Looking for ν sources

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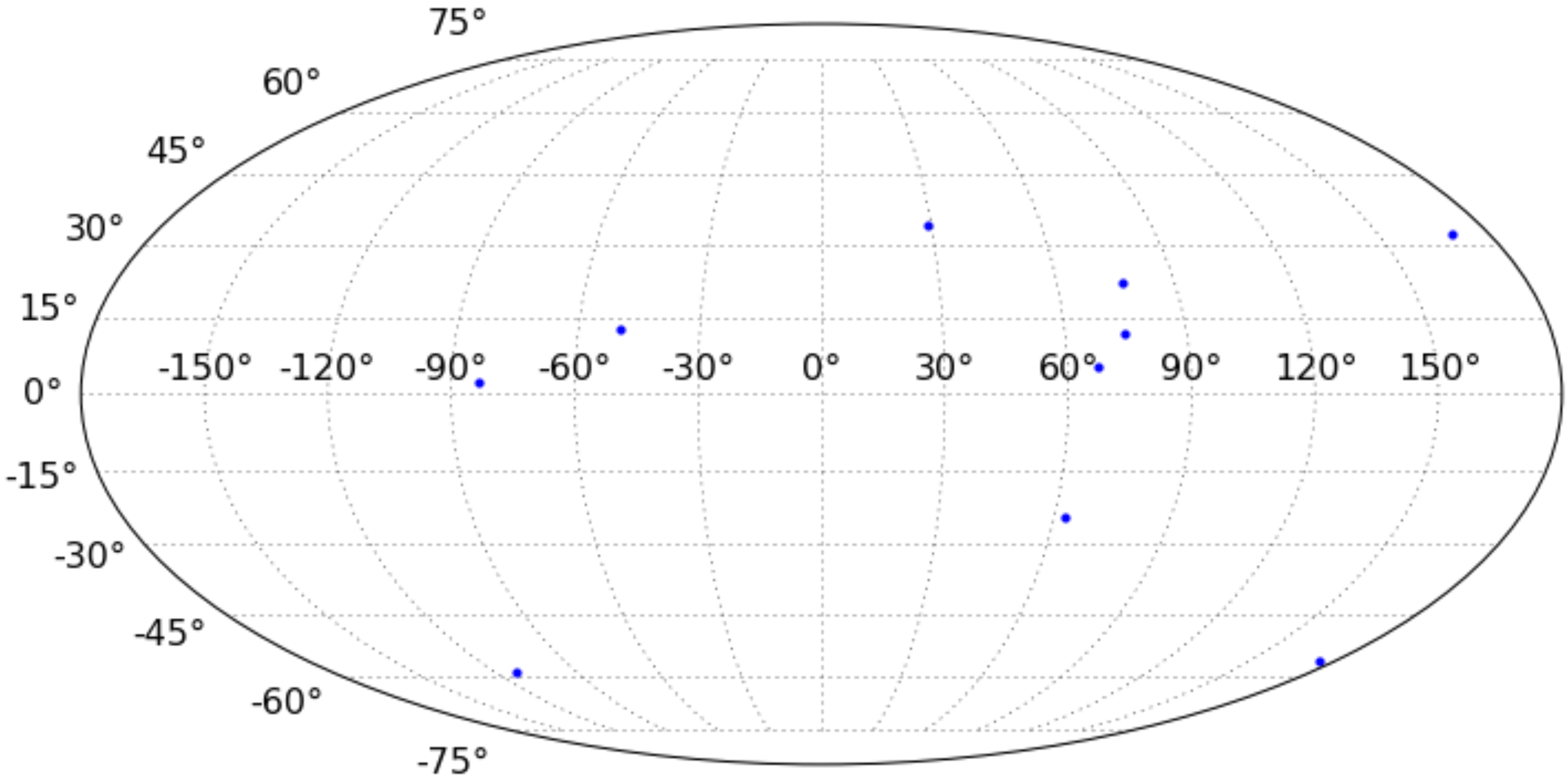
How hard is it to find point sources if we have very low statistics?

Let's illustrate this using Fermi photons with E > 50 GeV.

Fermi >50 GeV photons

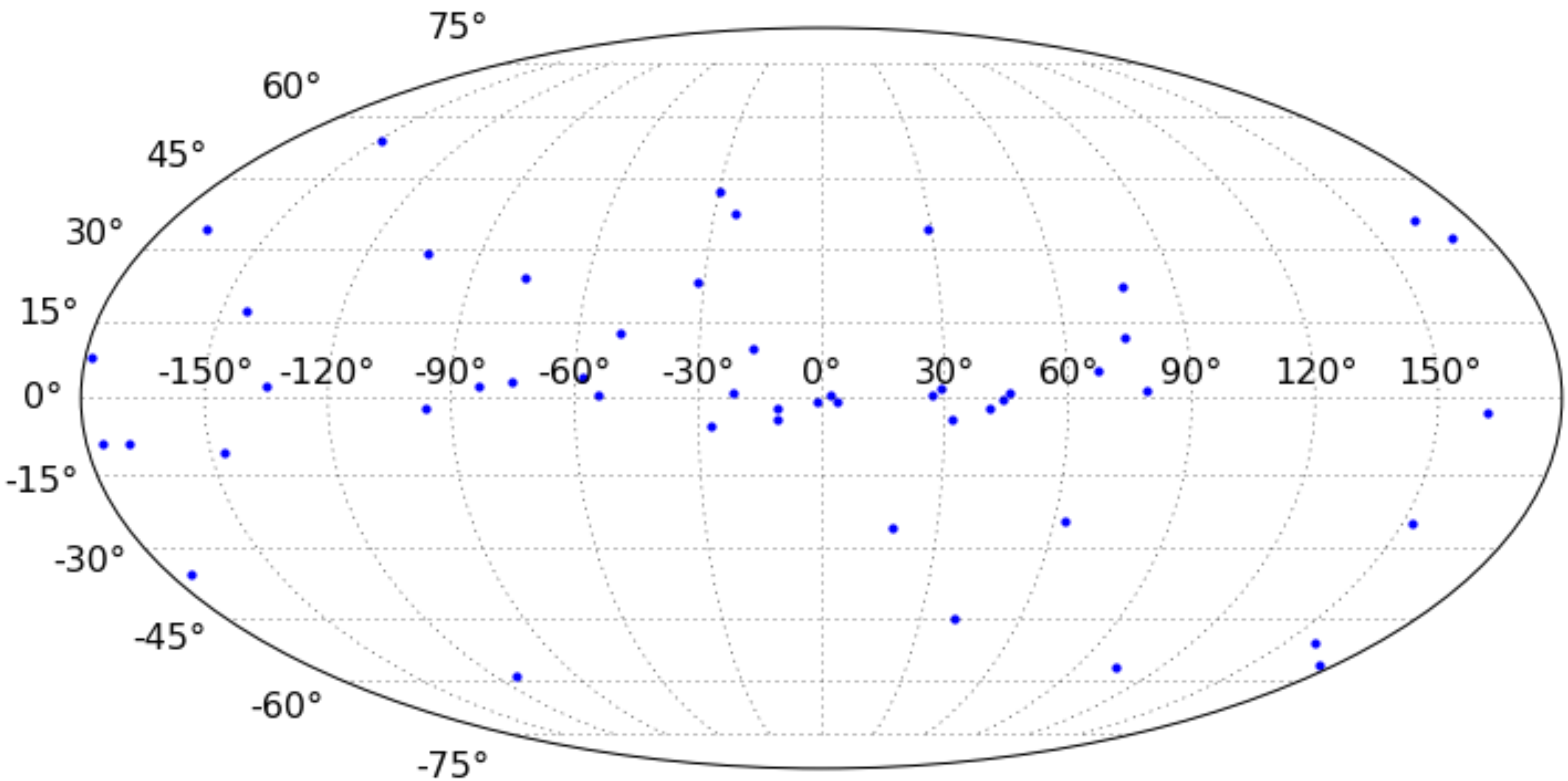
N = 10



- We know the gamma sky > 50 GeV is highly anisotropic (Galactic plane, blazars, etc). How does the sky look if we sample random events from the database?
- Remember that IceCube detects ~10 events/year.

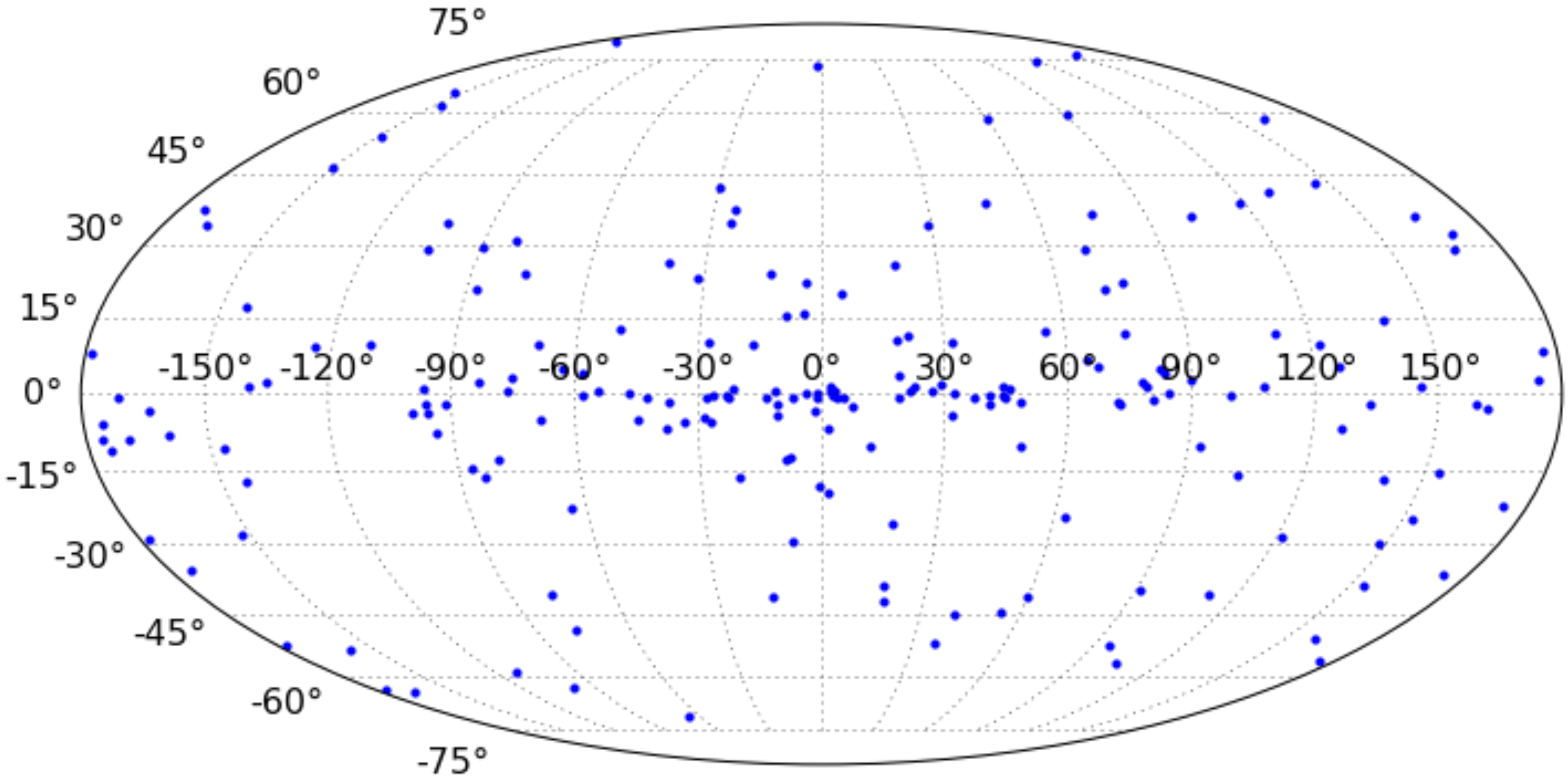
Fermi >50 GeV photons

N = 60



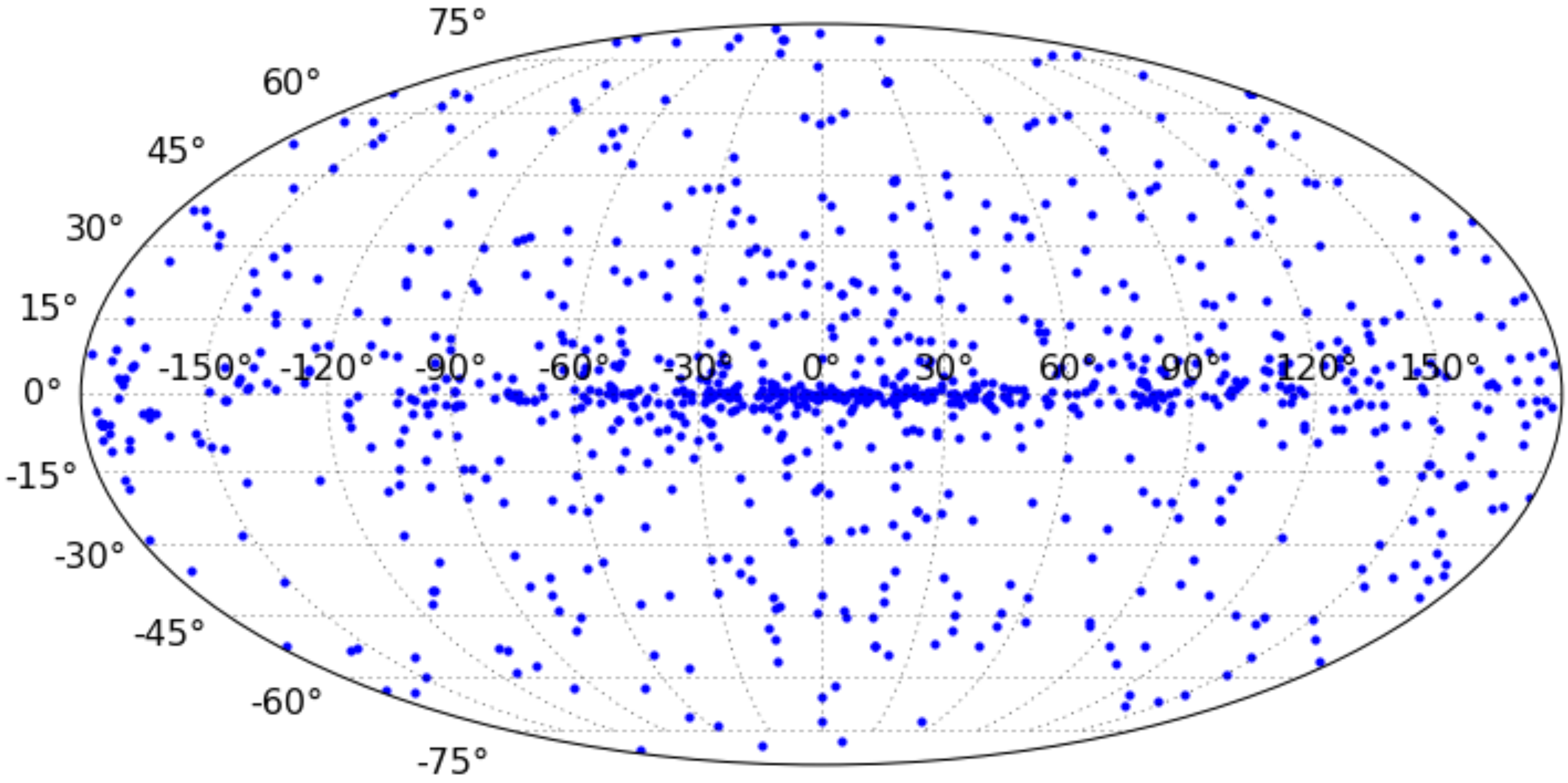
Fermi >50 GeV photons

N = 200



Fermi >50 GeV photons

N = 1000



- Now imagine if 2/3 would had an angular resolution of 15°…
- **Conclusion: it's hard to search for point sources with 10 events/year!**

A taste of the search for neutrino sources

- *Disclaimer*: This is **NOT** a full implementation of the IceCube tools but an illustration of a simpler method plus a quick description of the unbinned likelihood method.

- Install iminuit in your Docker:
  - `pip install iminuit`

- Clone this git repo, launch the jupyter notebook server and open the notebook:
  - `git clone https://github.com/jmsantander/fermi-school-2018.git`
  - `cd fermi-school-2018`
  - `notebook`