ES5/P24/ID127 - **MOMENT TENSOR INVERSION FOR SMALL EARTHQUAKES IN THE PYRENEES**

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Quantification of strong magnitude (M >5.5) earthquakes is routinely undertaken by many institutions. For instance, Global CMT solutions are available within a few hours over the Internet. In regions with moderate seismicity, efforts now focus on developing robust and rapid, if not automatic, inversion methods for small earthquakes. The present work describes such an attempt in the crossborder framework of the SISPyr project (INTERREG IVa France-Andorra-Spain 2007-2013 program). We developed a method which automatically determines the frequency ranges for each component that can be used for the inversion. The optimal focal mechanism is then determined by a systematic grid search exploration. Synthetic seismograms are obtained by using Green's functions computed with the Bouchon method.

To check the robustness of the method, we compared its outputs with results obtained independently over a subset of the SISPyr database. This database was collected by the SISPyr working team; it consists of 129 events with ML > 3 between 2001 and 2008, yielding over 4000 accelerometric, broad band and short-period recordings. We chose 22 events within this database, with ML magnitudes (RéNaSS scale) ranging from 3.8 to 5.2, and a large geographical distribution.

The comparisons were drawn along two axes : the mechanisms were compared with results from classical computations of polaritybased focal mechanisms, and the Mw values to the moment magnitudes recently proposed by Drouet et al. (2010) from S-wave spectra. The results are very encouraging; the mechanisms are in general very similar, and the magnitudes are in very good agreement.

Robust moment tensors can therefore be obtained rapidly for earthquakes with Mw as low as 3.0 in the Pyrenees, with only 5 recording stations. Efforts should now be undertaken to make this method fully automatic, as required if its outputs are to be incorporated in shakemap computations (planned in the SISPyr project). From a tectonic point of view, the computed mechanisms are predominantly extensional, supporting recent geodetic and seismological results that point to extension across the Pyrenees.