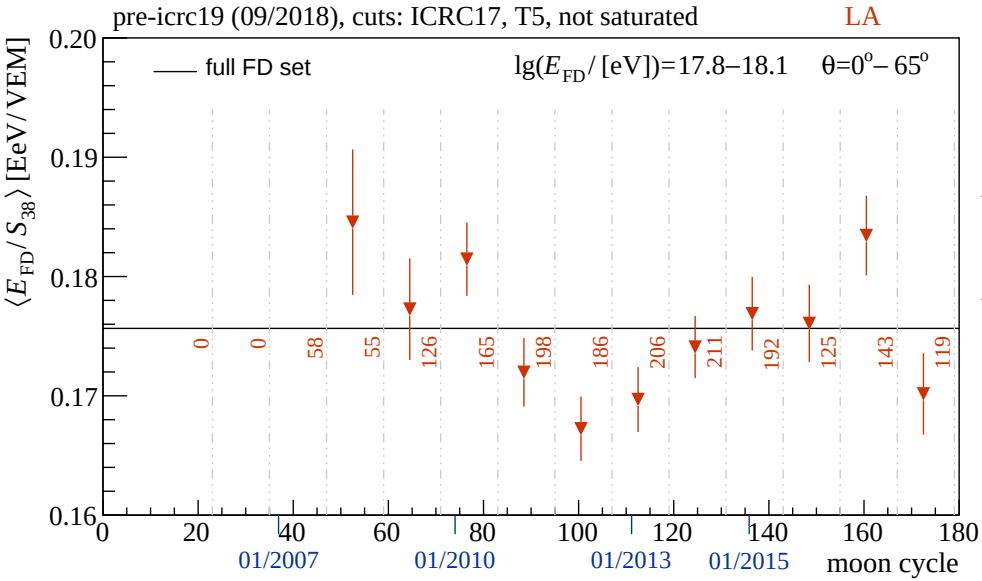


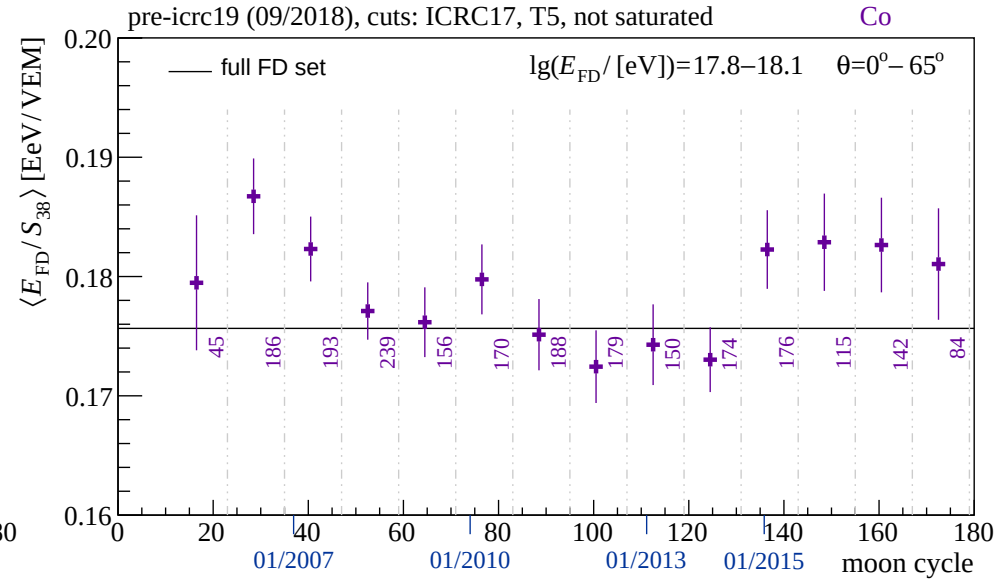


E_{FD}/S_{38}, $\lg(E/\mathrm{eV}) = 17.8 - 18.1$



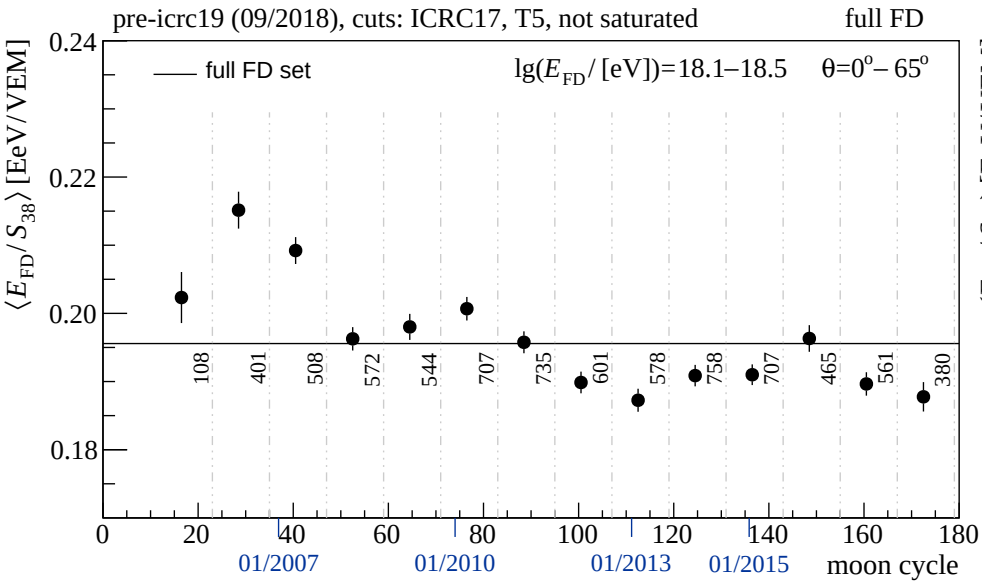


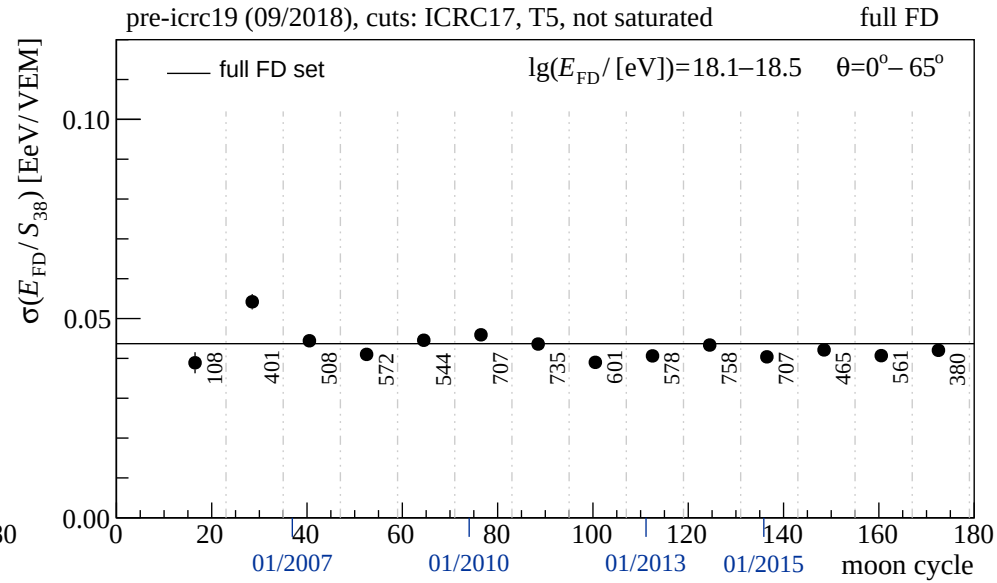




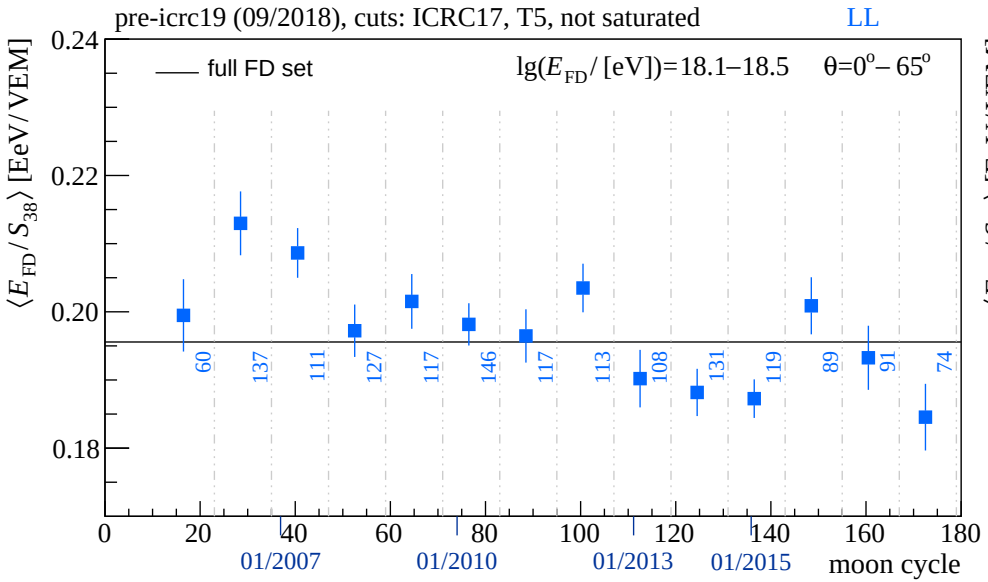
LM point near moon cycle 160 is at ≈ 0.15 [EeV/VEM]

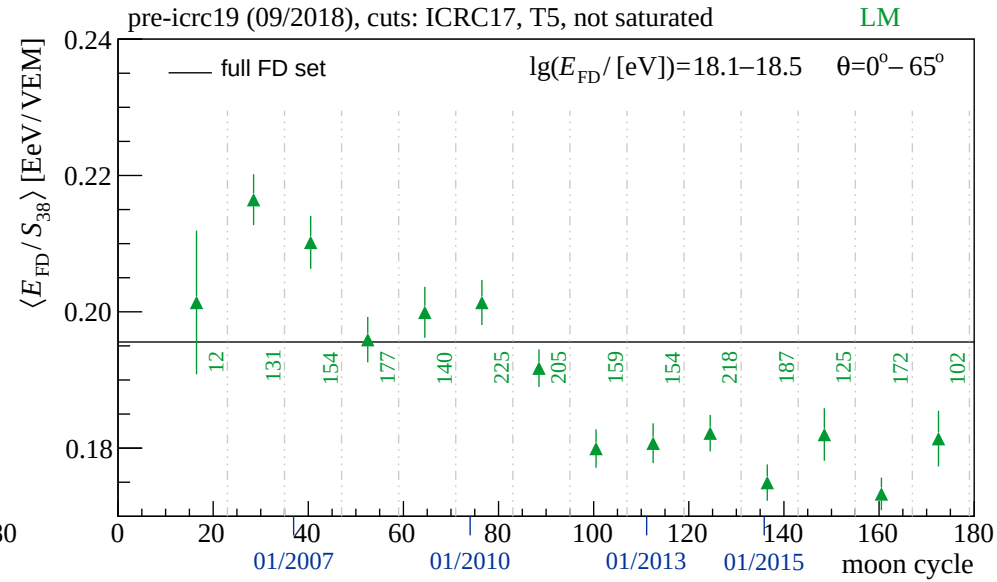
E_{FD}/S_{38}, $\lg(E/\mathrm{eV}) = 18.1 - 18.5$

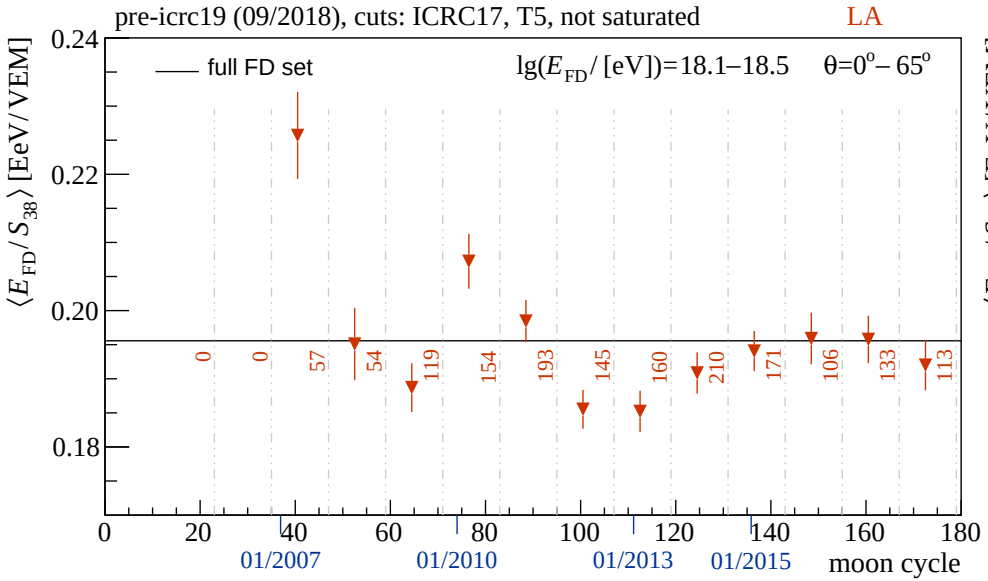


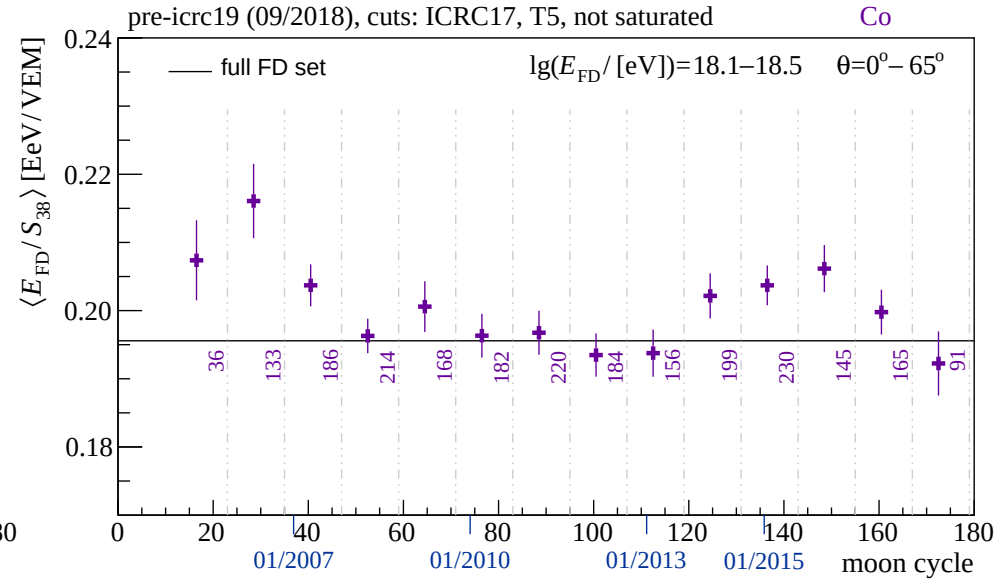


E_{FD}/S_{38}, $\lg(E/\mathrm{eV}) = 18.1 - 18.5$

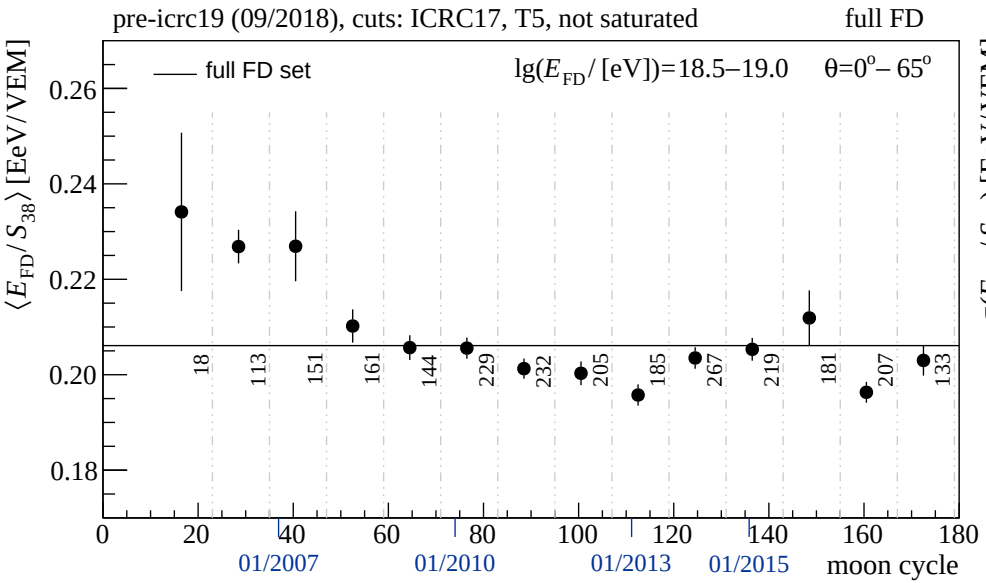


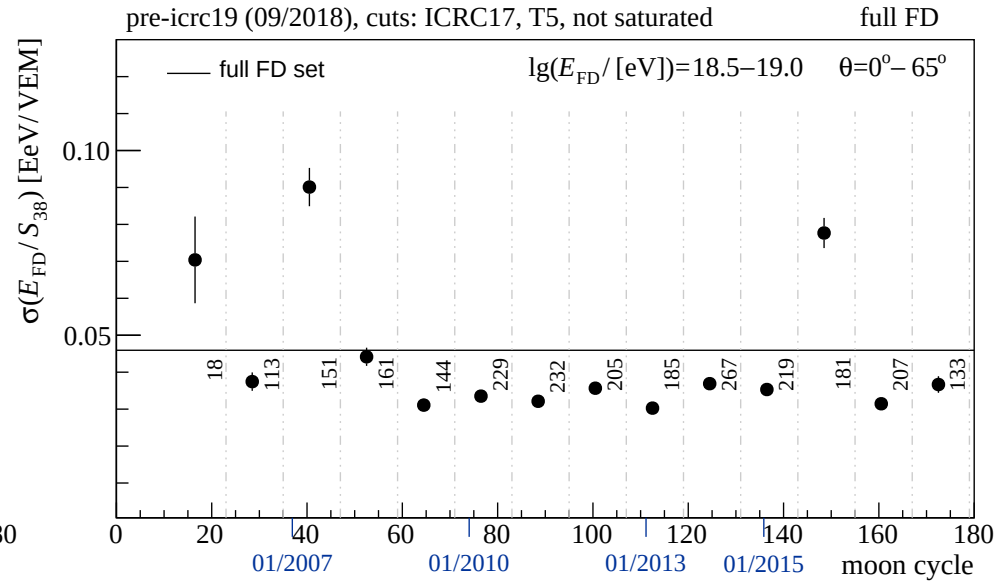




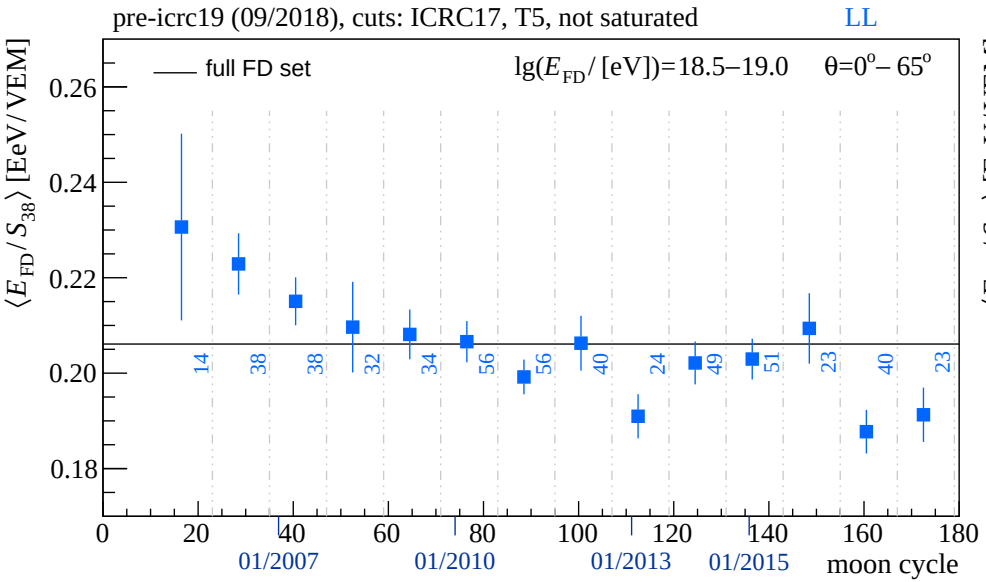


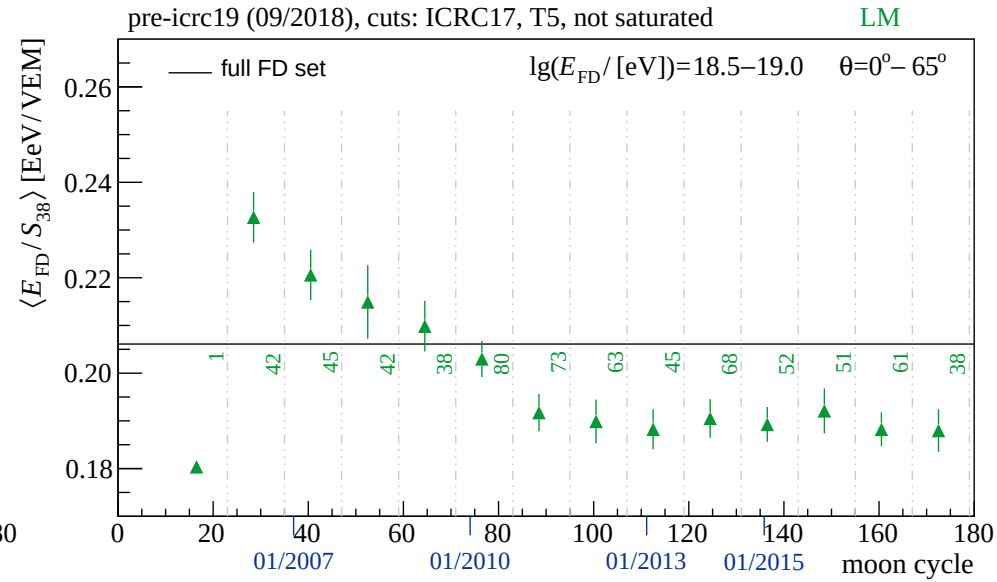
E_{FD}/S_{38}, $\lg(E/\mathrm{eV}) = 18.5 - 19.0$

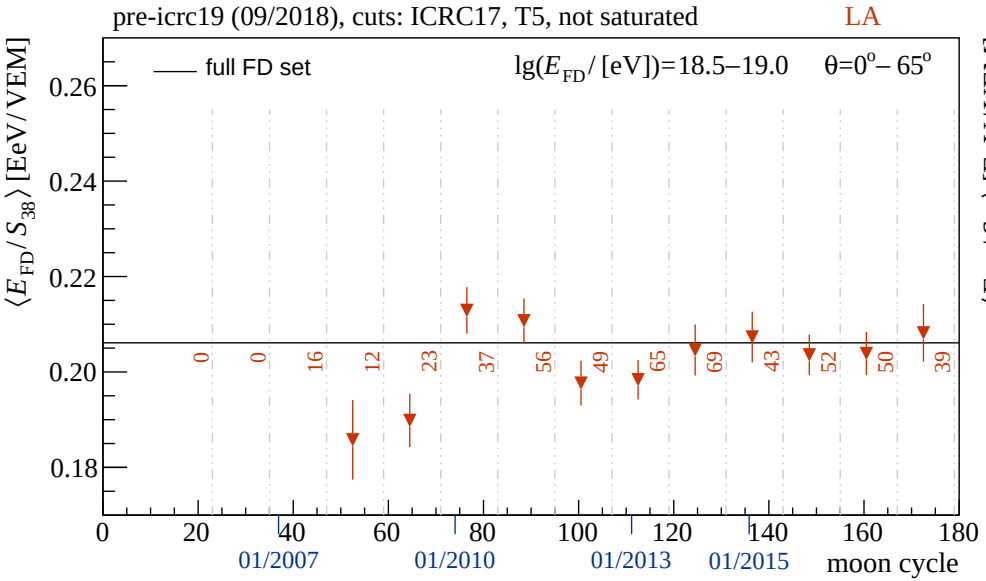


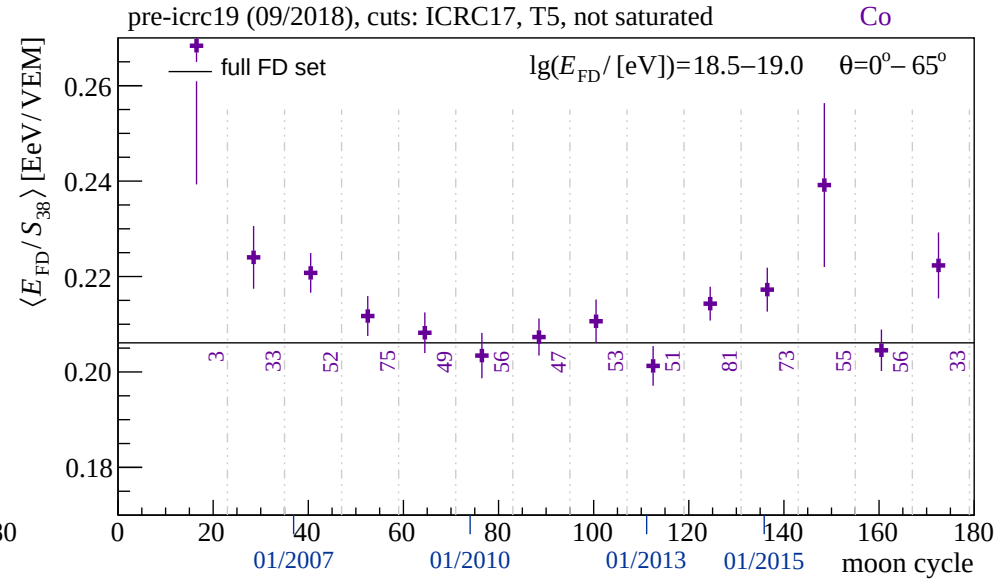


E_{FD}/S_{38}, $\lg(E/\mathrm{eV}) = 18.5 - 19.0$

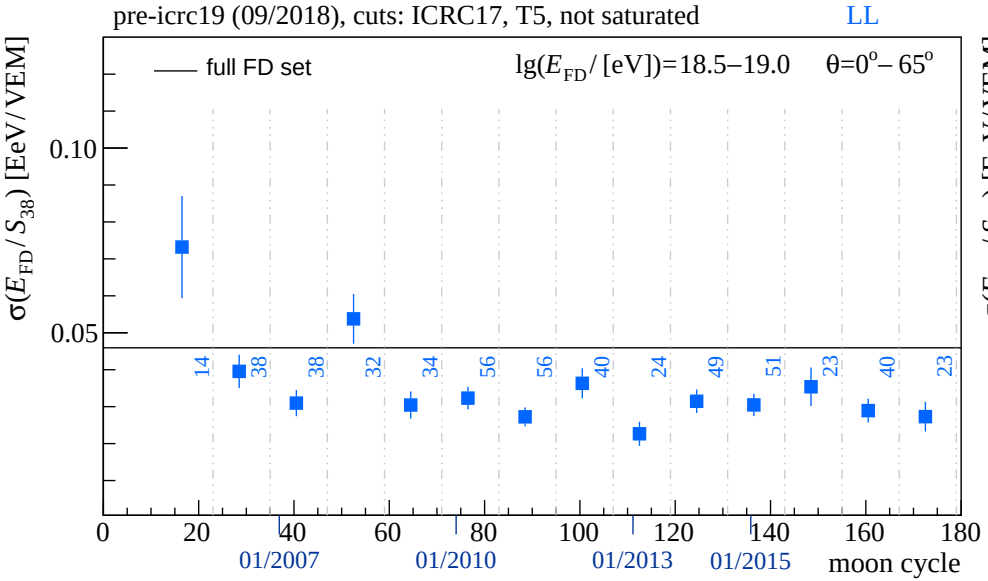


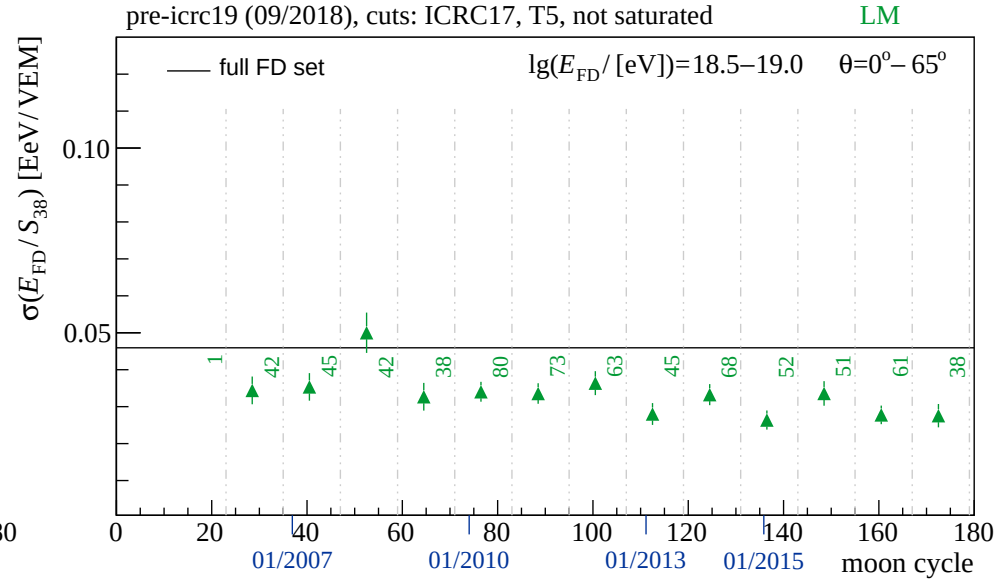


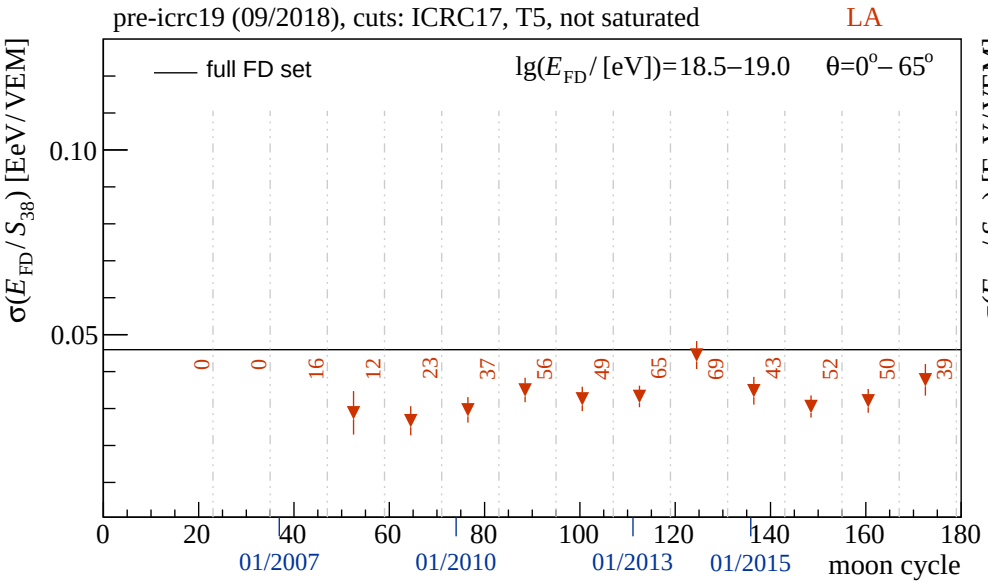


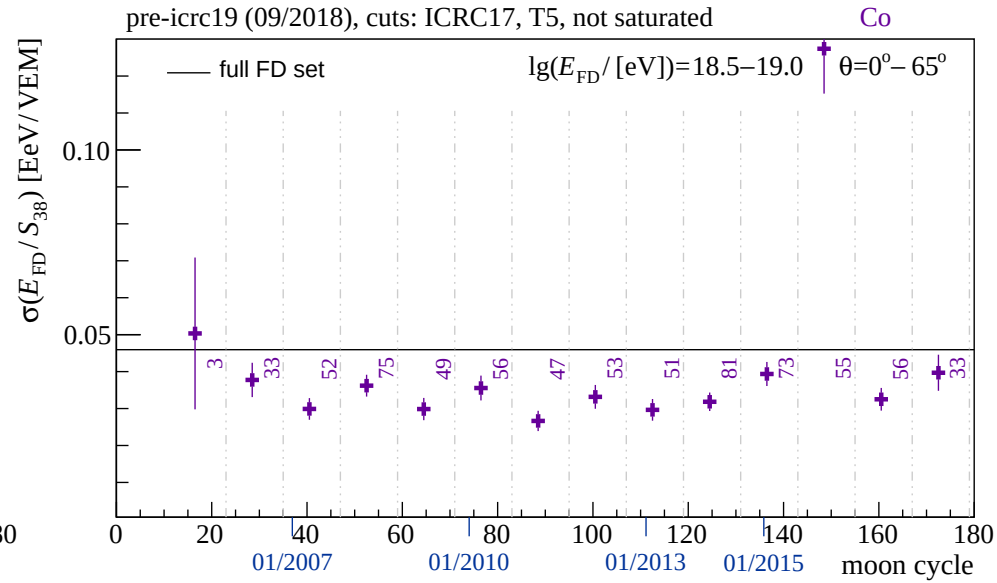


E_{FD}/S_{38}, $\lg(E/\mathrm{eV}) = 18.5 - 19.0$

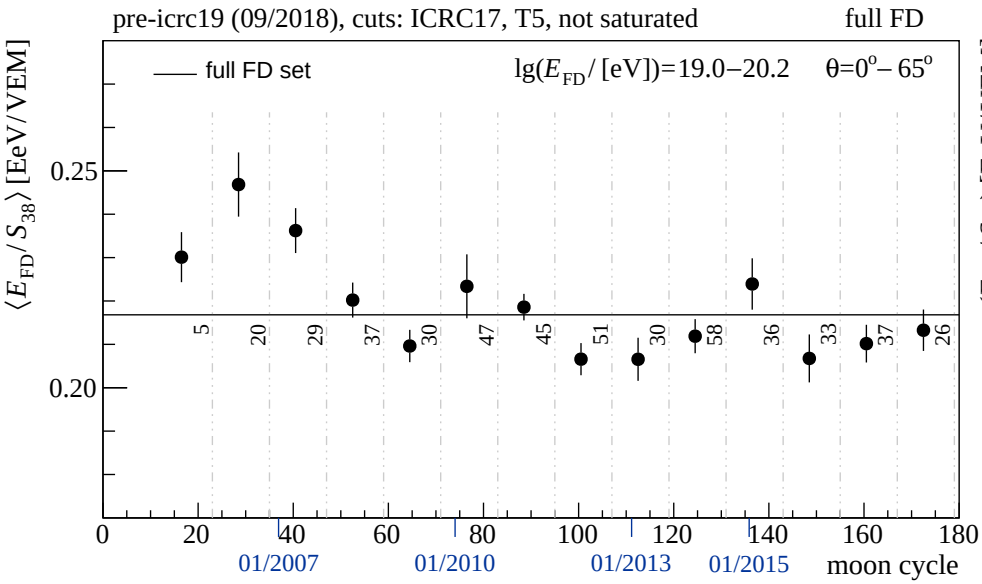


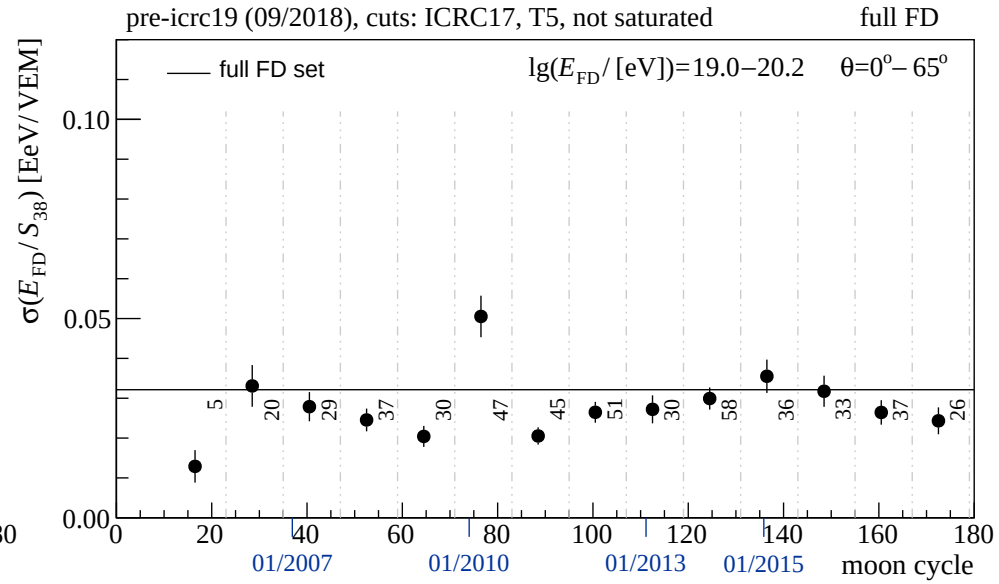




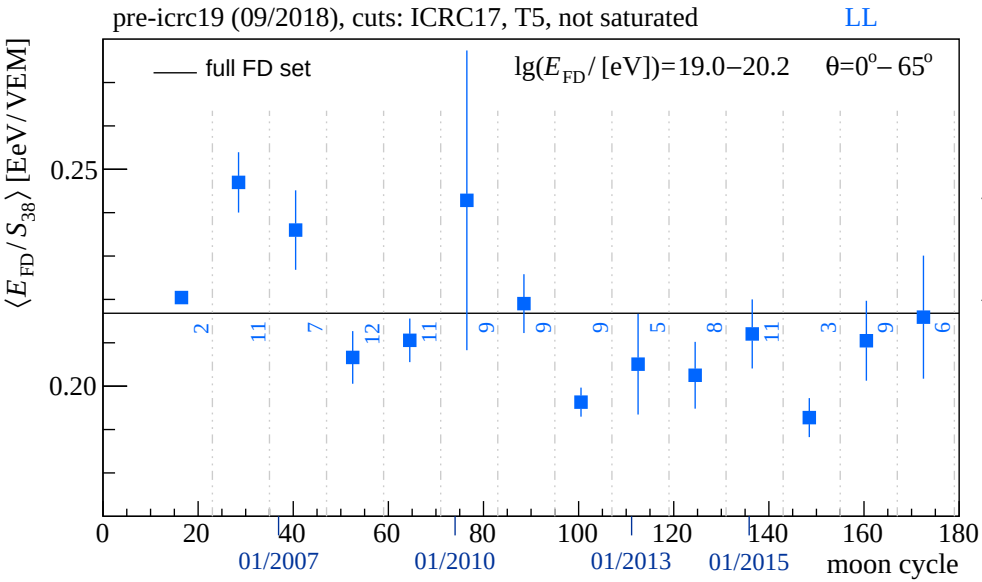


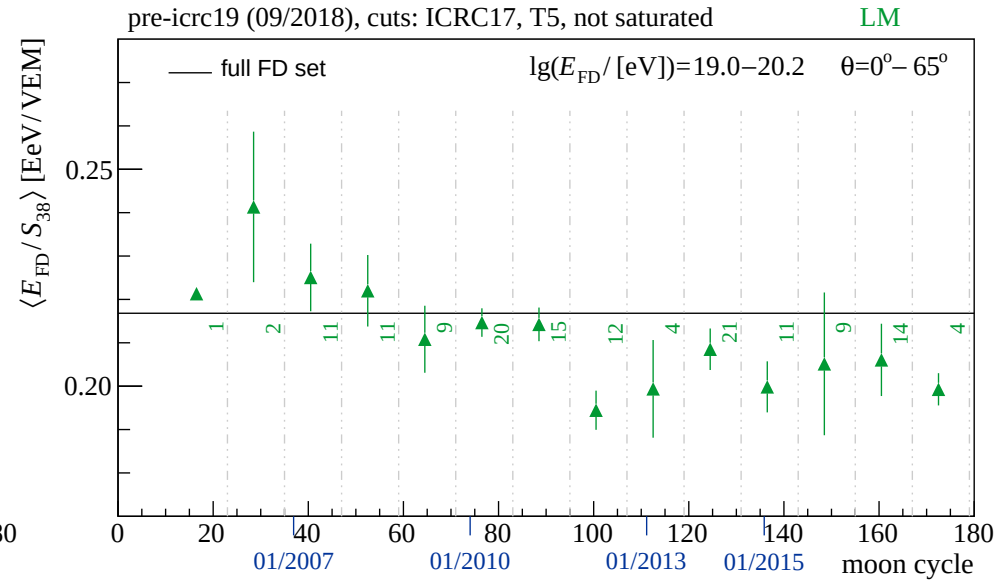
E_{FD}/S_{38}, $\lg(E/\mathrm{eV}) = 19.0 - 20.2$

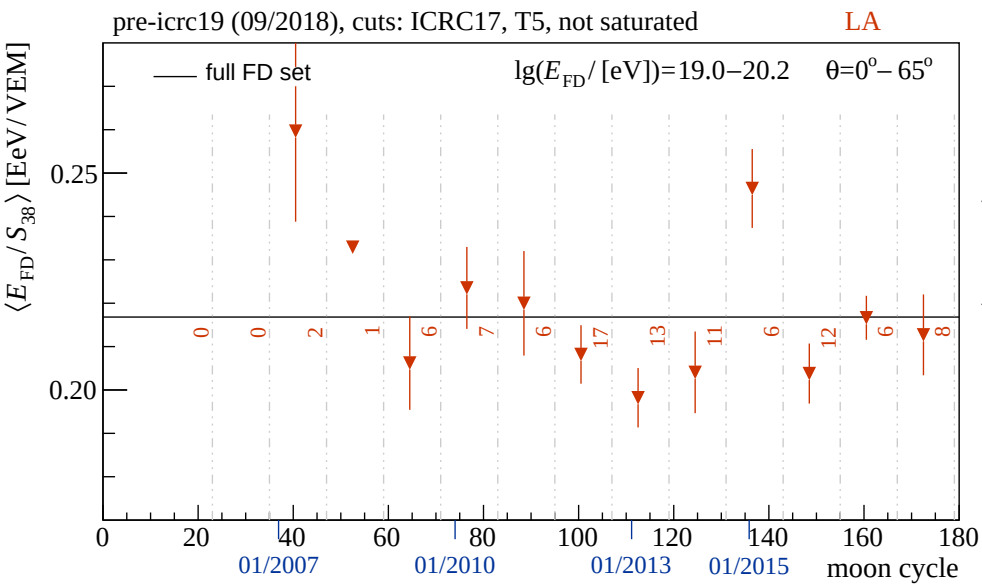


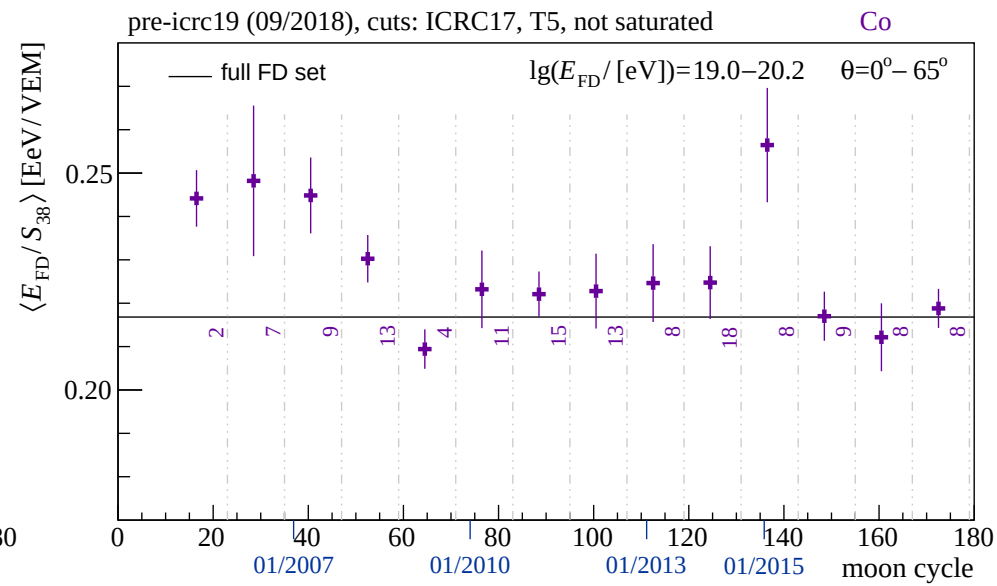


E_{FD}/S_{38}, $\lg(E/\mathrm{eV}) = 19.0 - 20.2$



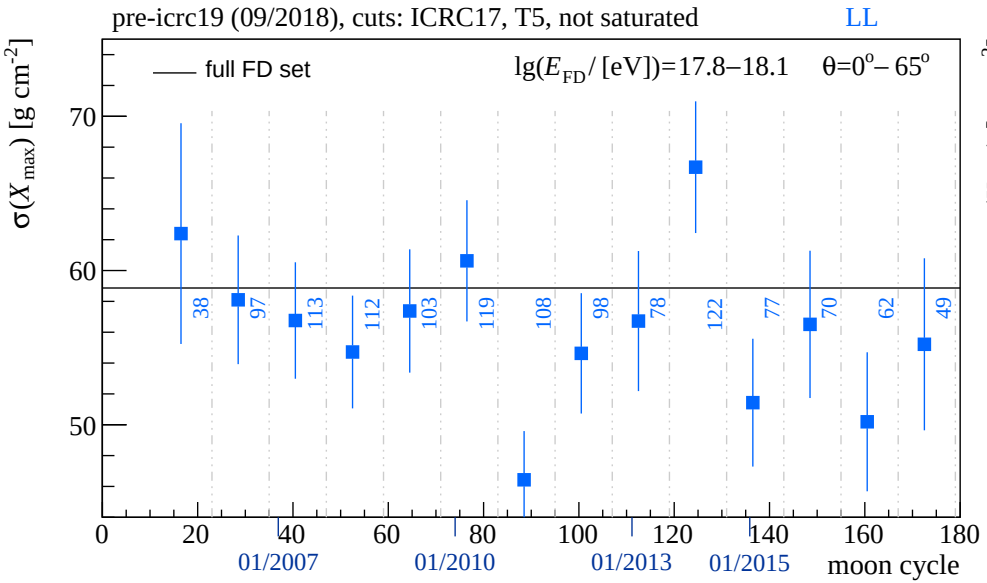


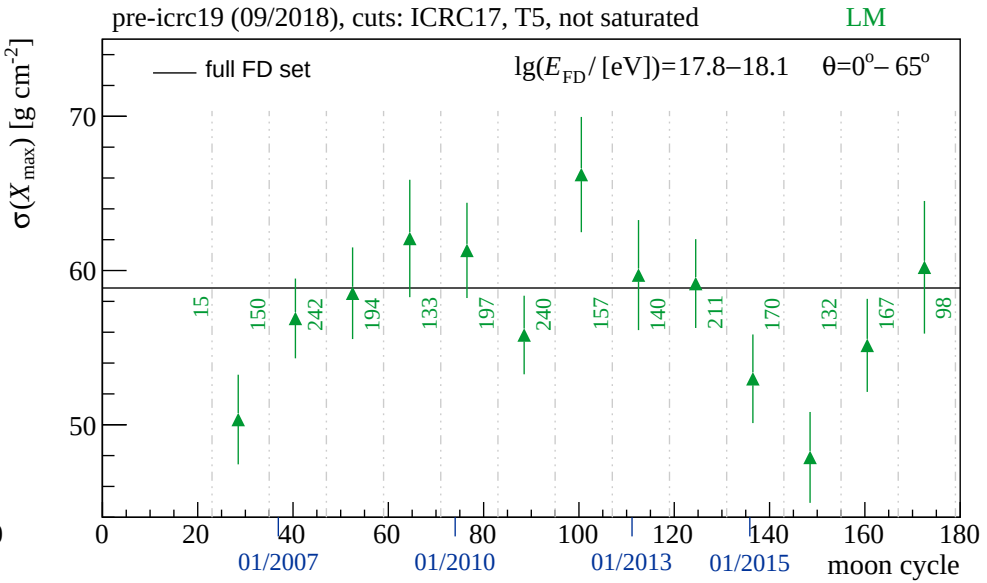


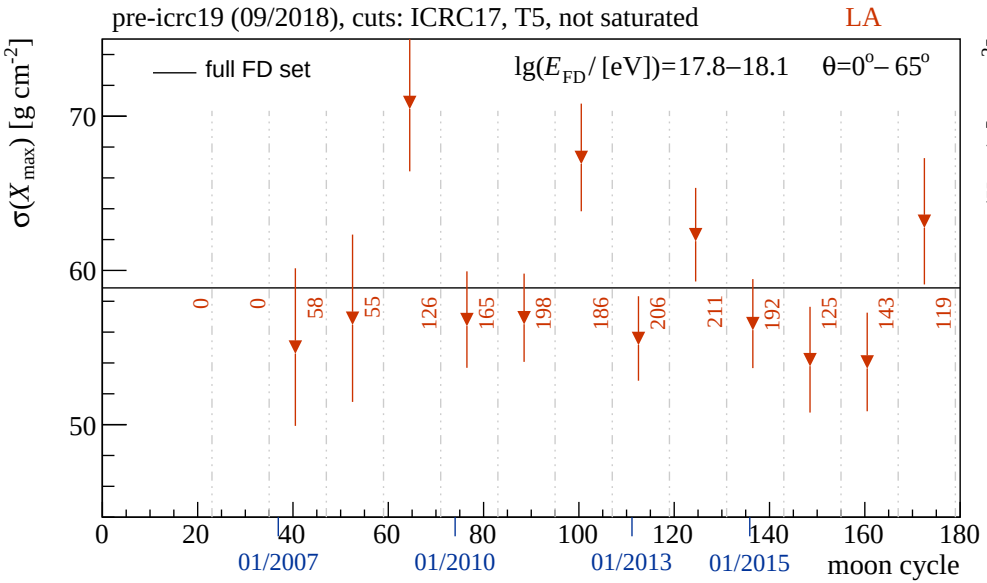


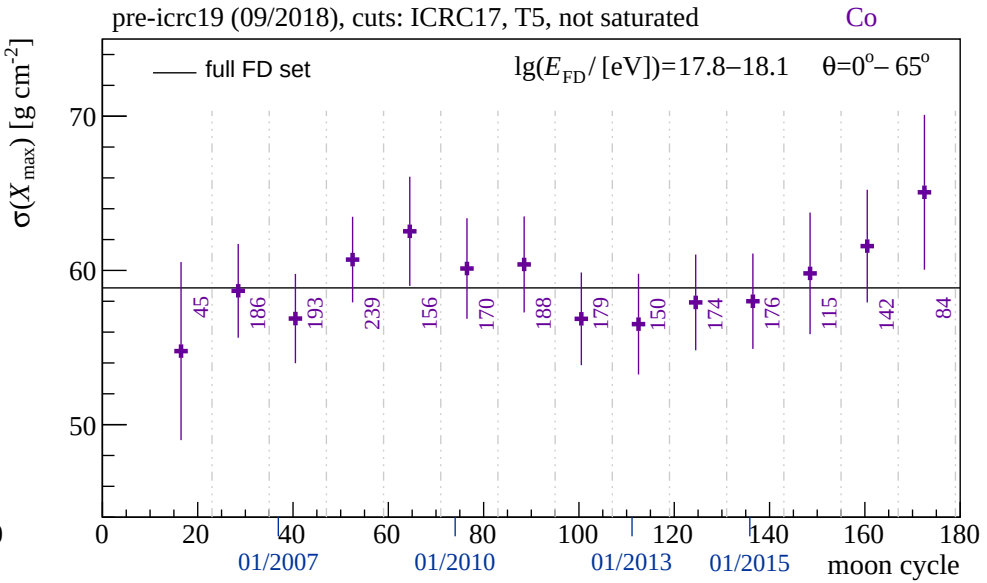
backups

$X_{\max}$, $\lg(E/\mathrm{eV}) = 17.8 - 18.1$

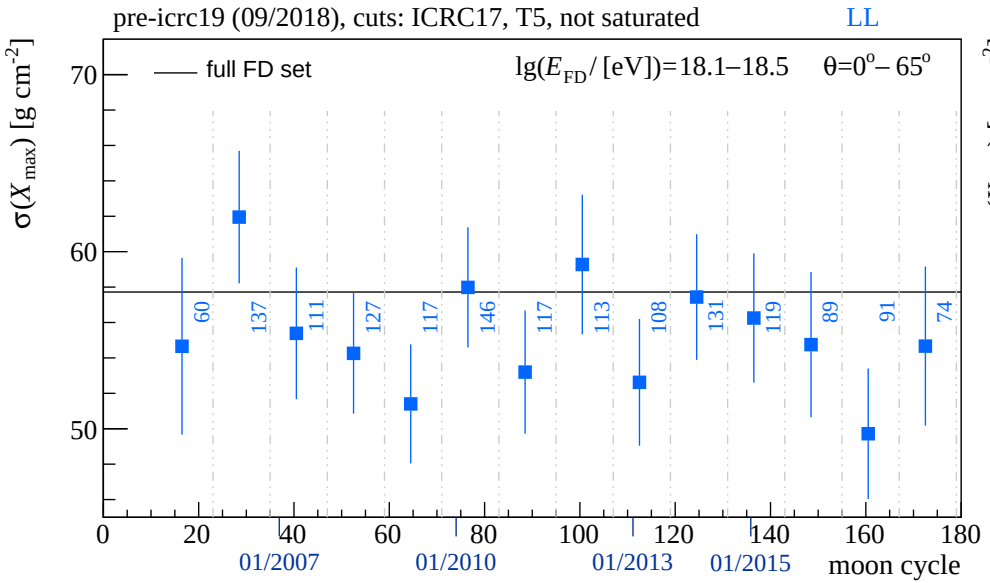


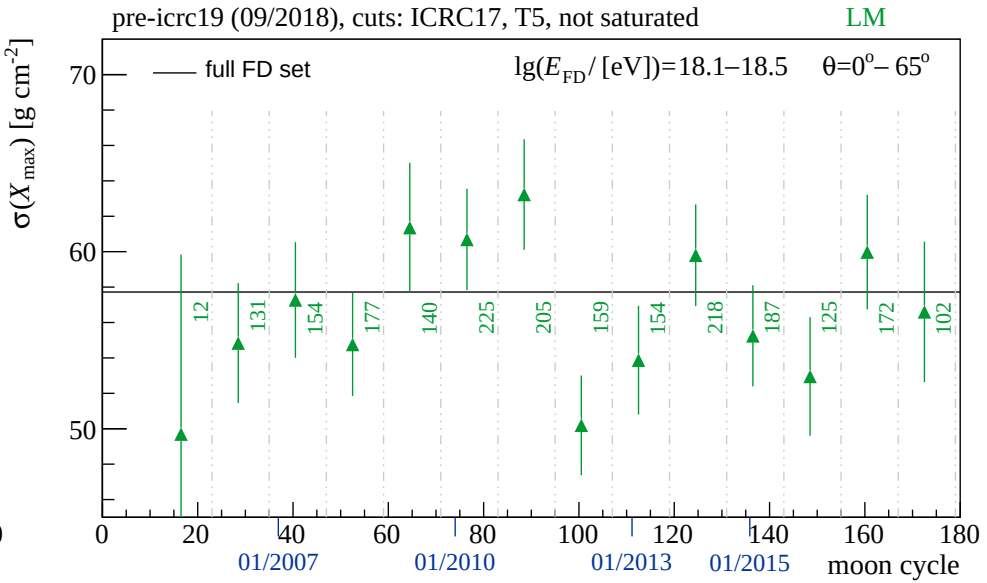


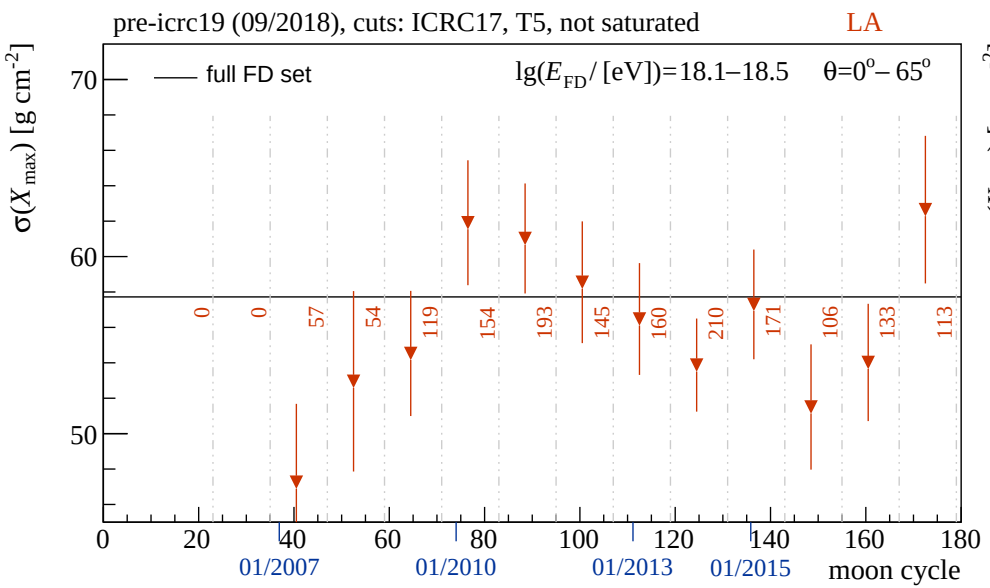


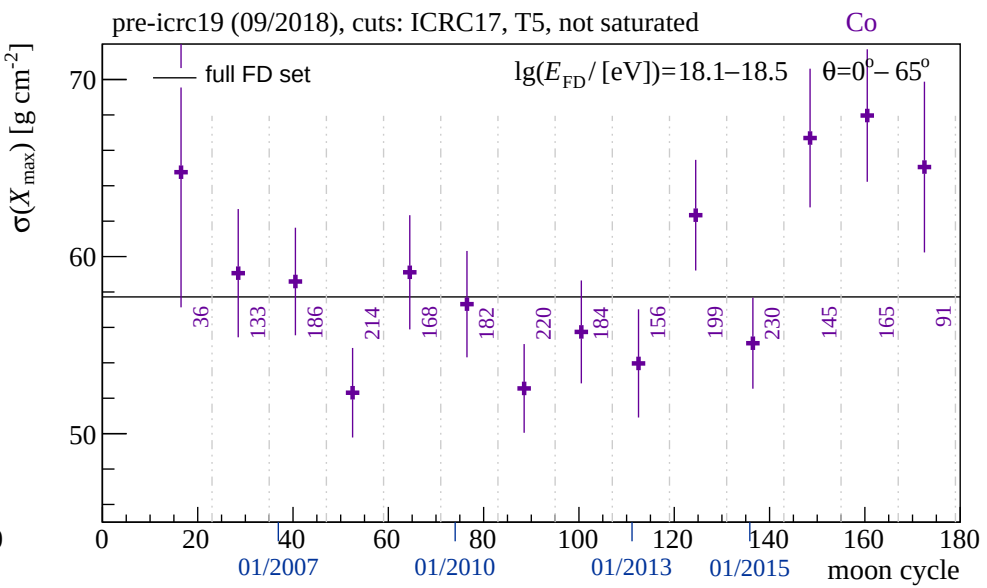


$X_{\max}$, $\lg(E/\mathrm{eV}) = 18.1 - 18.5$

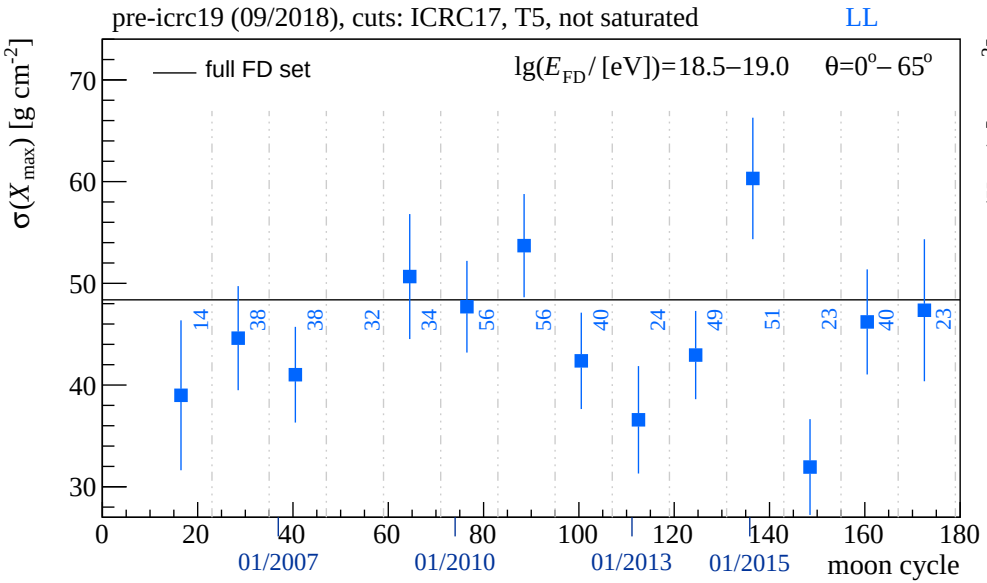


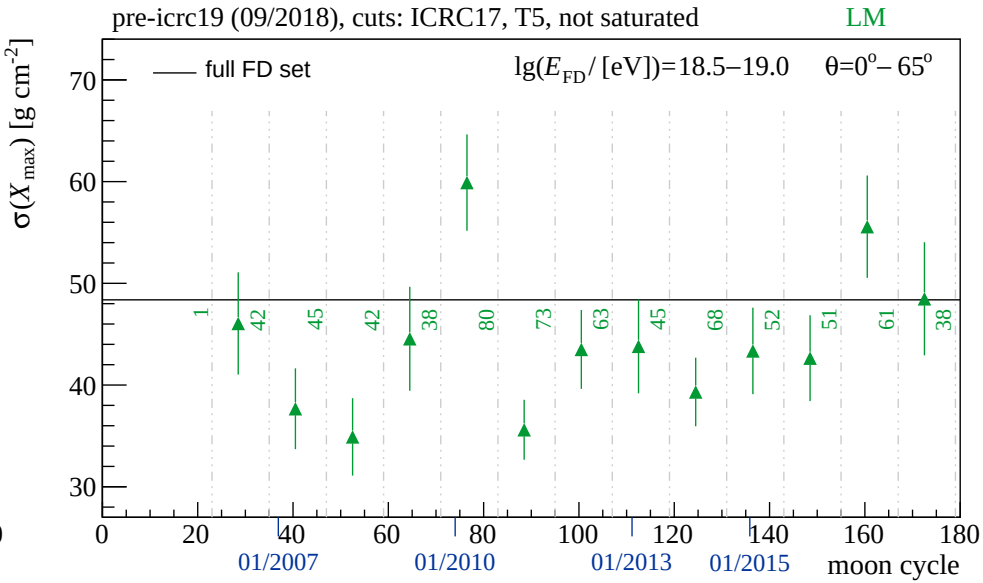


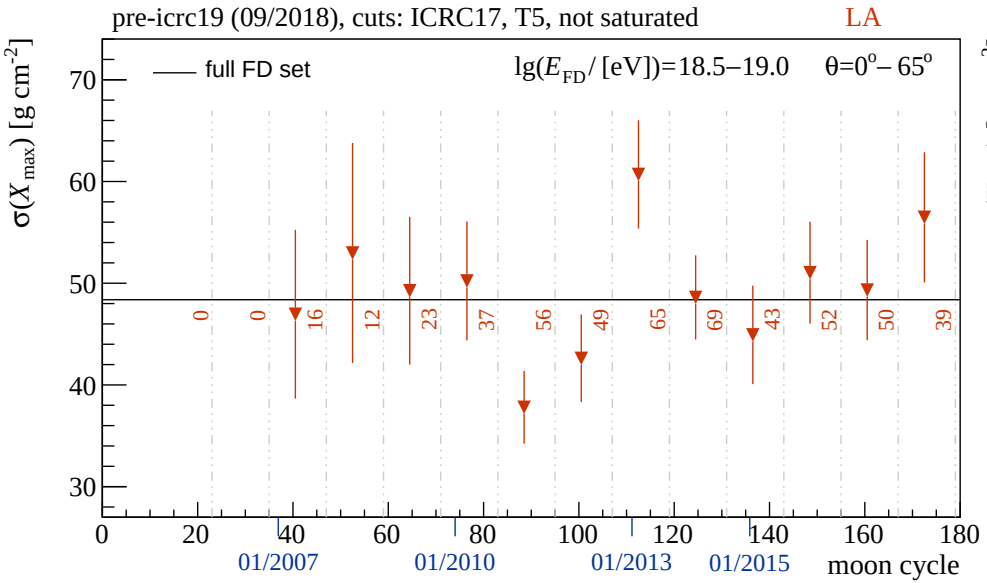


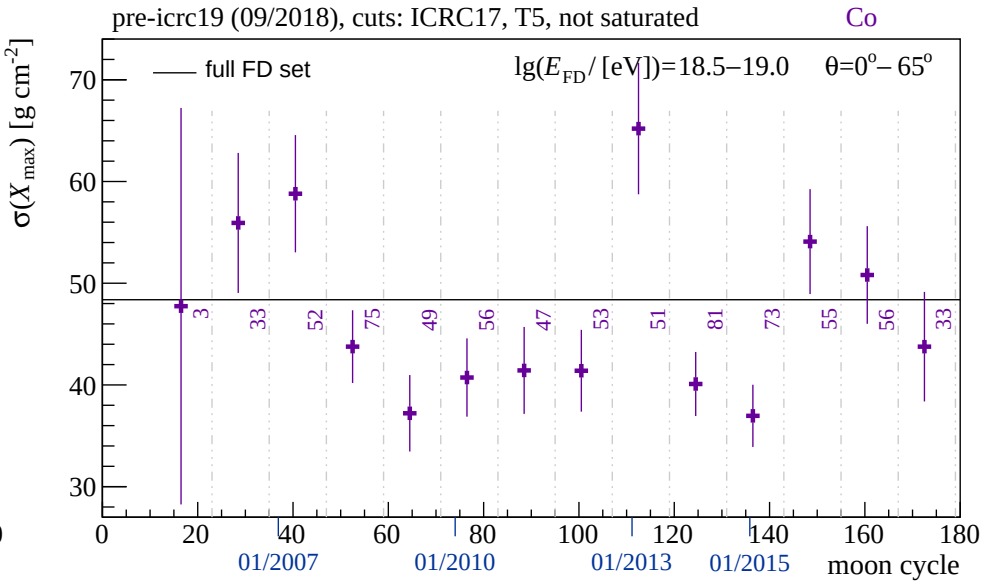


$X_{\max}$, $\lg(E/\mathrm{eV}) = 18.5 - 19.0$

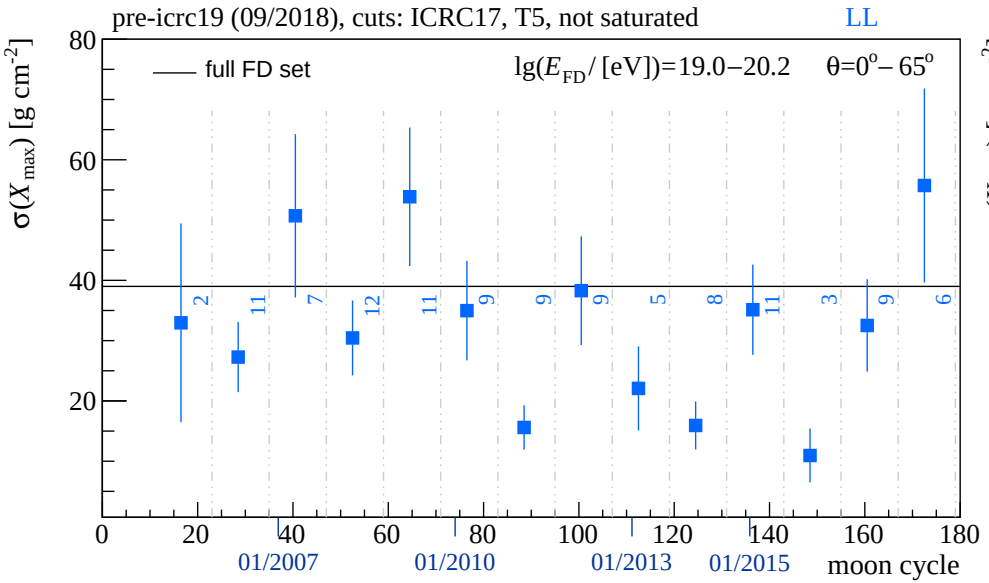


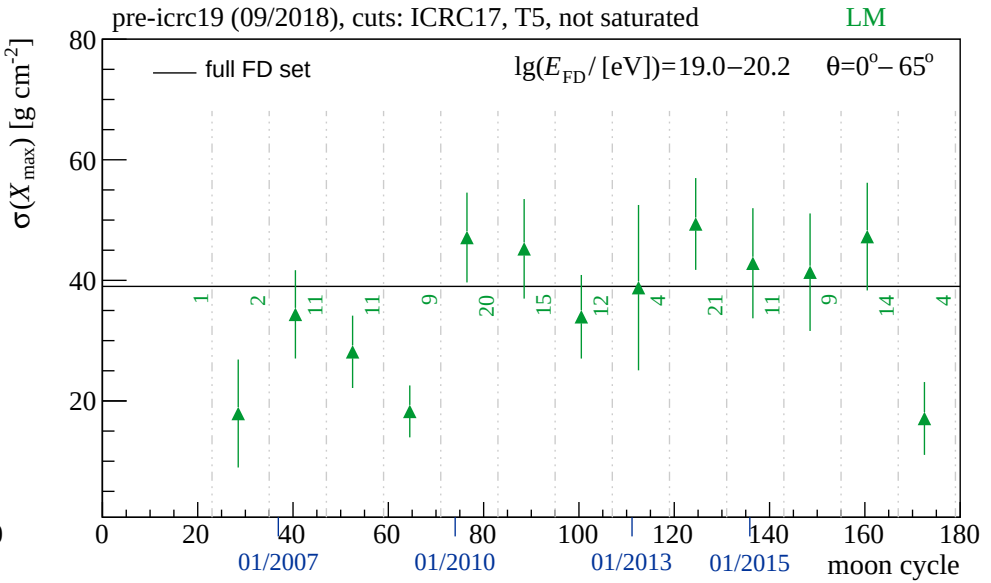


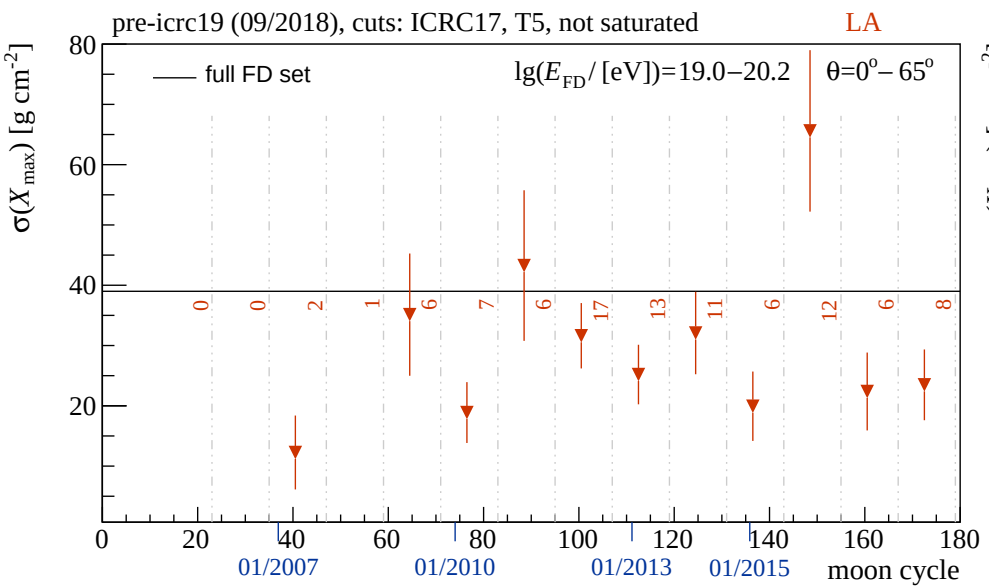


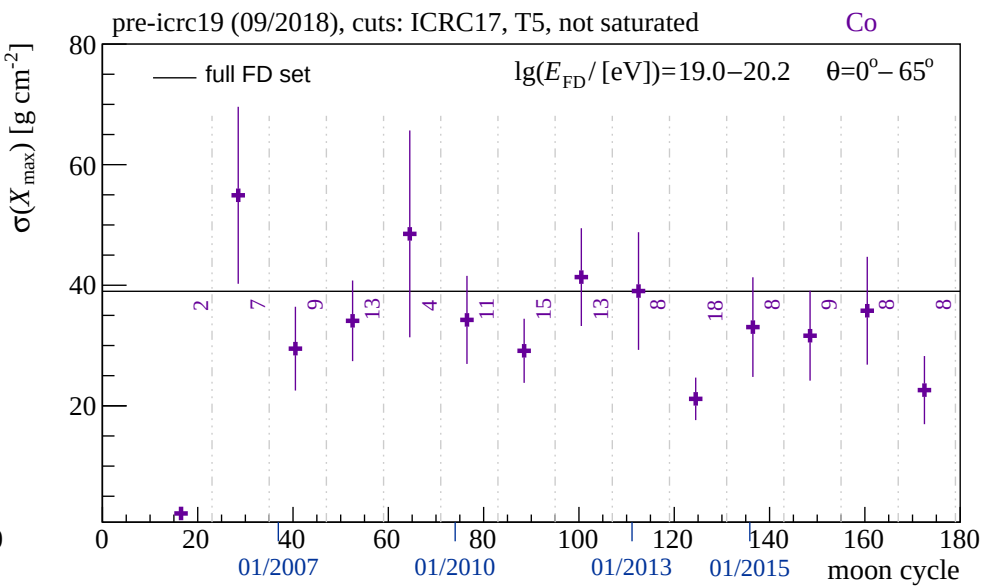


$X_{\max}$, $\lg(E/\mathrm{eV}) = 19.0 - 20.2$

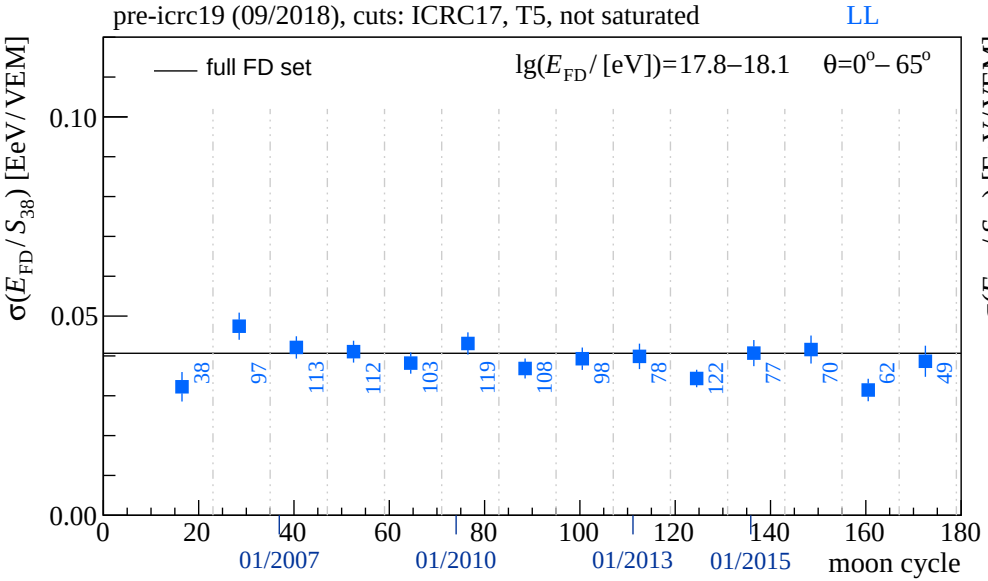


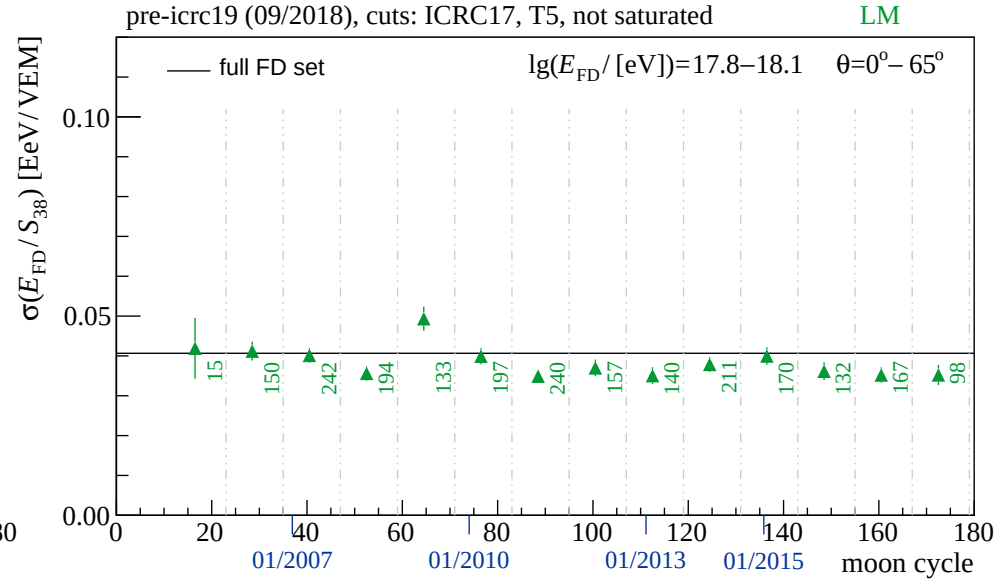


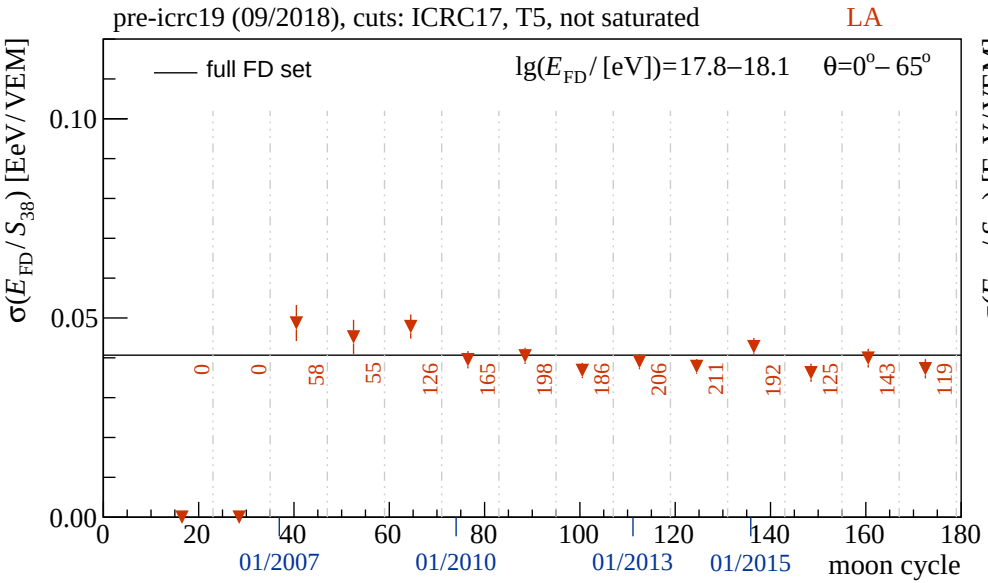


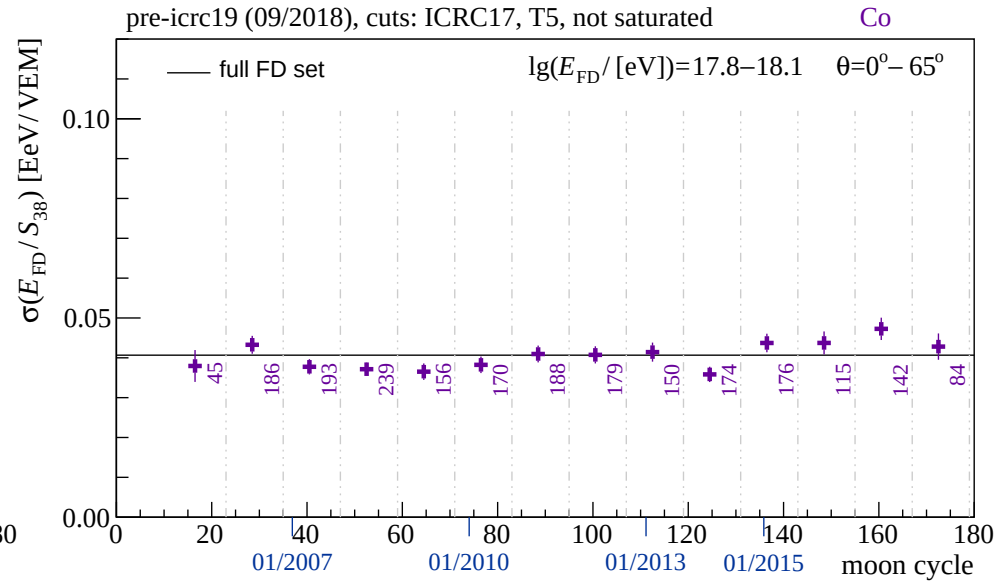


E_{FD}/S_{38}, $\lg(E/\mathrm{eV}) = 17.8 - 18.1$

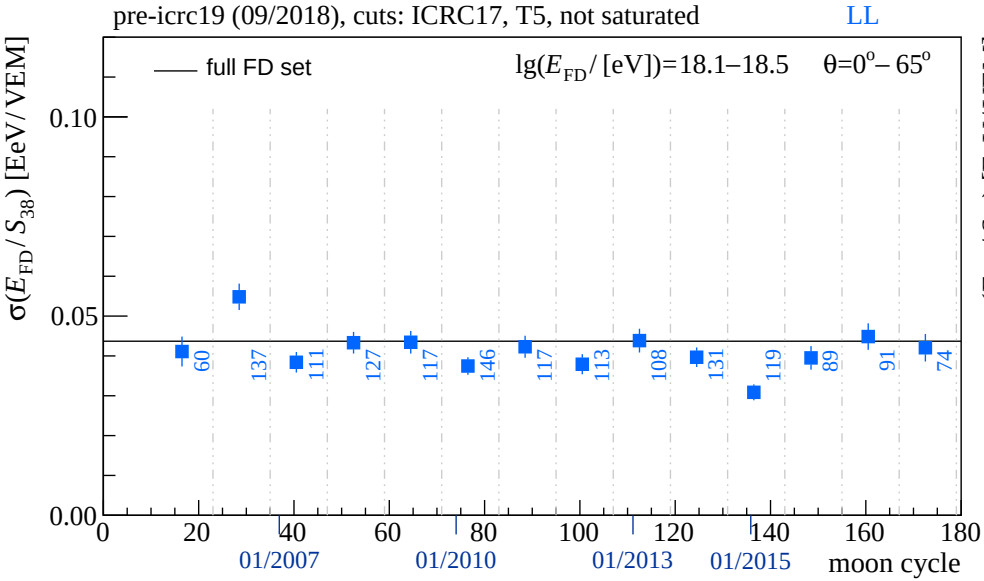


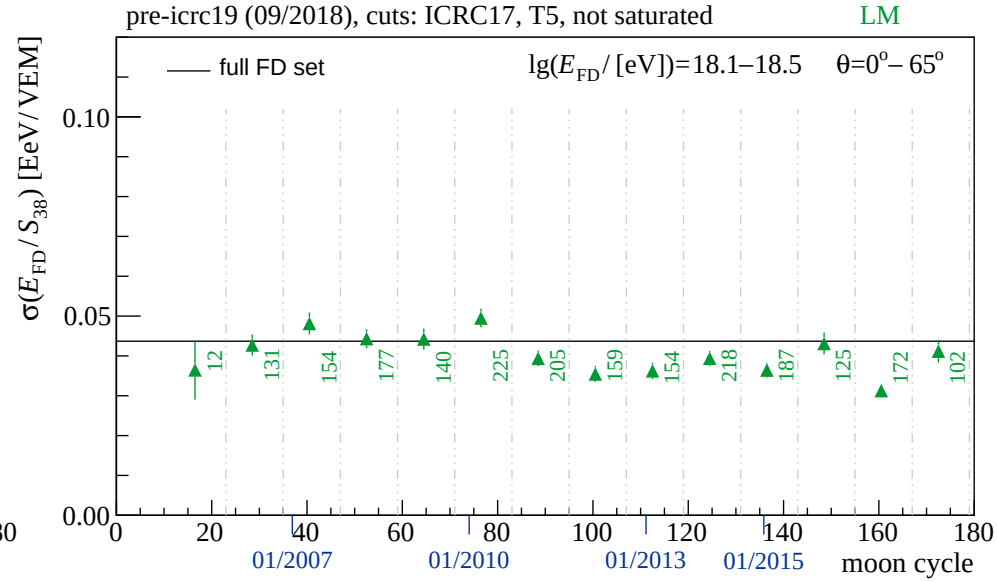


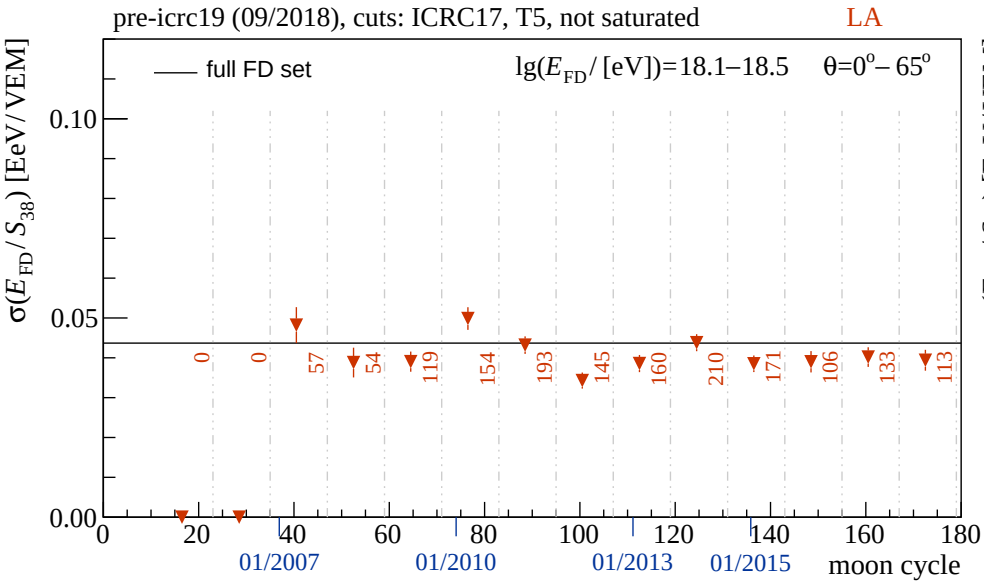


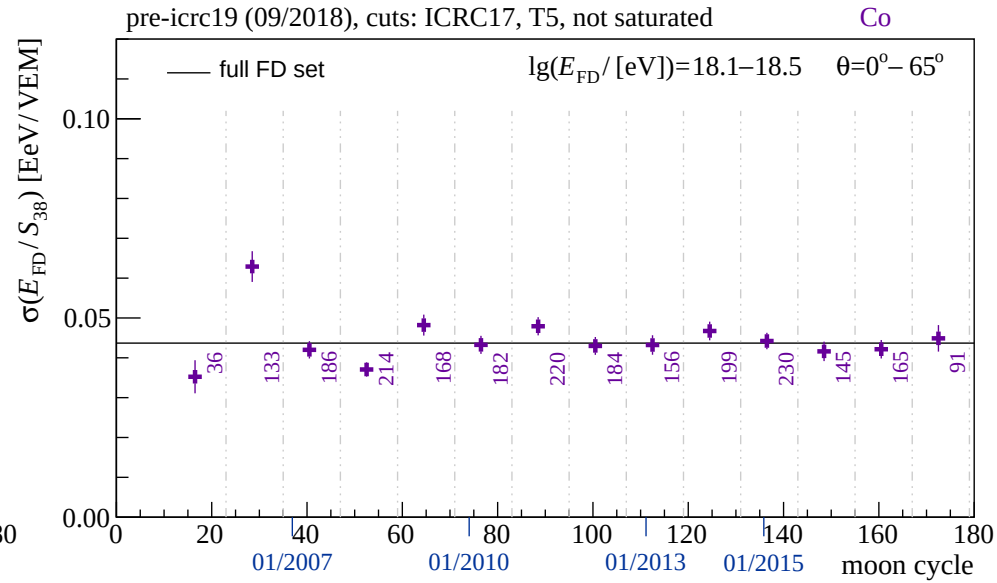


E_{FD}/S_{38}, $\lg(E/\mathrm{eV}) = 18.1 - 18.5$









E_{FD}/S_{38}, $\lg(E/\mathrm{eV}) = 19.0 - 20.2$