Reconstruction Chain Studies
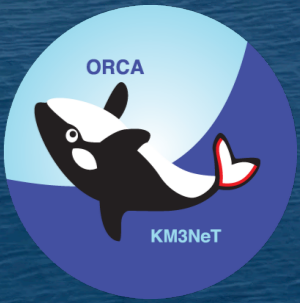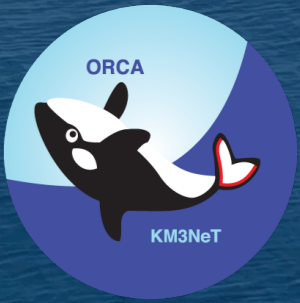
ORCA Osc. WG phone call,
Brían Ó Fearraigh, September 2019
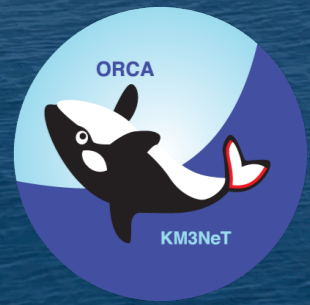
- Discussion of two eLog posts: https://elog.km3net.de/Computing+and+Software/353 and https://elog.km3net.de/Computing+and+Software/346
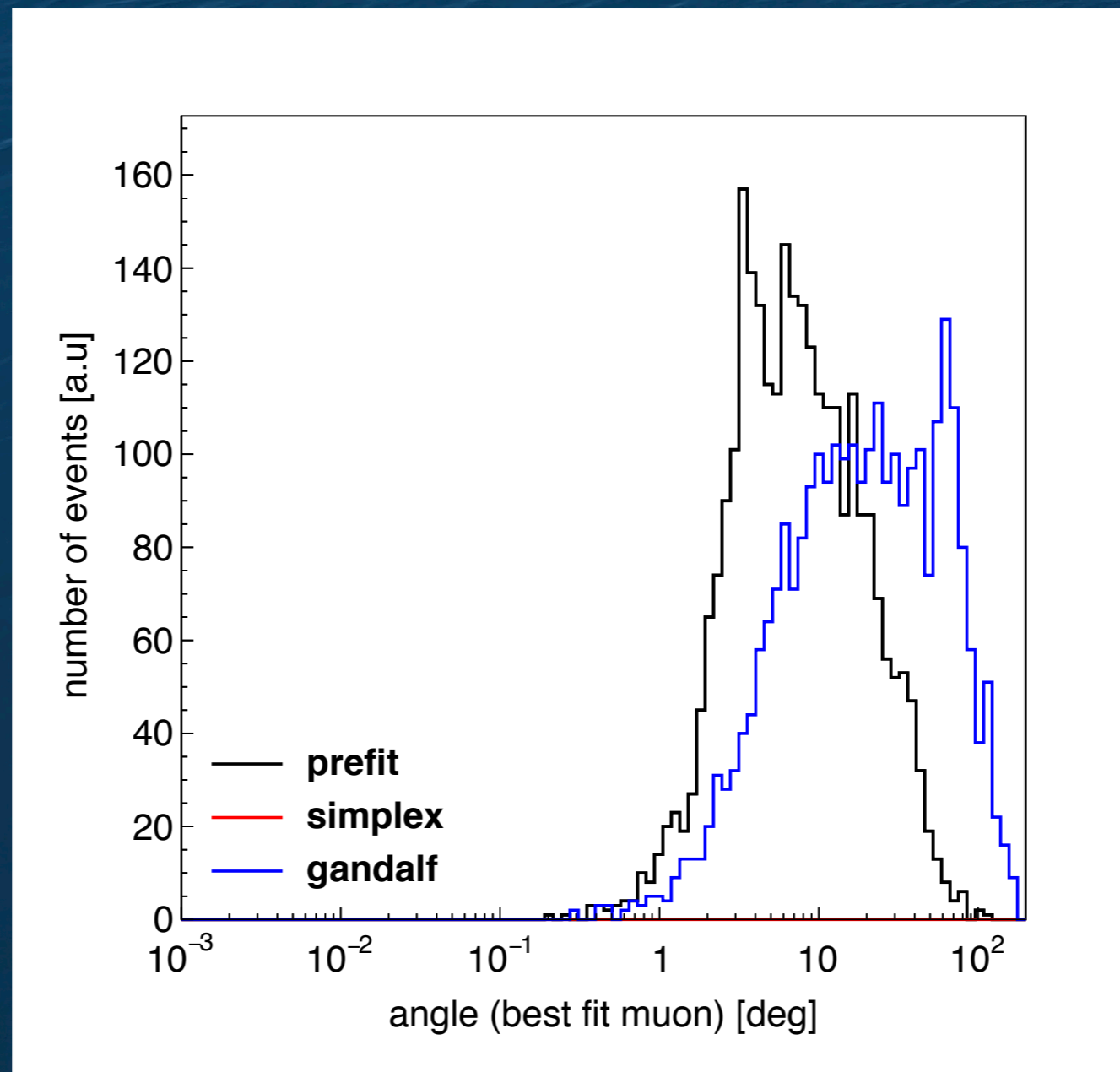
Inclusion of L0 hits in JPrefit

- JORCAPrefit, and JPrefit in the MC production scripts, includes L0 hits.
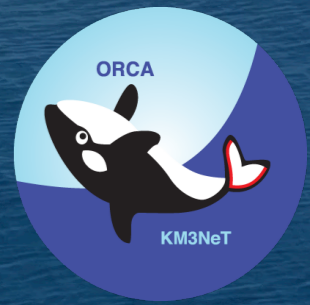
- *JPrefit -U* option to use L0s.

Inclusion of L0 hits in JPrefit

- Inclusion of many more events results in a better efficiency, but poorer median angular deviation.
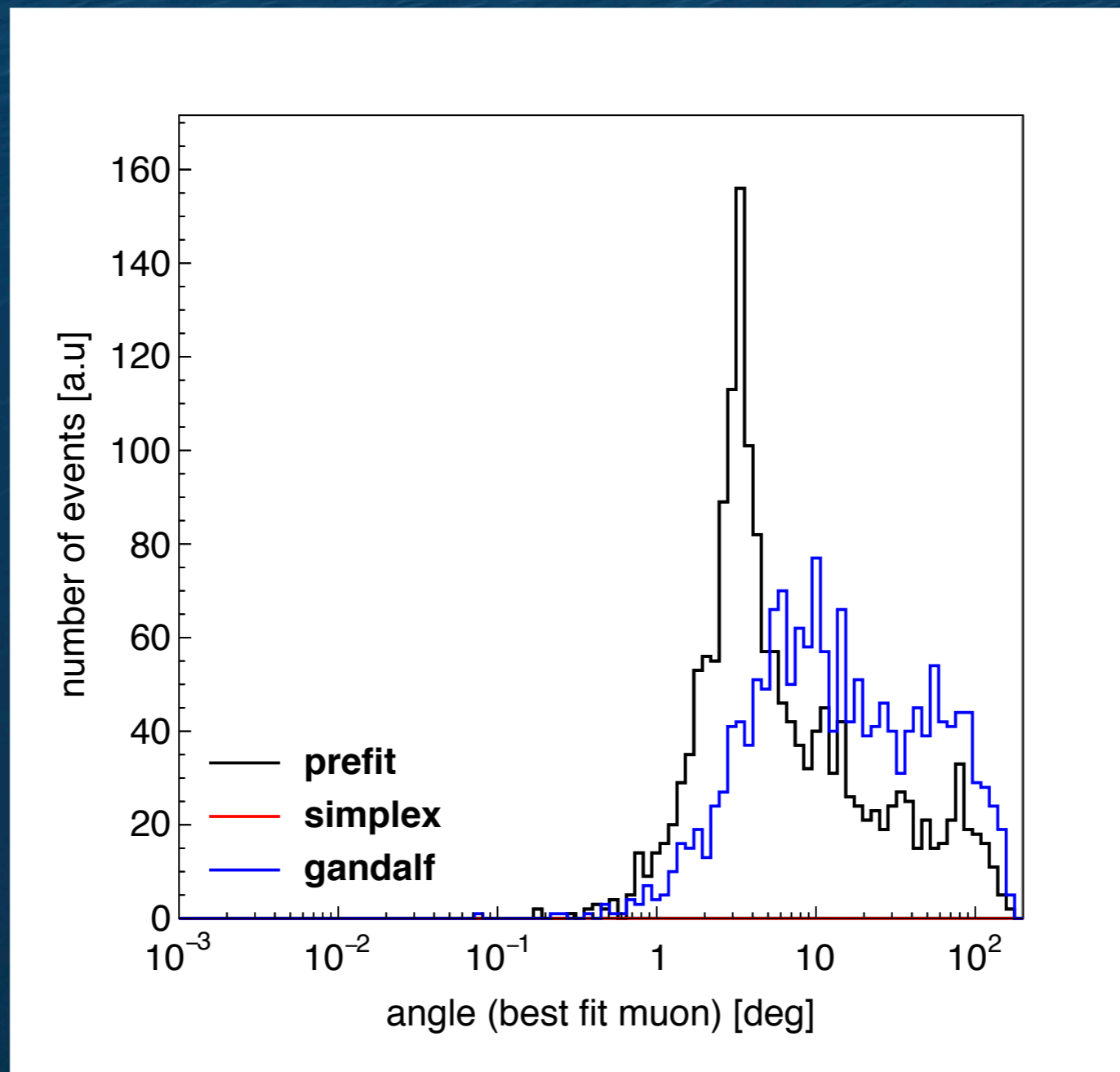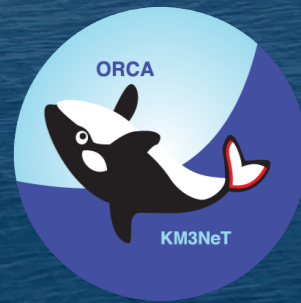

with L0 hits

Inclusion of L0 hits in JPrefit

- Inclusion of many more events results in a better efficiency, but poorer median angular deviation.
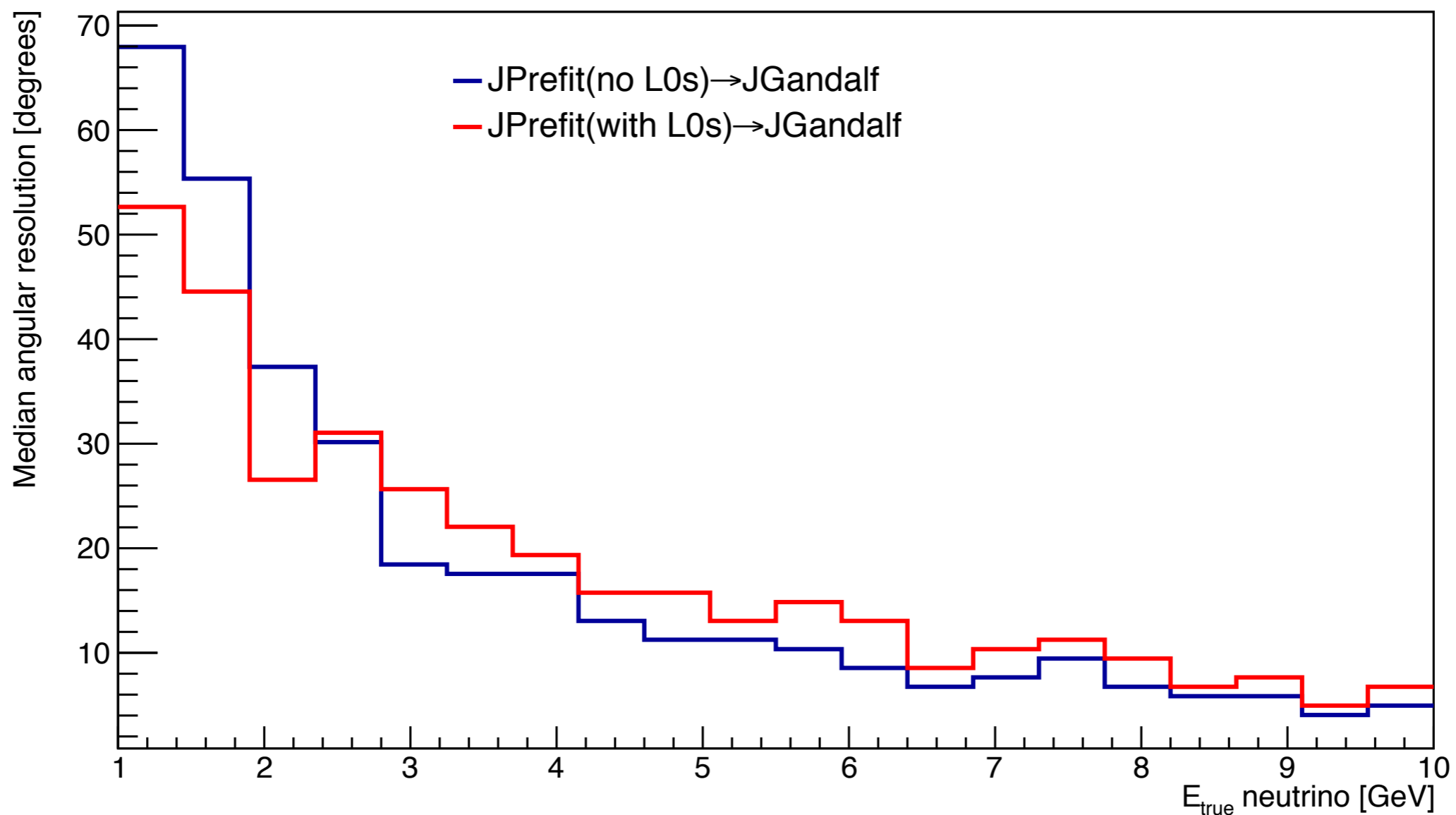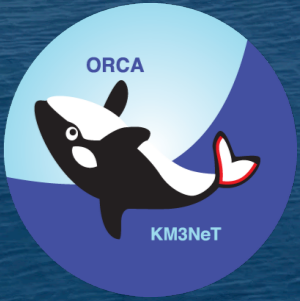

no L0 hits

Inclusion of L0 hits in JPrefit

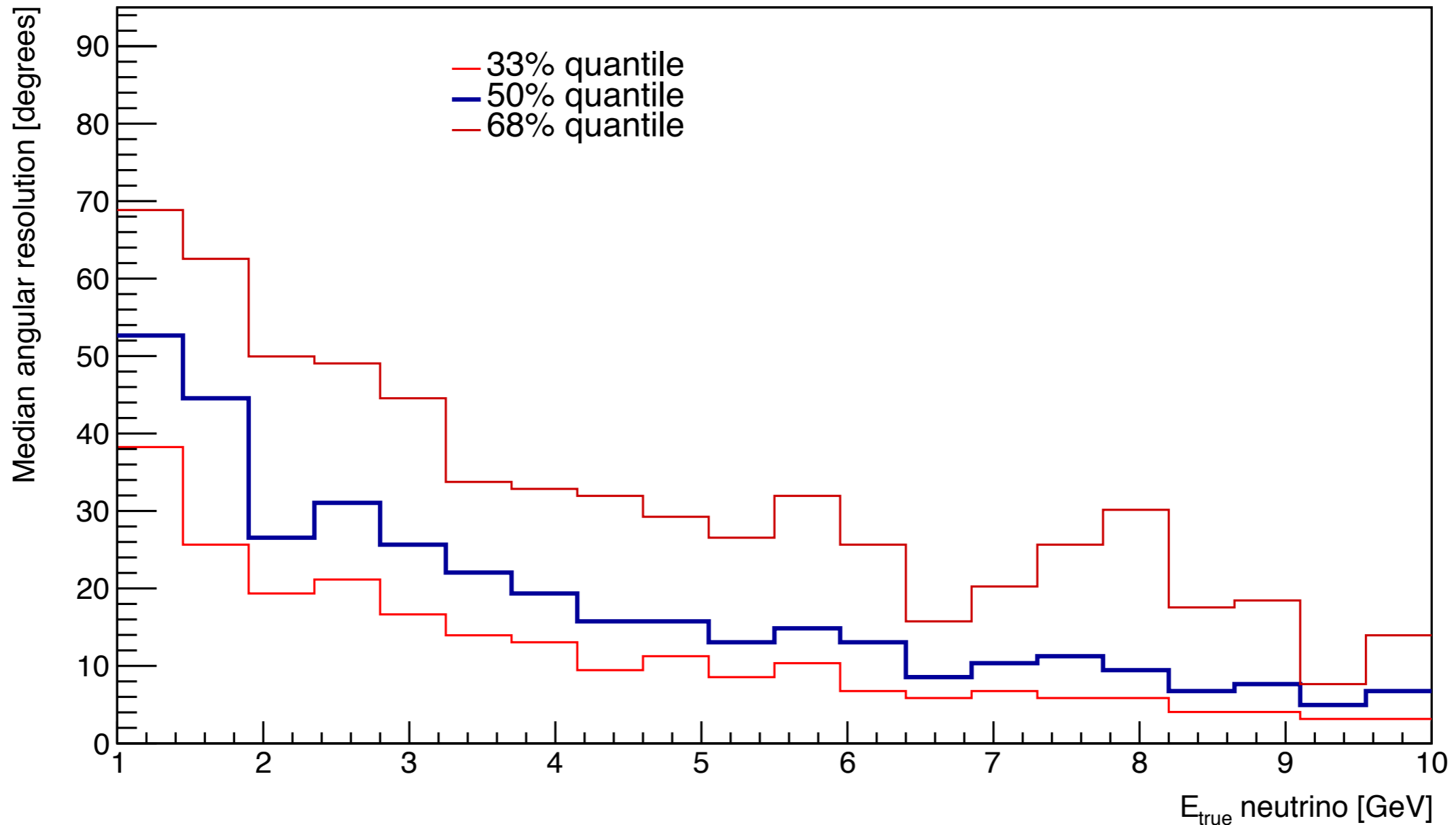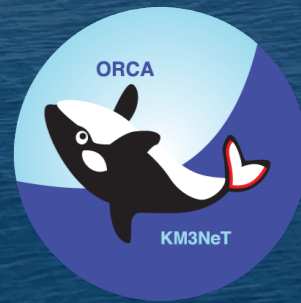- Slightly better median angular resolution

Inclusion of L0 hits in JPrefit

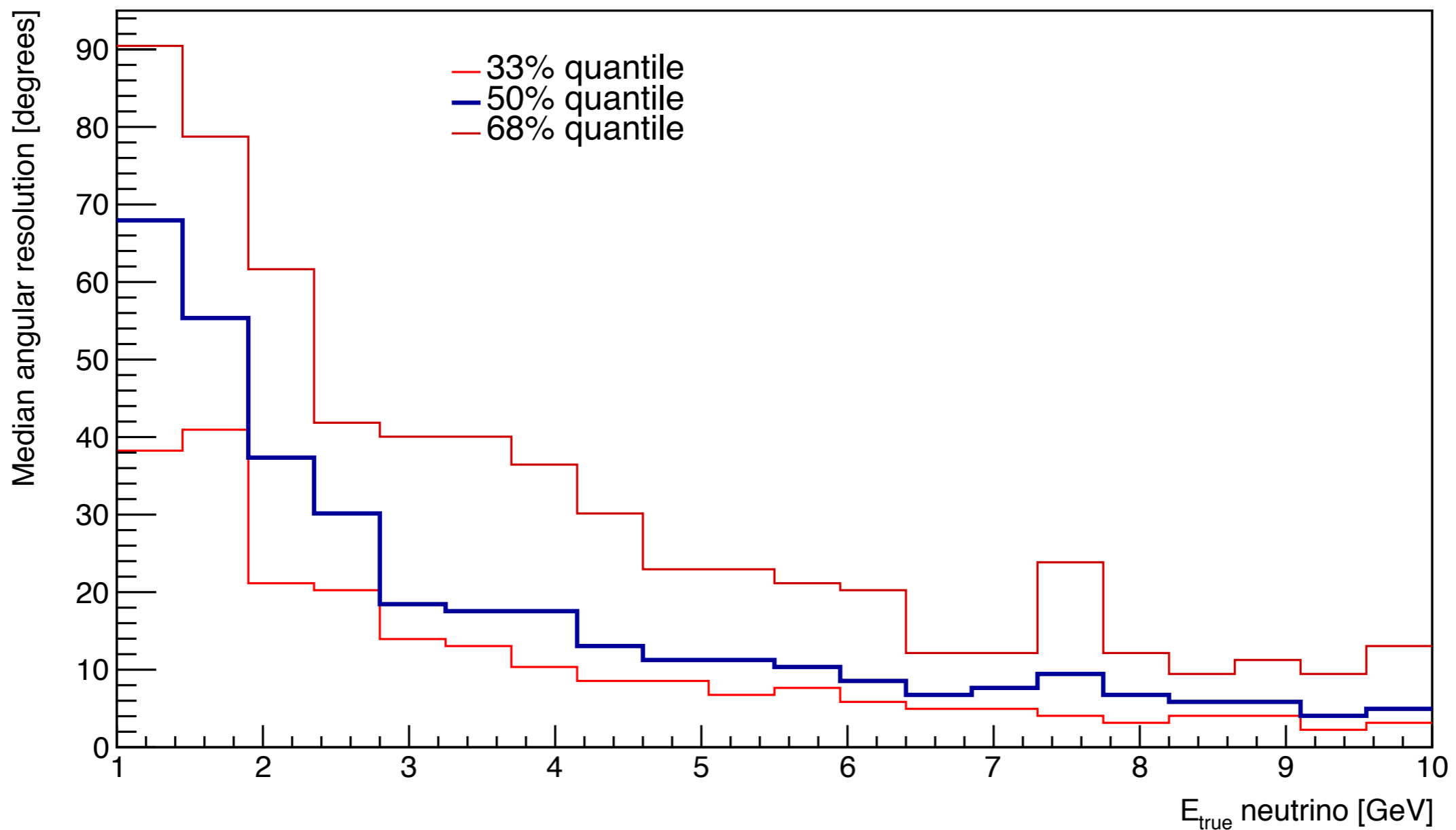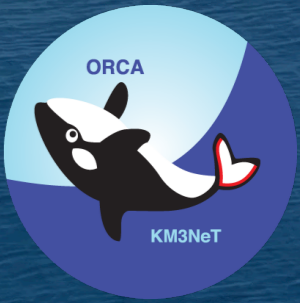- Showing quantiles for both cases..

Inclusion of L0 hits in JPrefit

- Showing quantiles for both cases..
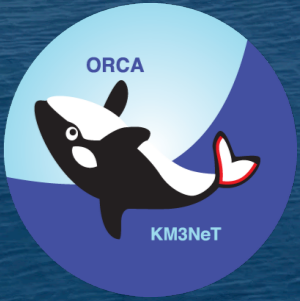

JPrefit→JGandalf (no L0s)

Inclusion of L0 hits in JPrefit

- include as many events as possible and can make cuts at analysis level. E.g. a selection criteria can always bring back to the L1 hit only case.

- Suggestion from Maarten de Jong to include L0s or not dependent on which trigger was used.

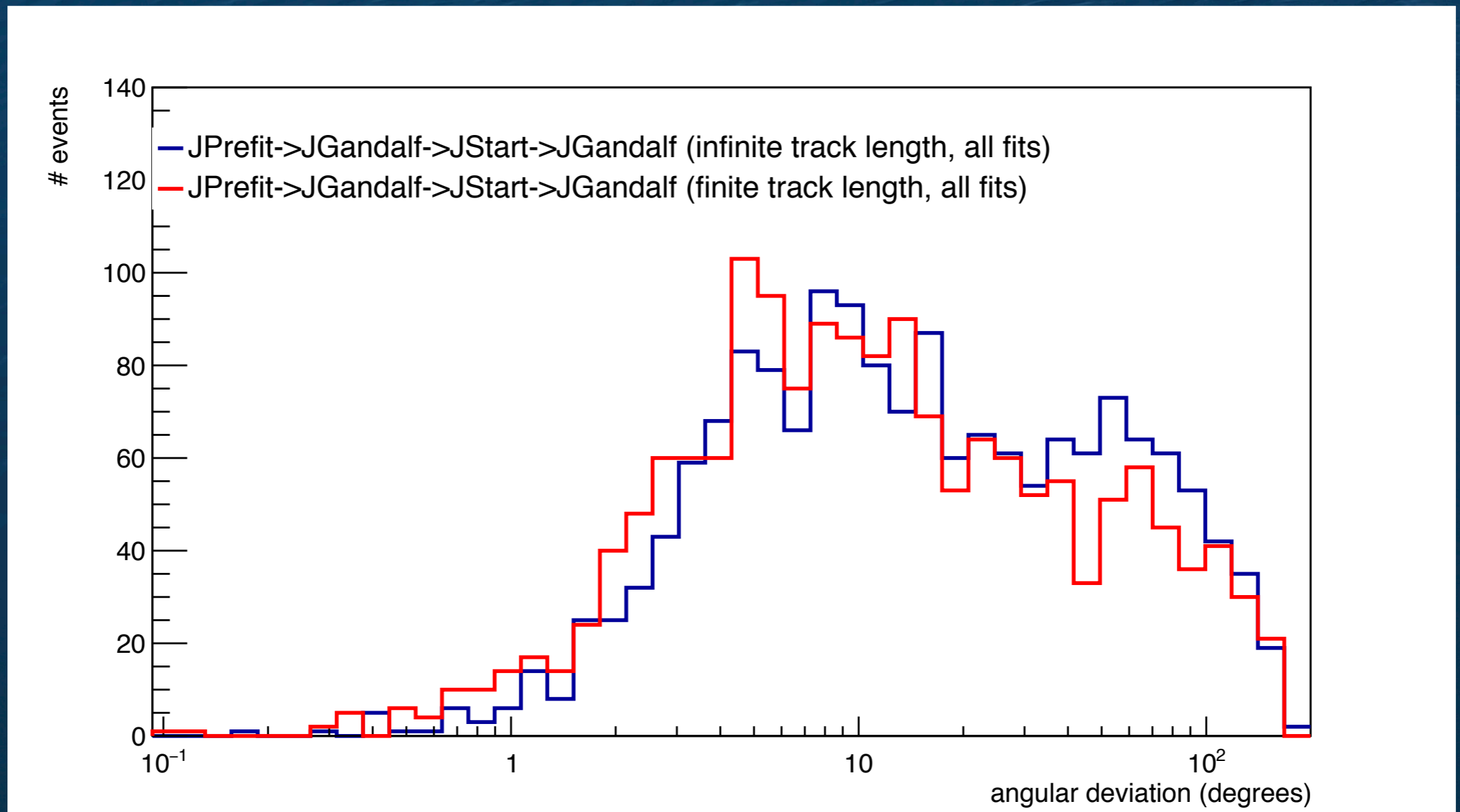# JGandalf Update

- As shown previously, running JGandalf after JStart (using the track length for the hit selection) can give an improvement in the angular deviation/median angular resolution
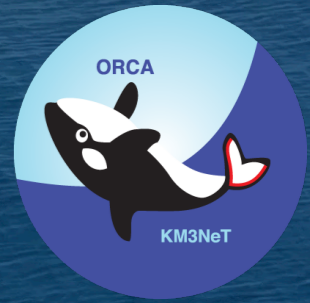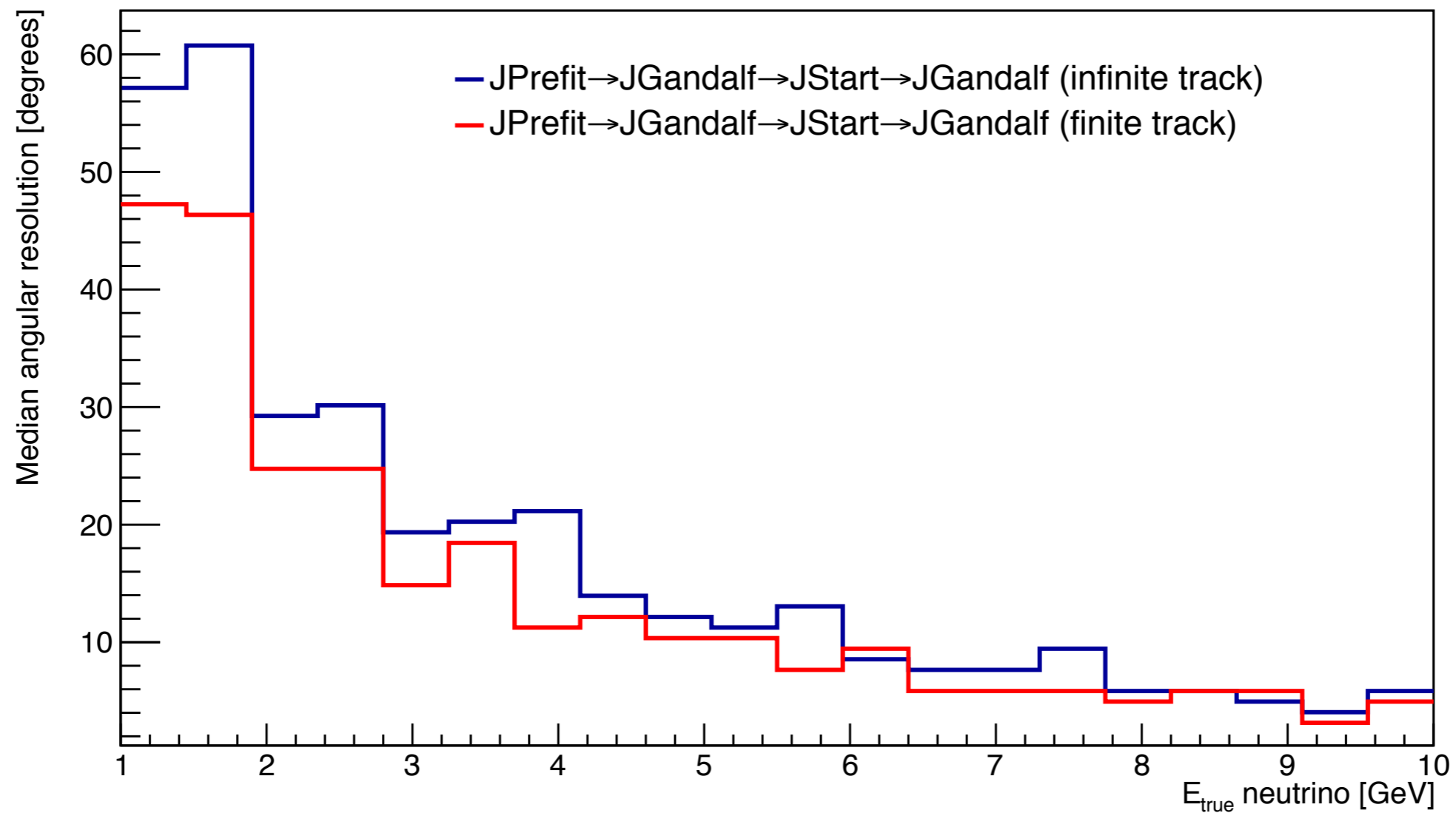
JGandalf Update
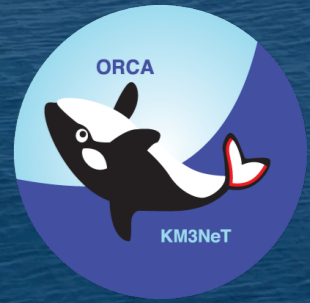
- Angular deviation (from best fit · true muon track)

- Median space angle: 13.384° (infinite track) vs. 10.374° (using track length)
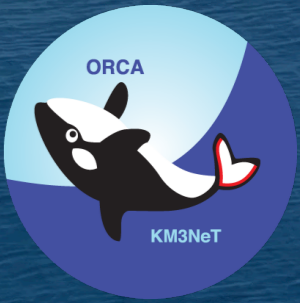
JGandalf Update

- Angular resolution improvement..

JGandalf Update

- JGandalf has been updated such that if the object *W(START_LENGTH_METRES)* exists, it will be used for the hit selection.

- The option *JGandalf -z "x x"* exists to extend the range around the track length by a specified amount. The default is still to take an infinite track when ran after *JPrefit*.
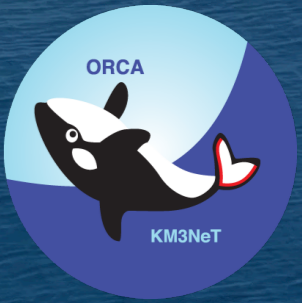
Extras

JGandalf Update

- Keep in mind these checks have been for <u>one file,</u> mcv5.0.gsg_muon-CC_1-10GeV.km3sim.jte.100.root

JGandalf Update

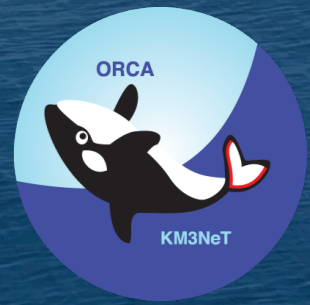- Also check on extending the track length upstream and downstream (symmetrically in both directions).

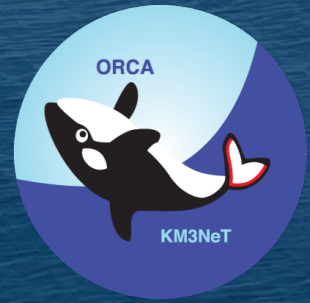| TRACK LENGTH EXTENSION (M)	MEDIAN ANGULAR DEVIATION (DEGREES)
Infinite track length	13.384
0 (track length)	10.374
2	9.686
4	9.363
5	9.304
6	9.235
7	9.463
10	9.647
20	9.669
50	10.398
100	12.038

JGandalf Update

- Also check on extending the track length upstream and downstream (asymmetrically in both directions).

TRACK LENGTH EXTENSION (M) (DOWNSTREAM, UPSTREAM)	MEDIAN ANGULAR DEVIATION (DEGREES)
-1 ,6	9.163
-5 , 9	9.304
-4 , 8	9.165
-3 , 30	9.321
-3, 25	9.278

1-3 metres downstream appears to give an improvement,
whereas no point extending too much upstream
~ vague but not too important ~