

The MeV Point-Source Sky during the COMPTEL Mission

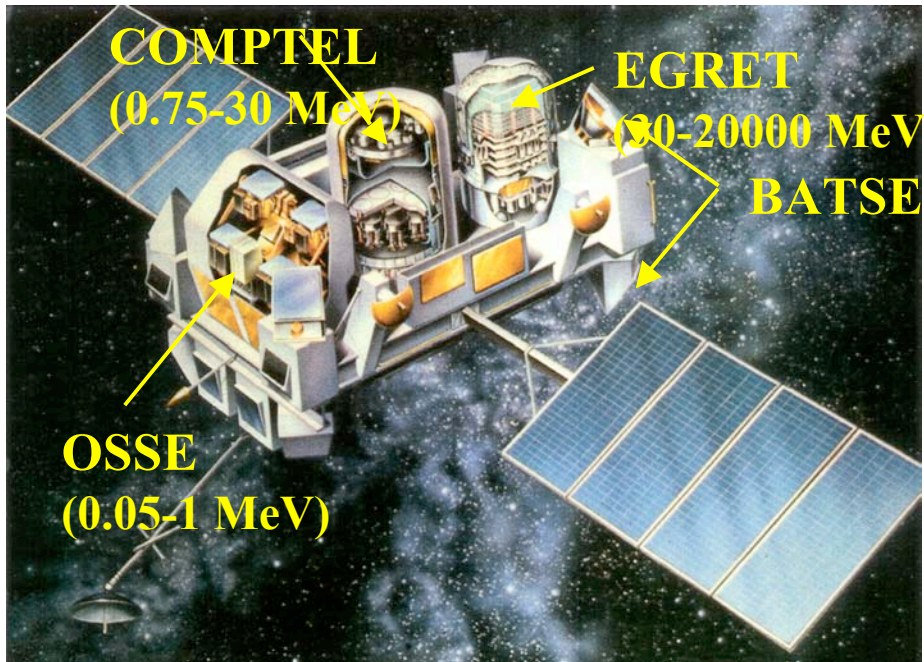
W. Collmar, A. Strong, V. Schönfelder

MPE Garching

Outline

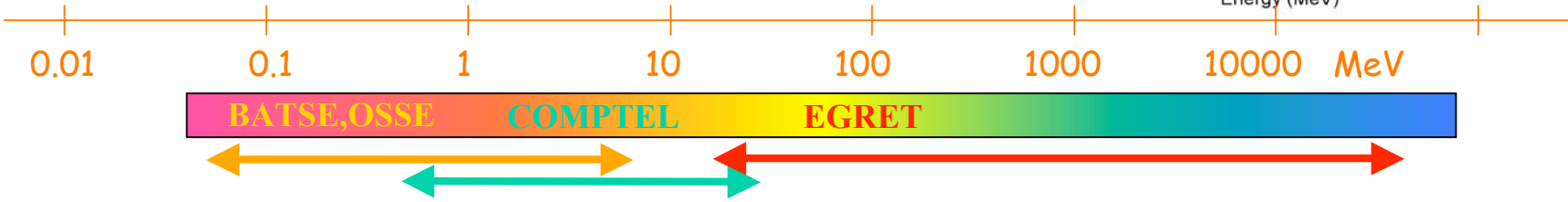
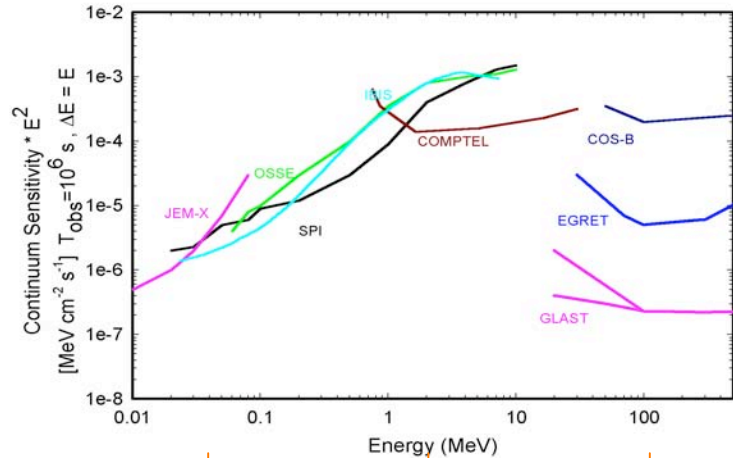
- 1) **COMPTEL on CGRO**
- 2) **The first COMPTEL Source Catalog**
- 3) **All-Mission All-Sky Maps**
- 4) **Some Properties of brightest MeV Sources**
- 5) **Summary**

COMPTEL on CGRO

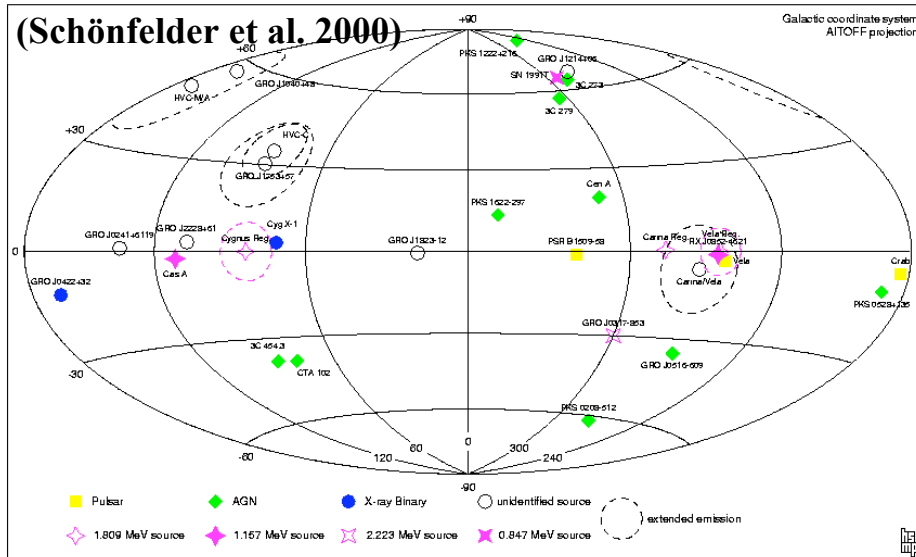


COMPTEL (Compton Telescope)

- mission: Apr. 91 – June 2000
- energy range: 0.75 – 30 MeV
- mounted parallel to EGRET
- “first-generation” experiment
- **pioneered MeV band**



Summary First COMPTEL Source Catalog



- contains published results of first 5.5 years (April '91 – October '96)
- 32 Sources (different nature)
- 31 GRBs / 21 solar flares
- upper limits for various types of objects (e.g. AGN, gal. BHs)

Source Type	#
Pulsars	3
Stellar BH	2
SNR (continuum)	1
AGN	10
Unidentified Sources	
- $ b < 10^\circ$	4
- $ b > 10^\circ$	5
γ -line sources	
- 1.809 MeV (^{26}Al)	3
- 1.157 MeV (^{44}Ti)	2
- 0.847/1.238 MeV (^{56}Co)	1
- 2.223 MeV (n-capt.)	1

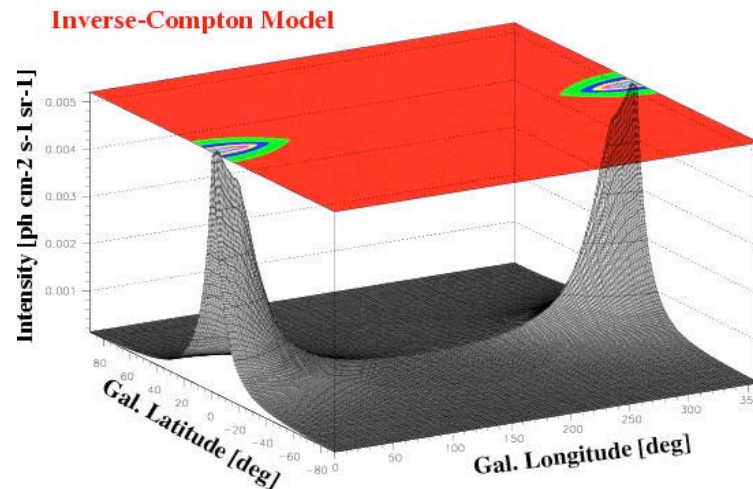
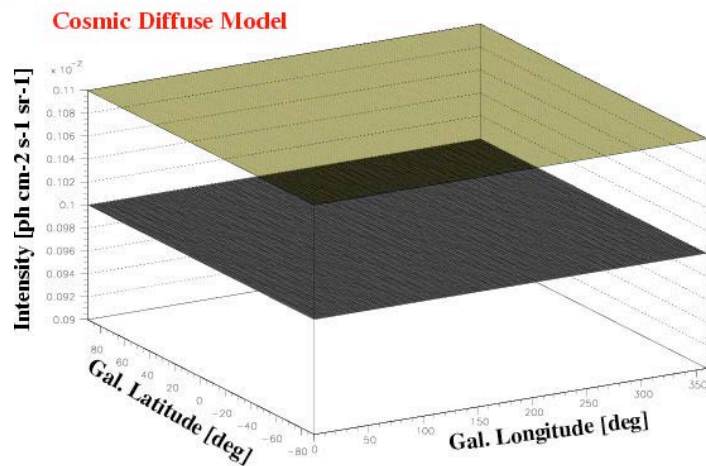
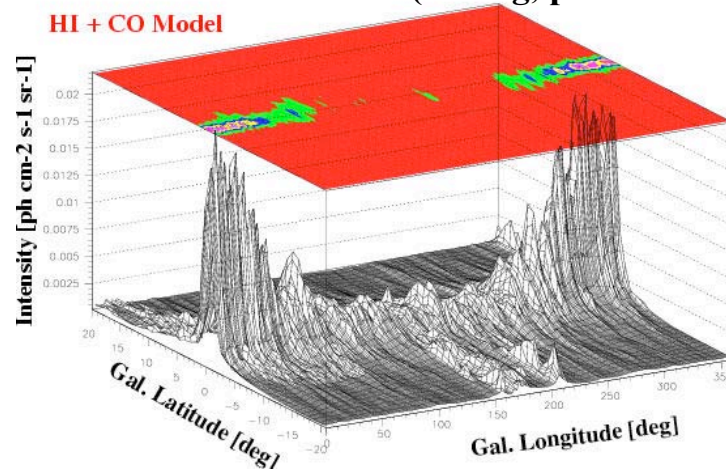
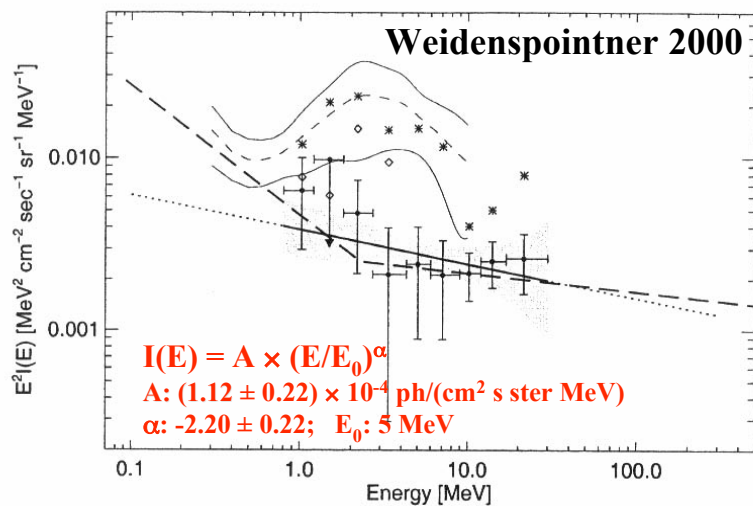
Systematic Source Searches in COMPTEL Data

- **systematic source searches by all-sky analyses (incl. diffuse model handling) for**
 - **different time periods**
 - + individual mission phases (9 periods/years)
 - + combinations of mission phases:
e.g. - I-IV (EGRET), I-VI (2nd reboost), I-IX (all mission)
 - **different energy bands**
(std.: 0.75-1, 1-3, 3-10, 10-30 MeV; revised bands)
- **analysis method: standard COMPTEL MLM (skymaps, source detection, flux fitting)**
- **generation of all-sky and galactic pole (north/south) maps**
- **extract source properties of candidates**
 - **significances, light curves, spectra**
- **goal: 2. COMPTEL Source Catalog**

All-Sky Maps: Diffuse Emission Handling

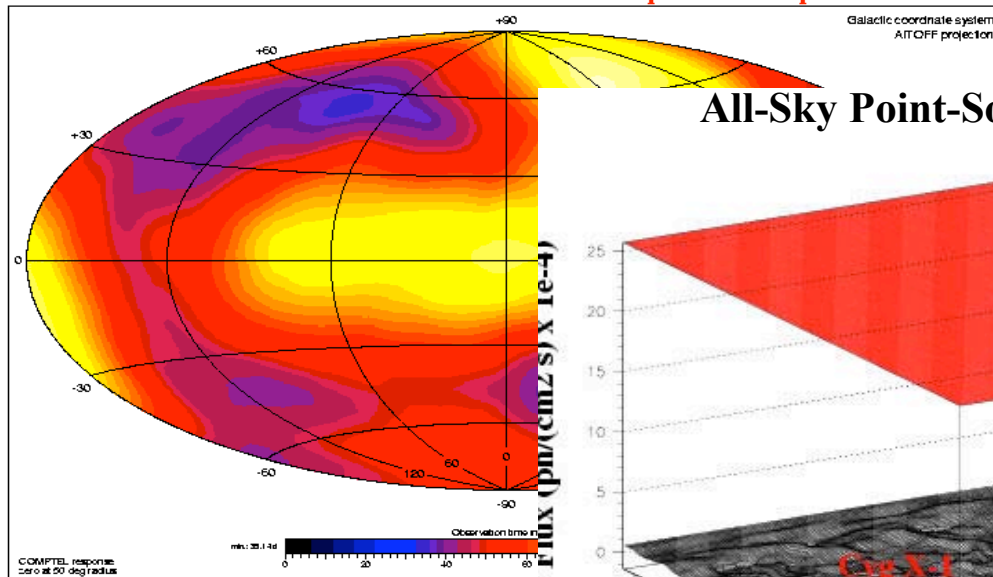
(3 global diffuse Models applied)

(Strong, priv. comm.)

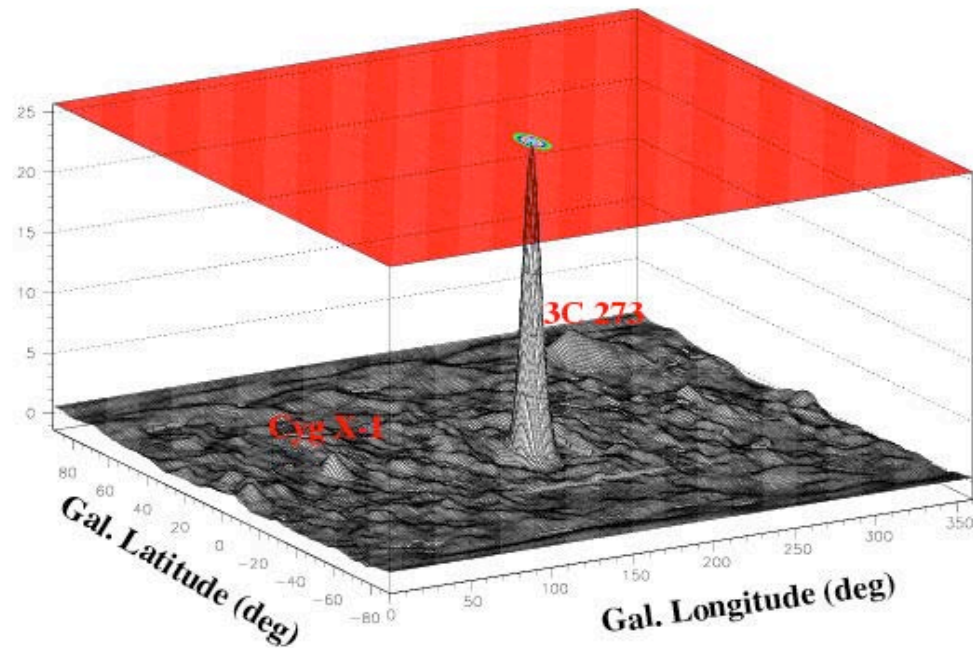


COMPTEL ALL-Mission All-Sky Exposure

CGRO/COMPTEL All-Mission Exposure Map



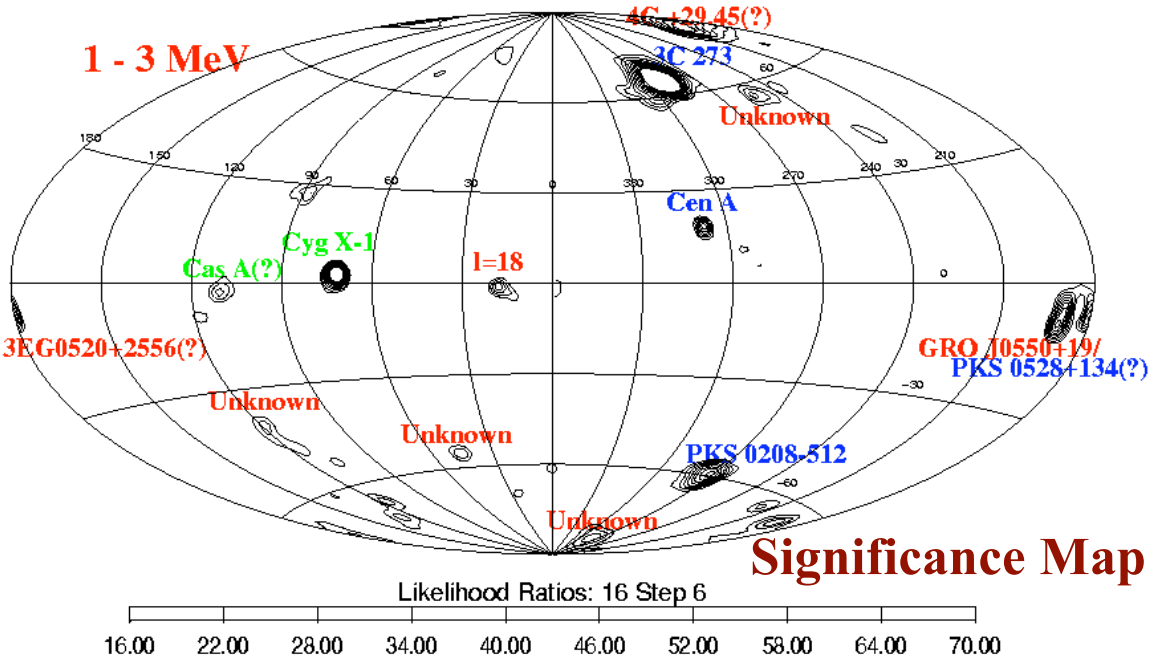
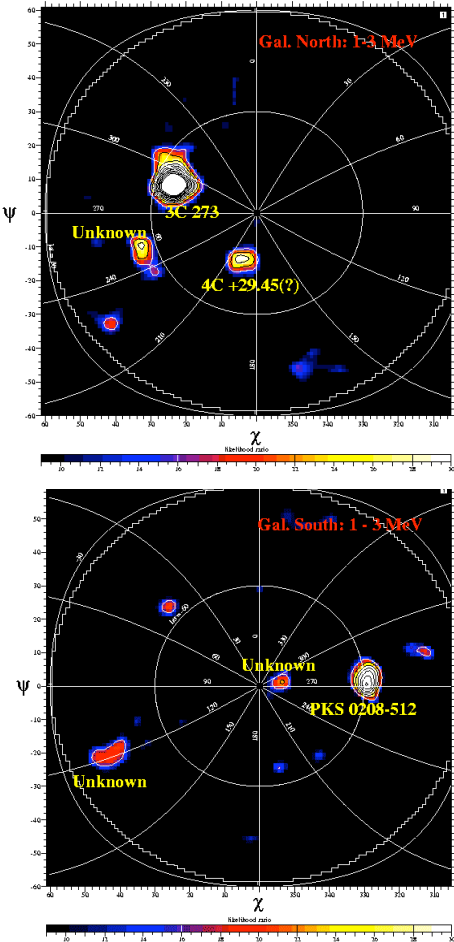
All-Sky Point-Source Flux Map



1-3 MeV; all-mission
(diffuse emission subtracted)

All-Mission All-Sky Point Source Map (1 –3 MeV)

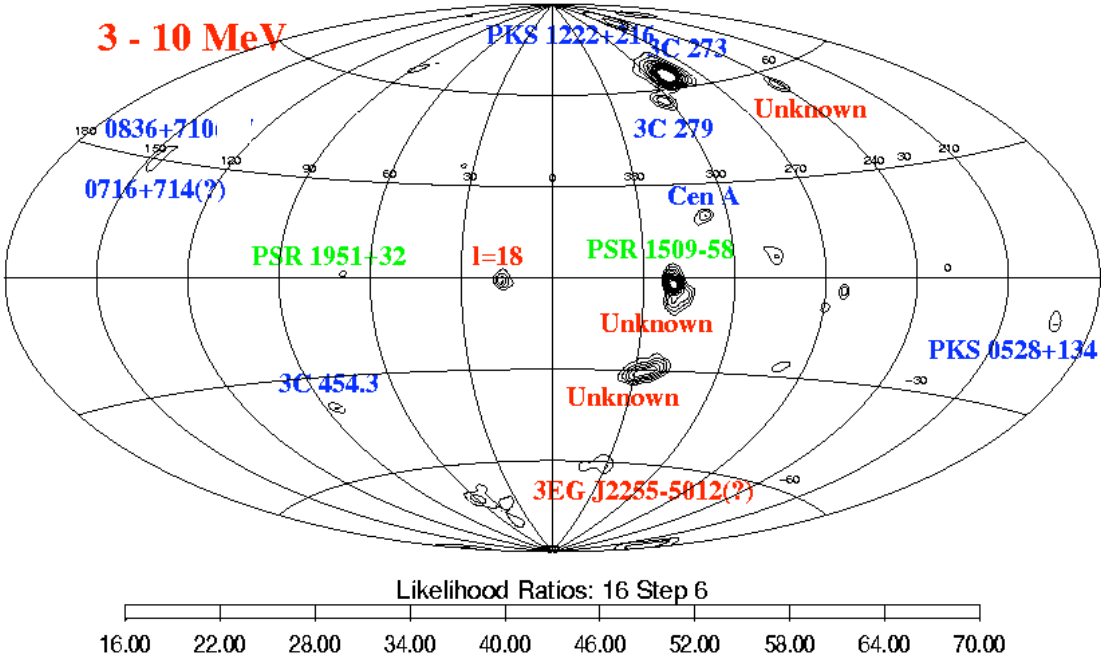
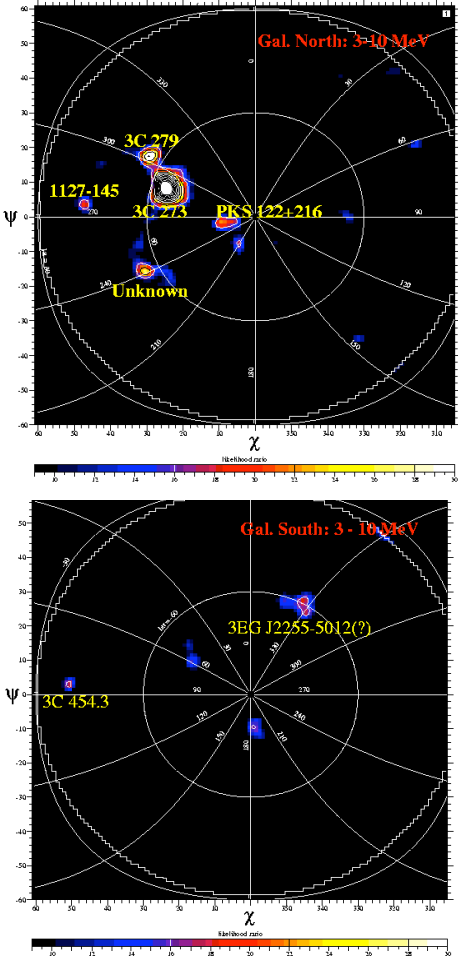
(extragalactic / galactic / unknown sources)



Significance Map

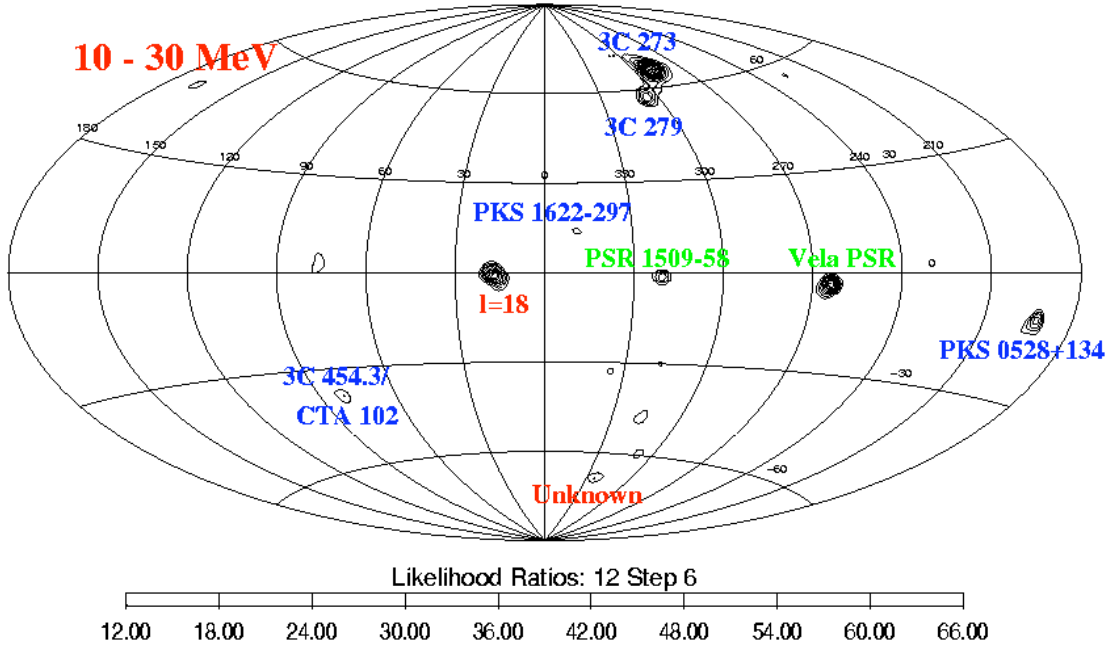
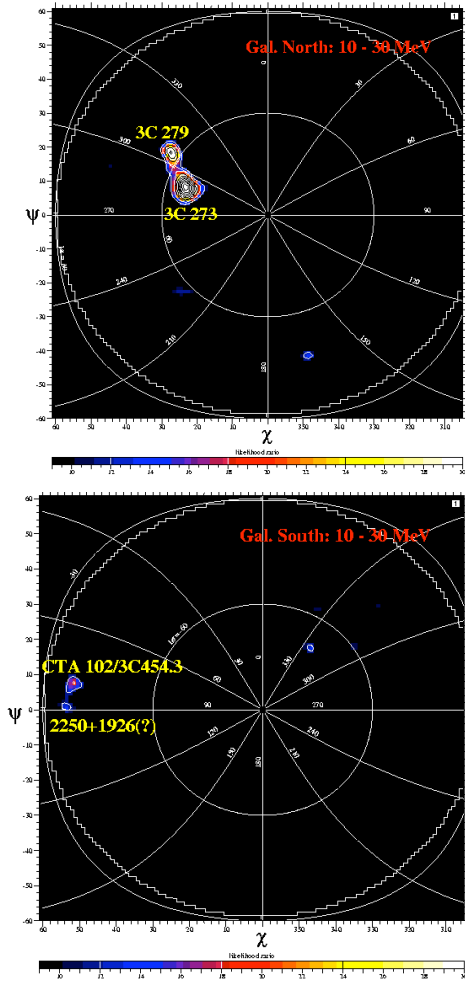
All-Mission All-Sky Point Source Map (3 - 10 MeV)

(extragalactic / galactic / unknown sources)

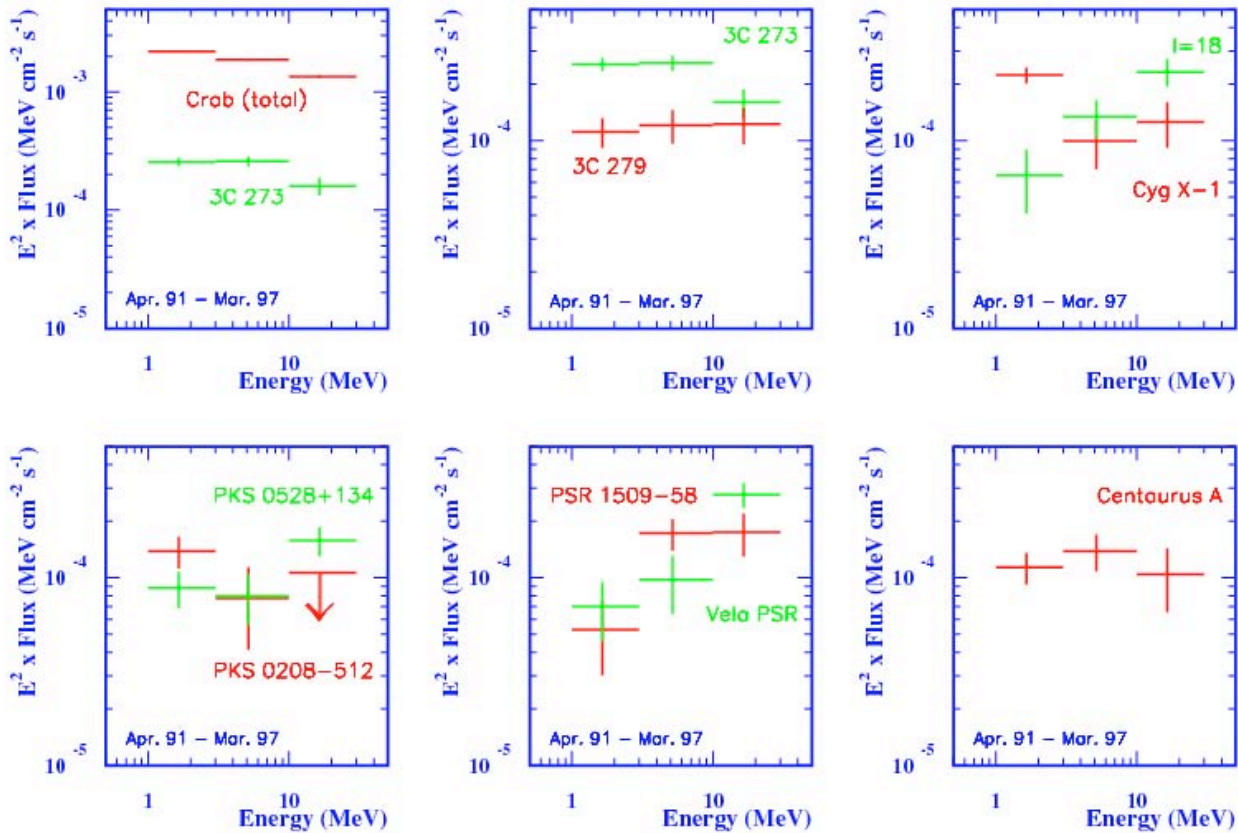


All-Mission All-Sky Point Source Map (10 - 30 MeV)

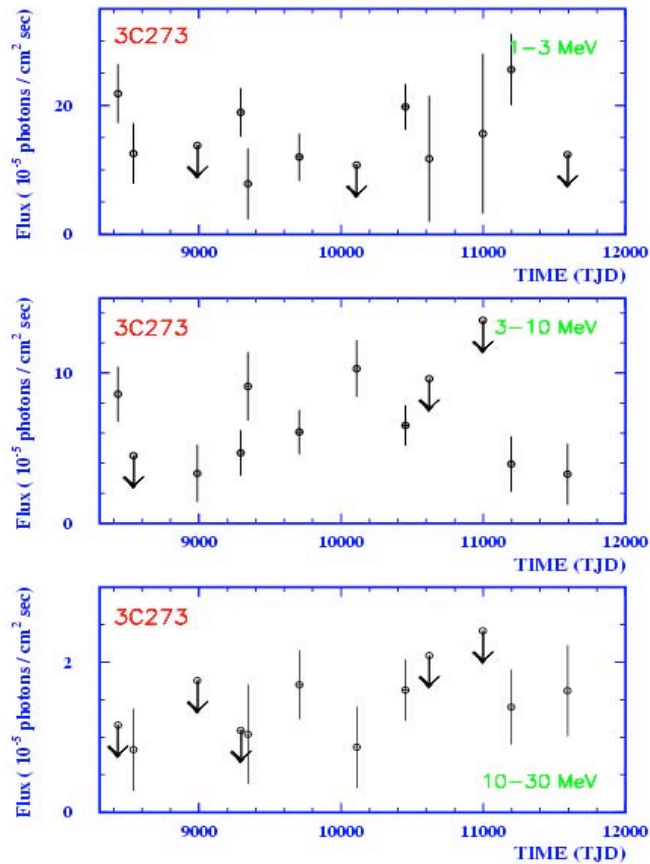
(extragalactic / galactic / unknown sources)



Spectra of “Top Ten” brightest MeV Sources

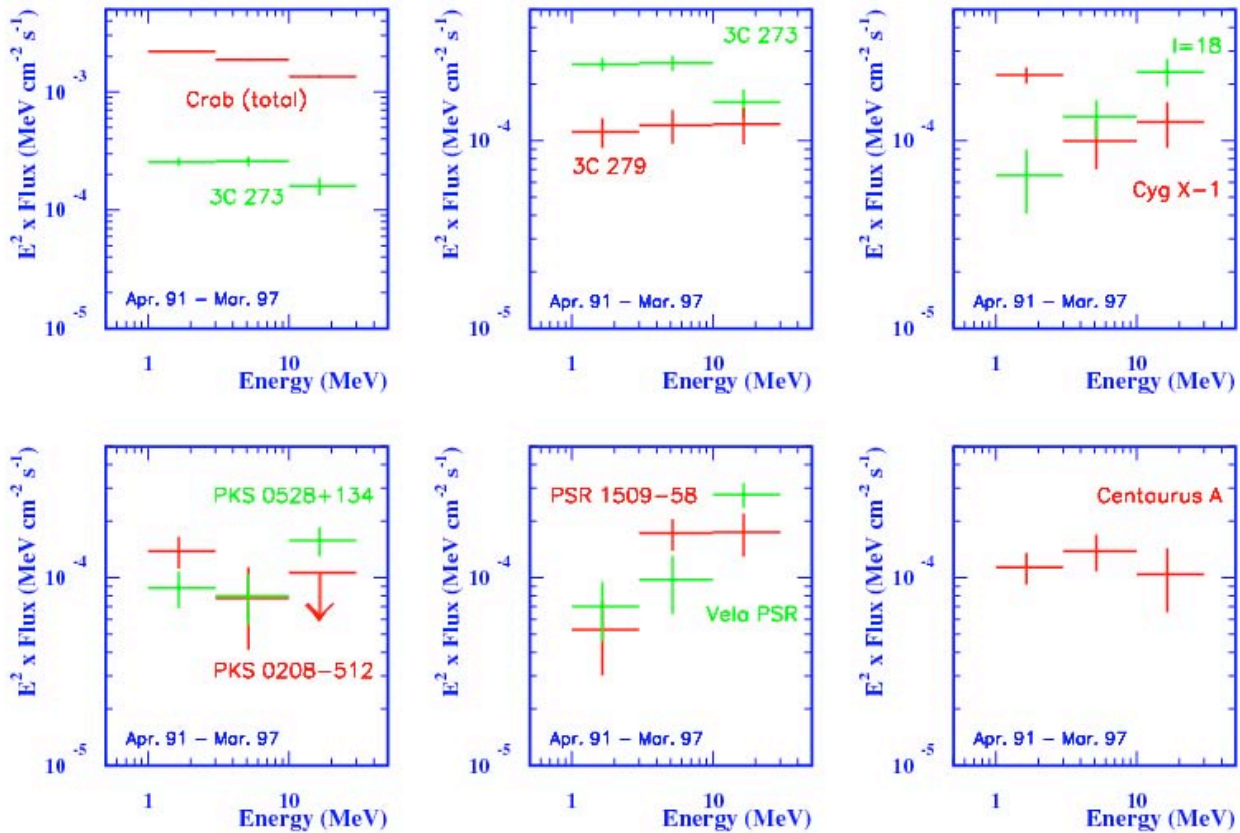


3C 273 Mission Results

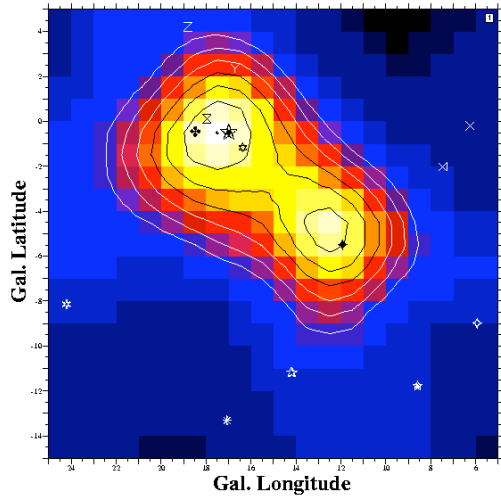


- 3C 273: 2nd brightest MeV Source
- all-mission light curves (within 30° of COMPTEL pointing)
- persistent MeV source

Spectra of “Top Ten” brightest MeV Sources

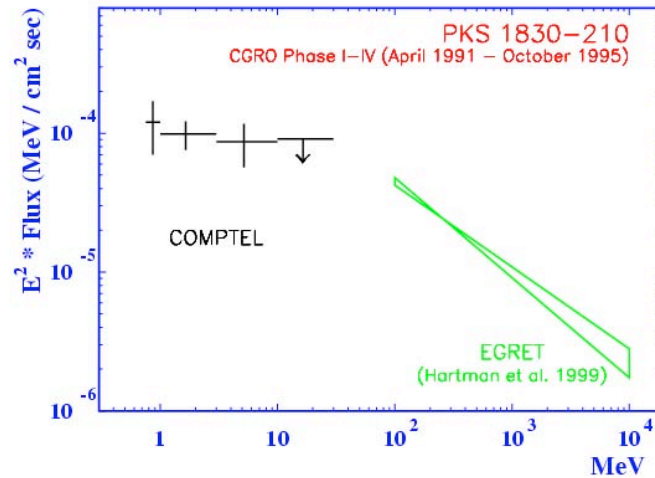
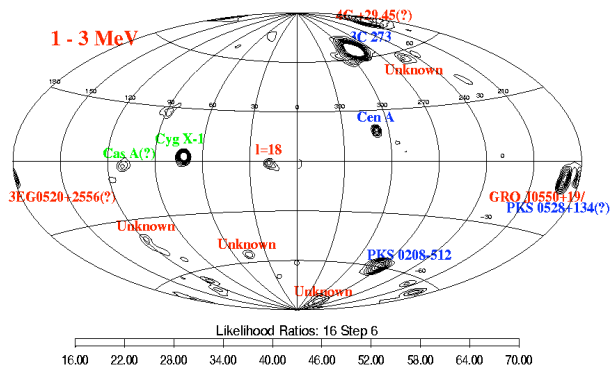


"l=18" region

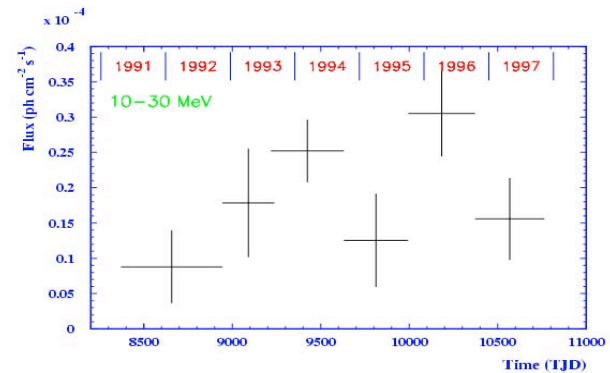
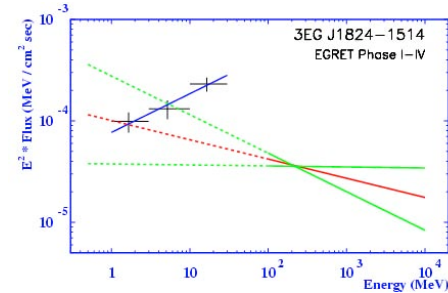
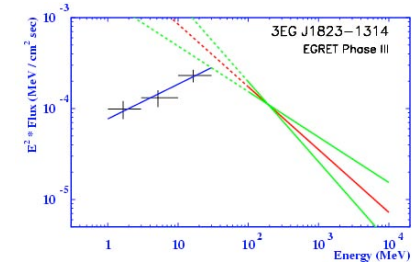
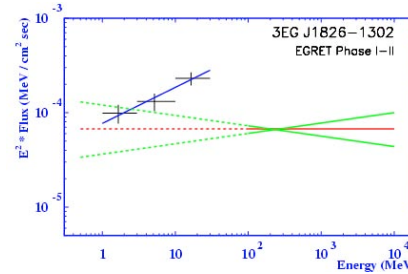
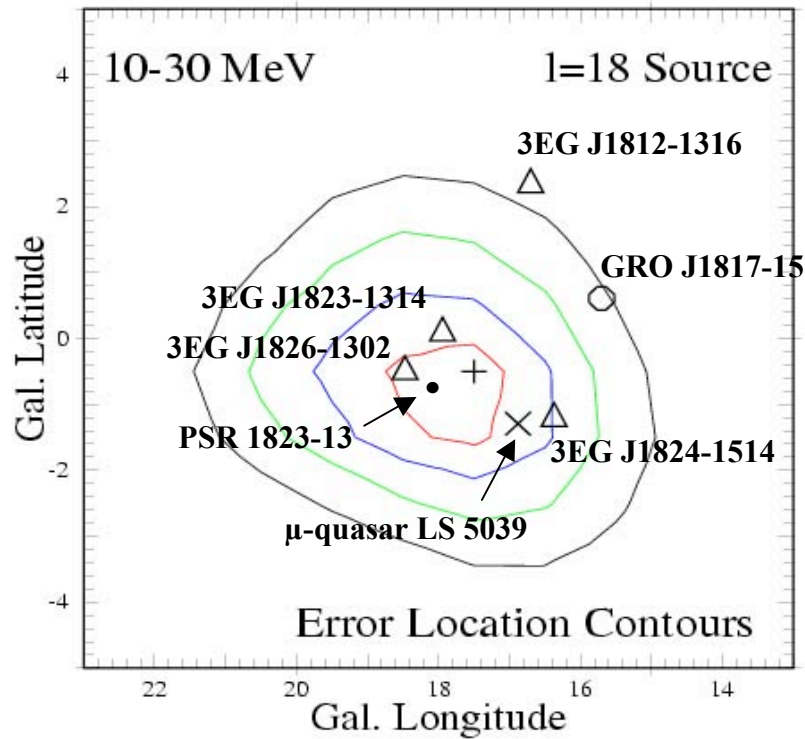


3EG J1832-2110 (?)
Phase I-VI
1-3 MeV
5.0 σ

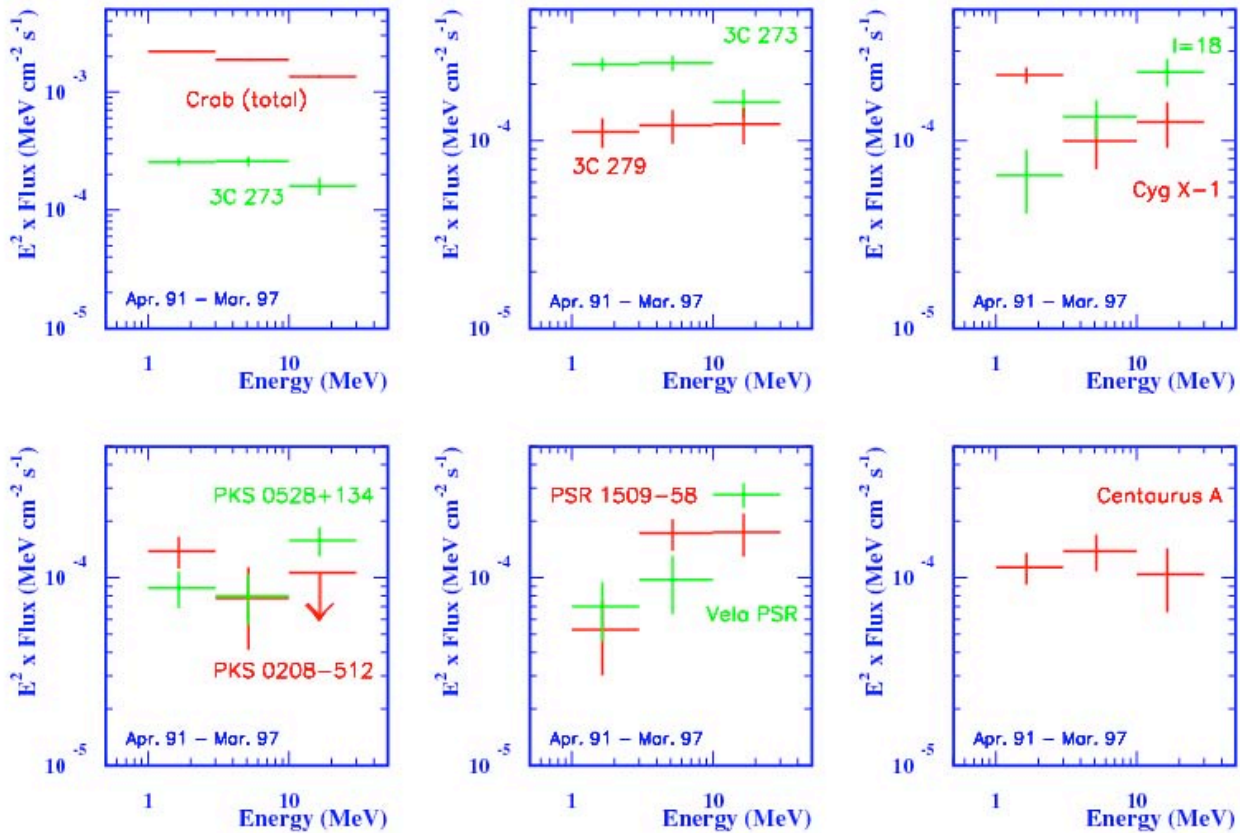
"l=18": a well-known but unidentified MeV source



“l=18”: GRO J1823-12 (l/b: 17.5/-0.5)



Spectra of “Top Ten” brightest MeV Sources



Summary

- **COMPTEL data analysis still possible (COMPASS), and is pursued (low level)**
- **the “MeV sky” is still populating with sources**
 - 4 new blazars (e.g. PKS 1820-211; Collmar 2006)
 - 1 unidentified EGRET source: 3EG 0520+2556
 - 3 unidentified MeV sources (e.g. GRO J0550+19)
 - further candidates

⇒ **goal: 2nd COMPTEL source catalog**
- **GLAST/LAT:**
 - archival analysis of MeV data for promising sources (e.g. GLAST steep spectrum sources)
 - non-variable MeV sources (Crab, Vela PSR) useful for cross-calibration at lowest GLAST/LAT energies