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THE ITALIAN DATABASE OF EARTHQUAKE-INDUCED GROUND FAILURES (CEDIT): NEW RELEASE AND DEVELOPING APPLICATIONS

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Purpose: The Italian Catalogue of Earthquake-Induced Ground Failures (CEDIT – Catalogo degli Effetti Indotti da Forti Terremoti in Italia) collects evidence of ground effects induced by historical earthquakes occurred in Italy. Since the 1997 the catalogue has been managed by the Research Centre for Geological Risks of Sapienza University of Rome (CERI). Its latest release, online by 2021, contains 4041 earthquake-induced ground effects by 175 seismic events from 1117 A.D. to 2022.

Methods: The last release of the catalogue allows a free online consultation based on WebGIS and Web Map Service (WMS) optimised for portable devices. The induced ground failures have been catalogued following a systematic review of the documents in the historical archives and searching in the published literature; ground failures induced by recent earthquakes were directly field surveyed. An application for smartphones and tablets was customised for performing the automatic inventorying of the effects; it can be directly interfaced with the online database. The info useful for effect description is linked to each induced ground effect, including geolocation, typology, macroseismic intensity of the point in which it occurred, lithotype involved, volume, interference with anthropic works and other metadata. As far as the historical effects are concerned, however, four geolocation classes were considered, with increasing error, depending on the uncertainty in exact geolocation (i.e. error ranges from 1 up to 30 km depending by the class).

Results: The last release of the CERI database includes 4041 earthquake-induced ground effects inventoried in more than 1000 administrative localities of Italy and are related to 175 historical earthquakes. In particular, 2242 ground effects are represented by landslides (55% of the total collected effects), 981 ground effects are represented by ground cracks (24 % of the total), 486 ground effects belong to the liquefactions category (12% of the total), 194 ground effects are composed by ground changes (5% of the total) and, finally, 138 are associated to surface faulting ground effects (4% of the catalogue). The most recent earthquake which has been included in the CEDIT catalogue is the 2022, 5.5 Mw, Marche coast earthquake, which induced 18 effects surveyed between the Conero promontory and that of San Bartolo, south of Ancona and north of Pesaro respectively.

Conclusions: The CEDIT catalogue results a useful tool for analysis of scenarios based on occurred earthquake-induced effects in the National territory. Furthermore, starting from the distribution of the inventoried effects, it has been possible to implement susceptibility studies through artificial intelligence applications which up to now provided expected distributions of earthquake-induced landslides.