



## TEMPORAL VARIATIONS IN THE ITALIAN SEISMICITY OF THE 20<sup>TH</sup> CENTURY

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The temporal distribution of Italian seismicity, as from the CPTI11 catalogue, shows a non-uniform distribution through the 20th century. In particular the annual earthquake rate shows a rapid increase at the end of the 19th century, with peak between 1895 and 1905, and a decrease between 1930 and 1955, followed by another smaller peak around 1958-1964. The rates in the last 20 years are consistently lower than in the mentioned periods. This is particularly evident for the lowest  $M_w$  values in the catalogue ( $4.5 \leq M_w \leq 5.0$ ).

If the small number of earthquake reported between 1940 and 1950 can be easily imputed to historical reasons (i.e. world-war two), the reasons of the variations in the earthquake rates for the other periods asked for some analysis.

We firsts analysed the catalogue from a geographical point of view, identifying Central Italy as the area where the variations in earthquake occurrence are most evident.

Taking into account that CPTI11 contains magnitudes derived from i) macroseismic data, ii) instrumental data, and iii) a combination of them (whenever the two estimates are both available), we analysed the three types of magnitude separately. This analysis revealed that the peak at the beginning of the 20th century is mostly due to a number of events not supported, in the current version of the catalogue, by macroseismic data points, for which the catalogue's reference study assesses epicentral intensity 6 (then converted to  $M_w$ ). On the other hand, for the first half of the 20th century,  $M_w$  values derived from the conversion of early instrumental magnitudes (mostly  $M_s$ ), seem to exceed the corresponding macroseismic magnitude. The opposite is observed in the comparison of macroseismic and instrumental magnitudes (mostly  $M_L$  and  $M_w$ ), after 1976.

In addition, it is to be observed that the systematic collection of macroseismic data in Italy started in 1895 and the network of observers reached its maximum extension around 1913. After 1935 the collection of macroseismic data declined and was resumed in a systematic way only after 1980.

The described analyses account for most of the observed temporal variations in the Italian seismicity, but the low activity rates after 1985, and especially after 1995 when reliable instrumental  $M_w$  estimates start to be available also for small earthquakes, still remains, probably suggesting some variations in the tectonic activity.

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