



Comparing methods for Earthquake Location

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There are plenty of methods available for locating small magnitude point source earthquakes. However, it is known that these different approaches produce different results. For each approach, results also depend on a number of parameters which can be separated into two main branches: (1) parameters related to observations (number and distribution of for example) and (2) parameters related to the inversion process (velocity model, weighting parameters, initial location etc.).

Currently, the results obtained from most of the location methods do not systematically include quantitative uncertainties. The effect of the selected parameters on location uncertainties is also poorly known. Understanding the importance of these different parameters and their effect on uncertainties is clearly required to better constrained knowledge on fault geometry, seismotectonic processes and at the end to improve seismic hazard assessment.

In this work, realized in the frame of the SINAPS@ research program (<http://www.institut-seism.fr/projets/sinaps/>), we analyse the effect of different parameters on earthquakes location (e.g. type of phase, max. hypocentral separation etc.). We compare several codes available (Hypo71, HypoDD, NonLinLoc etc.) and determine their strengths and weaknesses in different cases by means of synthetic tests. The work, performed for the moment on synthetic data, is planned to be applied, in a second step, on data collected by the Midi-Pyrénées Observatory (OMP).