A first look at hydrophones (from a Jpp perspective)

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Procedure (I)

- Run acoustic event builder
  - JAcousticsEventBuilder.sh <detector file> <run number>
    - creates¶
      <toashort file> KM3NeT_DDDDDDDD_RRRRRRRR_toashort.root
      <event file> KM3NeT_DDDDDDDD_RRRRRRRR_event.root
- Run global fit procedure
  - JKatoomba.sh <detector file> (event file)+ <katoomba file>

¶ DDDDDDDD and RRRRRRRR correspond to detector identifier and run number, respectively.

Procedure (II)

- Run example script <Jpp>/examples/JAcoustics/JHydrophone.sh
  - JHydrophone.sh <detector file> <katoomba file> <toashort file>
    - JBaseWriter -a <detector file> # writes base module (x, y, z) and t_0
    - JHydrophone -f <katoomba file> -i <toashort file> # creates histograms

- Note that in this procedure:
  - time offset of optical module $\equiv$ average time offset of PMTs¶
  - time offset of base module $\equiv$ $0\ \mu s$
  - delay time of piezo sensor $\equiv$ $170\ \mu s$
  - delay time of hydrophone $\equiv$ $50\ \mu s$

¶ $\langle t_0 \rangle \cong 200\ \mu s$.

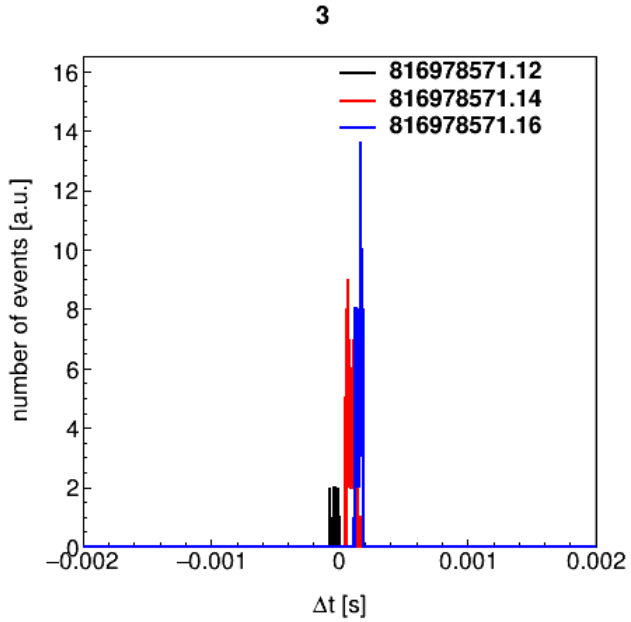
Procedure (III)

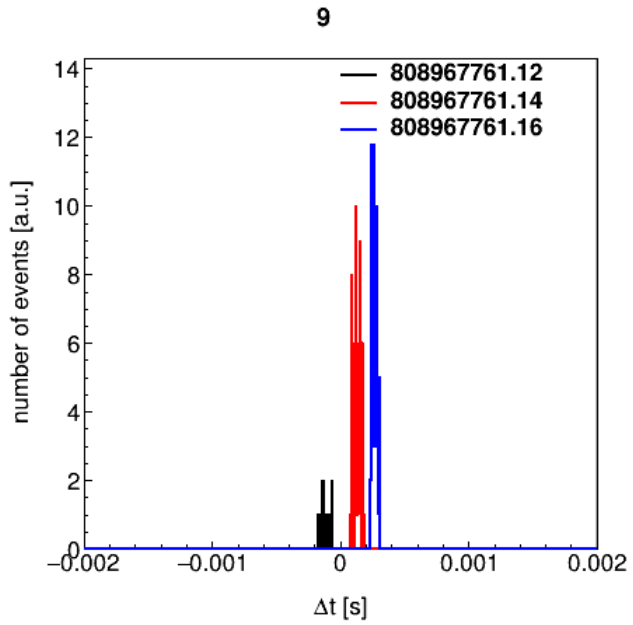
- Input data
  - (relative) hydrophone positions from Vincent B.
  - detector file and tripod positions as obtained from scans
    - see presentation at Calibration meeting d.d. 30 July 2020
  - ORCA detector 49, run 7600

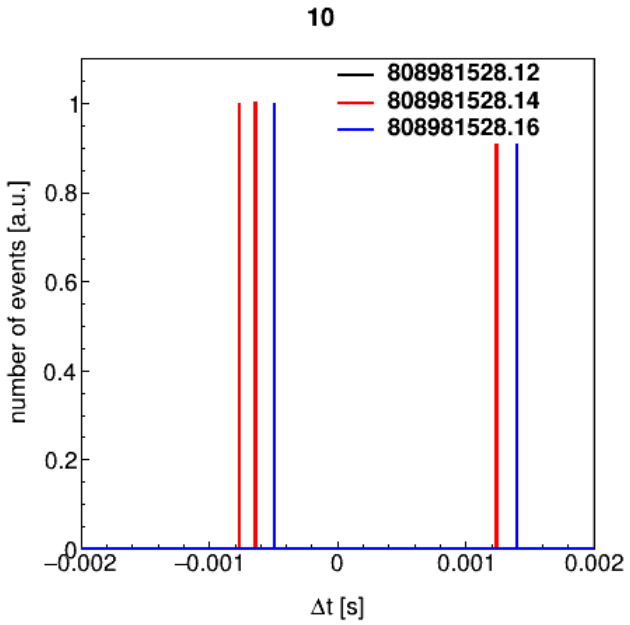
- Histogram time residuals between:
  1. estimated time-of-emission from hydrophone
     (= time-of-arrival corrected for propagation time)
  2. fitted time-of-emission from global fit (using only piezo sensor data)

No data

No data







No data

Conclusions

- Time offset between base module and optical modules understood in terms of available data in detector file (or database)
- No data from hydrophones on string 1, 2 and 11
- Poor data from hydrophone on string 10
- Time residuals of hydrophones on string 3 and 9 within $\pm 300\ \mu s$