GammaLib - Support #2761

Significant residuals in background simulations for limited radius at low energies

11/20/2018 04:43 PM - Knödlseder Jürgen

Status:	Closed		**Start date:**	11/20/2018
Priority:	Normal		**Due date:**	
Assigned To:	Knödlseder Jürgen		**% Done:**	100%
Category:			**Estimated time:**	0.00 hour
Target version:	1.6.0			

Description

Anastasia Sokolenko reported some strange features when simulating background events for the 1DC South 50h IRF for a simulation radius of 0.5 deg. There seem to be energy dependent excess events at low energies compared to the predicted number of background events. Increasing the simulation radius, the effects are not significant anymore (see below).
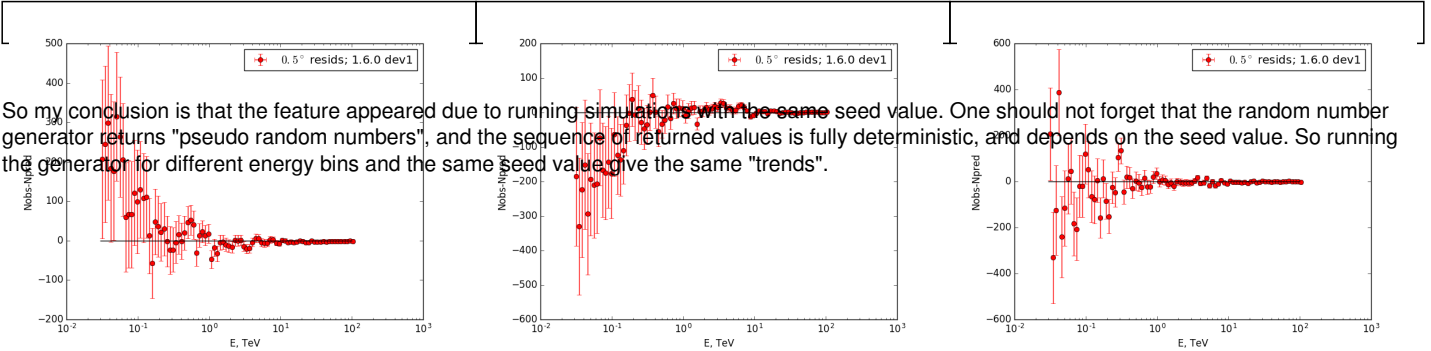
History

#1 - 11/20/2018 06:02 PM - Knödlseder Jürgen

- *File residual_0.5deg_maxrate1_10subbins_seed1.png added*

- *File residual_0.5deg_maxrate1_10subbins_seed2.png added*

- *File residual_0.5deg_maxrate1_10subbins_seed-change.png added*

- *Status changed from New to In Progress*

- *% Done changed from 0 to 90*

I looked the entire day into this problem, making many cross and double checks, without finding any problems.

I noticed, however, that changing the seed value for the simulations had quite some impact on the results. The left panel below shows the result for seed=1 and the mid-panel the result for seed=2. I then incremented the seed value after the computation for an energy bin, and got the result in the right panel, which no longer shows correlations with energy.

So my conclusion is that the feature appeared due to running simulations with the same seed value. One should not forget that the random number generator returns "pseudo random numbers", and the sequence of returned values is fully deterministic, and depends on the seed value. So running the generator for different energy bins and the same seed value give the same "trends".

#2 - 11/22/2018 04:18 PM - Knödlseder Jürgen

- *Tracker changed from Bug to Support*

- *Status changed from In Progress to Closed*

- *% Done changed from 90 to 100*

Files

residual_5.0deg_maxrate1_10subbins.png	33.9 KB	11/20/2018	Knödlseder Jürgen
residual_0.5deg_maxrate1_10subbins.png	31.8 KB	11/20/2018	Knödlseder Jürgen

residual_0.5deg_maxrate1_10subbins_seed1.png	31.8 KB	11/20/2018	Knödlseder Jürgen
residual_0.5deg_maxrate1_10subbins_seed2.png	32.7 KB	11/20/2018	Knödlseder Jürgen
residual_0.5deg_maxrate1_10subbins_seed-change.png	30.9 KB	11/20/2018	Knödlseder Jürgen