Looking into scaling angular resolution parameters for muons for IC22/IC40

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I started out investigating what we could do with Cramer-Rao after Jan's talk at the muon call:

http://butler.physik.uni-mainz.de/I3Wiki/index.php/Estimation_of_resolution_and_likelihood_as_cut_parameter
I took the same method as Jan used, to take the separate Azimuth and Zenith sigmas to parameterize, and fitting a Gaussian to the reconstruction error for a slice of sigma values.

For the first part here I use IC22 simulation and paraboloid applied to the 32-iteration llh seed, and used $E^{-2}$ weighted numu.

Cramer-Rao is on the top, Paraboloid on the bottom of the next slides:
So here are the fits for the components we used to scale the sigma parameters:
The peak of the distributions of the adjusted parameters is in the same spot as the paraboloid sigma, but the pull seems to be slightly smaller.
In the end, making this modification to the resolution we get from either the paraboloid or Cramer-Rao has the same result on the discovery potential (top) and sensitivity (bottom) curves when we run Cramer-Rao on the PS data sample. The curves are also on top of what we get from just using the paraboloid sigma.
Before: using one method of parameterizing resolution (SPE32, Cramer-Rao) applied to IC-22 dataset.

After: using a different method, find a way to parameterize MPE to find a correction for the IC-40 dataset.
Moving along to IC40, we are interested in finding some way of scaling the sigma we get from the MPE reconstruction, which we know is too small and doesn't describe the actual event reconstruction uncertainties. For IC40 is is too small by about a factor of 2, getting worse for larger events. Here we look at the MC true energy, where the white circles are made at the median of the vertical slice.
Here are some other energy-dependent parameters, I ended up choosing to use Nchan as the parameter to derive a function to scale the sigma.
Two more for fun...
I tried fitting the log of the Nchan with $E^{-2}$ (top), $E^{-1.5}$ (bottom left) weights and unweighted nugen (bottom right) to see how the fits compared, since they have different amounts of contribution at high Nchan, where the error in the pull is more pronounced.
Here is the comparison of the fits for different weights, the main difference seems to be the height at very high Nchan values.
I had a look at how the $E^{-1.5}$ correction affects various parameters, the mcAz is flat at one, and there is still some structure at very downgoing values of the mc Zenith, but that gets washed out somewhat when we use the reconstructed value for Zenith.
Here are a few more parameters, the pulls for CogZ and NdirC are flat at one.

Nhits has some wiggle at lower values, then coming back to one at high values.
What I want(ed) to do is have a look at the Llh-map applied to MPE and SPE32 fits for the same events, to have a look at the shapes.

How far out is the MPE fit llh-space paraboloid? --is there more than one function, like a narrow parabola that the fitter finds and something wider? --or is the whole shape just steeper than with SPE?