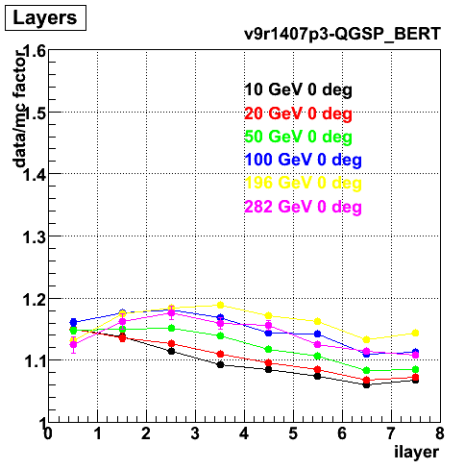
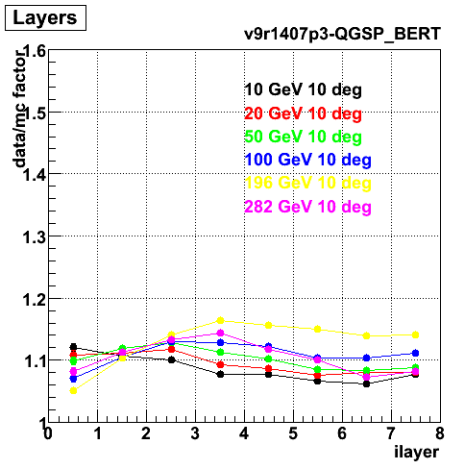
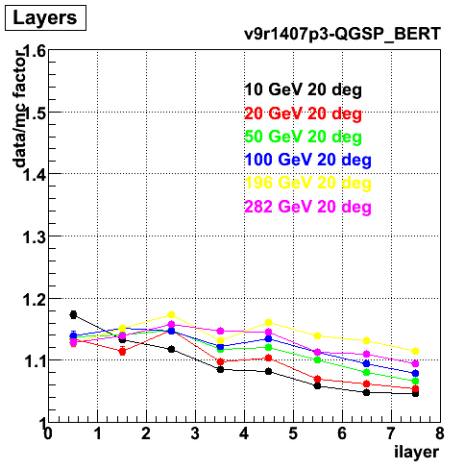
Data/MC comparison and extra X0 for new LPM

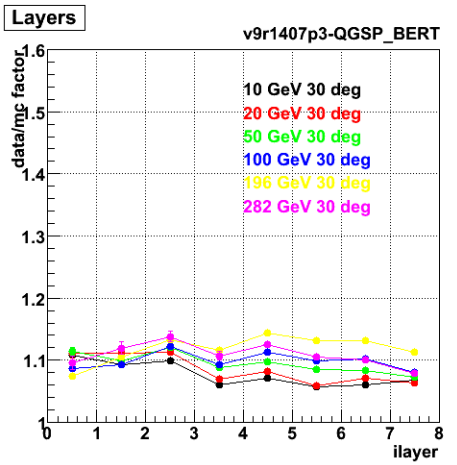
- Last data reprocessing :
  - -recon-v2r71215p1
- Simulation
  - v9r1407p3L-QGSP_BERT : new LPM
  - 10, 20,50, 100, 196 and 282 GeV for 0, 10, 20 and 30 deg
- My method to add some extra material along the beamline can not be very precise when no more on-axis : it gives an estimation untill we get the full simulation

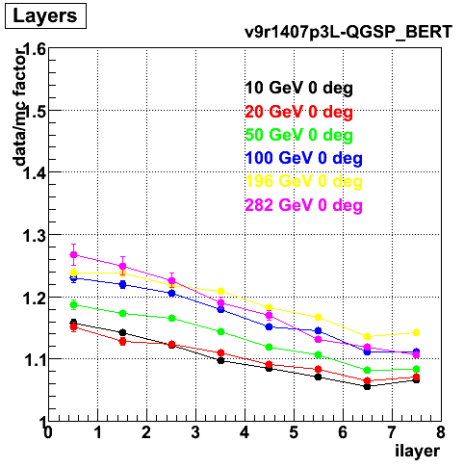
Top : no LPM - bottom : new LPM

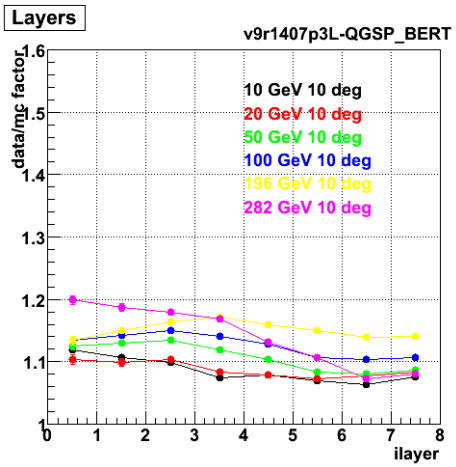


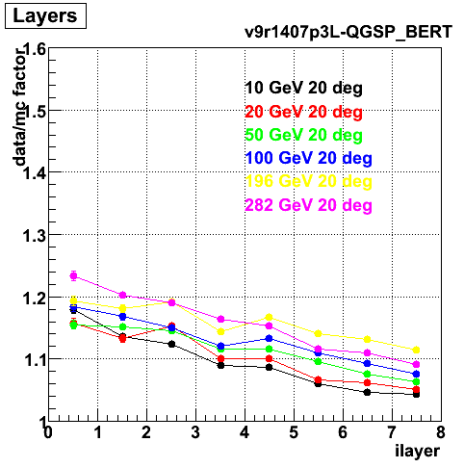


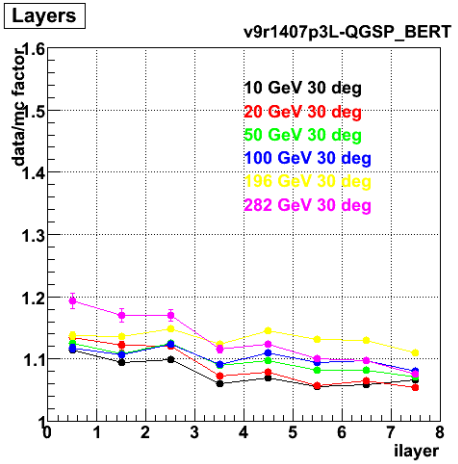




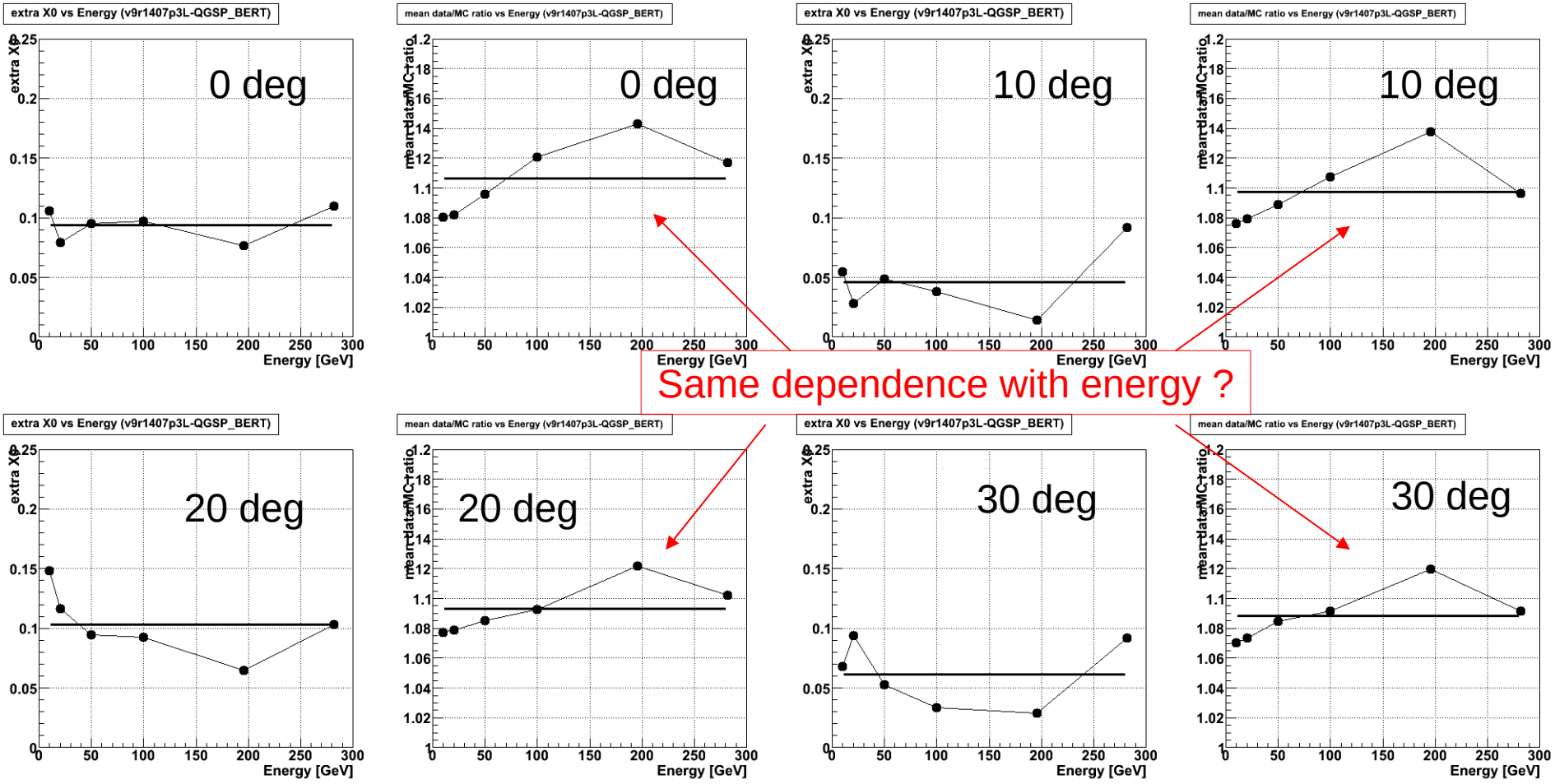






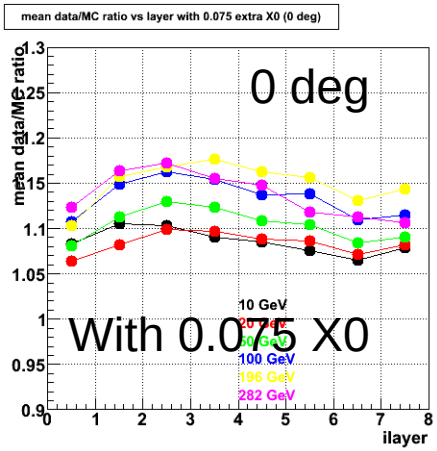


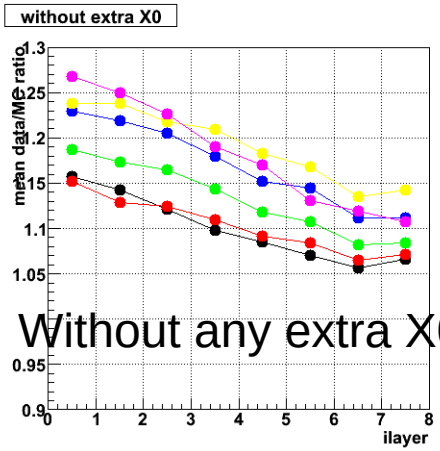
Looking for the optimal extra X0

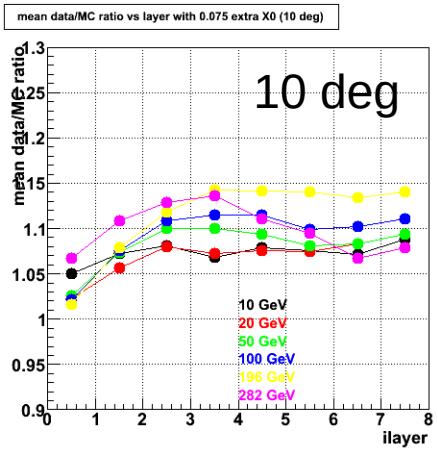


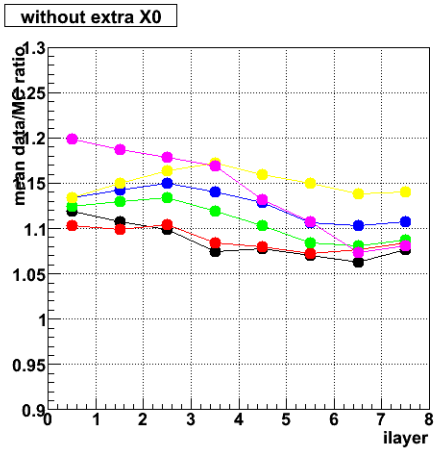
0 and 20 deg : ~0.1 X0, but 10 and 30 : ~0.05 X0...

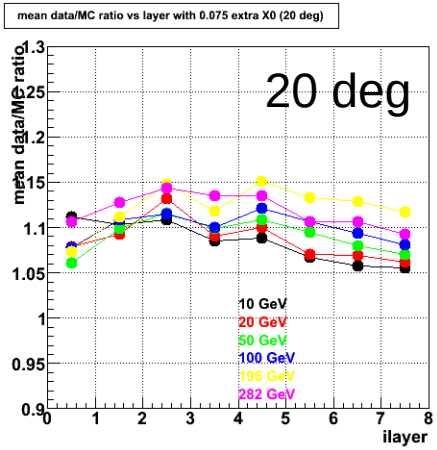
With 0.075 X0 :

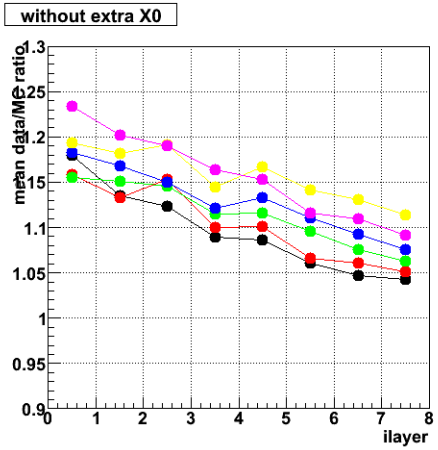

mean data/MC ratio vs layer with 0.075 extra X0 (0 deg)
0 deg
With 0.075 X0
10 GeV
20 GeV
50 GeV
100 GeV
196 GeV
282 GeV
mean data/MC ratio
ilayer

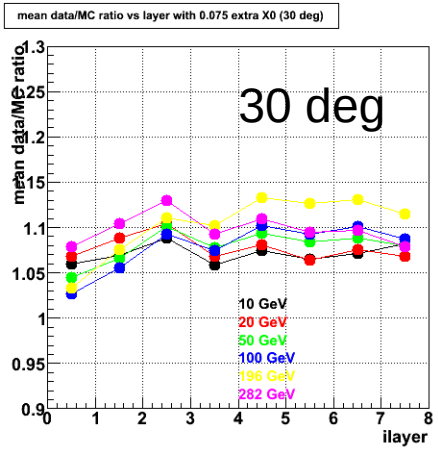

without extra X0
Without any extra X0
mean data/MC ratio
ilayer

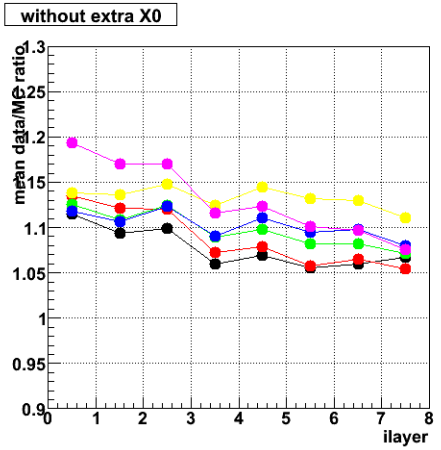

mean data/MC ratio vs layer with 0.075 extra X0 (10 deg)
10 deg
10 GeV
20 GeV
50 GeV
100 GeV
196 GeV
282 GeV
mean data/MC ratio
ilayer


without extra X0
mean data/MC ratio
ilayer


mean data/MC ratio vs layer with 0.075 extra X0 (20 deg)
20 deg
10 GeV
20 GeV
50 GeV
100 GeV
196 GeV
282 GeV
mean data/MC ratio
ilayer


without extra X0
mean data/MC ratio
ilayer


mean data/MC ratio vs layer with 0.075 extra X0 (30 deg)
30 deg
10 GeV
20 GeV
50 GeV
100 GeV
196 GeV
282 GeV
mean data/MC ratio
ilayer


without extra X0
mean data/MC ratio
ilayer

Conclusions

- Again : this method can not be very precise, but..
- We find the same feature as with the pressure scan analysis : 10 and 30 deg would need less extra X0 than 0 and 20 deg.
- Anyway, the new LPM + some extra X0 really help to reduce the broadening of data/MC ratio : ~ all layers, energies, angles lie between 1.05 and 1.15
- Next step :
  - redo the same analysis but with full simulation of extra material (and make use also of the number of hits to find the optimal extra X0)
  - Determine the global recalibration factor (it may depend on energy…)