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Erratum: "Search for sub-TeV Neutrino Emission from Novae with IceCube-DeepCore" (2023, ApJ, 953, 160)

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The flux upper limits calculated using the GRECO Astronomy data set initially reported in the published article are underestimated by a factor of 2, and the effective area is overestimated by the same factor. Event weights, calculated from a simulated neutrino

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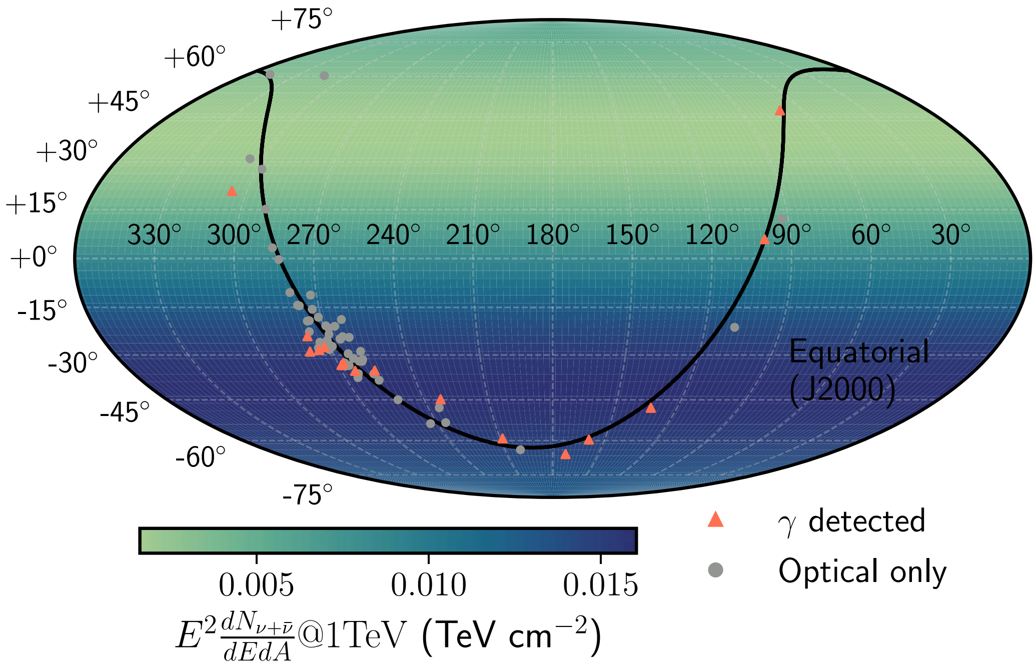

Figure 1. Locations of novae investigated in this work. Those novae that were identified in GeV gamma-rays are shown in orange, while those only detected at other wavelengths are shown in gray. These novae are shown on top of the sensitivity (described fully in Section 4) that our unstacked analysis (described in Section 4.1) would have to a single nova, assuming an analysis time window of 1 day.

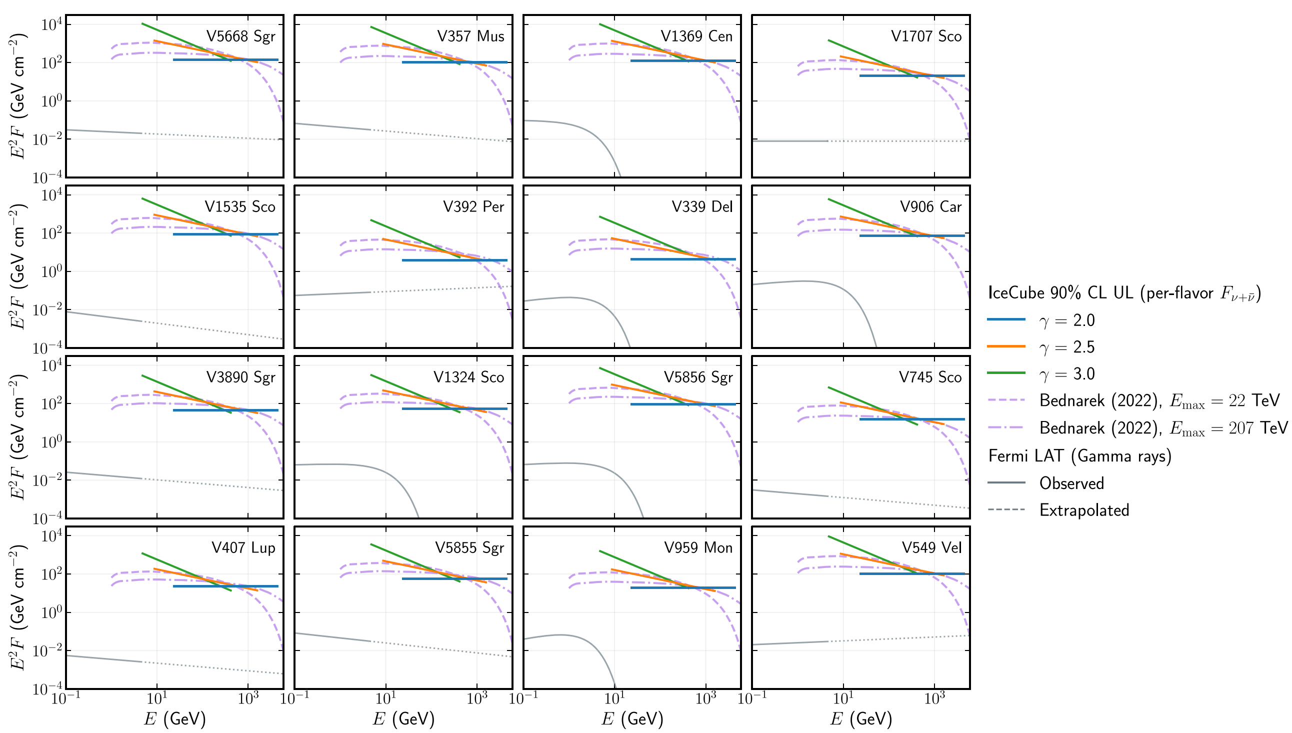

Figure 4. Upper limits on neutrino emission from all of the novae analyzed in the gamma-ray correlation analysis. Upper limits on power laws span the 90% energy ranges discussed in Figure 9, and include systematic effects as discussed in Section 4.3. In addition to constraining power laws, we also inject the spectral shapes from models in Bednarek & Śmiałkowski (2022) and our upper limits on those spectra are shown in pink. We compare these fluxes to the measured gamma-ray fluxes (gray). For those gamma-ray detected novae that did not show evidence for a cutoff in the gamma-ray spectra, we show the lines as dotted past the global cutoff energy found in Franckowiak et al. (2018).

signal, are used to convert the best-fit number of signal events, $\hat{n}_s$, to the time-integrated flux for the combination of neutrinos and antineutrinos, $F_{\nu+\bar{\nu}}$, assuming equal flux of ν and $\bar{\nu}$. Initially, the event weights incorrectly assumed the summed flux of ν and $\bar{\nu}$ instead of the average flux. Using event weights for the summed flux of ν and $\bar{\nu}$ double counts the factor of 2, which is already included in the conversion from $\hat{n}_s$ to $F_{\nu+\bar{\nu}}$. The corrected Figures 1, 4, 6 (left panel), 8, and 11 and Table 1 are shown here, where $F_{\nu+\bar{\nu}}$ represents the combined neutrino and antineutrino fluxes.

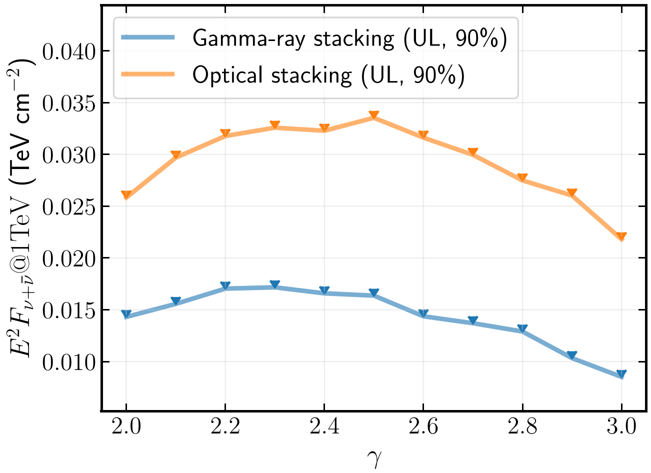

Figure 6. (Left panel) Upper limits on the stacked neutrino fluxes for the gamma-ray stacking (blue) and optical stacking (orange) weighting schemes. This plot shows the energy-scaled time-integrated fluxes from all sources for each weighting scheme. The right panel in the published article remains unchanged. See the main text and figure caption in the published article for further details.

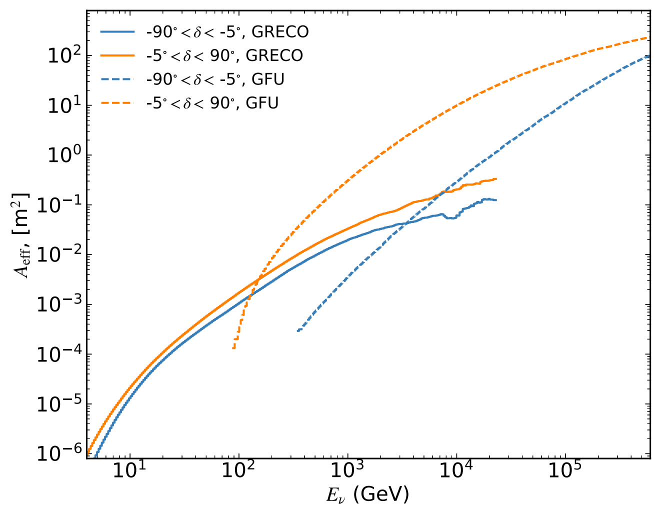

Figure 8. All-flavor, $\nu + \bar{\nu}$ averaged effective area for the low-energy GRECO event selection used for this analysis (solid lines). We include, for comparison, a higher-energy $\nu_\mu + \bar{\nu_\mu}$-only event selection that is often used to search for astrophysical neutrino transients (dashed lines).

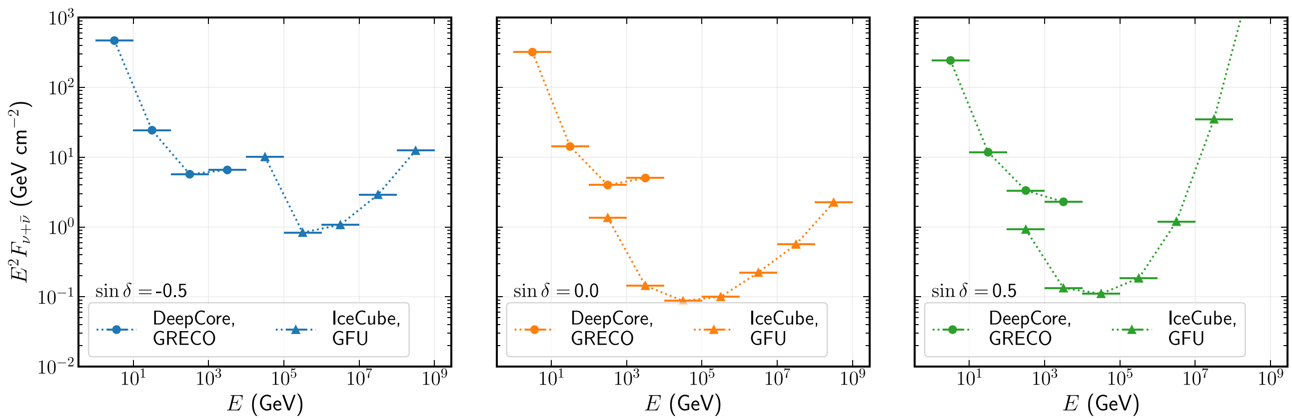

Figure 11. Differential sensitivities for 1000 s timescale transients using the GRECO Astronomy event selection (circles) and comparing to a higher-energy event selection (GFU, triangles). We inject a power-law spectrum with $F_{\nu+\bar{\nu}} \propto E^{-2}$ in each decadal bin. The panels show three representative declinations ($\sin\delta$) in the Southern Hemisphere, at the horizon, and in the Northern Hemisphere.

Table 1
Results from the Gamma-Ray Correlation Analysis

Name	α	δ	MJD_{start}	MJD_{stop}	ΔT (days)	$\mathcal{TS}$	$\hat{n}_s$	$\hat{\gamma}$	Pre-trial p-value	$E^2 F_{\nu+\bar{\nu}}$ at 1 TeV (GeV cm^{-2})
V1324 Sco	267.7°	−32.6°	56093.0	56110.0	17.0	0.00	0.0	⋯	1.000	52.9
V959 Mon	99.9°	+5.9°	56097.0	56119.0	22.0	1.14	14.8	2.75	0.197	19.5
V339 Del	305.9°	+20.8°	56520.0	56547.0	27.0	0.00	0.0	⋯	1.000	4.21
V1369 Cen	208.7°	−59.2°	56634.0	56672.0	38.0	0.01	3.8	4.00	0.070	125.9
V745 Sco	268.8°	−33.2°	56694.0	56695.0	1.0	0.00	0.0	⋯	1.000	14.9
V1535 Sco	255.9°	−35.1°	57064.0	57071.0	7.0	6.95	59.9	3.02	0.002	85.2
V5668 Sgr	279.2°	−28.9°	57105.0	57158.0	53.0	1.30	62.0	3.16	0.112	139.2
V407 Lup	232.3°	−44.8°	57657.0	57660.0	3.0	0.00	0.0	⋯	1.000	22.4
V5855 Sgr	272.6°	−27.5°	57686.0	57712.0	26.0	0.00	0.0	⋯	1.000	56.6
V5856 Sgr	275.2°	−28.4°	57700.0	57715.0	15.0	5.13	40.3	2.81	0.015	94.0
V549 Vel	132.6°	−47.8°	58037.0	58070.0	33.0	0.22	22.4	4.00	0.062	103.2
V357 Mus	171.6°	−65.5°	58129.0	58156.0	27.0	0.01	5.0	4.00	0.115	104.6
V906 Car	159.1°	−59.6°	58216.0	58239.0	23.0	0.00	0.0	⋯	1.000	73.0
V392 Per	70.8°	+47.4°	58238.0	58246.0	8.0	0.88	15.4	3.64	0.373	3.84
V3890 Sgr	277.7°	−24.0°	58718.0	58739.0	21.0	0.00	0.0	⋯	1.000	45.1
V1707 Sco	264.3°	−35.2°	58740.0	58744.0	4.0	0.00	0.0	⋯	1.000	21.2

Note. MJD_{start} and MJD_{stop} represent the beginning and end of when a nova was detected by Fermi-LAT, respectively. This is the same time window used for the neutrino search. The observed test statistic ($\mathcal{TS}$), best-fit number of signal events ($\hat{n}_s$) and best-fit spectral index ($\hat{\gamma}$) for the neutrino search from each nova are given here. The p-values shown are before accounting for the factor accrued from performing multiple searches. The final column gives the time-integrated flux upper limit for each nova, assuming a power-law spectrum with $\gamma = 2.0$ as defined in Equation (2) and including the systematics discussed in Section 4.3.

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