

Vertex fit

Using MC hits

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Vertex fit

MC hits

NueCC files:

- Only using contained events
- Events with 700-950 hits ($E_\nu \sim 10$ TeV) \rightarrow easy comparison with toy MC

Several bugs fixed:

- Some hits were skipped \rightarrow fit bias
- DOM position was used in calculating residuals (instead of PMTs)

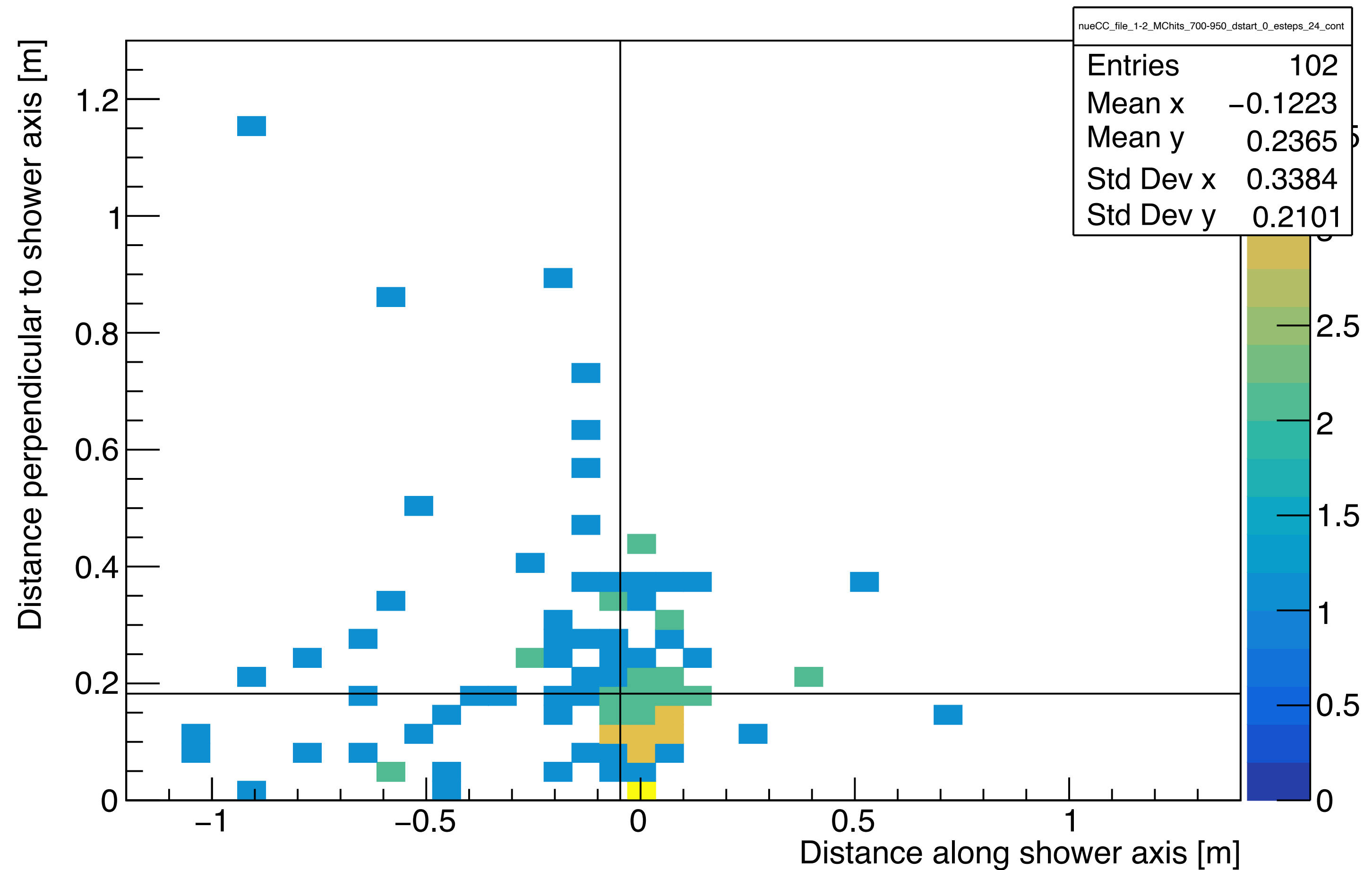
Vertex fit

700 - 950 MC hits, 24 elongation steps, all hits

Vertex resolution

Median resolution (black lines)

- Along shower axis: -0.0473 m
- Perpendicular: 0.183 m



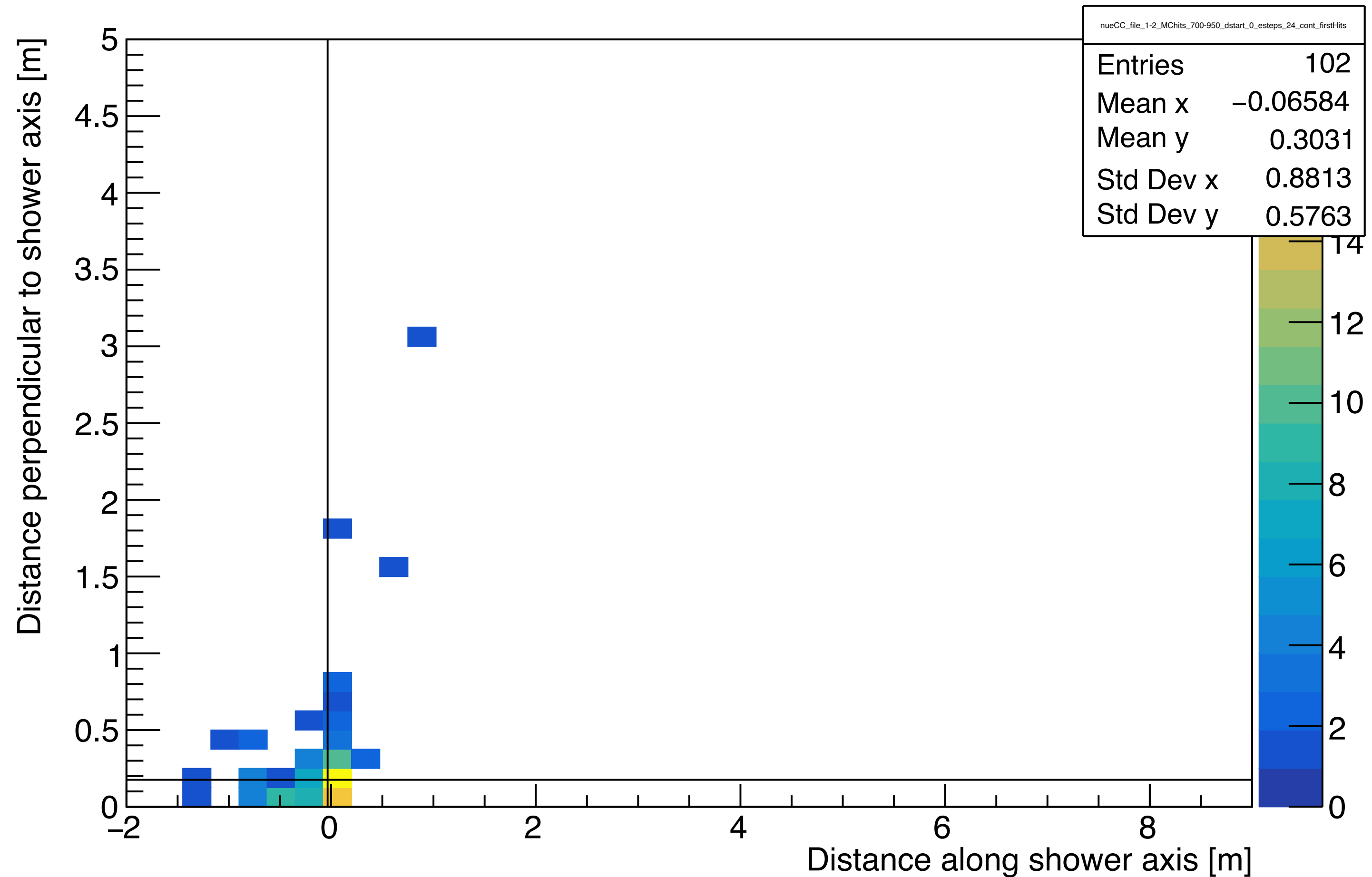
Vertex fit

700 - 950 MC hits, 24 elongation steps, 1st hits

Vertex resolution

Median resolution (black lines)

- Along shower axis: -0.0343 m
- Perpendicular: 0.176 m



Vertex fit

Hits

The same exercise, using hits (after JTriggerEfficiency)

When reconstructing the same events

- Same number of MC hits \rightarrow way fewer hits

For better comparison

- Selecting events with 700-950 hits ($E_\nu \sim 25$ TeV)
(after filtering for background hits)

Vertex fit

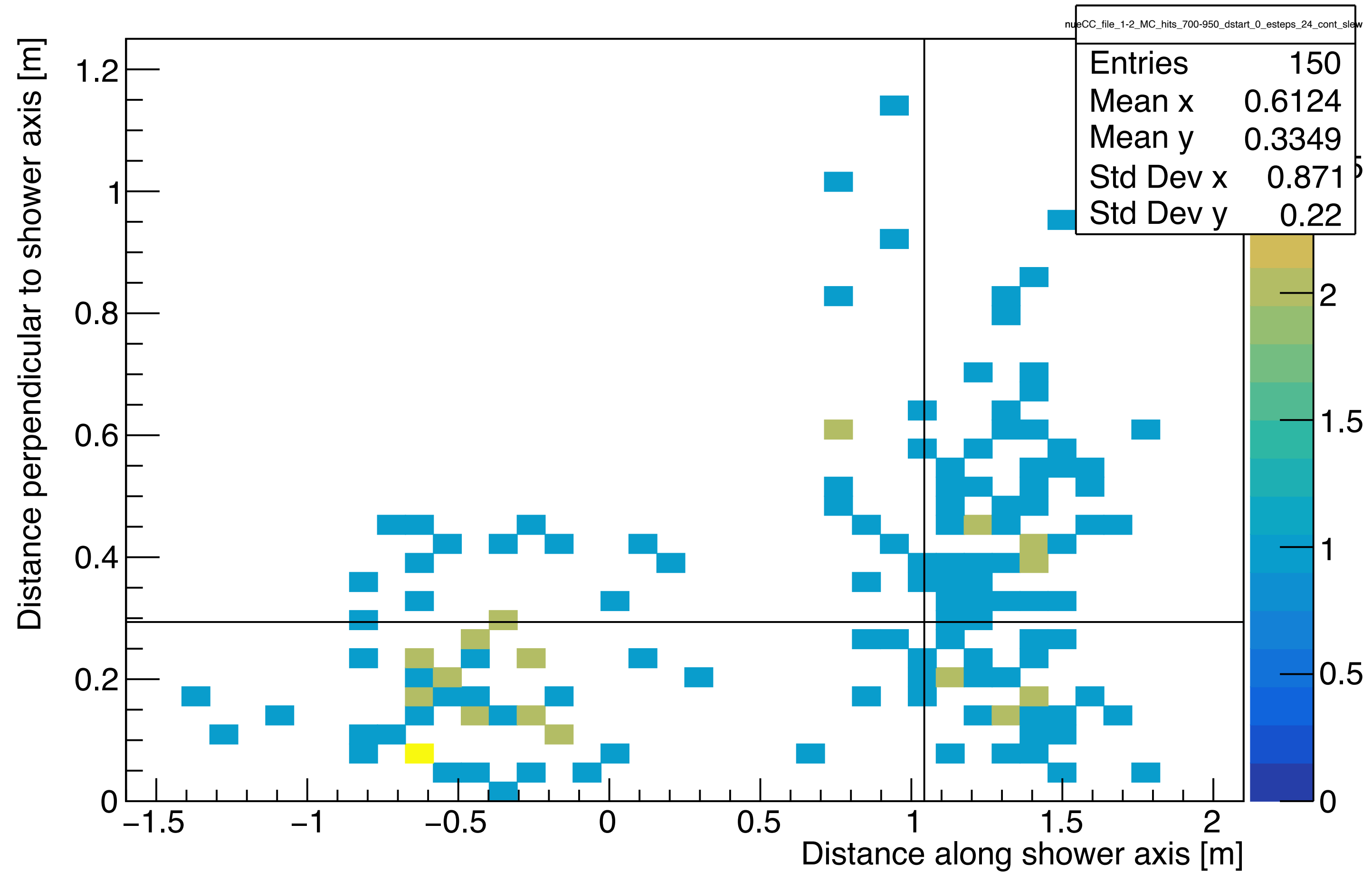
700 - 950 hits, 24 elongation steps, all hits

Vertex resolution

Median resolution (black lines)

- Along shower axis: 1.04 m
- Perpendicular: 0.294 m

Two populations: *before* or *after* the shower



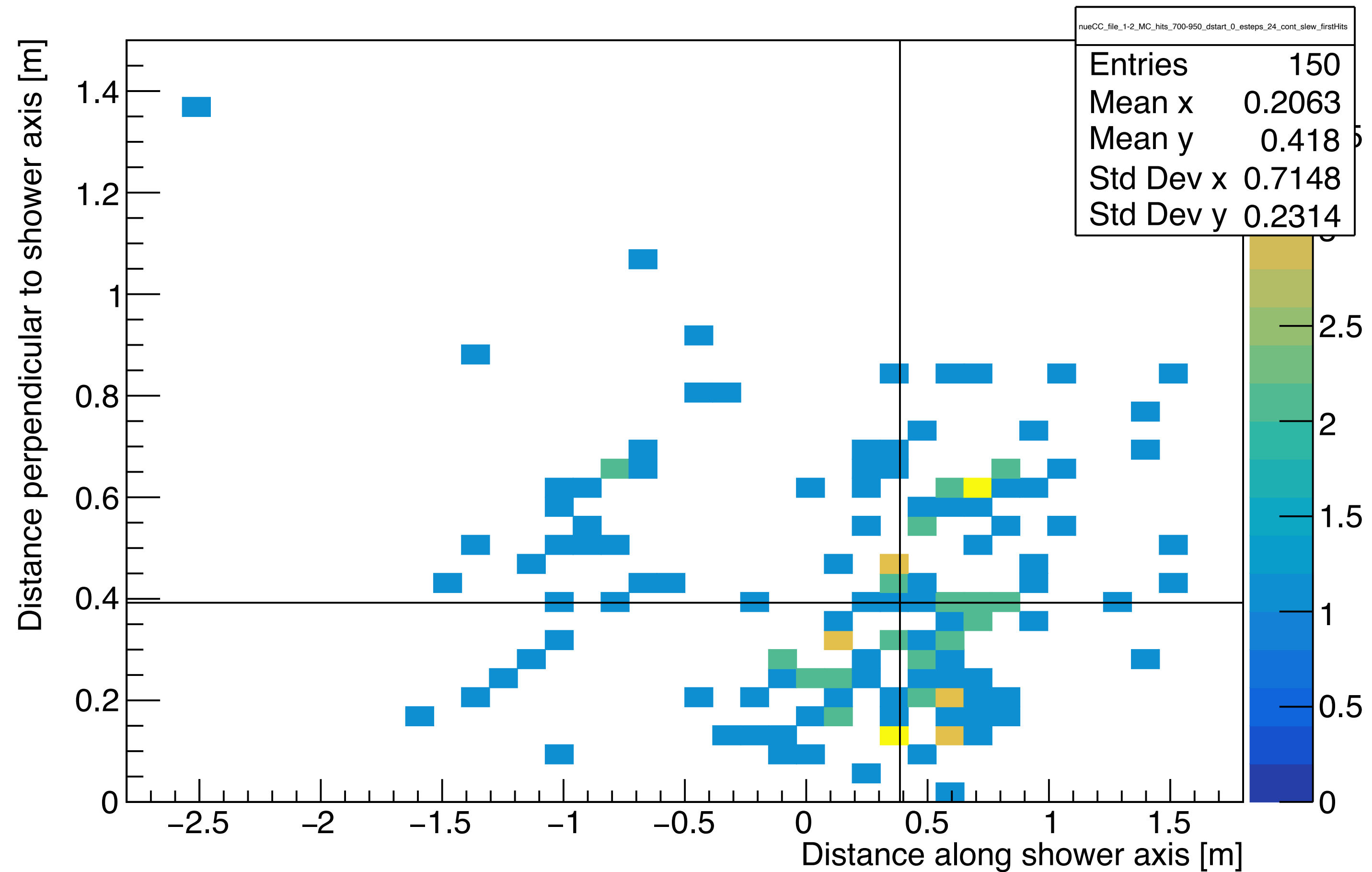
Vertex fit

700 - 950 hits, 24 elongation steps, 1st hits

Vertex resolution

Median resolution (black lines)

- Along shower axis: 0.386 m
- Perpendicular: 0.392 m



To do

- Study the performance for hits
- Check performance for both MC and normal hits over the full energy range