Observation periods with the Sun located within the COMPTEL Field-of-View

10 September 1996, UNH G. Rank

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Introduction

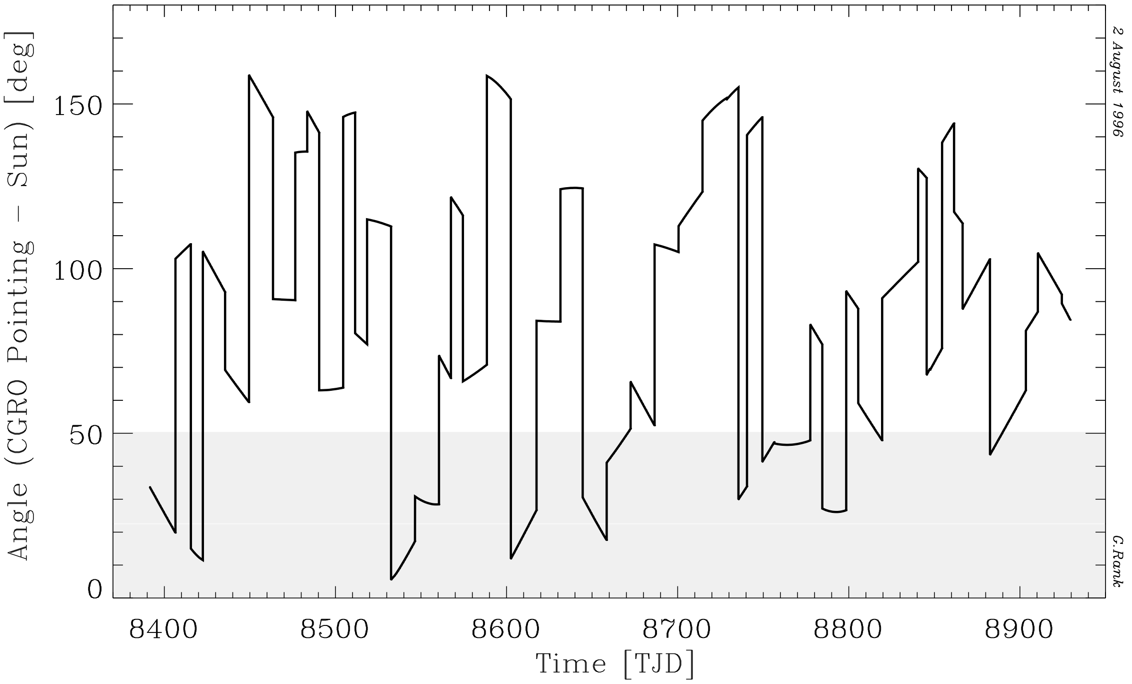
The COMPTEL viewing plan of phases 1 to 5 was used to identify all time periods, where the Sun was located within the field-of-view (FOV) of the instrument. The FOV is not defined by a sharp limitation, but the sensitivity decreases more and more for sources further off the pointing axis. Here an angle of 50° was used as the limit of the FOV. Up to the current date (16 August 96) a total of 340 days has accumulated where the Sun is within the FOV.

To calculate the Sun's zenith angle, the following procedure was used:
1. The dates of satellite reorientation and the GRO z-axis orientation is read from the COMPTEL viewing plan.
2. For each day in a given viewing period, the position of the Sun is calculated in celestial coordinates (algorithm based on Peter Duffett-Smith 'Practical Astronomy with your Calculator').
3. The angular distance between the pointing and the Solar position is calculated (equals the Zenith angle of the Sun in COMPTEL coordinates).

The next step to do will be the performance of a full coordinate transformation to calculate the Solar position in COMPTEL coordinates. This gives the zenith angle directly and also provides the azimut angle, which may be needed for further analysis.

Based on this list and comparing with GOES and BATSE listings, a systematic search for detected flares in the telescope can be done. In addition to the large flares which have been already analyzed in some detail, this would add a number of M-class, probably some C-class flares. This list could also serve to find out observation periods of low solar activity for the study of non flare related production of 2.2 MeV emission.

CGRO PHASE 1 (22 April 1991 – 17 November 1992)



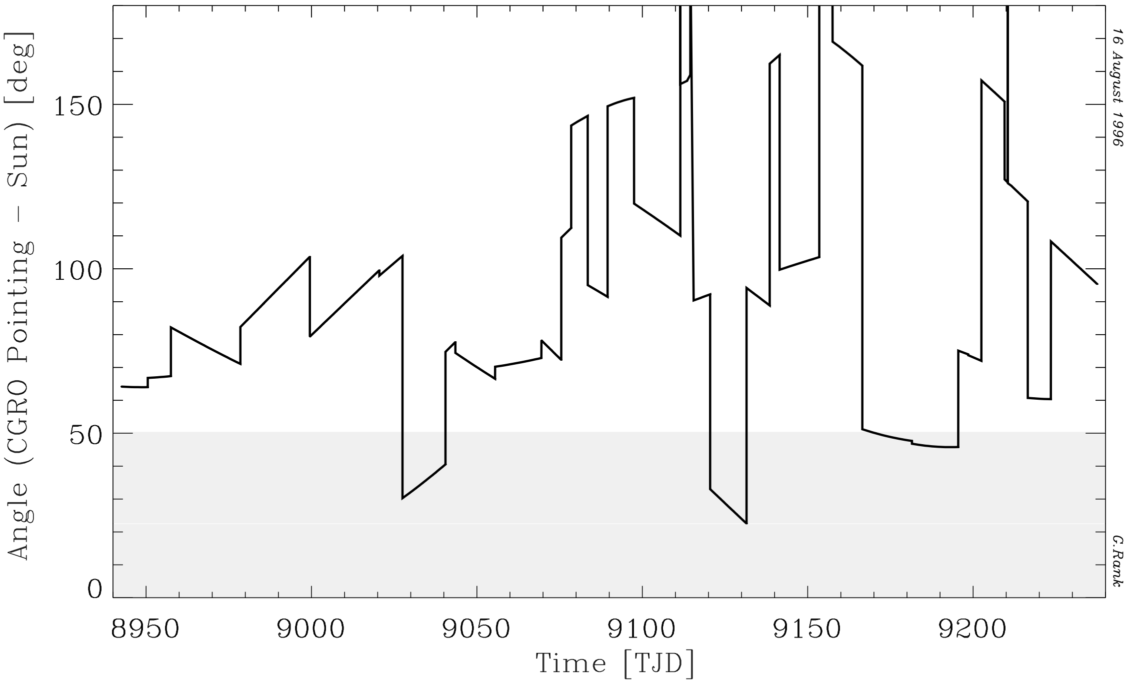
Phase 1 lasts from 22 April 1991 to 17 November 1992. This period includes some in-flight calibration observations at the beginning of the phase. During some of these test phases of the Crab Pulsar the Sun is located within the FOV (not shown here). The first nominal sky-mapping observation starts 16 May 1991. The total period with the Sun within the FOV during phase 1 is 137 days.

During this period the Sun was in a very active state. It includes the major flares in June 1991 (6 X-class flares) during obs. period 2.5 and in October 1991 (5 X-class flares) during obs. period 12.

CGRO observation plan phase 1

Obs.	TJD	Date	Zenith
1	8392 – 8406	16May91 – 30May91	33 → 20
2.5	8416 – 8422	9June91 – 15June91	14 → 12
11	8533 – 8546	4Oct91 – 17Oct91	6 → 17
12	8546 – 8560	17Oct91 – 31Oct91	31 → 28
16	8603 – 8617	13Dec91 – 27Dec91	13 → 27
19	8645 – 8658	24Jan92 – 6Feb92	30 → 18
20	8659 – 8670	6Feb92 – 18Feb92	41 → 50
26	8736 – 8740	24Apr92 – 28Apr92	30 → 34
28	8750 – 8756	8May92 – 14May92	42 → 47
29	8757 – 8777	14May92 – 4June92	47 → 48
31	8785 – 8798	12June92 – 25June92	27
33	8817 – 8819	14July92 – 16July92	50 → 48
40	8883 – 8889	18Spt92 – 24Spt92	44 → 50

CGRO PHASE 2 (17 November 1992 – 7 September 1993)

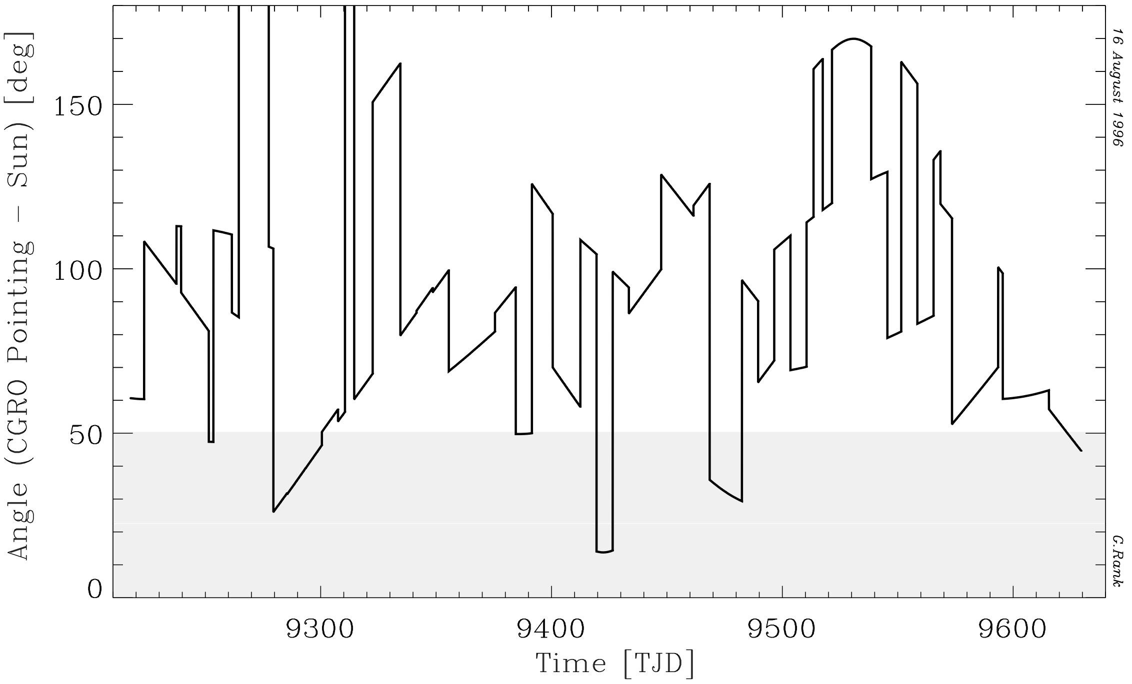


Phase 2 lasts from 17 November 1992 to 7 September 1993. At several days the instrument is turned off: on 5/4/93 (TJD 9111) and 5/7/93 (9114) because of thrustler test burns, from 6/15/93 to 6/18/93 (9153-9156) due to a reboost and on 8/11/93 in anticipation of enhanced activity of the Perseides. The total period with the Sun within the FOV during phase 2 is 45 days.

CGRO observation plan phase 2

Obs.	TJD	Date	Zenith
209	9028 – 9040	10Feb93 – 22Feb93	31 → 41
221	9121 – 9131	14May93 – 24May93	32 → 23
227	9171 – 9181	3July93 – 13July93	50 → 48
228	9181 – 9195	13July93 – 27July93	47 → 46

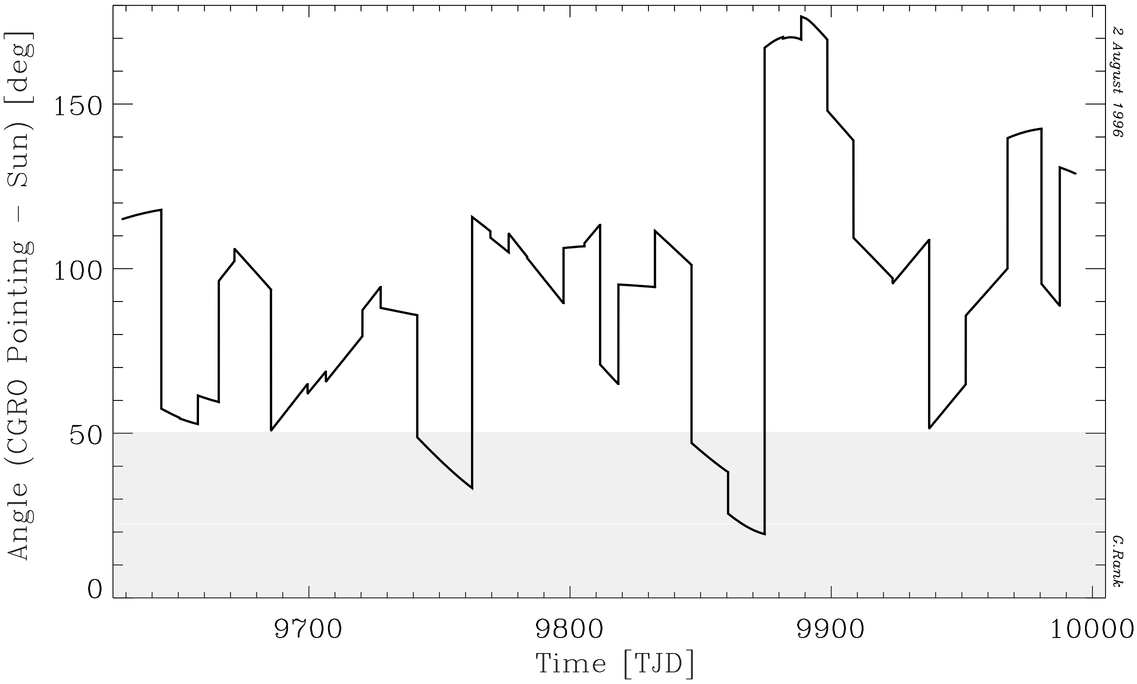
CGRO PHASE 3 (7 September 1992 – 4 October 1994)



Phase 3 lasts from 7 September 1992 to 4 October 1994. Two reboost are done during this phase, from 10/4/93 to 10/17/93 (9264-9277) and from 11/19/93 to 11/24/93 (9310-9314). The total period with the Sun within the FOV during phase 3 is 49 days.

CGRO observation plan phase 3			
Obs.	TJD	Date	Zenith
303	9252 – 9253	21Spt93 – 22Spt93	47
304	9280 – 9285	20Oct93 – 25Oct93	27 → 32
305	9285 – 9293	25Oct93 – 2Nov93	32 → 39
306	9293 – 9300	2Nov93 – 9Nov93	39 → 50
318.1	9385 – 9390	2Feb94 – 7Feb94	49
320	9420 – 9426	9Mar94 – 14Mar94	14
325	9469 – 9482	27Apr94 – 10May94	36 → 29
339	9625 – 9629	29Spt94 – 4Oct94	50 → 44

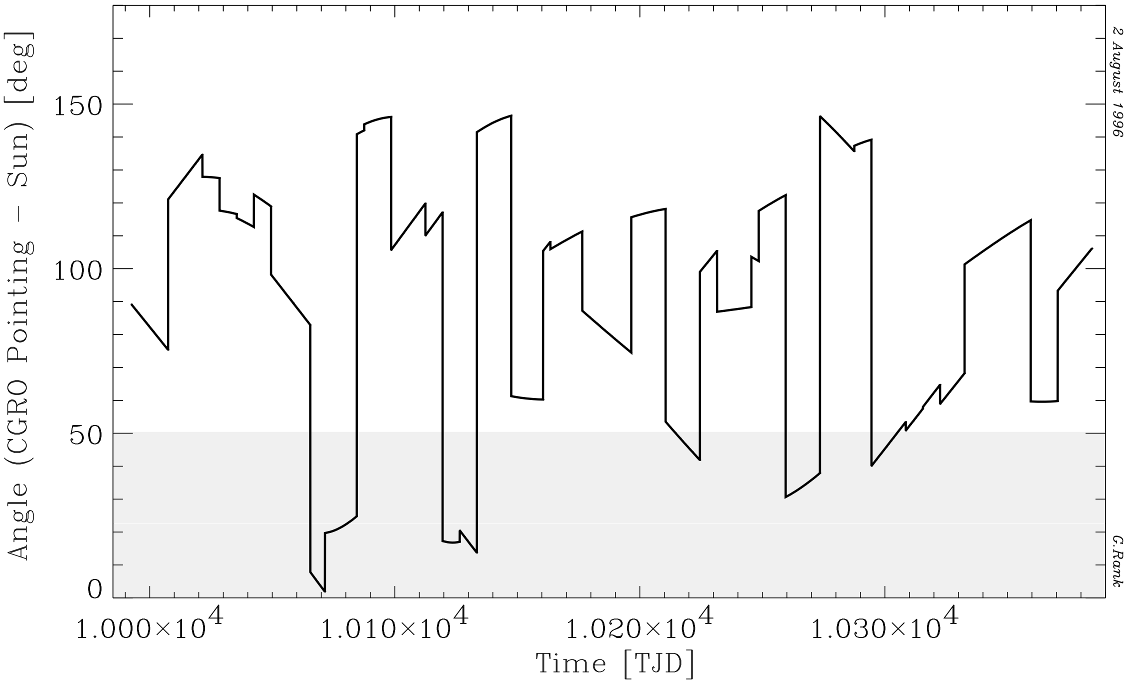
CGRO CYCLE 4 (4 October 1994 – 3 October 1995)



Cycle 4 lasts from 4 October 1994 to 3 October 1995. A reboost of the CGRO satellite was done during this phase. The total period with the Sun within the FOV during cycle 4 is 47 days.

CGRO observation plan phase 4			
Obs.	TJD	Date	Zenith
410	9742 – 9762	25Jan95 – 14Feb95	48 → 33
419.5	9847 – 9860	10May95 – 23May95	46 → 38
420	9860 – 9874	23May95 – 6June95	25 → 19

CGRO CYCLE 5 (3 October 1995 – 28 October 1996)



Observation Cycle 5 lasts from 3 October 1995 to 28 October 1996. The total period with the Sun within the FOV during cycle 5 is 62 days.
This period covers a time of low solar activity. However, an X-class flare occured on 9 July 1996 (TJD 10273).

CGRO obs. phase 5			
Obs.	TJD	Date	Zenith
508	10066 – 10071	15Dec95 – 20Dec95	7 → 2
509	10071 – 10084	20Dec95 – 2Jan96	20 → 24
513	10120 – 10126	7Feb96 – 13Feb96	17
514	10126 – 10133	13Feb96 – 20Feb96	20 → 14
520	10215 – 10224	12May96 – 21May96	50 → 42
523	10260 – 10273	26June96 – 9July96	31 → 38
526	10295 – 10304	31July96 – 9Aug96	41 → 50