

Measuring the prompt component of the atmospheric muon flux

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Definition z-position

Center:

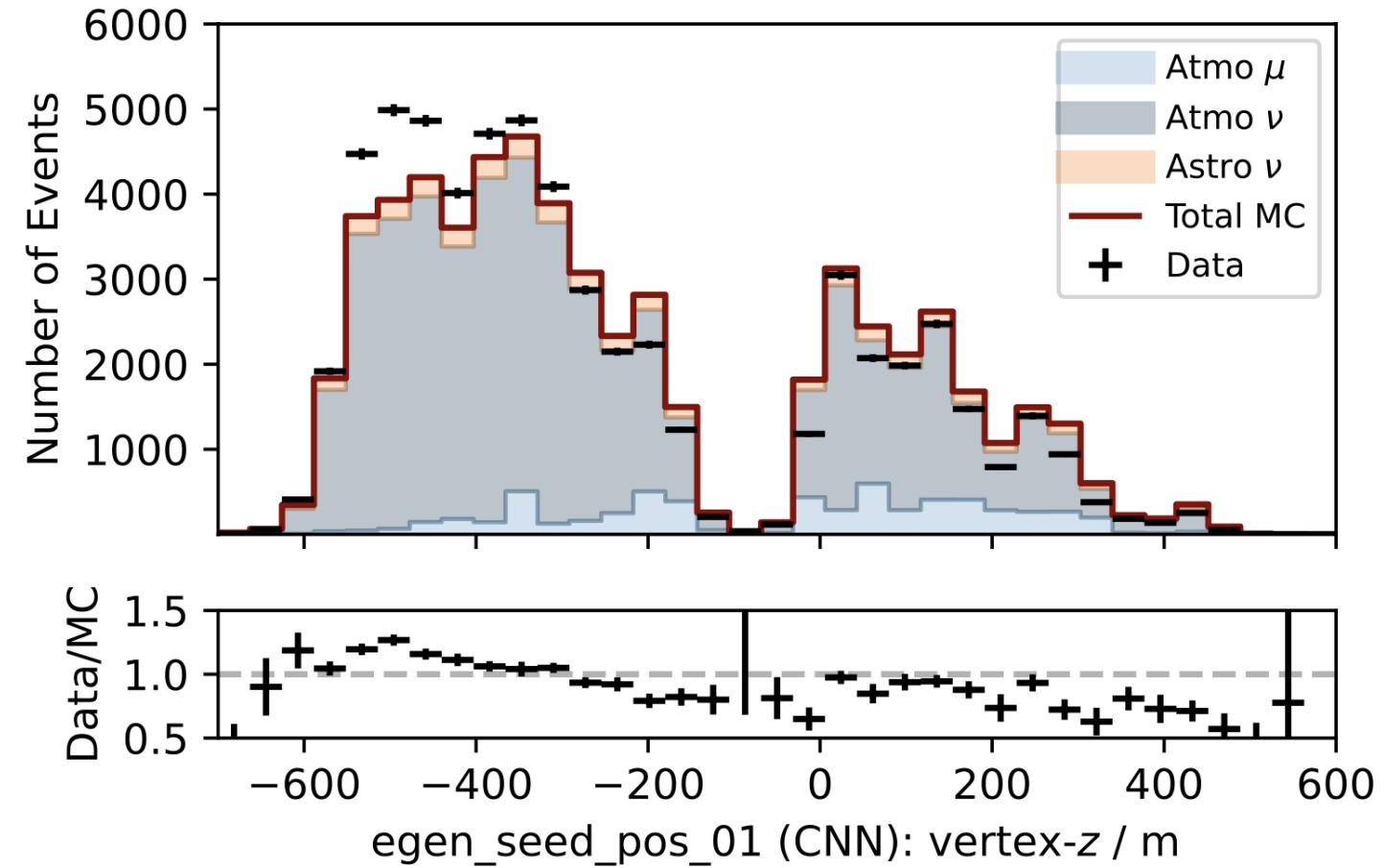
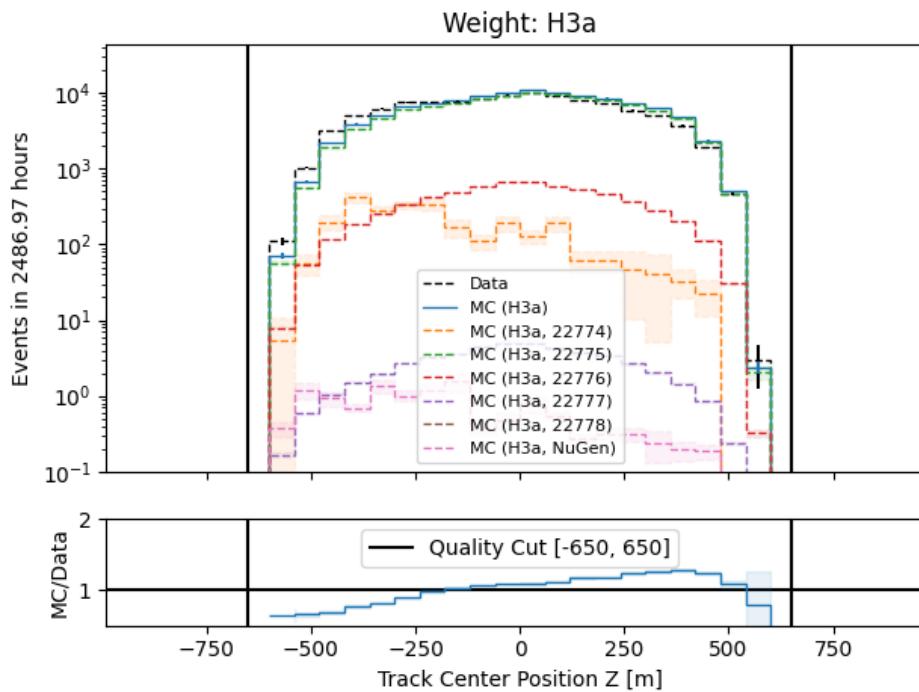
- z vertex of closest approach point of muon track to detector center point (0, 0, 0,)

Entry:

- z vertex of intersection of muon track with convex hull around in-ice detector array extended by 200m

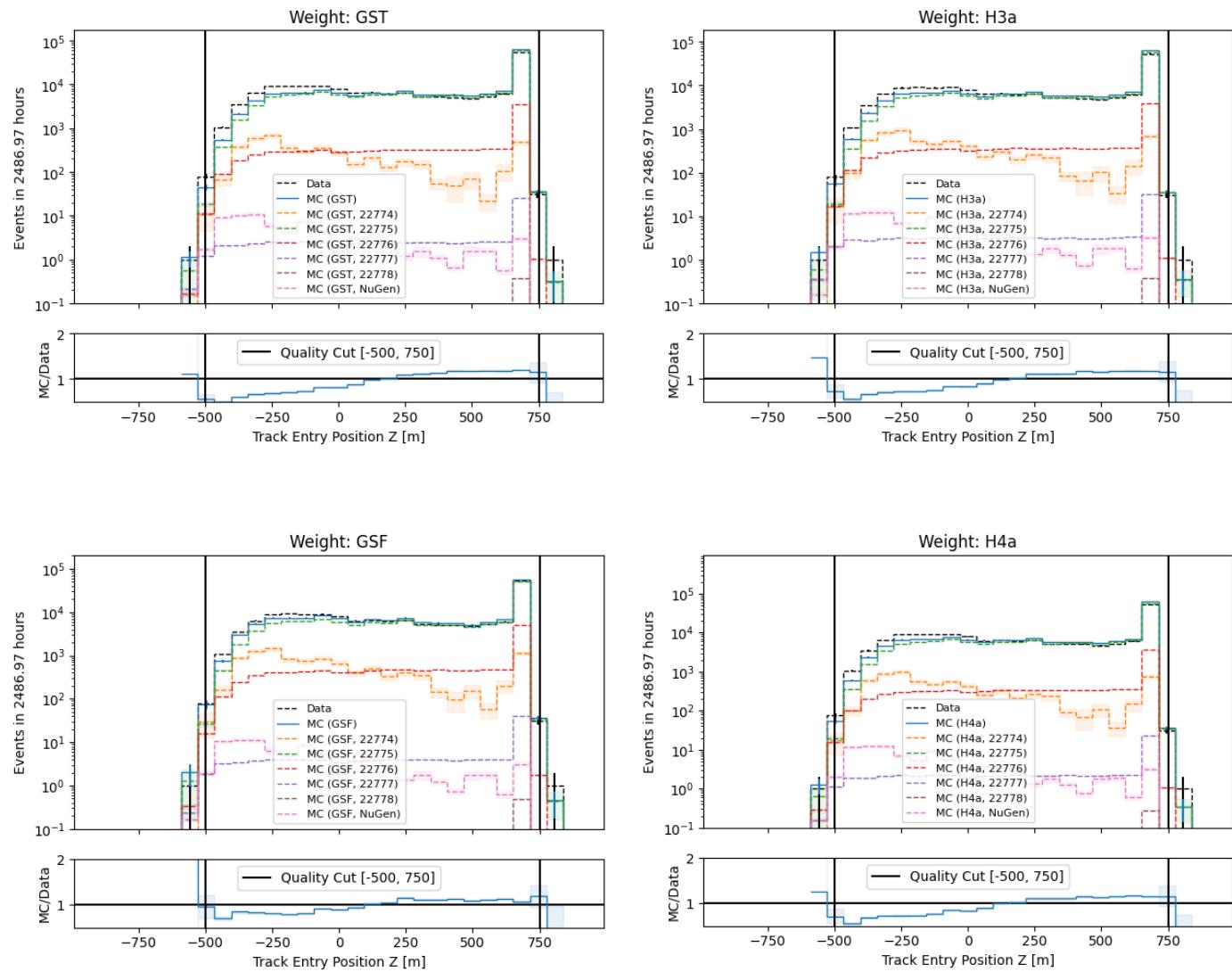
Neutrino: z-vertex

- Dissertation Mirco
- Same shape mismatch for neutrinos as for muons

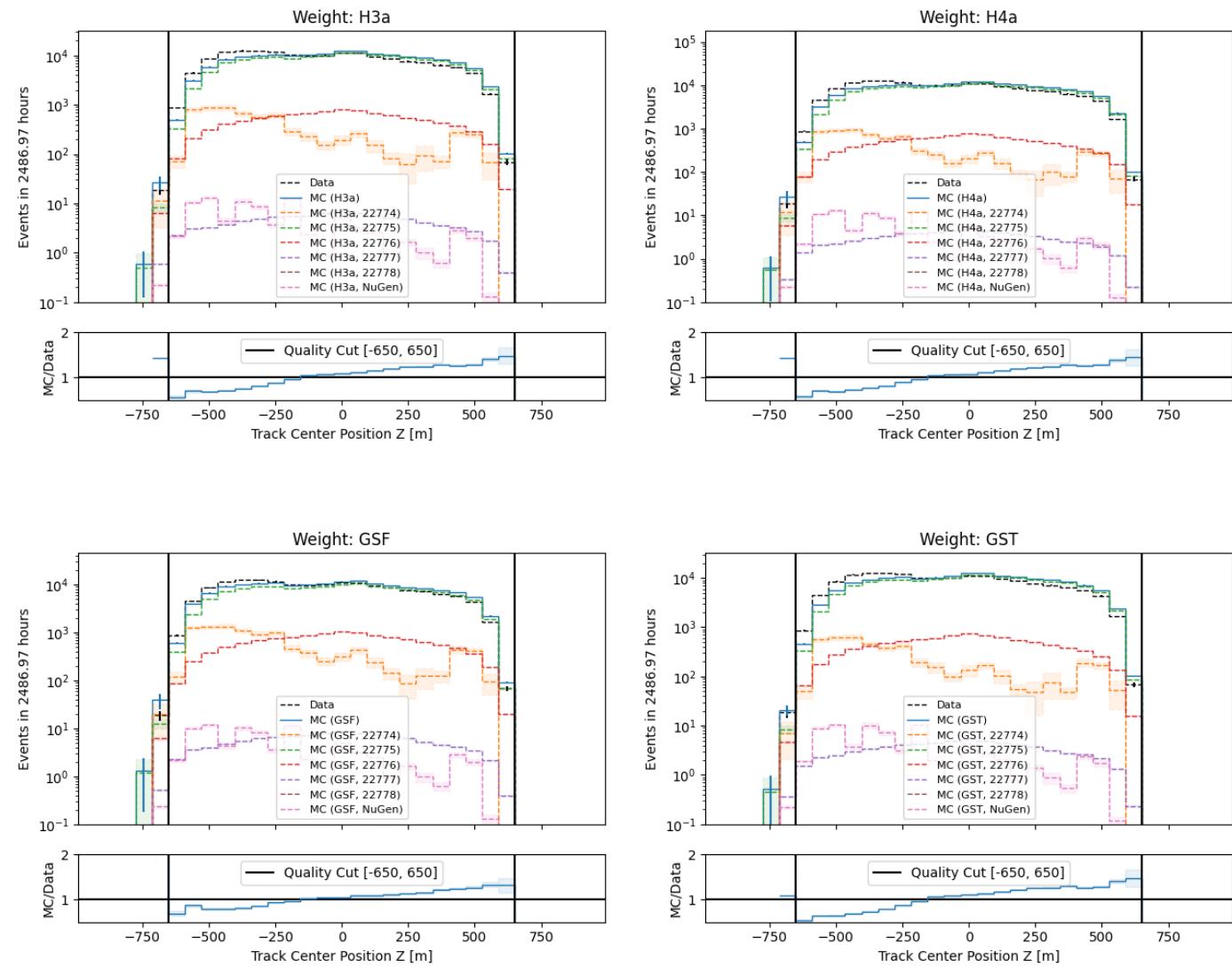


Level 4: muon filter and 500 TeV bundle energy at surface cut

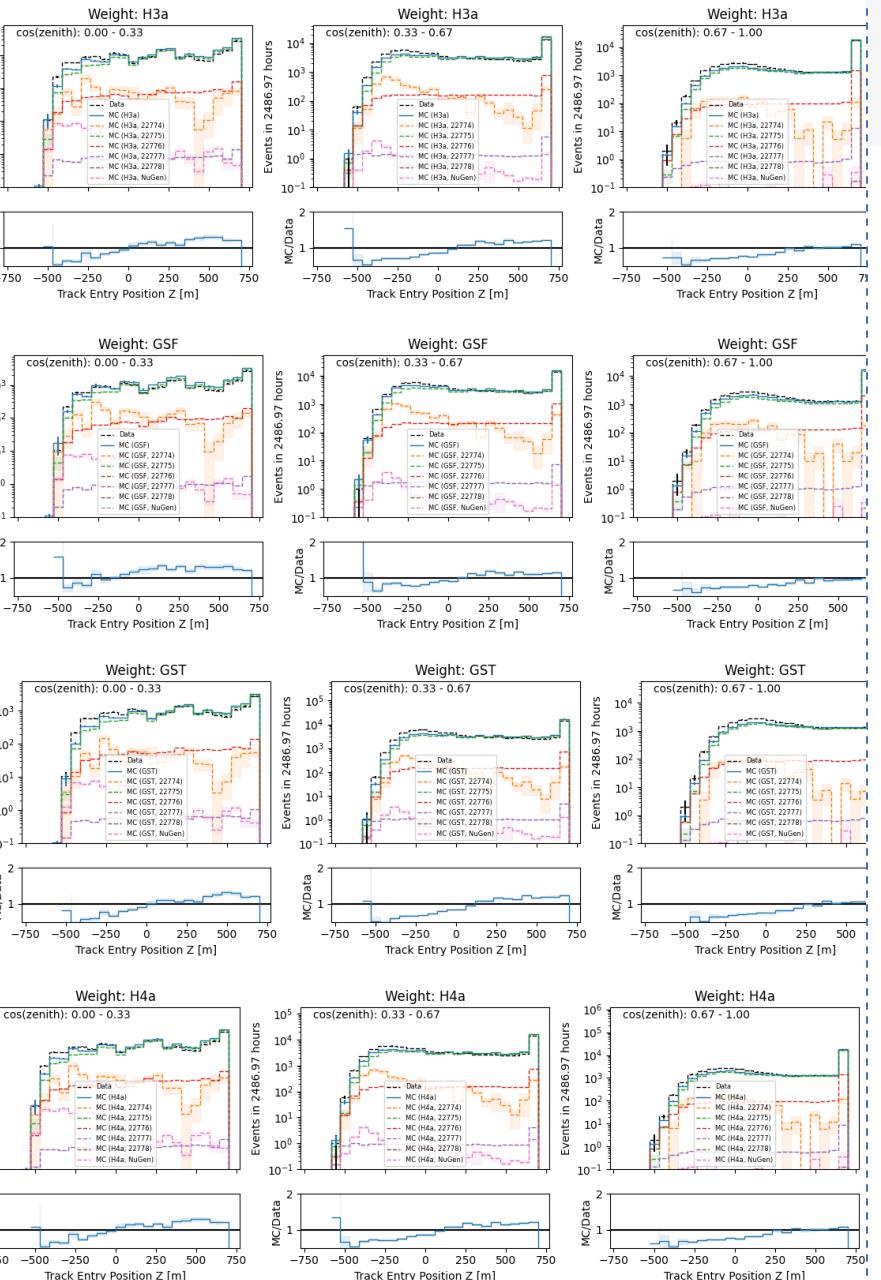
Entry position z



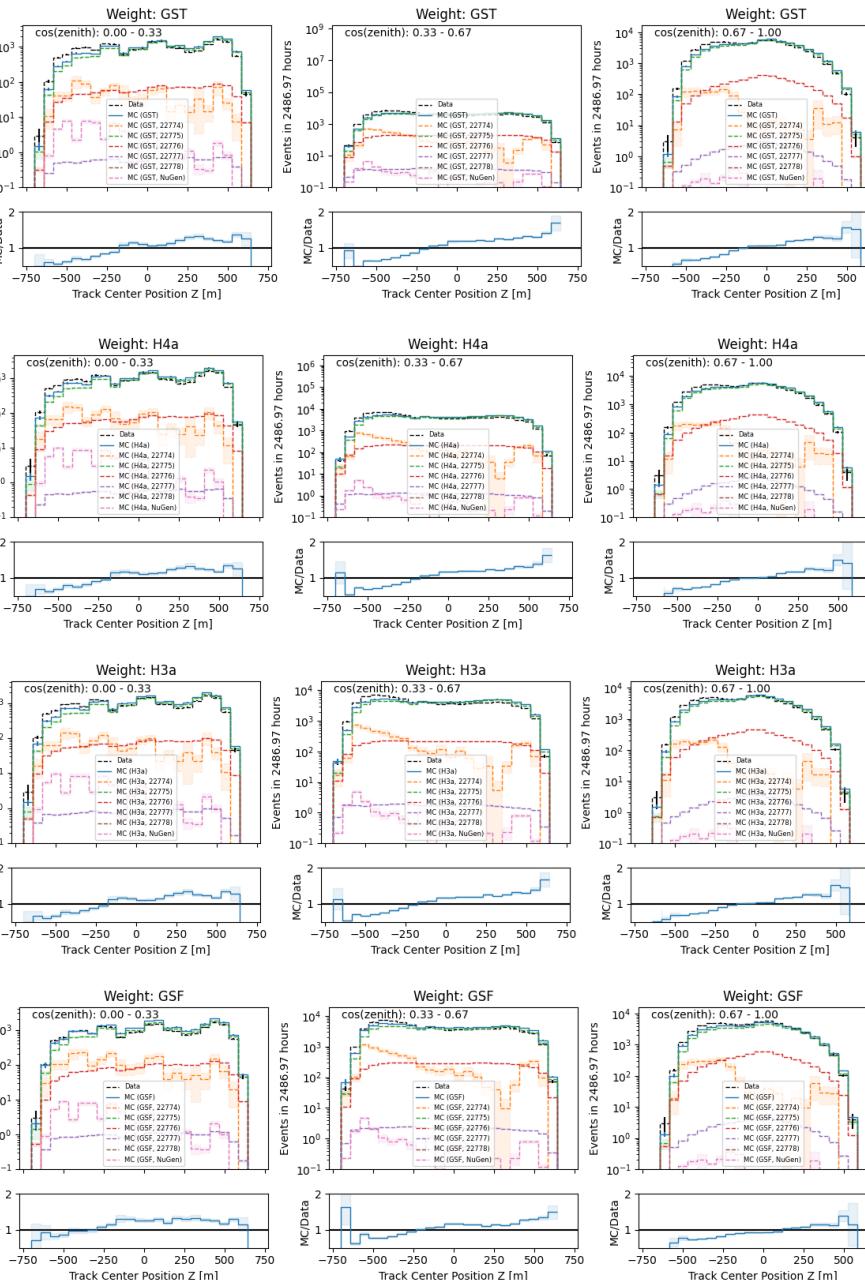
Center position z



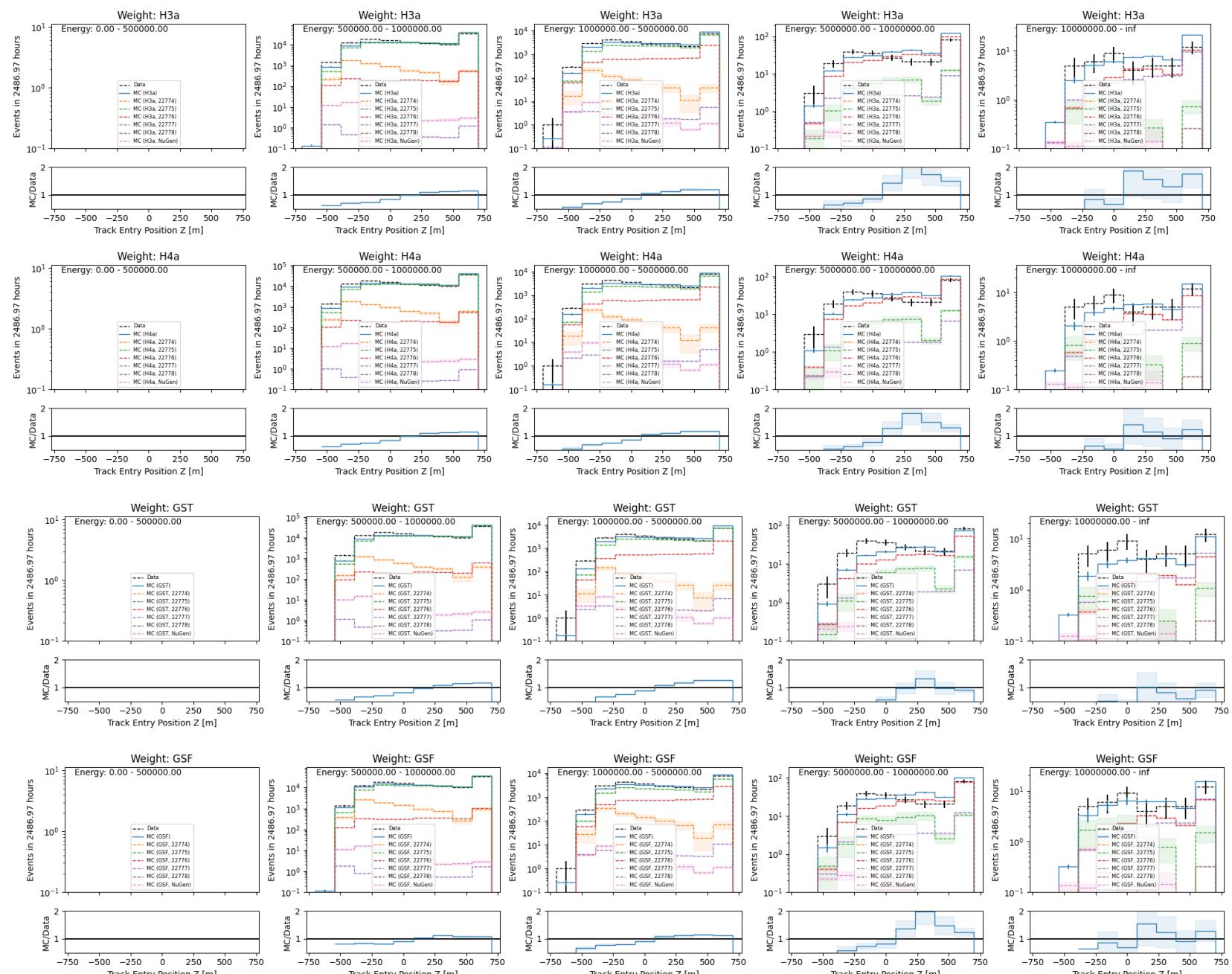
Entry position z - different cos(zenith)



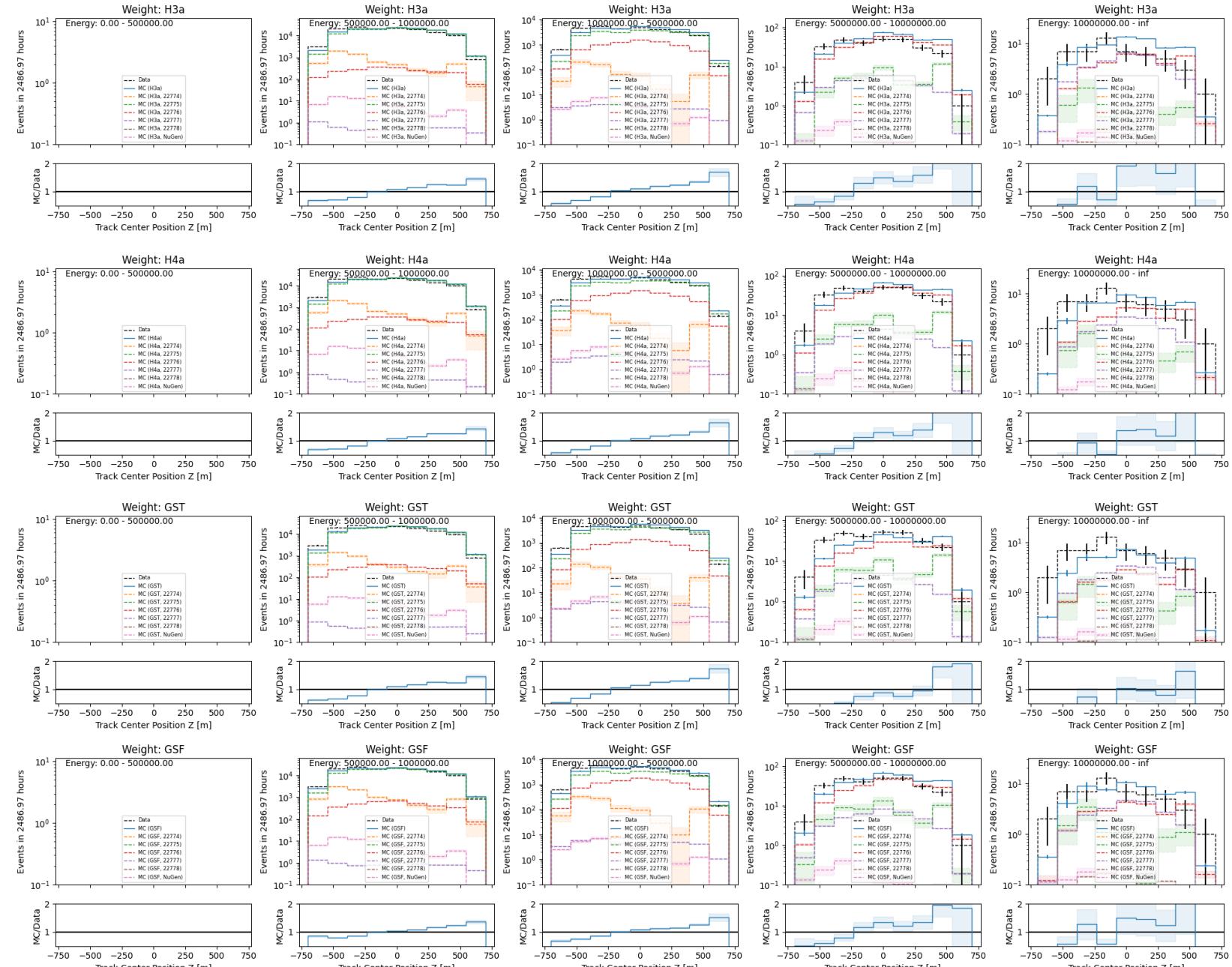
Center position z - different cos(zenith)



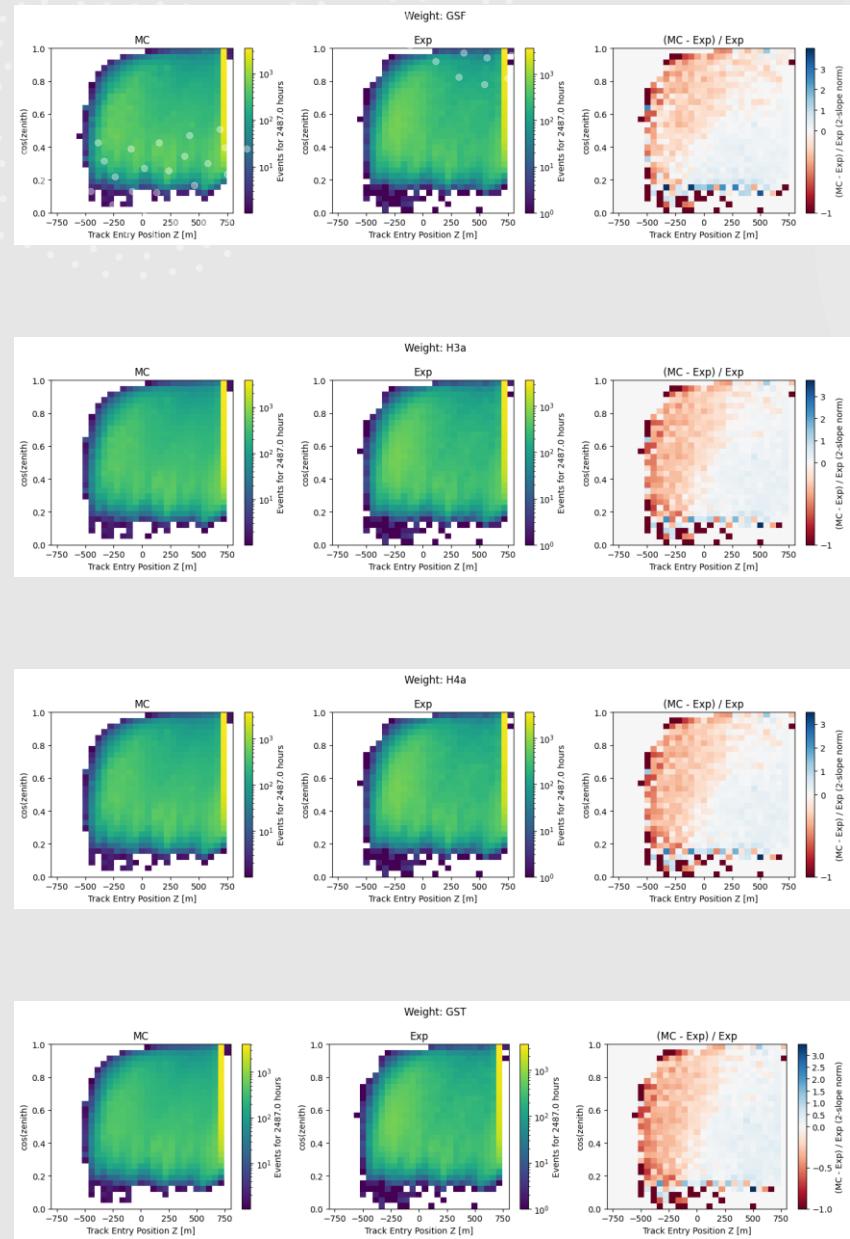
Entry position z
- different cuts on
bundle energy at
surface



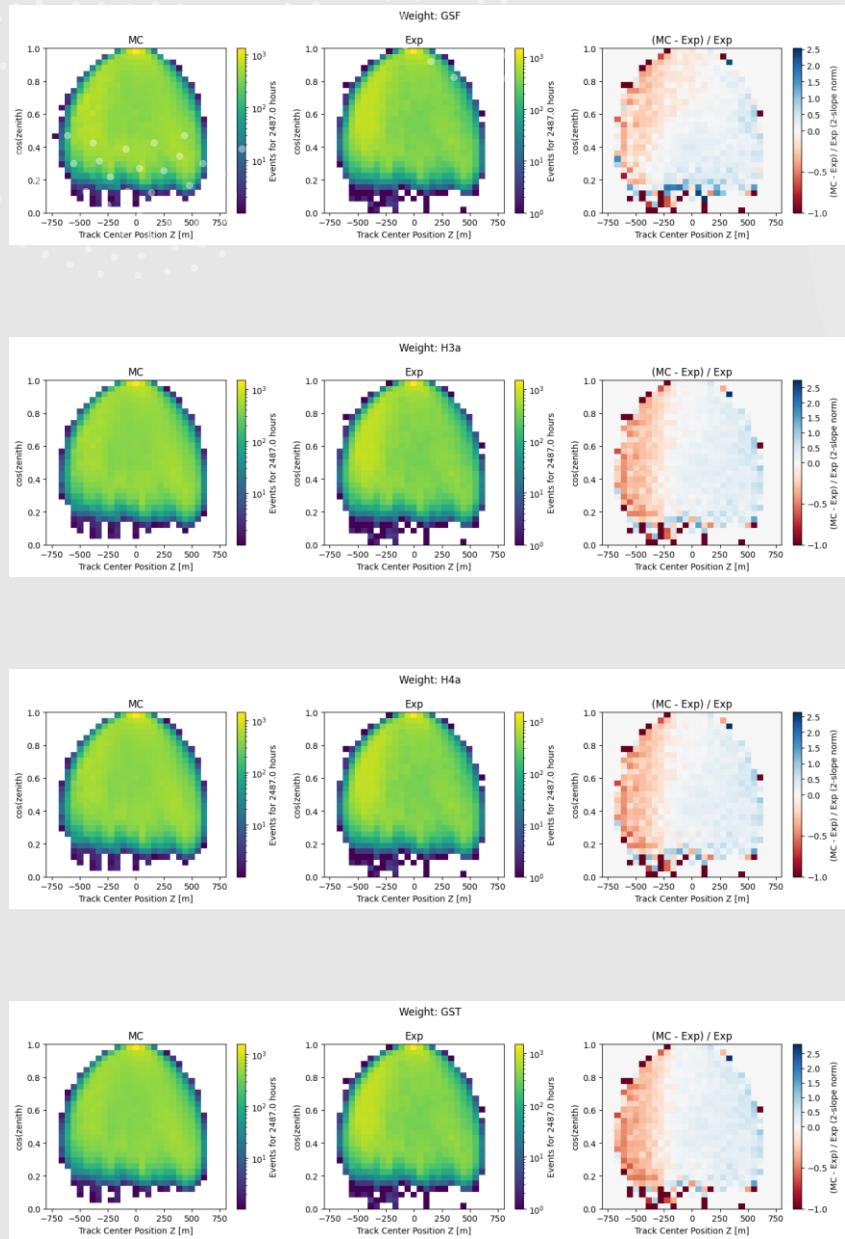
Center position z
- different bundle energy
cuts at surface



2D Entry position z - cos(zenith)

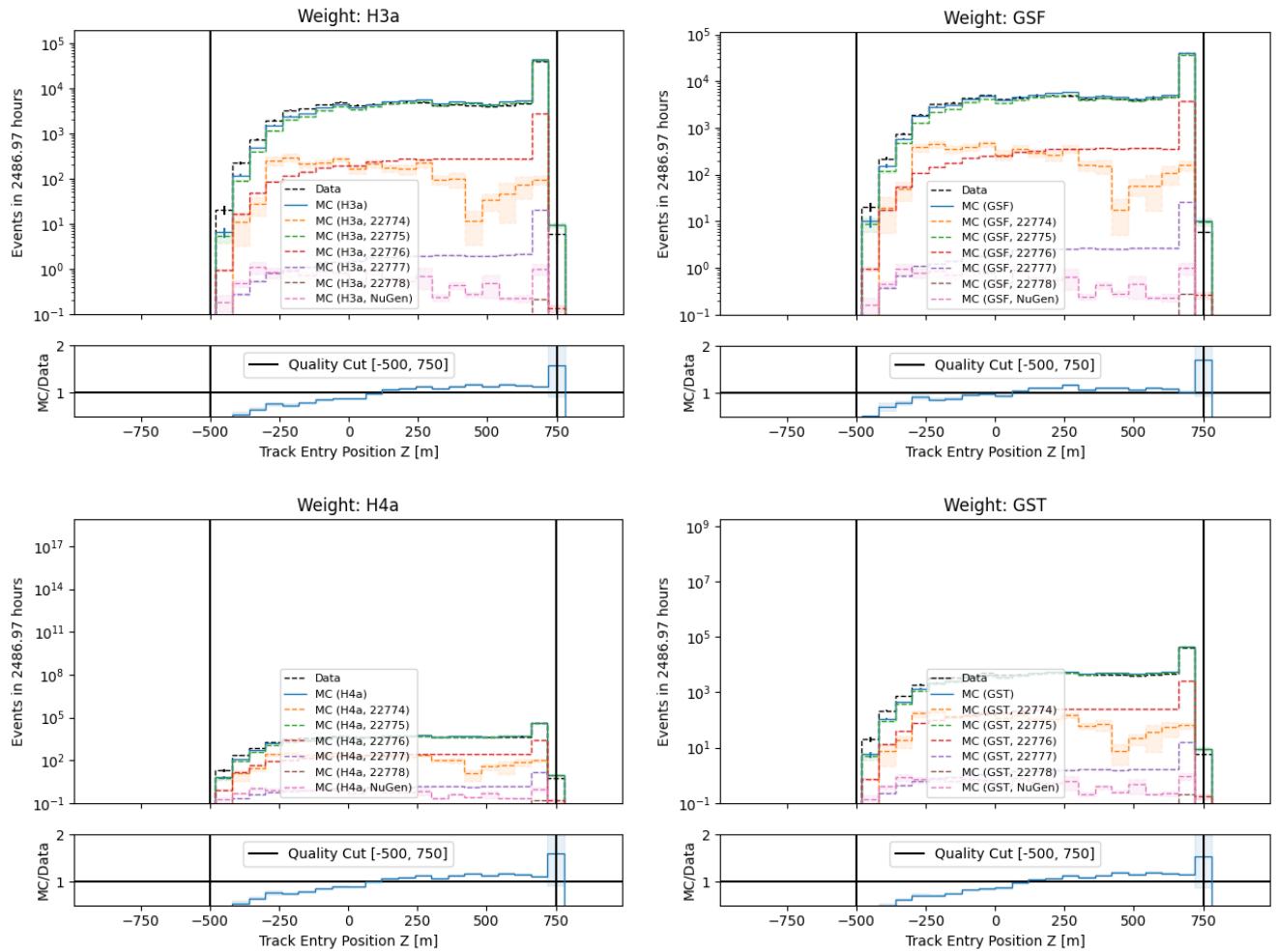


2D Center position z - cos(zenith)

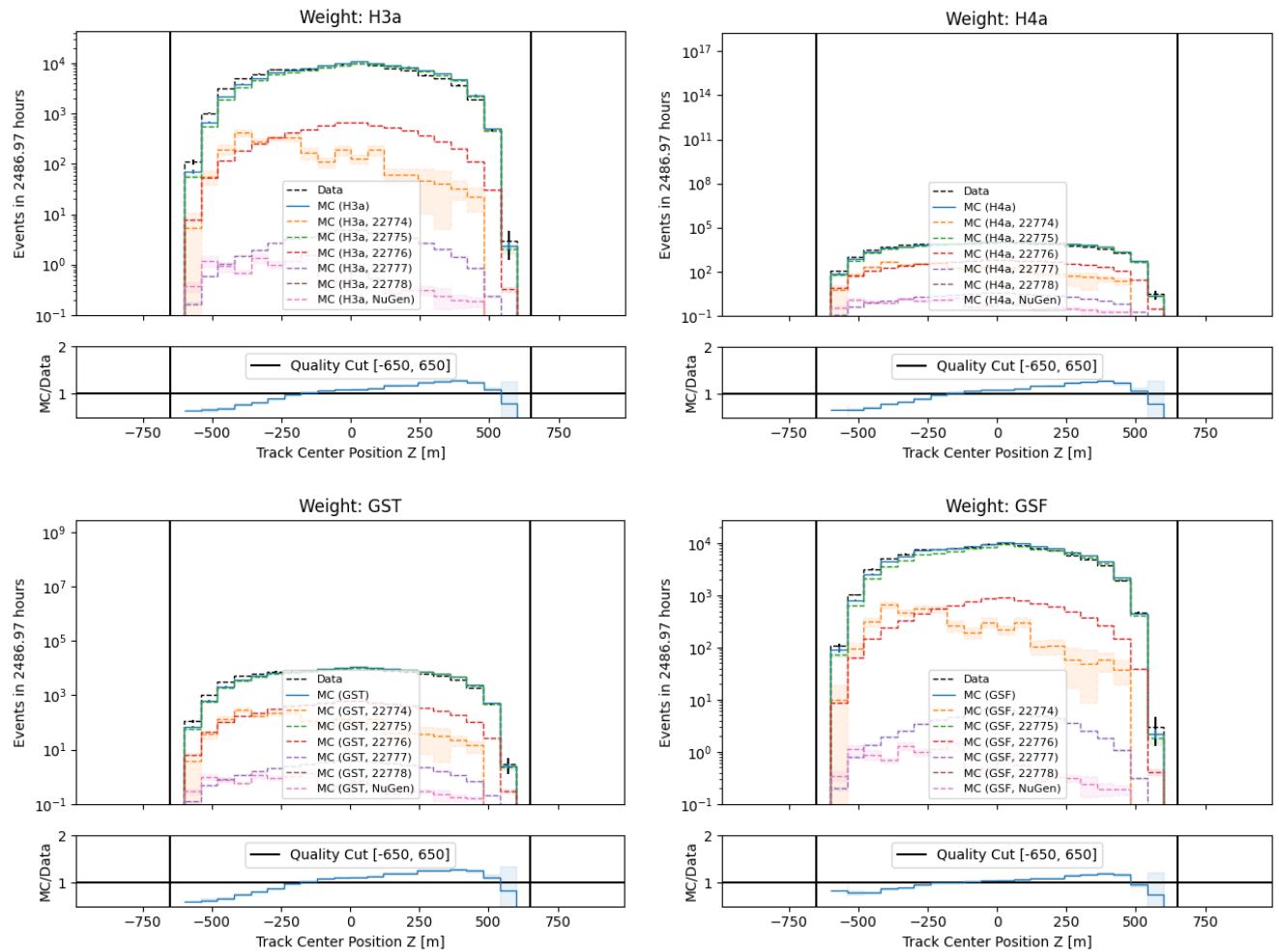


Level 5: quality cuts to improve data-mc

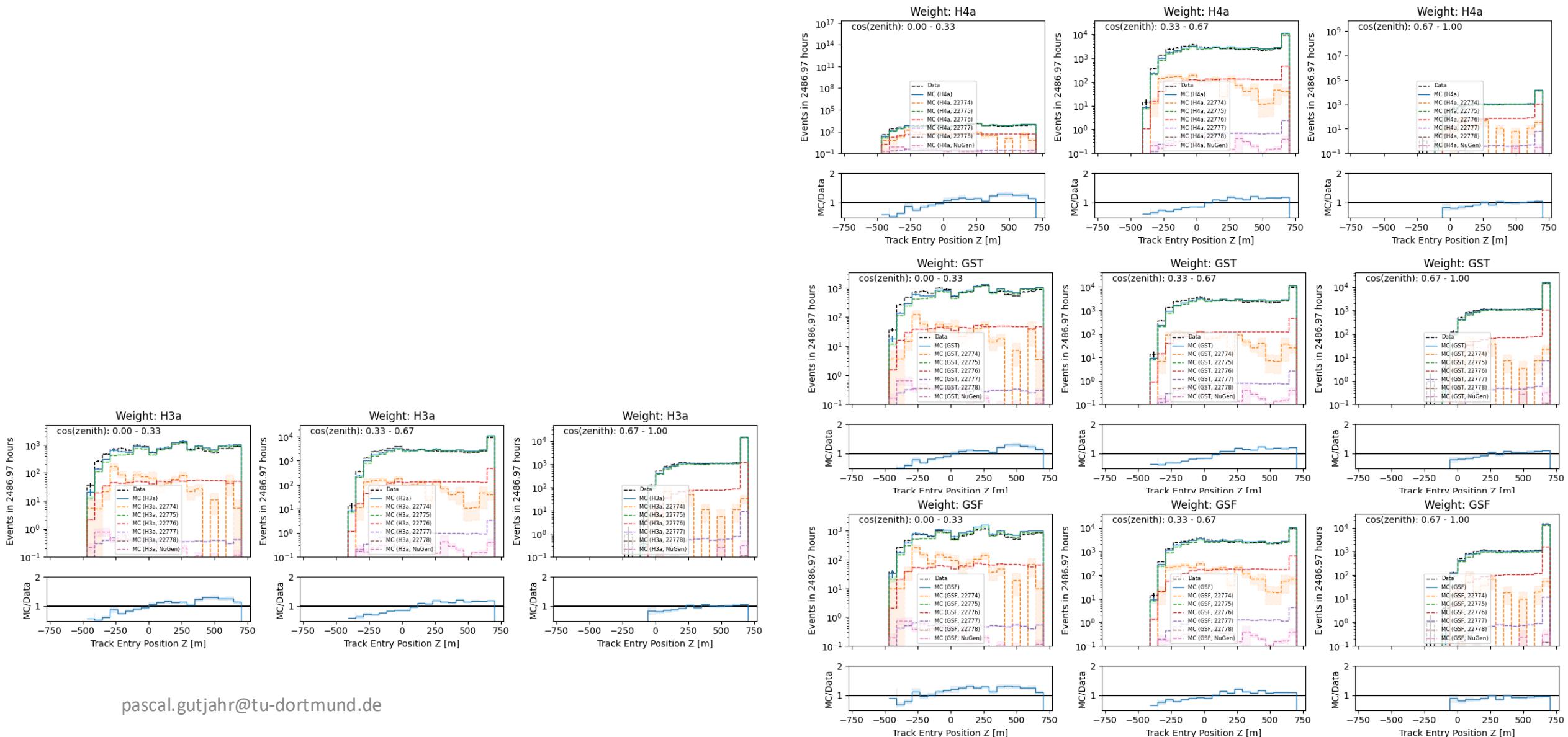
Entry position z



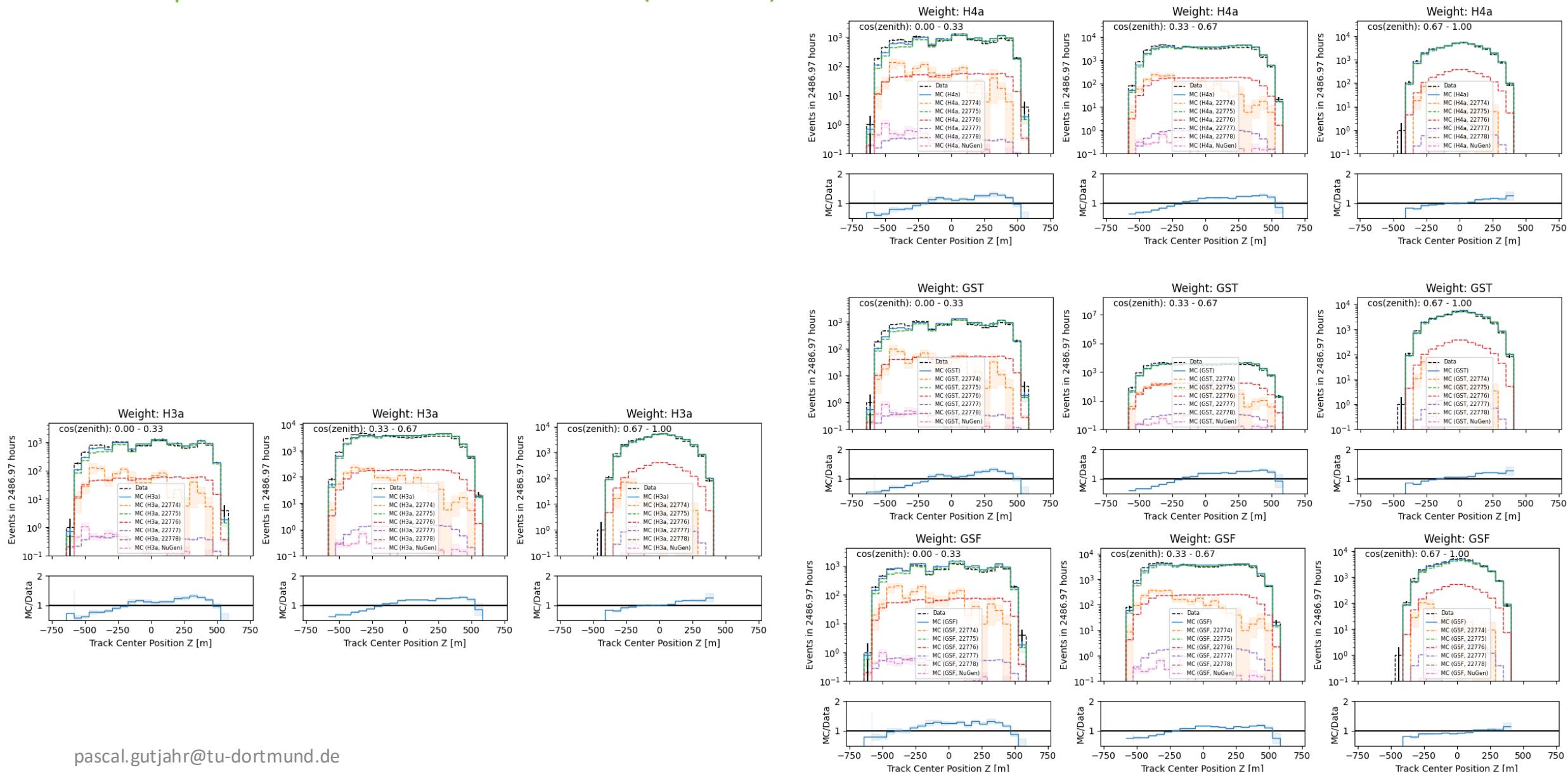
Center position z



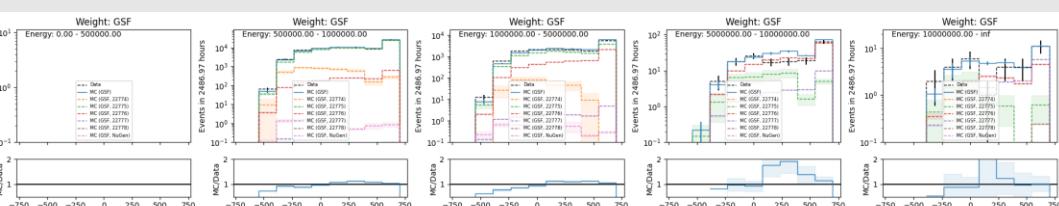
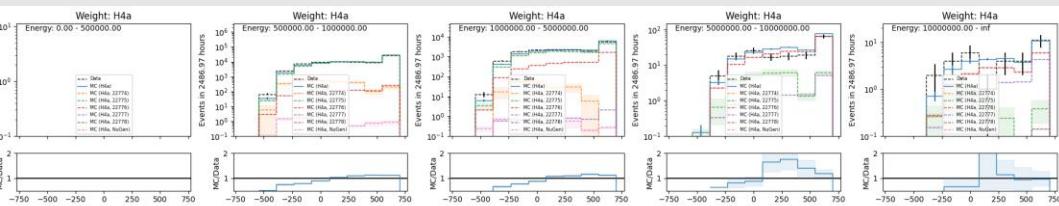
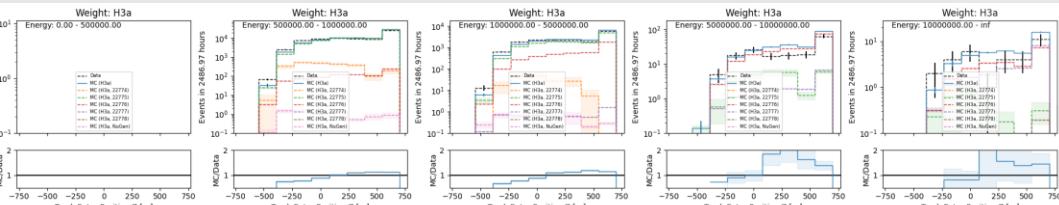
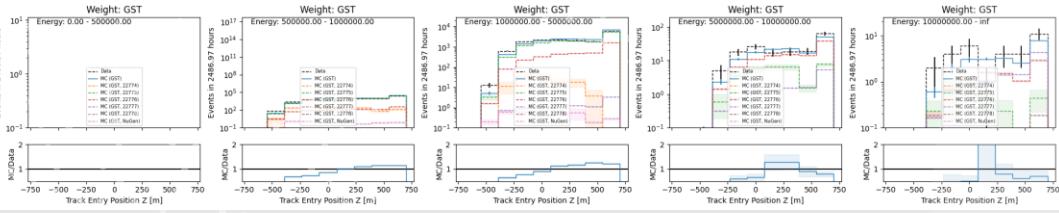
Entry position z – different $\cos(\text{zenith})$



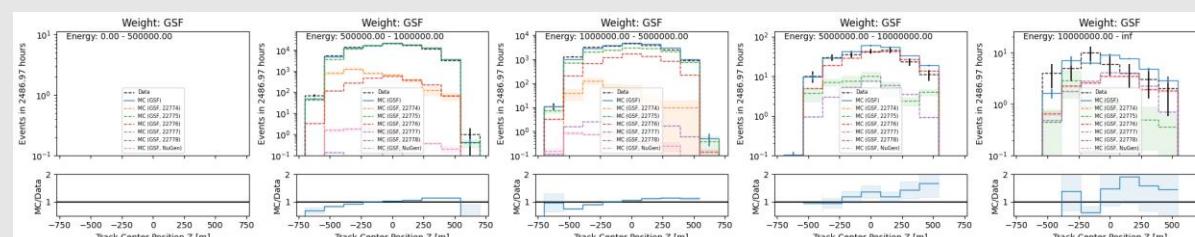
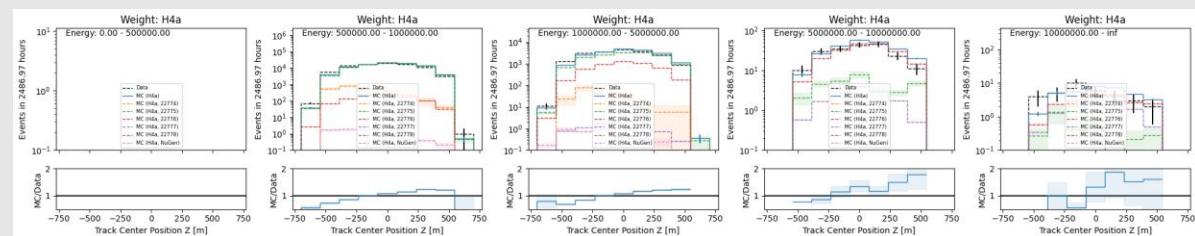
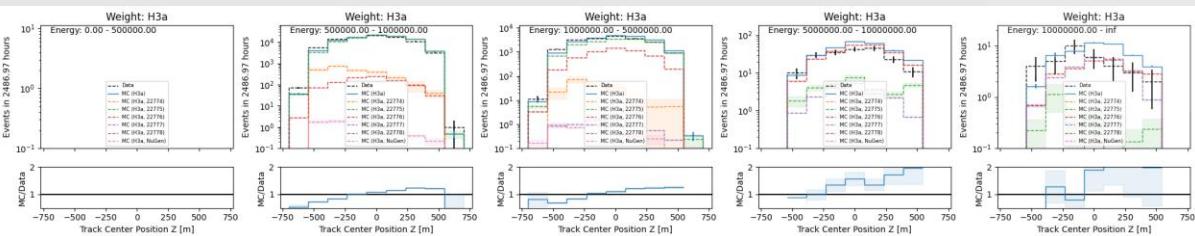
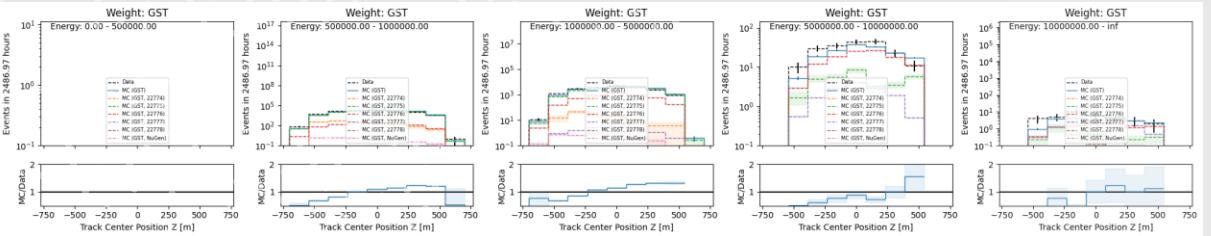
Center position z – different $\cos(\text{zenith})$



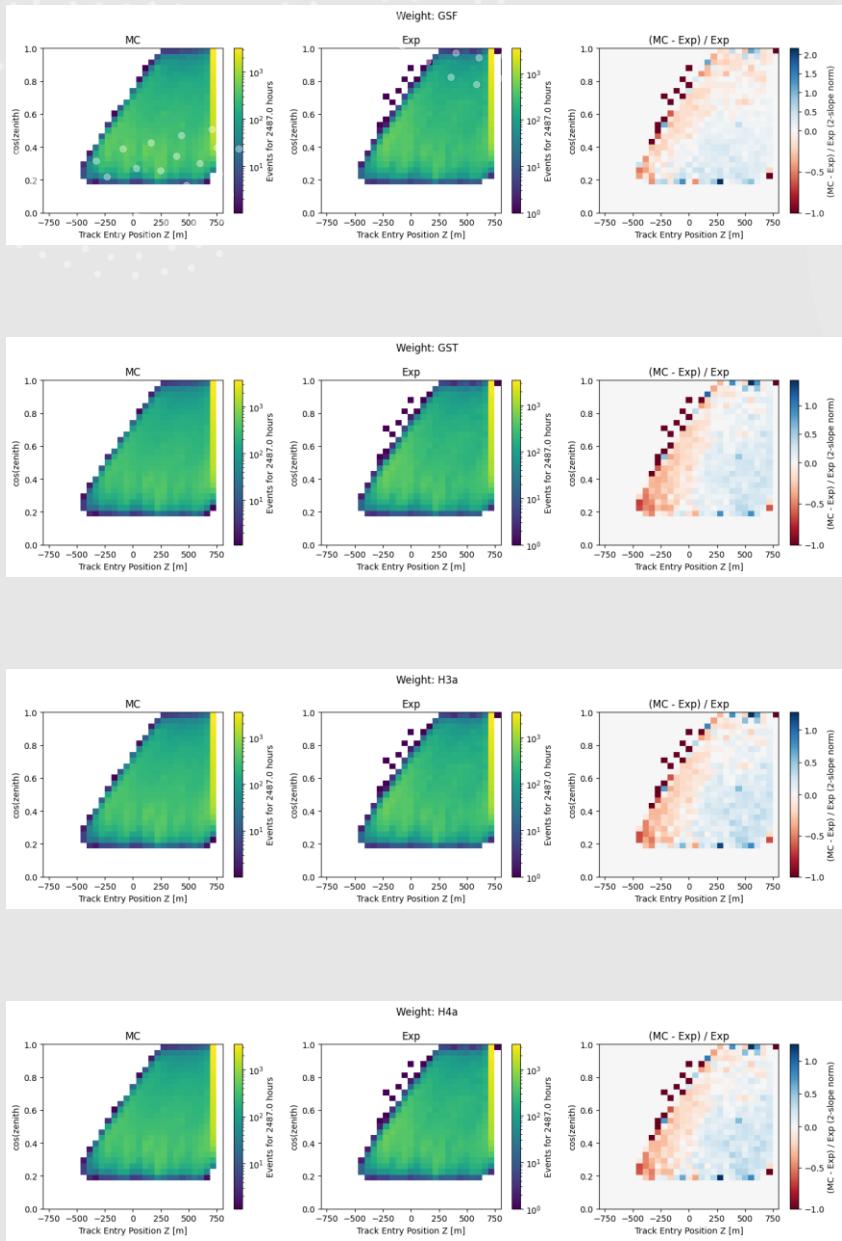
Entry position z
- different bundle
energy cuts at surface



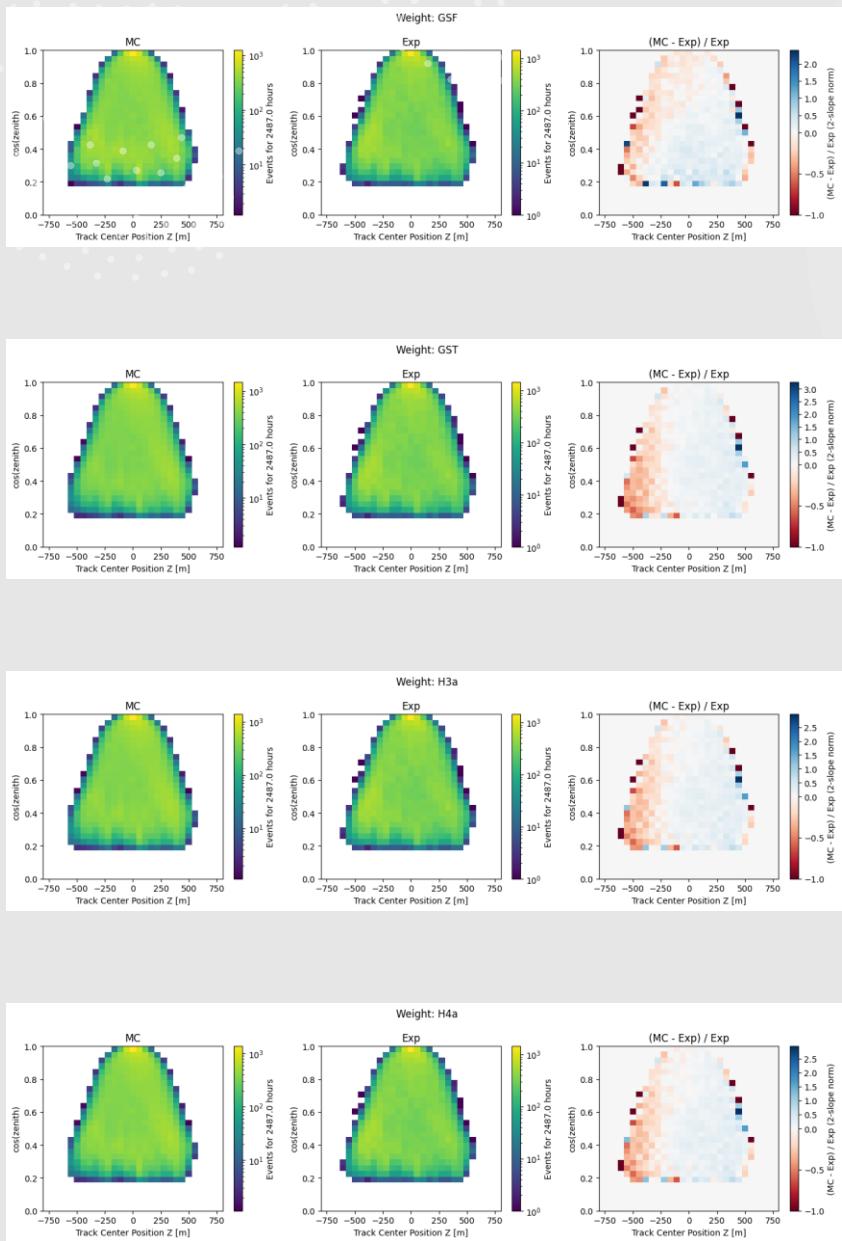
Center position z
- different bundle
energy cuts at surface



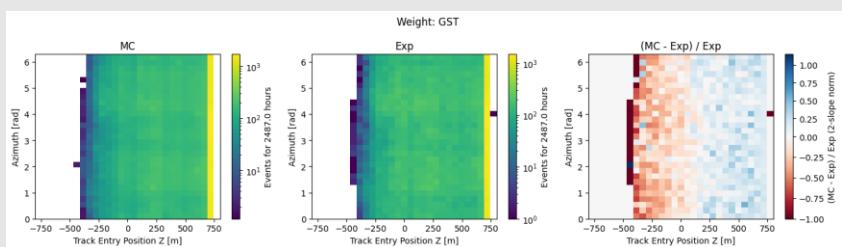
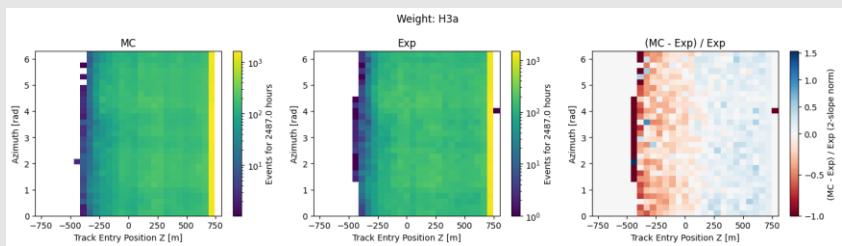
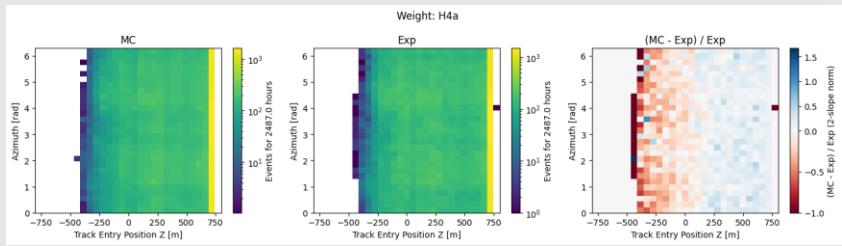
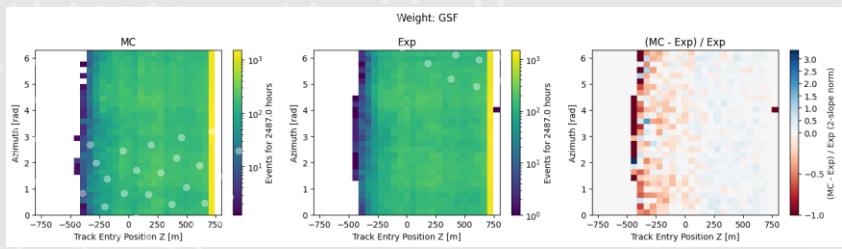
2D Entry position - cos(zenith)



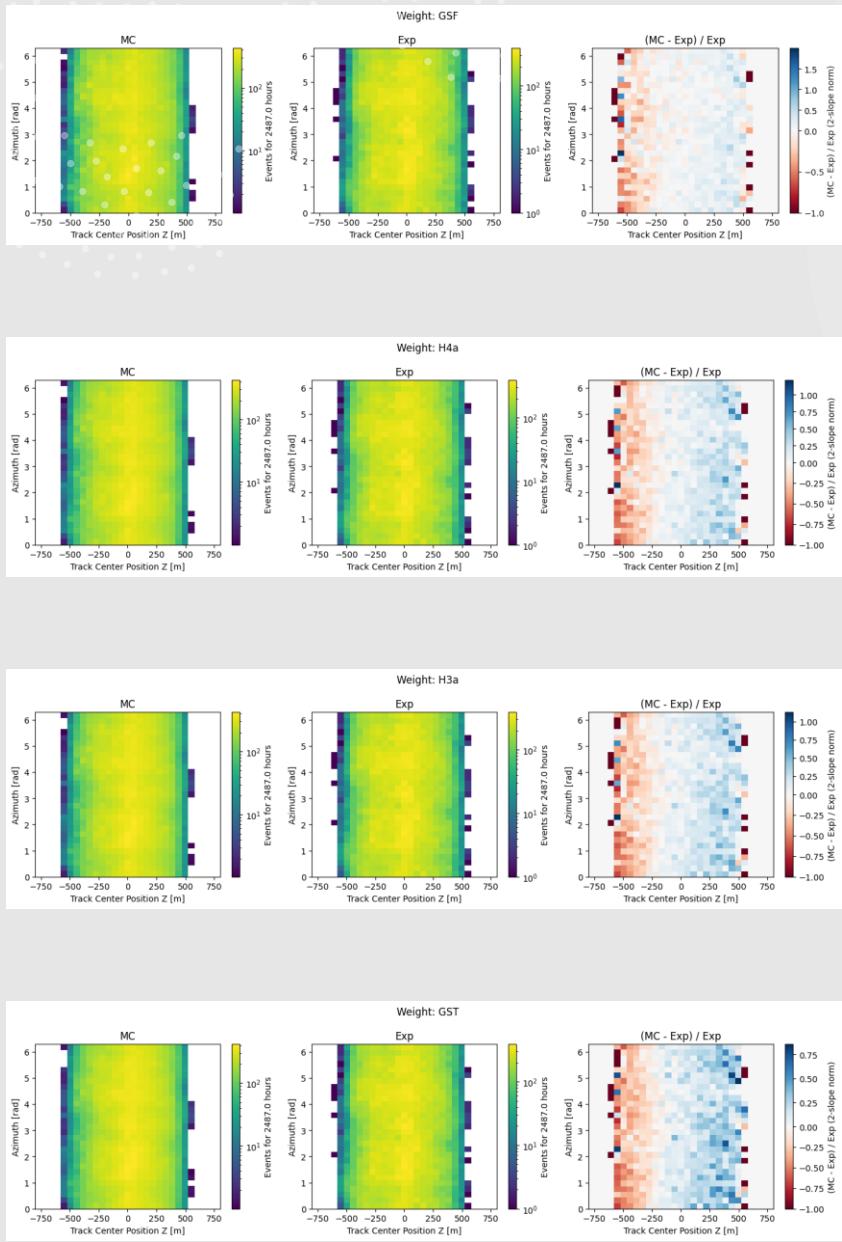
2D Center position - cos(zenith)



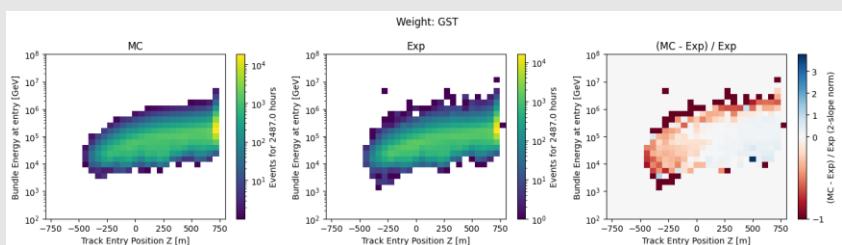
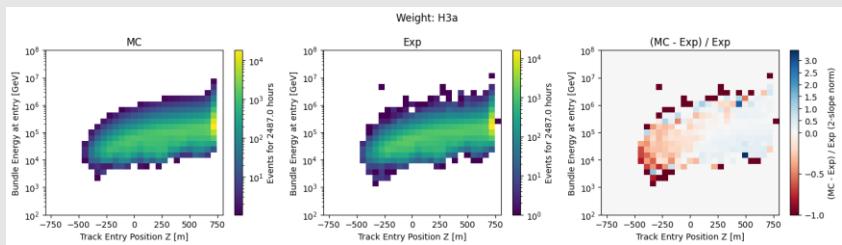
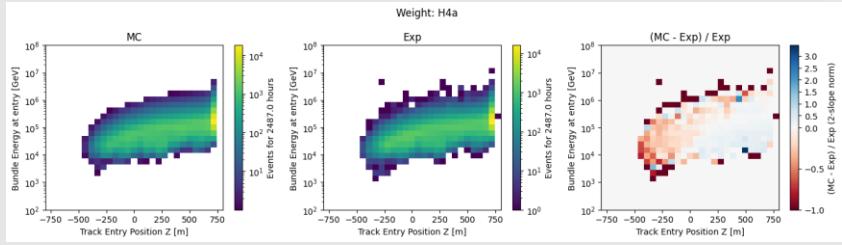
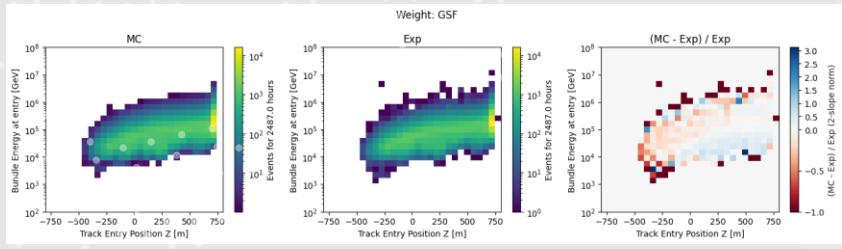
2D Entry position - azimuth



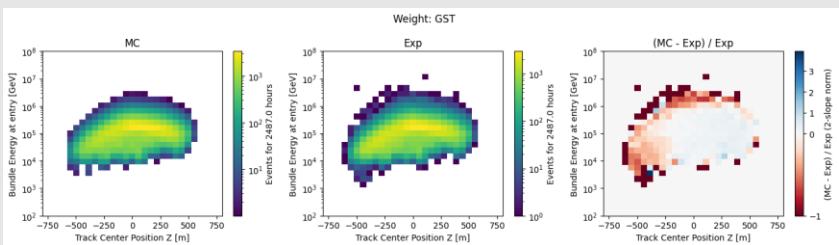
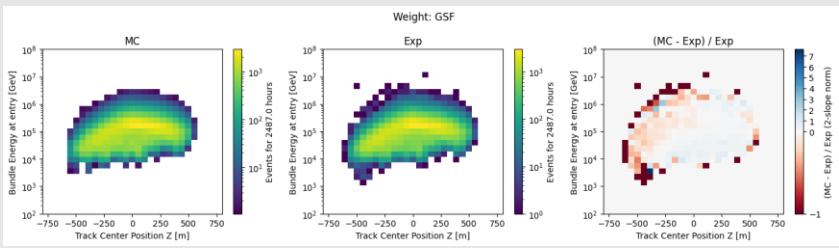
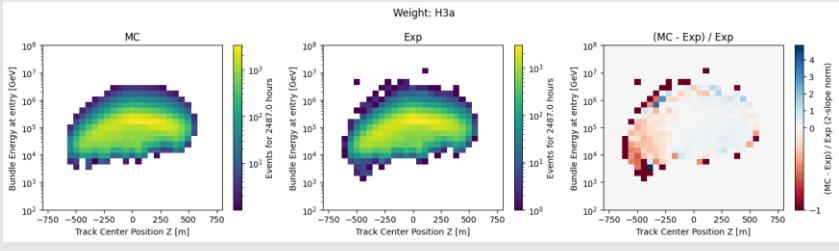
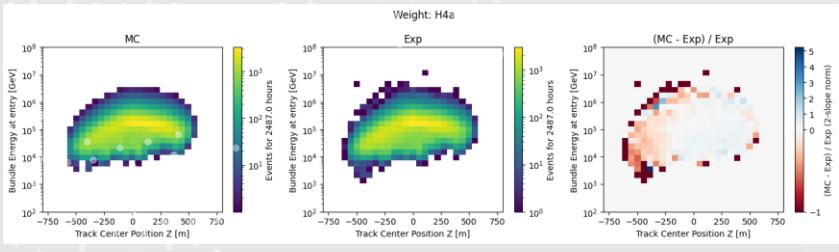
2D Center position - azimuth



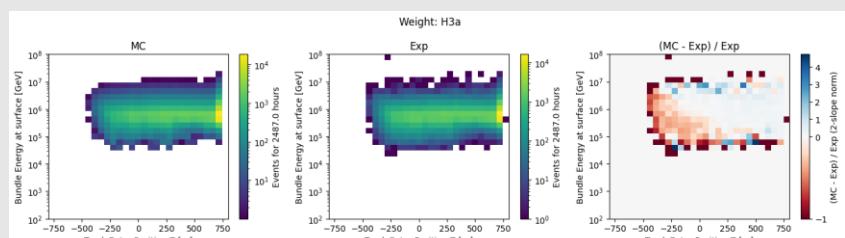
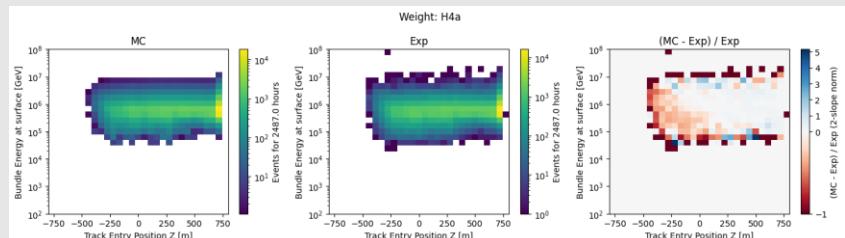
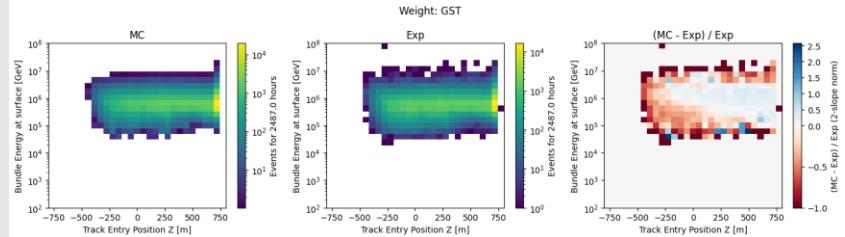
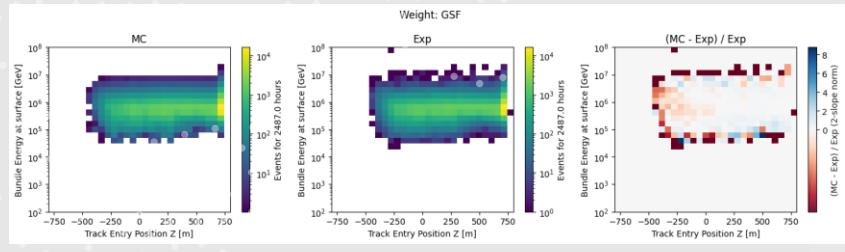
2D Entry position - bundle energy at entry



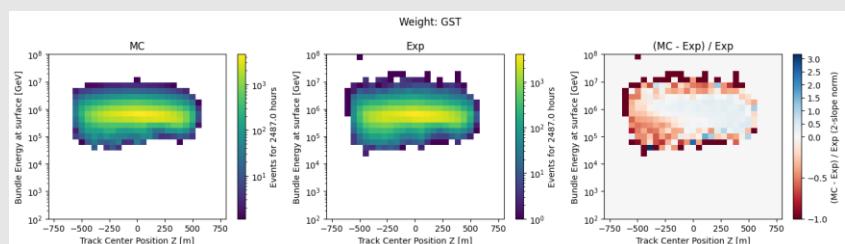
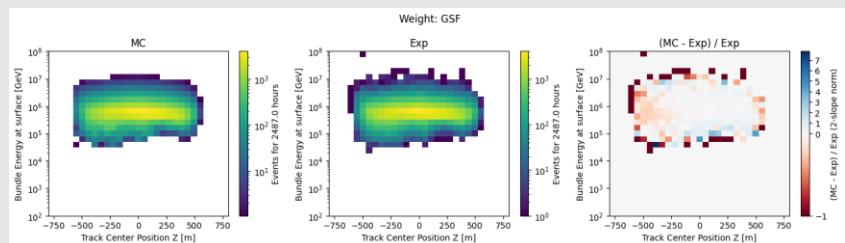
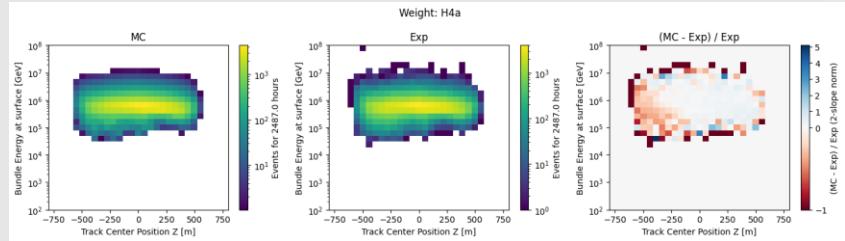
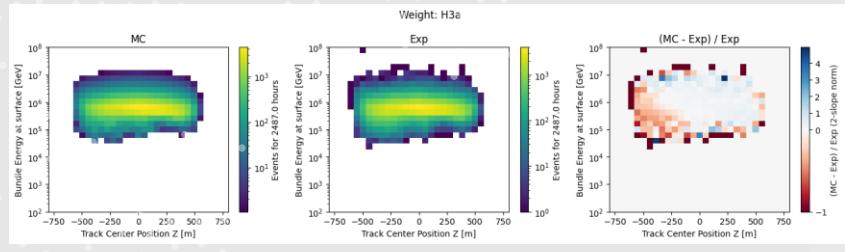
2D Center position - bundle energy at entry



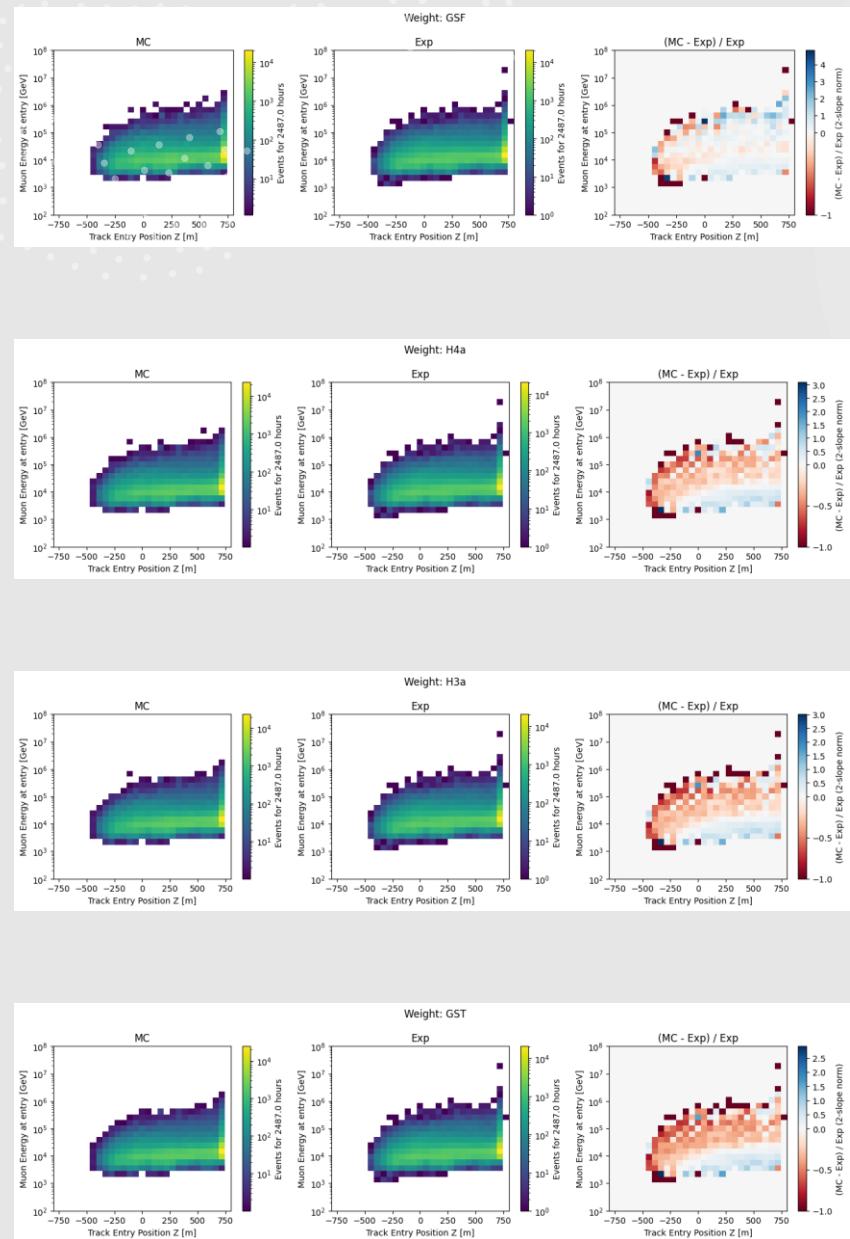
2D Entry position - bundle energy at surface



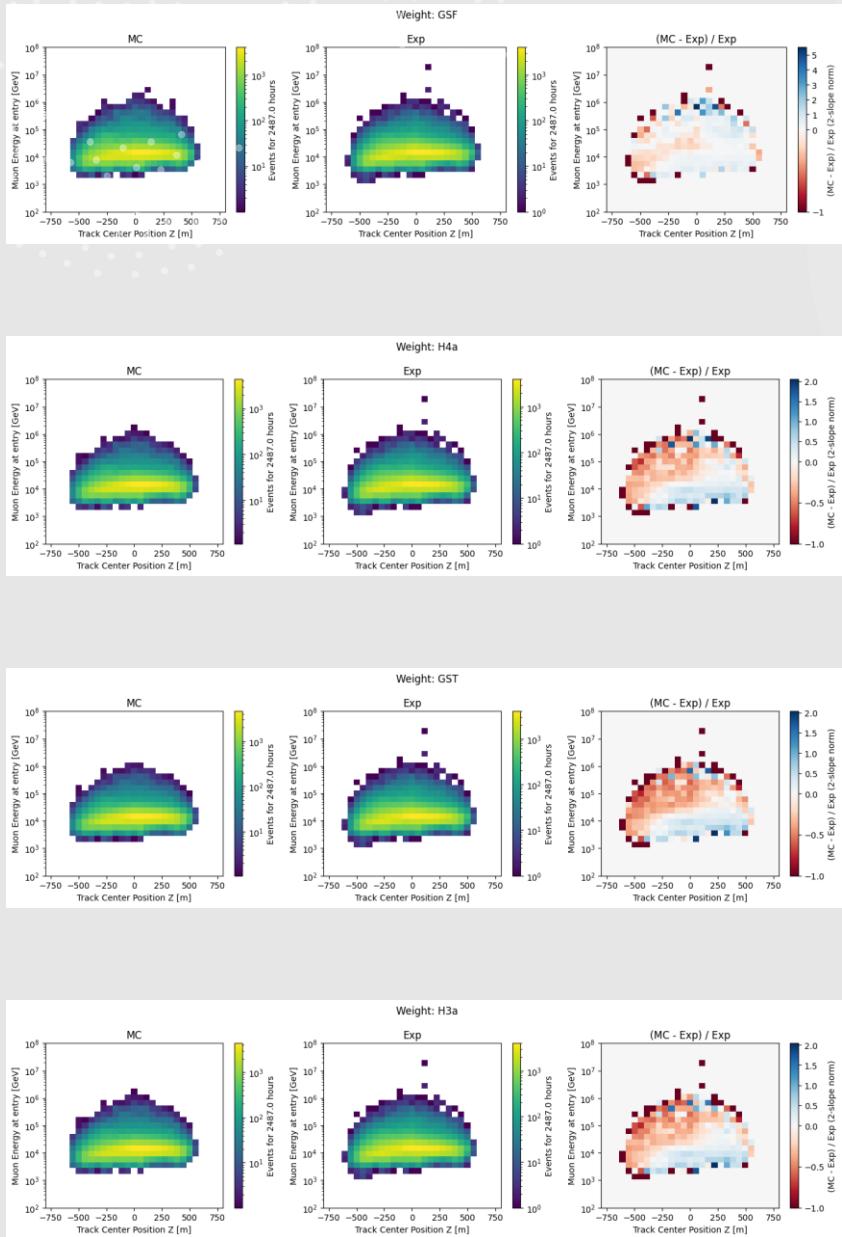
2D Center position - bundle energy at entry



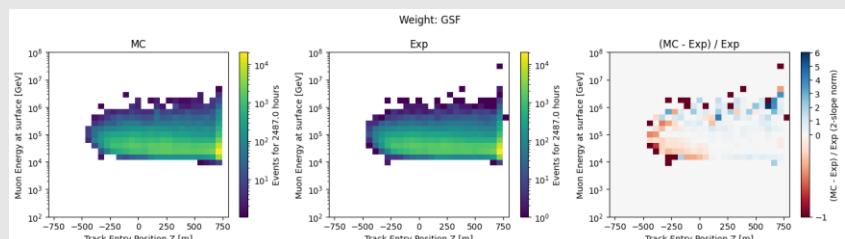
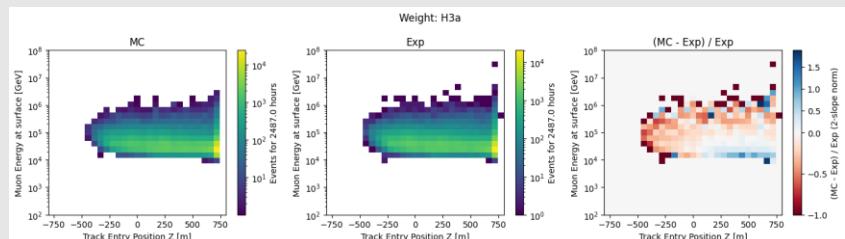
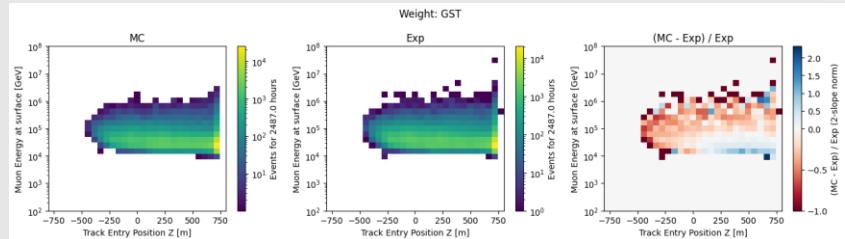
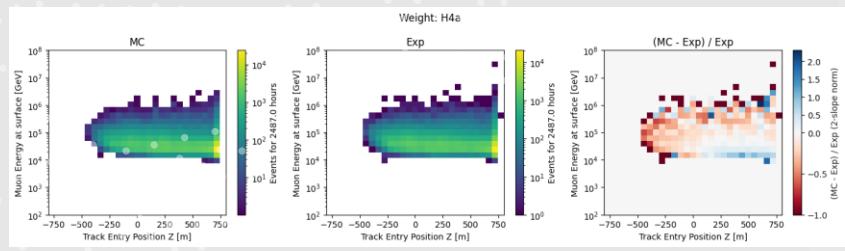
2D Entry position - leading muon energy at entry



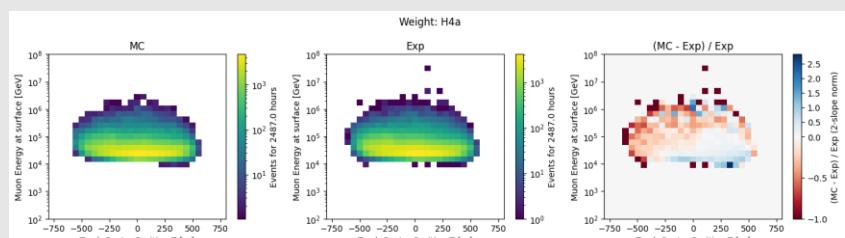
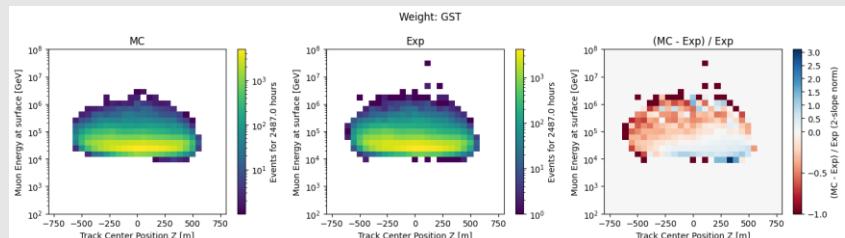
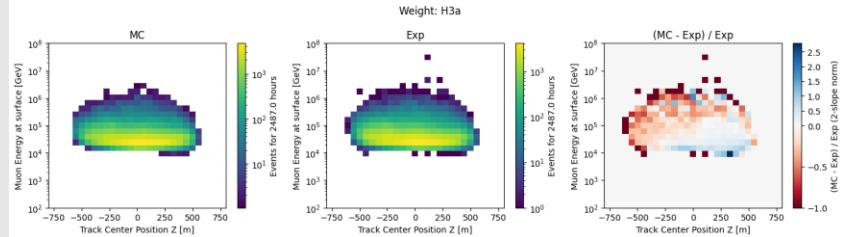
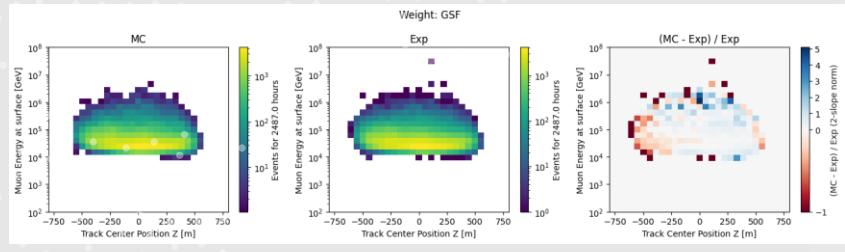
2D Center position - leading muon energy at entry



2D Entry position - leading muon energy at surface



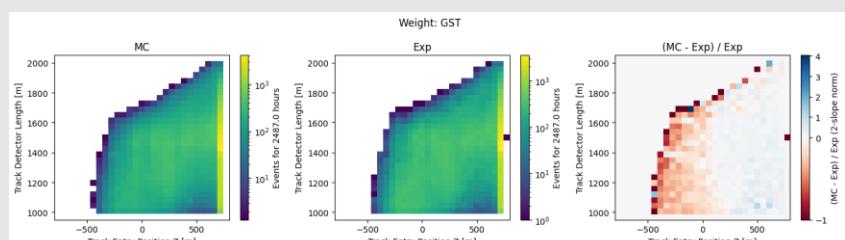
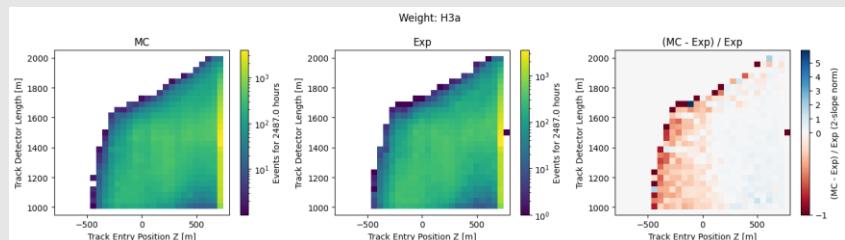
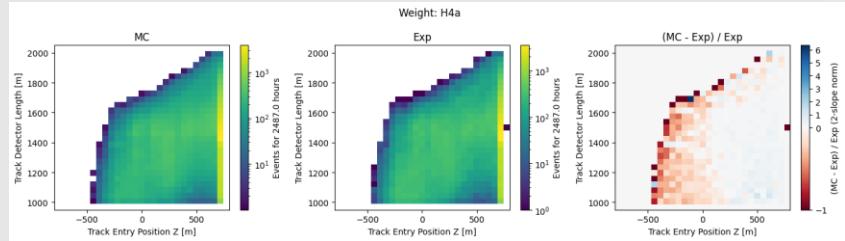
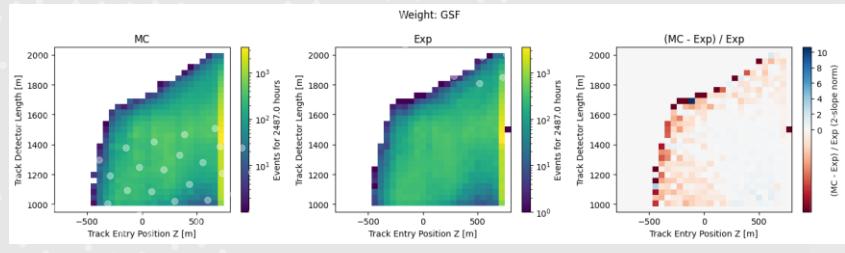
2D Center position - leading muon energy at surface



2D Entry position - track length in detector

- $r = 500$
- $l = 1000$
- extention = 400
- $\text{np.sqrt}(2 * r + \text{extention})^{**2} + (1000 + \text{extention})^{**2}$

→ 1980m

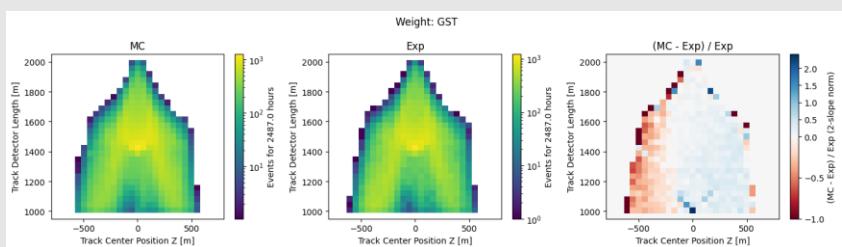
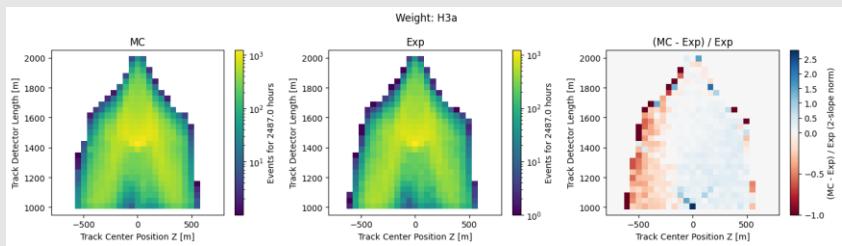
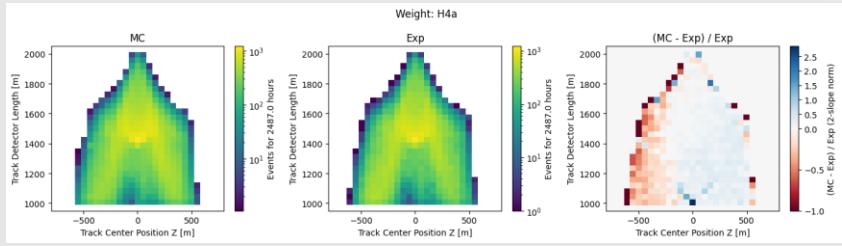
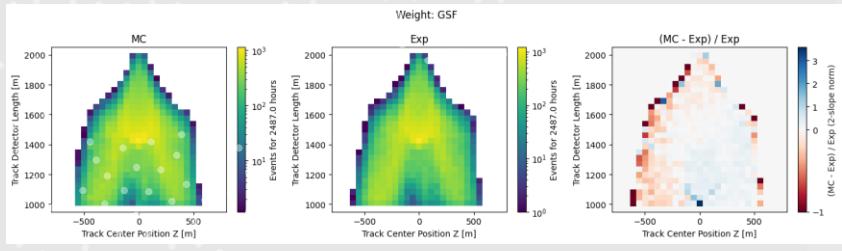


2D Center position

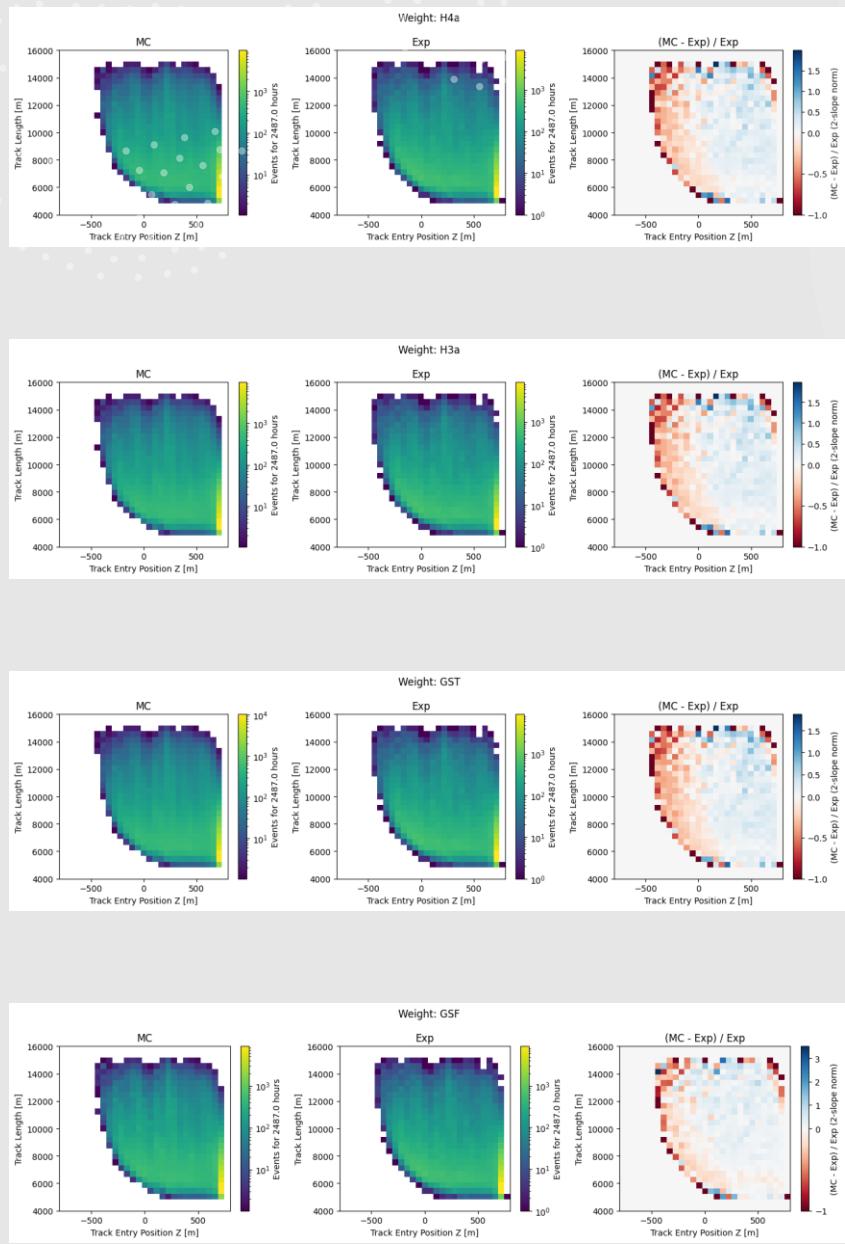
- track length in detector

- $r = 500$
- $l = 1000$
- extention = 400
- `np.sqrt((2 * r + extention)**2 + (1000 + extention)**2)`

→ 1980m



2D Entry position - total track length



2D Center position - total track length

