

GammaLib - Action #3549

Implement TOFCOR when reading events from "old" EVP datasets

02/19/2021 04:24 PM - Knödlseider Jürgen

Status:	Closed	Start date:	02/19/2021
Priority:	Urgent	Due date:	
Assigned To:	Knödlseider Jürgen	% Done:	100%
Category:		Estimated time:	0.00 hour
Target version:	2.0.0		
Description			
<p>According to attachment:com-rp-rol-drg-057.pdf a TOF corrections needs to be applied to EVP datasets of version 2 and older (see DSD_REP keyword in the EVP file). An example of an old EVP dataset is the one in viewing period 1 of the Crab.</p> <p>The TOF correction is implemented in TOFCOR in the DAL library DALAAA18 (see attachment:dalaaa19.tofcor.f). The correction is automatically implemented when reading an EVP file (see attachment:dalaaa19.pevpsr.f):</p>			
<pre>C VERNO integer data set representation version PEVPRI * C-- De-scale parameter and transform from INTEGER*2 to C argument spec C Copy data from COMMON PEVPD1 to return variables TIMTAG(1) = TIME(1) TIMTAG(2) = TIME(2) MPAR(1) = EN(1) MPAR(2) = EN(2) MPAR(3) = EN(1) + EN(2) MPAR(4) = 0 MPAR(5) = PHI MPAR(6) = 0 MPAR(7) = LOC(1)/32. MPAR(8) = LOC(2)/32. MPAR(9) = LOC(3)/256. MPAR(10) = LOC(4)/32. MPAR(11) = LOC(5)/32. MPAR(12) = LOC(6)/256. MPAR(13) = LOC(7)/128. MPAR(14) = LOC(8)/128. CLASS = CL MODCOM = MC REFLAG = RF VETO = VF EVSCT(1) = CO(1) EVSCT(2) = CO(2) EVSCT(3) = CO(3) EVSCT(4) = CO(4) EVSCT(5) = EH CTYP = CLASS(1:3) C C Now do the TOF correction for dataset versions < 3 C IF(VERNO.LT.3)THEN C C Do not correct for SIM events C IF (CTYP .NE. 'SIM') THEN IF (REFLAG .GE. 4) THEN CALL TOFCOR(MPAR(1),MPAR(2),MPAR(14),IDUM) ENDIF ENDIF ENDIF</pre>			

An equivalent TOF correction should be implemented in GCOMEventList::read_events.

History

#1 - 02/19/2021 05:00 PM - Knödlseider Jürgen

- Status changed from New to In Progress
- % Done changed from 0 to 10

I recognised that VP 0001.0 includes a newer EVP with TOFCOR applied. However a valid dataset for testing is VP 0002.5 which has an old data representation.

#2 - 02/19/2021 05:32 PM - Knödlseider Jürgen

- File vp0002_5.png added
- File vp0002_5-tofcor.png added
- % Done changed from 10 to 50

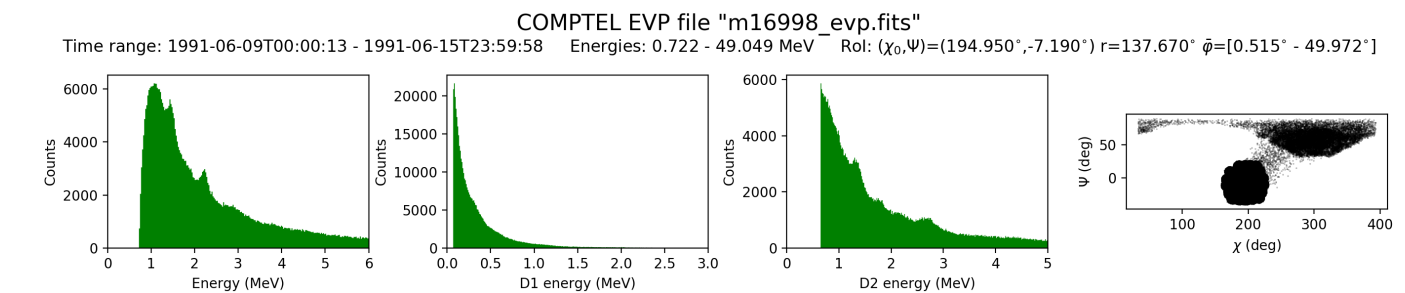
I implemented the TOFCOR correction, the results are displayed in the panels below. The top panel is the original panel without ToF correction which shows some structure in the ToF distribution due to oversampling. The bottom panel is after application of the TOFCOR correction. Note that the correction considerably modifies the ToF distribution, lacking events with small ToF. Note that the nominal ToF window is 115-130.

Before TOFCOR correction

Time range: 1991-06-09T00:00:13 - 1991-06-15T23:59:58 Energies: 0.722 - 49.049 MeV Rol: $(\chi_0, \Psi) = (194.950^\circ, -7.190^\circ)$ $r = 137.670^\circ$ $\varphi = [0.515^\circ - 49.972^\circ]$

COMPTTEL EVP file "m16998_evp.fits.gz"

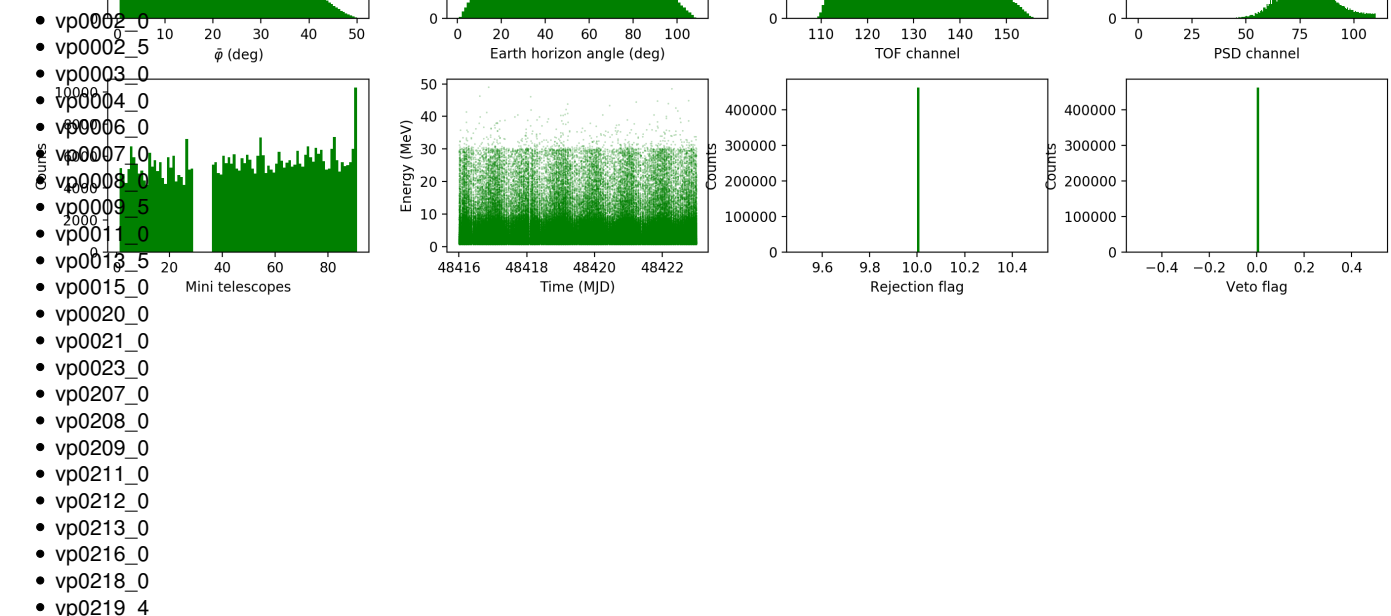
After TOFCOR correction



#3 - 02/20/2021 12:14 AM - Knödlseider Jürgen

- % Done changed from 50 to 60

The following 29 viewing periods only have a version 2 EVP file:



- vp0220_0
- vp0222_0
- vp0223_0
- vp0224_0
- vp0226_0
- vp0229_0

#4 - 02/20/2021 12:23 AM - Knödseder Jürgen

- *Status changed from In Progress to Pull request*
- *% Done changed from 60 to 90*

#5 - 02/21/2021 09:41 AM - Knödseder Jürgen

- *Status changed from Pull request to Closed*
- *% Done changed from 90 to 100*

Files

com-rp-rol-drg-057.pdf	403 KB	02/19/2021	Knödseder Jürgen
dalaaa19.tofcor.f	13.4 KB	02/19/2021	Knödseder Jürgen
dalaaa19.pevpsr.f	17.4 KB	02/19/2021	Knödseder Jürgen
vp0002_5.png	514 KB	02/19/2021	Knödseder Jürgen
vp0002_5-tofcor.png	511 KB	02/19/2021	Knödseder Jürgen