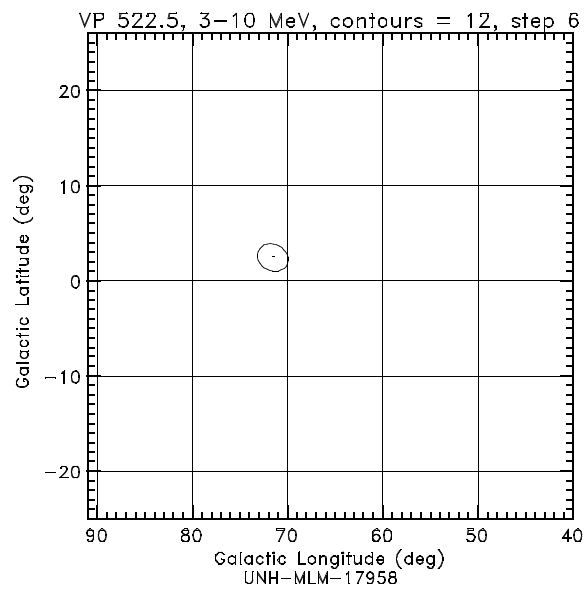
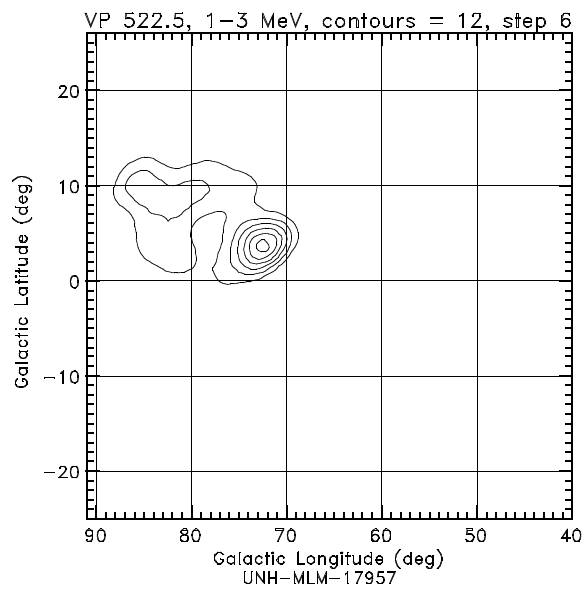
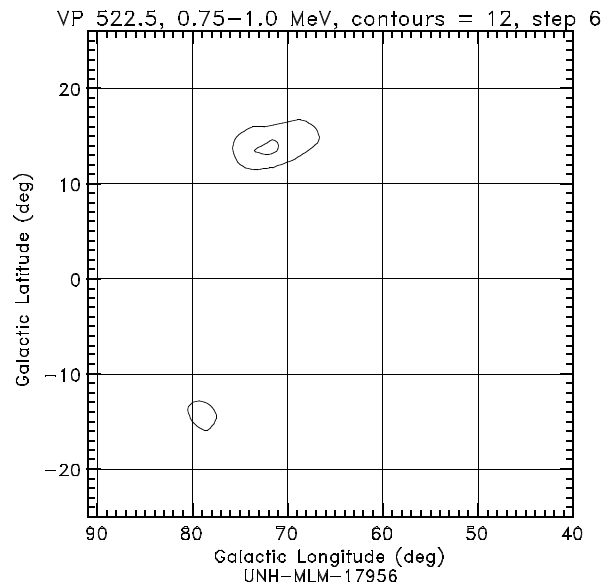
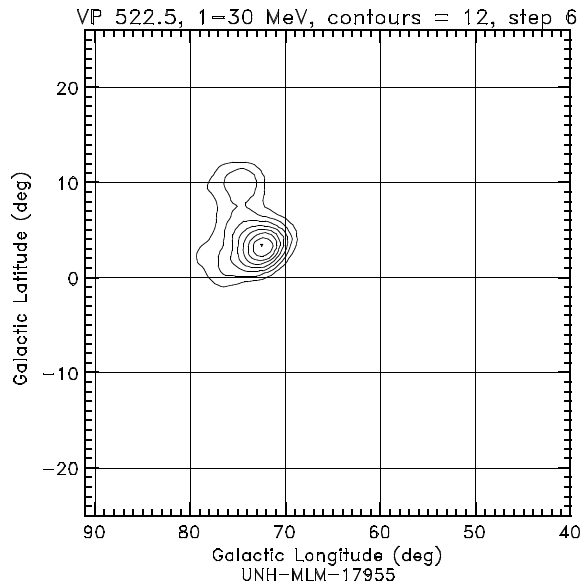


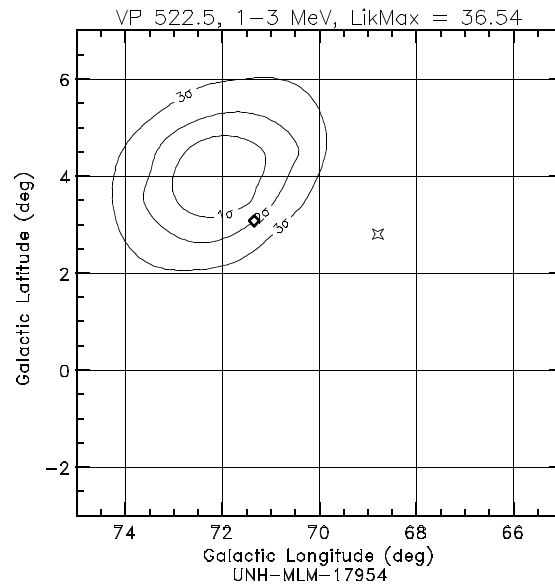
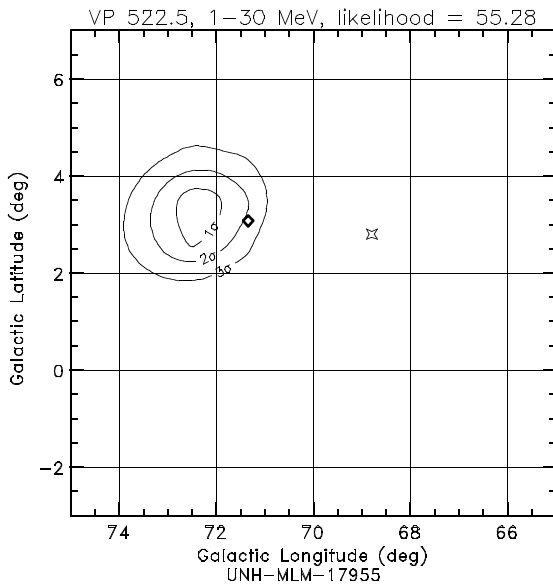
Cyg X-1 Target-of-Opportunity

- **Cyg X-1 entered a “high” X-ray state in May:**
 - A “high” X-ray state is characterized by a high flux level at soft X-ray energies and a low flux level at hard X-ray energies.
 - Cyg X-1 spends only about 10% of its time in the “high” state.
 - XTE observed a bright flare (2–12 keV), which began on May 10. From a pre-flare level of 0.5 Crab it brightened to 2 Crab by May 19. (IAUC 6404)
 - Simultaneously, BATSE noted a significant *decrease* in the 20–200 keV flux. (IAUC 6405)
- **A CGRO target-of-opportunity was declared on June 13.**
- **Observations started on June 14 (VP 522.5).**
- **Total observation lasted 11 days (June 14-25).**
- **First batch of data received at UNH on June 24. Second batch arrived on June 28. (Two batches in total.)**
- **First images generated on July 1.**

Cyg X-1 ToO - Images



Cyg X-1 ToO - Location Contours



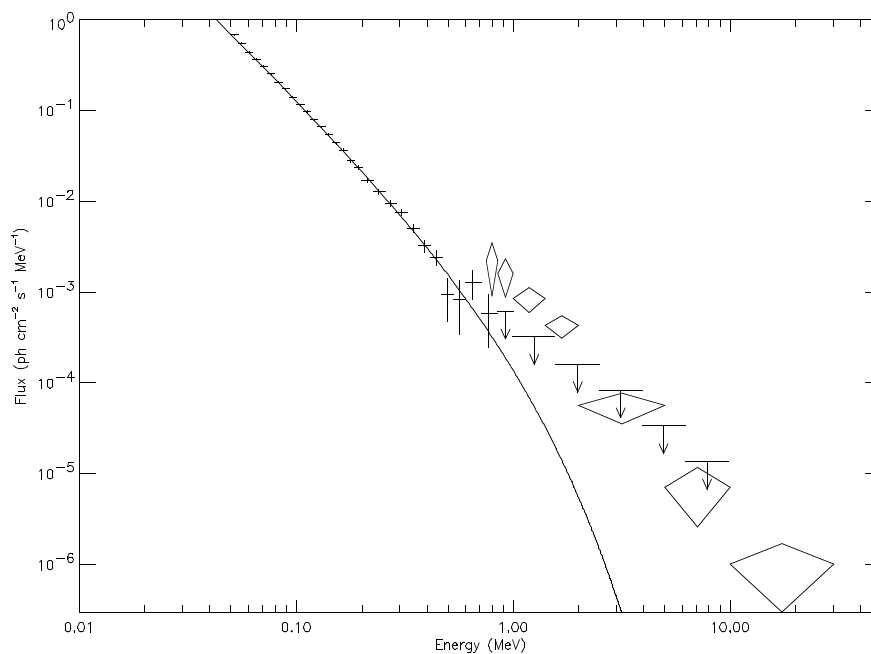
- A clearly defined point-like feature is evident in the data.
- The source is most pronounced in the 1-3 MeV energy range.
- The location contours for both 1-3 and 1-30 MeV are consistent with each other.
- The location contours encompass the location of Cyg X-1, but not the location of PSR 1951+32.

Cyg X-1 ToO - Spectrum of Cyg X-1

Spectrum presented at the last team meeting

- Derived from SRCLIX, modeling both Cyg X-1 and PSR 1951.
- No diffuse model included.
- Spectrum was similar in shape to the average phase 1-3 spectrum, but roughly a factor of ~ 4 higher.
- Show apparent discrepancies with OSSE spectrum.
- BATSE spectrum (from JPL-EBOP) not available.

COMPTEL- OSSE Spectrum from NRL

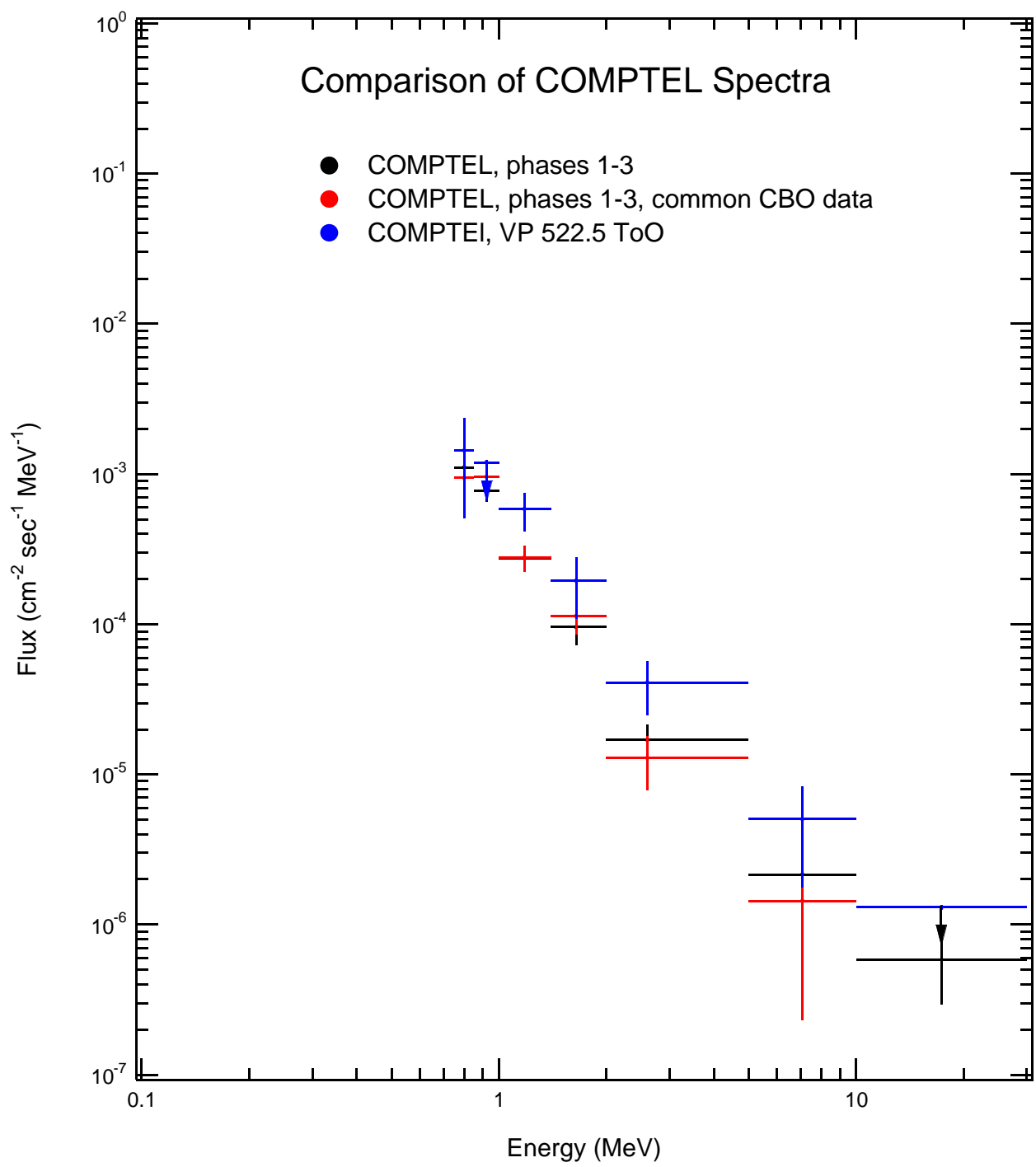


Cyg X-1 ToO - Spectrum of Cyg X-1

Since Last Team Meeting

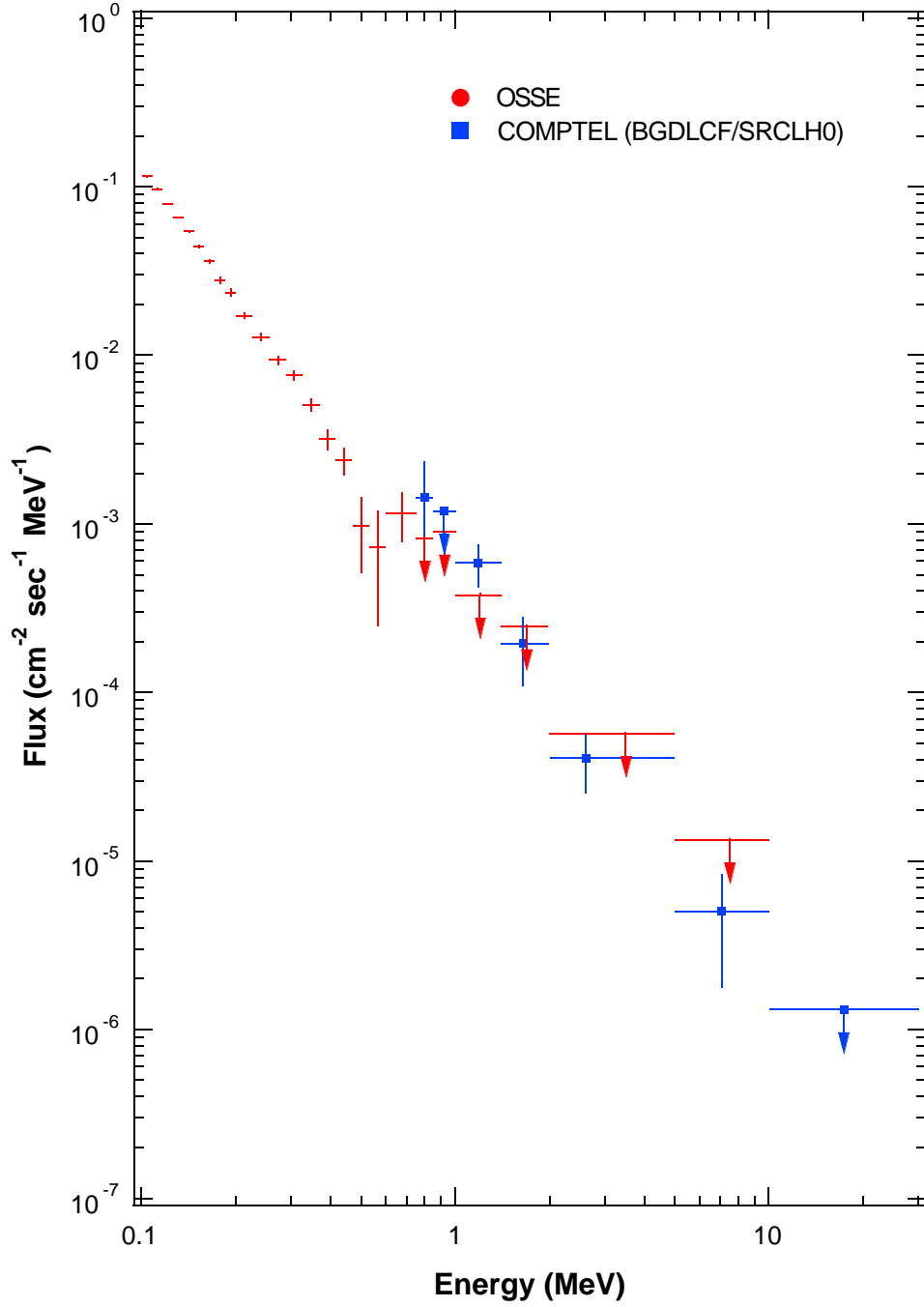
- Repeated analysis using BGDLCF/SRCLH0.
- Incorporated diffuse models (2 models – HI+CO and IC).
- A lack of a positive flux constraint in SRCLIK/SRCLH0 was noted:
 - A negative flux value for PSR 1951 led to enhanced flux for Cyg X-1, sometimes by as much as 50% or more.
 - Since negative fluxes are unphysical, it was decided that one could justify including a source model only if it was statistically justified by the data.
- Agreement between COMPTEL and OSSE has improved.
- Have worked with NRL (Grove, Philips) to obtain OSSE spectrum with same binning as COMPTEL spectrum.
- JPL has not yet received the BATSE data in readable form, so a ToO spectrum from EBOP-BATSE is still not available!?!
 - ⇒ Remember, the standard BATSE occultation technique is only good up to a few hundred keV. In order to have good sensitivity up to ~1 MeV, we need the JPL-EBOP data.
 - ⇒ There is considerable skepticism in some circles regarding the reliability of the JPL-EBOP results.

Comparison of COMPTEL Spectra



Latest COMPTEL-OSSE Spectrum

Cyg X-1 Target-of-Opportunity (VP 522.5)
joint OSSE-COMPTEL spectrum



Cyg X-1 ToO - Summary

- **Cyg X-1 is clearly seen during VP 522.5.**
- **It is most pronounced in the 1-3 MeV energy band.**
- **Weak detection below 1 MeV (hard spectrum?).**
- **Flux levels near 1 MeV are, at most, about a factor of 2-3 above those derived for the average phase 1-3 spectrum.**
- **If we can believe the joint COMPTEL-OSSE spectrum, there is evidence for an enhanced tail (or "bump") near 1 MeV. (Note the OSSE point just below the COMPTEL threshold.)**
- **Further action has been on hold, awaiting some additional input from JPL-EBOP... Perhaps we should simply proceed with publication with just the OSSE-COMPTEL data?**