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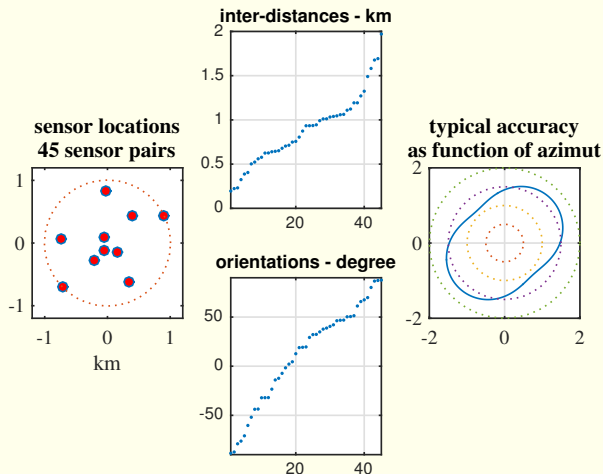
2 Numerical results

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- CRB

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Features for a station design

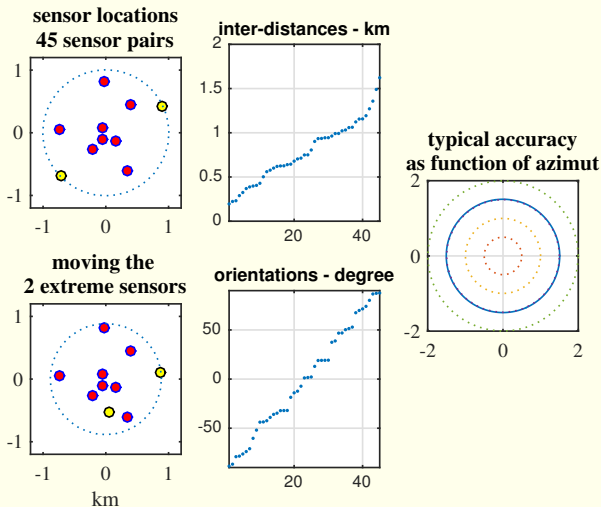
IS37: 10 sensors, hence 45 pairs.



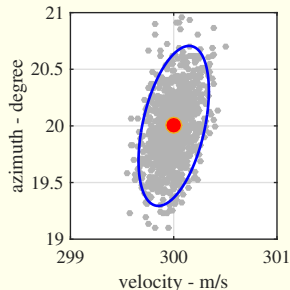
Elements of interest:

- the scale factor (aperture)
- the relative locations of the sensors
- uniformity of ...
- accuracy isotropy

By moving the 2 most distant sensors



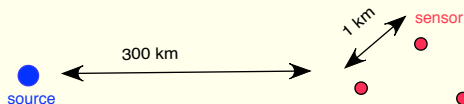
CRB as an index of accuracy



- Depending on the noise we observe different couples of values (grey points).
- A good estimator has to provide a set of values located around the true value with a dispersion as low as possible.
- The CRB provides a lower bound for the dispersion.
- A good estimator converges asymptotically to the CRB.

- the CRB is used to determine the confidence region (ellipse)
- it is worth to notice that the CRB does depend on the true values of the parameters that are unknown. Usually we replace by the estimated value.

Loss of coherence



- usually the sensors of the same station are very far from the source of interest, several hundreds of km compared to 1 km.
- however the signals arriving on the two sensors are not fully coherent. But in the absence of clear explanations a “black box” model is considered:

$$\log \text{MSC}(f) \approx -\beta f^2 \times d^2$$

where d is the distance between deux points of observation, f the frequency and β a LOC decay factor.

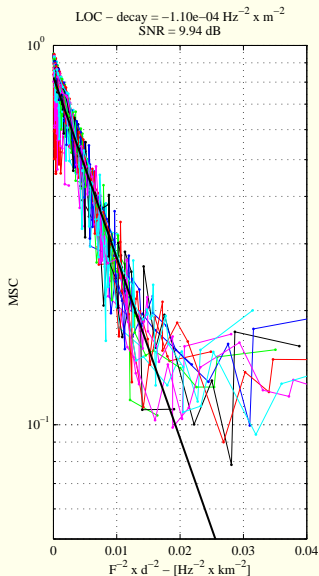
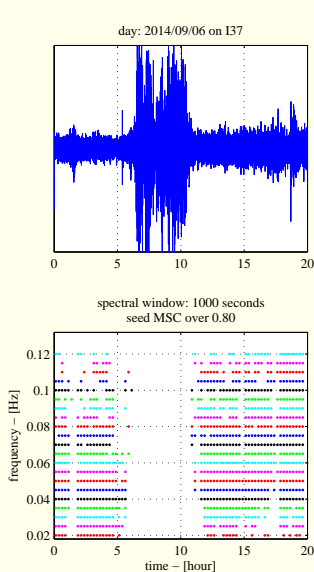
This simple model does not take into account the orientation of the sensor axis w.r.t. the direction of arrivals.

Protocol

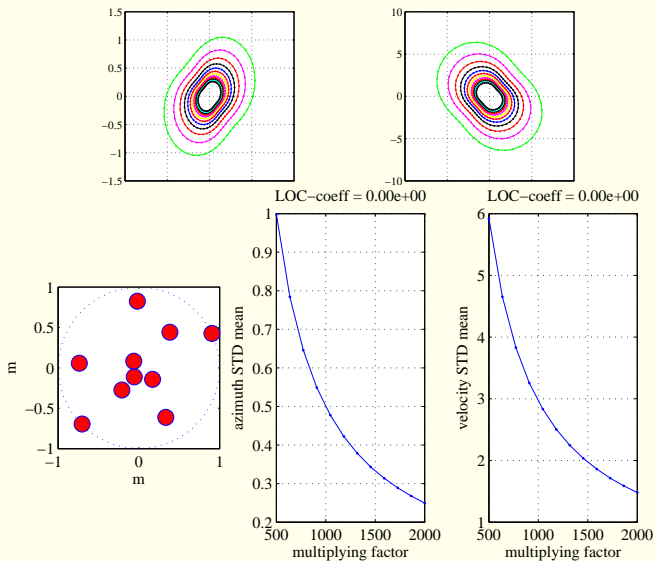
- For a given frequency in the selected bandwidth of interest B and for a given time window T , we perform the MSCs for each pairs of sensors. If the two closest sensors have an MSC over 0.8 in a certain T/F cell, we keep this T/F cell for all combinations of interdistances.
 - We average on the duration of the file.
-

- Bandwidth $[0.05 \quad 0.11]$ Hz,
- Time window duration $T = 500$ seconds,
- Time duration about 20 hours, i.e. about 144 windows.
- In the selected bandwidth the acceptance rate is ..

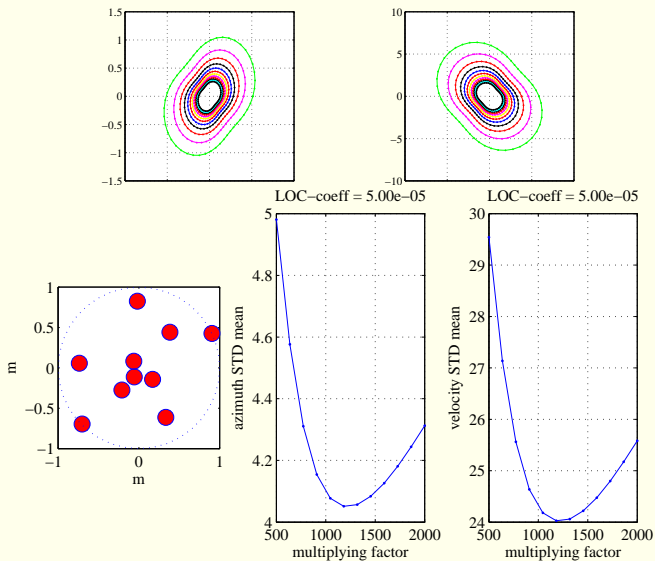
IS37, with 10 sensors then 45 interdistances



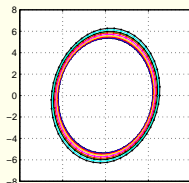
No LOC



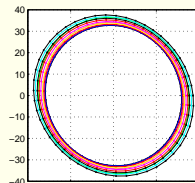
LOC with $\beta = 5e^{-5}$



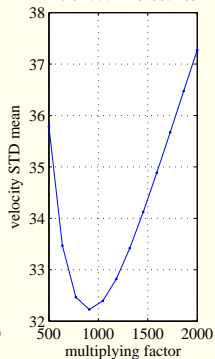
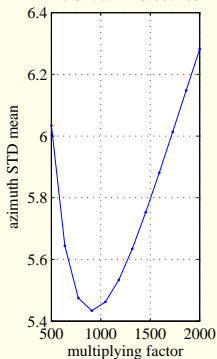
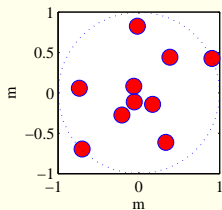
LOC with $\beta = 9e^{-5}$



LOC-coeff = $9.00e-05$



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Conclusion

- re-visit the LOC model
- study the effect of the sensor relative locations on the CRB in presence of LOC. Is the uniformity of distance/orientation useful?