

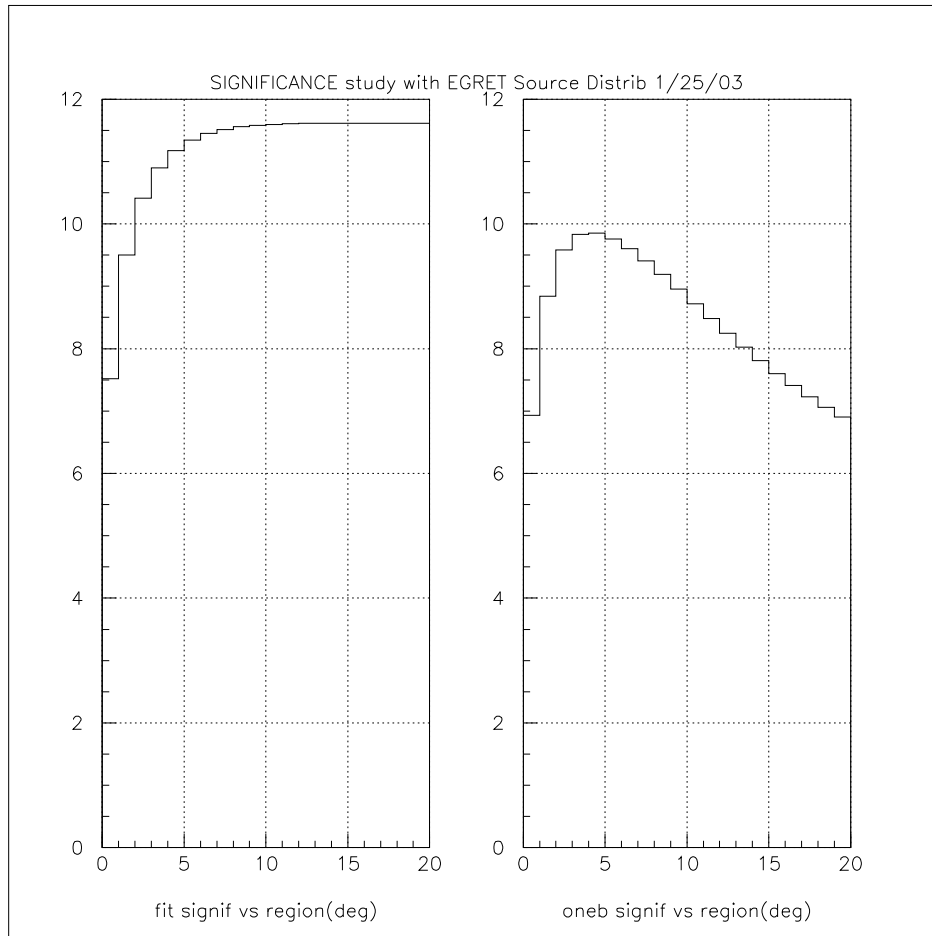
Milagro Collaboration Meeting
University of Maryland
March 27-28, 2003

Galactic Plane: Sensitivities.

Roman Fleysher and Peter Nemethy

- SENSITIVITY to SIGNAL (Analytic Calculation.)
- SENSITIVITY to CORRECTIONS (Simulations.)
- SENSITIVITY to CORRECTIONS (Data.)

SENSITIVITY to GAL SIGNAL with EGRET FOOTPRINT

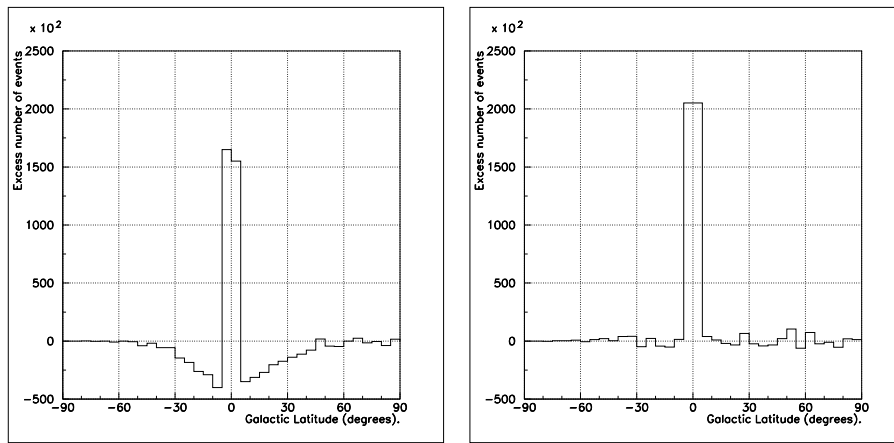


Relative Significance:

- FIT to EGRET SHAPE: 1.2
- SINGLE BIN +/-5deg: 1.0
- SINGLE BIN +/-2deg: 0.88

Importance of Excluding Signal Region.

MC Study: Serious local background distortion when Signal Region is not excluded.



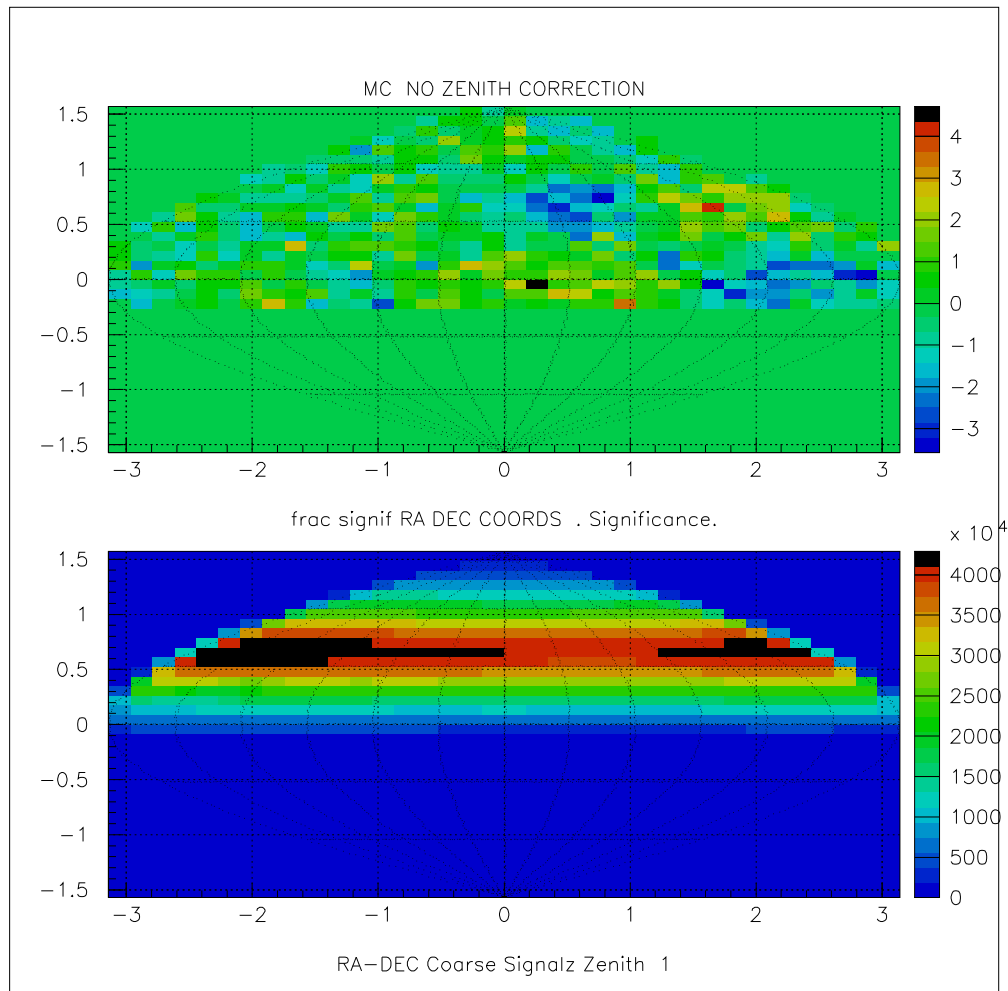
(a) Excess number of events N_γ as a function of Galactic Latitude. Source region is not excluded.

(b) Excess number of events N_γ as a function of Galactic Latitude. The region of $\pm 7^\circ$ around Galactic equator is excluded. Modified time swapping method is used.

Figure 9.1: Plots showing the results of Monte Carlo simulations with uniform Galactic signal flux being 0.0088 that of background in the region of $\pm 5^\circ$ around the Galactic equator. The expected bin content is about 205000.

25% Signal (or Significance) Loss when Signal Region is not excluded.

Background Structure from Zenith Breathing. RA-DEC Coordinates.

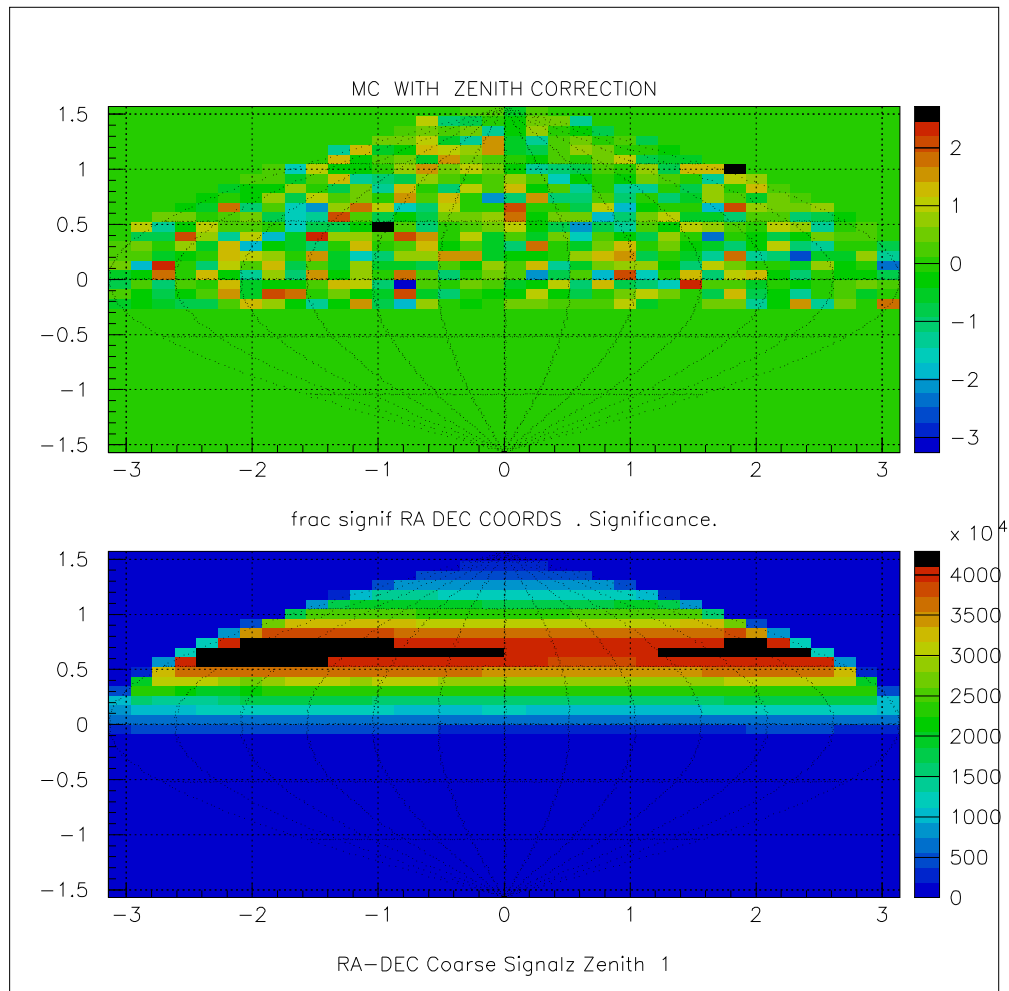


High Statistics (48 month equiv.) M.C. simulation study of single 2-month period.

We see large-angular-scale coherent structure.

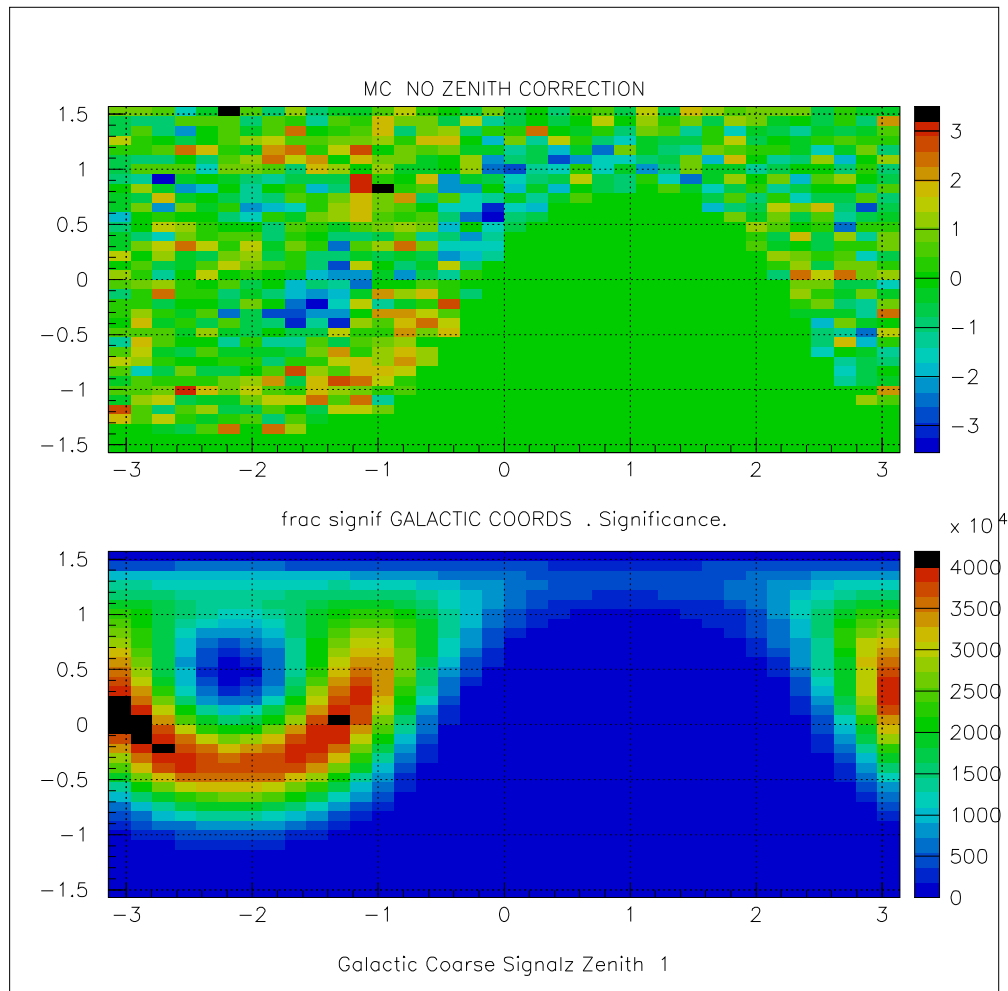
Expect some cancellation (shifting phase) over a year.

Background Structure from Zenith Breathing. RA-DEC Coordinates.



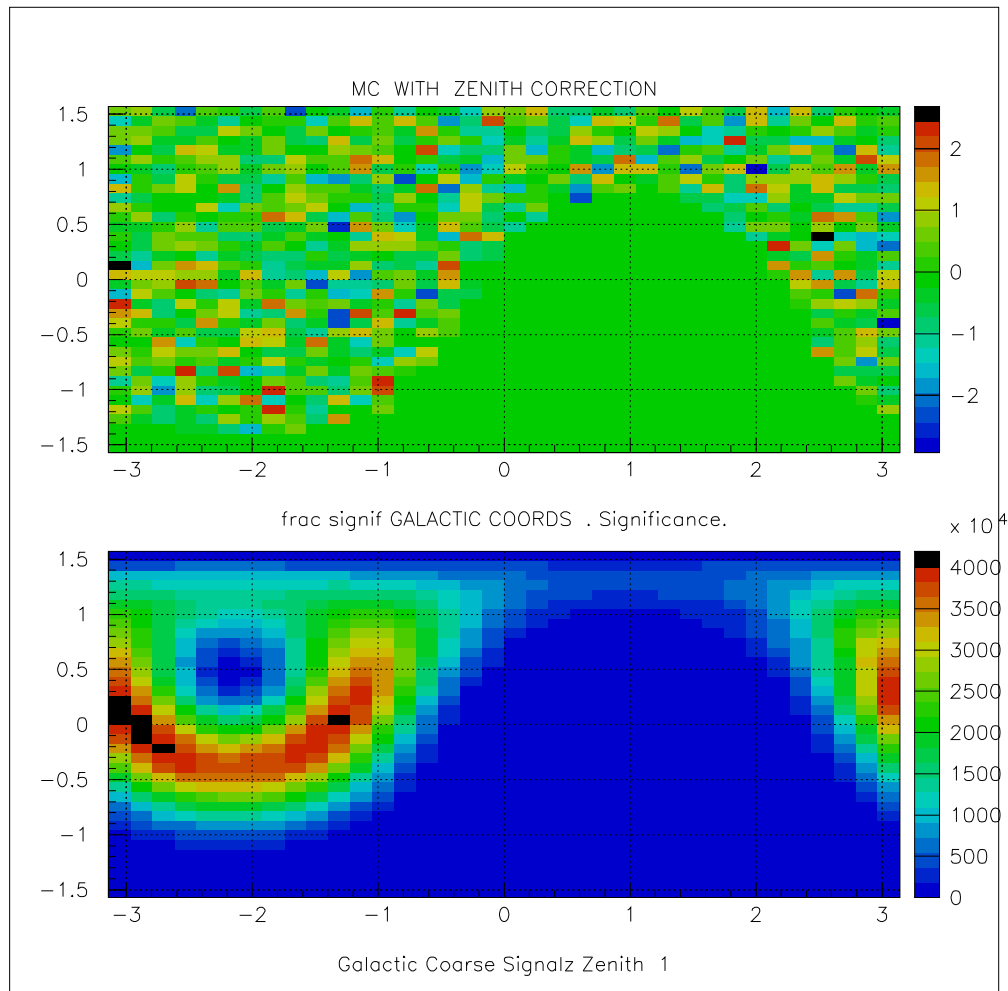
Large-angular-scale coherent structure removed.

Background Structure from Zenith Breathing. Galactic Coordinates.



We see large-angular-scale coherent structure.

Background Structure from Zenith Breathing. Galactic Coordinates.



Large-angular-scale coherent structure removed.

MC Study: Zenith Breathing Correction vs None.

Single Bin Analysis, Milagro INNER GALAXY.

High Statistics (48month equiv.) M.C. simulation study of single 2-month period.

Apparent Fractional Signals, in units of 10^{*-4} :

REGION	NO Z.B.CORR.	WITH Z.B.CORR.
+/-2deg	- 2.94 +/- 0.87	-1.12 +/- 0.87
+/-5deg	- 2.50 +/- 0.57	- 1.13 +/- 0.57

DATA: SENSITIVITY to CORRECTIONS

TURNING OFF the SIGNAL REGION EXCLUSION.

Single Bin Analysis: Milagro Inner Galaxy.

14month Data Set.

Fractional Signals, in units of 10^{*-4} :

REGION	FULL CORR.	NO EXCLUSION.
+/-2deg SIGNIF	4.57 +/- 1.64 (2.8 sigma)	3.68 +/- 1.63 (2.2 sigma)
+/-5deg SIGNIF	3.77 +/- 1.18 (3.5 sigma)	2.63 +/- 1.06 (2.5 sigma)

DATA: SENSITIVITY to CORRECTIONS

NO CORRECTIONS: TURNING OFF the SIGNAL REGION EXCLUSION and the ZENITH BREATHING CORRECTION.

REGION	FULL CORR.	NO CORRECTION.
+/-2deg SIGNIF	4.57 +/- 1.64 (2.8 sigma)	2.93 +/- 1.63 (1.8 sigma)
+/-5deg SIGNIF	3.77 +/- 1.18 (3.5 sigma)	2.50 +/- 1.06 (2.3 sigma)

DATA: SENSITIVITY to BREATHING CORRECTION

Single Bin Analysis. Milagro Inner Galaxy.

14month Data Set.

Fractional Signals, in units of 10^{-4} .

SIGNAL(Breath.Corr.) - SIGNAL(No Breath.Corr.):

REGION	SUMMER	WINTER	ALL
+/-2	1.71	- 0.78	0.62
+/-5	0.81	-0.78	0.33

Opposite Sign for Summer and Winter.

Some Cancellation for All = Summer plus Winter.