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Seismic monitoring of recent activity in the area of the 1428 earthquake (I_0=IX), Eastern Pyrenees

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On September 21^{st} 2004 an Ml = 4.0 earthquake took place in the Eastern Pyrenees, widely felt in the region and producing slight damage at the epicenter zone. It happened at the same area of the 1428 destructive earthquake (I_0 = IX EMS-98). At present, the area is characterized by a continued, moderate seismicity, with a few events of magnitude close to 4 reported in the last decades. For this recentmost event, the gauge made with the permanent regional seismological network located the hypocenter at 42.34º N, 2.17ºE and 4 Km depth (www.icc.es/sismes). The focal mechanism calculated from first-motion data of 35 stations shows a dextral strike-slip movement with a normal component. According to the dominant E-W geological structures in the epicentral area, a nearly E-W oriented nodal plane would be considered as the fault plane. The pressure axis is NW-SE oriented, which is coherent with the regional axis direction**.** In the following two days the permanent network registered about 120 aftershocks, three of which were felt again in the epicentral zone.

In order to monitor in detail this seismic sequence and to better constrain the seismotectonic pattern, 6 portable three-component stations were installed in the epicentral area during 35 days, between September 23^{rd} and October 28^{th} 2004. In this period, the portable network operated in continuous mode and allowed detection and location of about 800 aftershocks with magnitudes lower than 2.0 Ml. About 150 of these events were also registered by the permanent regional network. The earthquakes have been located first with the Hypo71 code and then relocated using the HypoDD code. Their hypocenters are concentrated in a narrow NW-SE oriented band of about 2 km x 1 km, and between 3 and 5 km depth. Nevertheless, in the last 10 days an increasing

number of aftershocks are located southwards of this band, in a more spread distribution and at shallower depths between 1 and 3 km. Hence, the depicted active structure is a fault plane that deepens from SW to NE, in agreement with a N-S geological cross-section that transects this area, and shows a S-directed, N-dipping thrust fault interpreted as the basal thrust of the Tertiary Pyrenean fold and thrust belt. This new seismic dataset hence provides relevant constraints on statistical relations, aftershock parameters and seismotectonic features for an area of major historical seismic activity.