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# Toward implementing a grid search moment tensor (GRiD MT) tool for the rapid detection and characterization of seismic events in Metropolitan France

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The aim of this study is to implement at the CEA a grid search moment tensor inversion scheme (GRiD MT) for the rapid detection and characterization of seismic events, to monitor low to moderate magnitude earthquakes in France. Given the heterogeneity of the seismic network and of the crustal geology over the country, we propose to use a combination of source grids focusing on specific regions. The GRiD MT approach requires an extensive preliminary analysis to define the different inversion parameters (velocity model, frequency band, and stations) and grid spacing (in latitude, longitude and depth). Here, we present the advances made towards the GRiD MT implementation for France. Using recent earthquakes, such as the 2019 ML 5.4 Le Teil earthquake, near Montelimar in Southern France, we discuss the validity of this detection and characterization tool for earthquake routine. The GRiD MT results applied in the South-East region for moderate earthquakes are close to those published by other agencies (USGS, IPGP, OCA, INGV) in terms of location, magnitude and focal mechanism. Nonetheless, more care is needed for the smallest events. We also discuss the precision and the uncertainties in constraining the source parameters using this method, especially when considering the goodness of fit as the unique criterion to identify a potential source, and different Earth's structures. In the end, we show that the GRiD MT approach may be an interesting tool to analyze seismic events in France within only a few minutes after their occurrence. However, their low magnitude range raises some challenging questions to be answered.