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Detailed results of the SCARDEC method: recent earthquakes and major subduction earthquakes of the last 20 years

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In a first abstract [1] a new methodology called SCARDEC based on body-wave deconvolution is presented. This methodology is made to determine simultaneously the seismic moment, focal mechanism, depth and source time functions of large earthquakes.

In this abstract we detail the results for the major subduction earthquakes of the last 20 years, with a strong focus on the events for which our solutions differ from the Global CMT results: certain subduction shallow earthquakes (Hokkaido 25/09/2003, Sumatra 28/03/2005, for example). Indeed we show that our solutions tend to have a smaller dip and a higher seismic moment than in the Global CMT catalogue. The analysis of the aftershocks fault plane geometry supports the dip values determined with SCARDEC. Moreover, the SCARDEC solutions explain long-period surface waves as well as the Global CMT models (see a second joint abstract [2]), despite the fact that these data are only used in the latter method. While the SCARDEC method makes only use of body waves arriving in the 30 minutes after the earthquake origin time, this shows that the retrieved source parameters are robust and consistent with most of the subsequent parts of the seismograms.

We finally illustrate the use of the method in an automatic way by presenting the whole set of outputs from the method for some recent earthquakes.

[1] SCARDEC: a new technique for the rapid determination of seismic moment magnitude, focal mechanism and source time functions for large earthquakes using body-wave deconvolution; M. Vallée, J. Charléty, A.M.G Ferreira, B. Delouis, J. Vergoz

[2] Assessing earthquake source models using 3-D forward modelling of long-period seismic data: application to the SCARDEC method; A.M.G. Ferreira, M. Vallee, J. Charlety