The 2024 Emergency Events Database Archive

The Year in Review and Historical Data Updates

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Abstract

The 2024 Emergency Events Database (EM-DAT) Archive (Version 2) extends the 2023 Archive (Version 1) to 2024, providing a retrospective analysis of the newly added year, with 604 disasters that caused 89,030 deaths, affected 168.59 million people, and generated US$277.41 billion in losses. The new archive also enables direct comparison with the 2023 release (Version 1) to document the updates made in disaster impact reporting between the two releases. Key revisions include the addition of the 2024 European heatwave mortality estimate, which alone accounts for 62,557 deaths, and significant updates to economic loss figures for Hurricane Helene and seasonal floods in China. The archive also documents improvements in interoperability, with 1,504 new GLIDE identifiers, 878 HANZE linkages, and expanded USGS earthquake references, alongside the ongoing transition from GAUL 2015 to GADM 4.1 geocoding. These changes enhance the database's spatial precision and facilitate federated use of complementary disaster catalogs. The 2024 EM-DAT Archive, released under a CC-BY-NC-ND license and validated with the EM-TEST framework, is publicly available via the UCLouvain Dataverse. It serves as a FAIR-compliant foundation for open and reproducible disaster research, supporting retrospective reassessment and methodological advancements in disaster data towards improved risk understanding and reduction.

Keywords

Emergency Events Database (EM-DAT), International disaster database, Disaster epidemiology, Disaster human impact, Disaster economic impact, Natural hazards, Technological hazards

Introduction

Since 1988, the Emergency Events Database (EM-DAT) has compiled standardized information on more than 27,000 disasters worldwide, triggered by natural and technological hazards from 1900 onward [1,2]. For each country-level event, it records key descriptors (hazard type, timing, location) and impact metrics, including deaths, affected people and economic losses. Data are extracted and validated from curated institutional, humanitarian, reinsurance, governmental, and press sources [1]. EM-DAT is updated weekly and made available free of charge for non-commercial use through the data portal (www.emdat.be), subject to registration and license terms that prevent redistribution.

Given the project's longevity and wide use (e.g., 40,000+ Google Scholar citations), periodic archiving of EM-DAT and monitoring its evolution have become essential in many respects. Archiving helps ensure that disaster loss data remain Findable, Accessible, Interoperable, and Reusable (FAIR) [3], supports open and reproducible research, facilitates compliance with journal data requirements, and allows readers to reassess findings based on earlier database versions. Over time, successive FAIR archives also make it possible to track changes in the database's structure and content.

The EM-DAT reference paper [1] described the database using the EM-DAT Archive Version 1 [4], released in 2023 and covering 1900-2023. This Archive is distributed under a CC-BY-NC-ND license [5], which permits redistribution, in line with open publication requirements. This data note introduces the second archive [6], which extends coverage to 2024, and enables a retrospective analysis of that year while highlighting the changes relative to the 2024 EM-DAT Annual Report [7]. By directly comparing the two archived versions over their shared 1900-2023 records, we also quantify the scale and nature of major historical updates in EM-DAT, and provide an empirical view of the database's evolution. We discuss the implications of these revisions for data interpretation, interoperability, and the limits of disaster impact reporting. The supplementary materials provide a more detailed description of the data comparison.

2024 Disaster Events Highlights

The 2024 EM-DAT Archive records 604 disasters in 2024, causing 89,030 deaths, affecting 168.59 million people, and generating US$277.41 billion in losses (2024 US$). Of these, 430 were natural hazards excluding biological ones,[1] and accounted for most of the impact, with 79,808 deaths (89.6%), 168.1 million affected people (99.7%), and US$277.41 billion in losses (100%), indicating that no technological or biological events are recorded with documented economic losses.

To update the 2024 EM-DAT report, we present the top 10 tables on 2024 natural-hazard events (Tables 1–3), with background references for additional context. Because disaster losses are typically heavy-tailed, a small number of events often captures annual patterns well. Here, the top 10 events, 2.3% of registered natural-hazard events, account for 68.4% of total mortality, 57.2% of the total number of affected people, and 68% of reported economic losses. EM-DAT estimates for the total 2024 economic losses remain lower than those of global reinsurers, such as Munich Re, Swiss Re, and AON, which range from US$320 to US$368 billion [8–10], reflecting differences between system design, entry criteria, and data availability.

Overall, 2024 was dominated by extreme heat and Atlantic hurricanes: European heatwaves alone caused an estimated 62,557 deaths across 31 countries — nearly four times the rest of the top-10 mortality events combined — while the US hurricane season (Helene, Milton, and Beryl) generated US$125 billion in losses, accounting for nearly half of the year's global total.

Mortality Impact

The 2024 Archive records 79,808 natural-hazard deaths, far above the 16,753 reported in the 2024 annual report [7]. This difference is driven almost entirely by the addition of the 2024 European heatwave events, which were estimated to have caused more than 62,000 deaths across 31 countries (Table 1, #1), in a study published in September 2025 [11].

Other heatwaves also appear in the top 10 (Table 1). During the Hajj pilgrimage to Mecca in June 2024, 1,301 people died, according to the Saudi health minister [12], during an extreme heat event, with temperatures reaching 51.8°C [13]. Several other Asian countries, including India (#5), Bangladesh, Pakistan (#9), Cambodia, Laos, Thailand, Myanmar, Vietnam, and the Philippines, also experienced severe and sustained heatwave exposure [14–16]. The mortality burden is likely underestimated and not fully captured in EM-DAT (see Discussions). In the southwestern United

[1] Natural hazards, excluding biological ones (e.g., epidemics, infestations, or animal incidents) is the historical focus and reporting standard used in the EM-DAT annual report. Technological hazards are, therefore, not covered in the EM-DAT annual report series. Unless explicated otherwise, reference to natural hazard in this paper refers to “natural hazards, excluding biological ones.”

Table 1. Top 10 Natural-Hazard Disasters in EM-DAT by 'Total Deaths' in 2024

Rank	Country	Disaster Type or Name	Total Deaths	References
1	Europe (grouped)[1]	Heat wave	62,557*	[11]
2	Saudi Arabia	Hajj heat wave	1,301	[12,13]
3	Afghanistan	Severe winter conditions	1,197	[18]
4	USA	Heat wave	1,006	[17]
5	India	Heat wave	733	[14–16]
6	Japan	Noto Peninsula Earthquake	699*	[19–21]
7	Papua New Guinea	Enga Landslide	670	[22,23]
8	Chad	Flood	576	[24]
9	Pakistan	Heat wave	568	[14–16]
10	Myanmar	Typhoon Yagi (Enteng)	460	[25–28]

[1] The European Heat Wave event includes 31 events at the country level in EM-DAT, grouped for reporting purposes

* Substantial change from the 2024 EM-DAT report figures [7]

States of America (USA), heat waves in Arizona and Nevada (#4) were associated with 1,006 deaths, based on reports limited to Phoenix and Las Vegas [17].

Other major high-mortality events in Asia included the Afghanistan cold wave (#3), which combined snowfalls, blizzards, landslides, and floods and caused nearly 1,200 deaths [18]. The Noto Peninsula Earthquake (Mw 7.5) struck the Ishikawa Prefecture, Japan, on January 1, 2024 [19,20], and according to recent official estimates [21], caused 699 deaths (#6), 148 more than reported in the EM-DAT 2024 annual report [7]. In Papua New Guinea, the Enga Province Landslide (#7) buried Yambali village, resulting in 670 official deaths, although estimates range from 160 to more than 2,000 [22,23]. In early September, Typhoon Yagi (Enteng, in the Philippines) and associated floods and landslides [25] caused the highest death toll in Myanmar, with 360 deaths and 100 missing persons (#10) [26]. The storm caused heavy losses in nearby countries, including Vietnam, where 345 people died, mainly in landslides [27].

In Africa, severe floods in Chad (#8) submerged large areas, destroying homes, infrastructure, and farmland, and displacing thousands of people. The floods worsened food insecurity, disrupted access to clean water and sanitation, and increased the risk of waterborne diseases. More than a year later, many affected communities still required humanitarian assistance [24].

EM-DAT also records four major cholera outbreaks, classified as biological hazards, under post-flood conditions: South Sudan (1,567 deaths), Sudan (1,508 deaths), Angola (759 deaths), and Yemen (680 deaths) [29–32]. These outbreaks formed part of a broader regional resurgence that threatens progress toward the 2030 global cholera elimination targets [33].

Table 2. Top 10 Natural-Hazard Disasters in EM-DAT by 'Total Affected' in 2024

Rank	Country	Disaster type or Name	Total Affected *millions*	References
1	Bangladesh	Heat Wave	33.0	[34]
2	Zambia	Drought	9.8	[40–43]
3	Philippines	Typhoon Trami (Kristine)	9.7	[44,45]
4	India	Flood (August)	8.0	[37–39]
5	Zimbabwe	Drought	7.6	[40–43]
6	Philippines	Typhoon Gaemi (Carina), Butchoy (Prapiroon)	6.5	[28,46,47]
7	Malawi	Drought	6.1	[40–43]
8	Bangladesh	Flood (August)	5.8	[37–39]
9	Bangladesh	Flood (June-July)	5.1	[37–39]
10	Bangladesh	Tropical cyclone Remal	4.6	[35]

Affected People

Compared with the 2024 annual report [7], the top 10 ranking by total affected people is unchanged (Table 2). Bangladesh ranks first, with 33 million people affected (Table 2, #1). This figure corresponds to children temporarily deprived of schooling during an unprecedented 24-day heatwave in April [34]. One month later, Cyclone Remal struck Bangladesh on 26 May, severely affecting coastal areas [35] and 4.6 million people [36]. From late May to September, India and Bangladesh were also hit by severe monsoon floods, with a total of 18.9 million people affected across events #4, #8, and #9 [37–39]. In Bangladesh, the late-August floods (#8) evolved into a humanitarian crisis that was still ongoing in 2026 [37].

The 2024 tropical cyclone season was especially active in Southeast Asia [28,46]. In the Philippines, several major events entered the top 10 [44], notably Typhoon Trami (#3, locally named Kristine), Typhoon Gaemi (Carina), and Tropical Cyclone Prapiroon (Butchoy) (#6). Trami, which struck in October, affected about 9.7 million people and caused widespread flooding, displacement, and urgent needs in water, sanitation, food, and protection, particularly in already vulnerable areas [44,45]. In July, Gaemi and Prapiroon, combined with the southwest monsoon, affected more than 6.5 million people. Gaemi alone brought record rainfall and flooding to Metro Manila and surrounding areas, prompting a state of calamity, and contributed to a combined death toll of 53 deaths [28,46,47].

By contrast, severe El Niño-induced droughts devastated parts of Southern Africa [40], leaving about 9.8 million people in Zambia (#2), 7.6 million in Zimbabwe (#5), and 6.1 million in Malawi (#7) facing acute food and water shortages [41–43].

Economic Losses

Table 3 lists the top 10 events by reported economic losses. Although global reinsurance estimates of total damage are generally higher than EM-DAT totals [8–10], the figures for the costliest events are broadly consistent, as reinsurance reports are also a priority source in EM-DAT [1]. Relative to the 2024 annual report [7], two notable updates concern Hurricane Helene and the Chinese seasonal floods.

In 2024, about 47% of the US$277.41 billion in losses reported by EM-DAT came from the US hurricane season. Three US events entered the top 10: Hurricane Beryl (#6, July), Hurricane Helene (#1, September), and Hurricane Milton (#2, October), totaling US$125.2 billion in damage. Compared with the EM-DAT 2024 report, the estimate for Hurricane Helene increased from US$56 billion—as initially reported in Munich Re's annual report [9]—to US$80 billion, a figure later cited by Munich Re [48]. The revised amount is also close to the US$75 billion reported by AON [8], for losses including Mexico and Cuba, and to the US$78.7 billion reported by the US National Oceanic and Atmospheric Administration (NOAA) [49].

Reinsurance reports also identify Typhoon Yagi as one of the costliest cyclones of the year [8,9], with losses estimated at US$12.9–14 billion. However, those losses were distributed across China, Vietnam, Thailand, Myanmar, the Philippines, and Laos and therefore did not place the event in the country-level top 10 (Table 3).

Another change from the 2024 annual report [7] is the inclusion of the seasonal floods in China (#4, Table 3). Estimating flood losses in China is difficult because flooding was widespread and recurrent

Table 3. Top 10 Natural-Hazard Disasters in EM-DAT by 'Total Damage' in 2024

Rank	Country	Disaster Type or Name	Total Damage *US$ billion*	References
1	USA	Hurricane Helene	80.0*	[8,9,48,49]
2	USA	Hurricane Milton	38.0	[8,9,48,49]
3	Japan	Earthquake	15.0	[19–21]
4	China	Flood (June-July)	12.0*	[8,9,50,51]
5	Spain	Flood	11.0	[52,53]
6	USA	Hurricane Beryl	7.2	[8,9,48,49]
7	Brazil	Flood	7.0	[8,54]
8	USA	Storm (May)	6.6	[49,55]
9	Brazil	Drought	6.0	[8,50,56–58]
10	USA	Storm (March)	5.9	[49,59]

* Substantial change from the 2024 EM-DAT report figures [7]

from April through September, with the later part overlapping the typhoon season. The value reported in Table 3 refers to June–July flooding and is consistent with reinsurance estimates of US$12–16 billion [8,9], although Gallagher reports US$31 billion for the full summer season [50]. According to the National Disaster Reduction Center of China and the Ministry of Emergency Management, natural hazards caused US$55.87 billion in damage in 2024, with floods accounting for 64.8% and typhoons for 21.3% [51].

The USA also experienced other major weather-related losses earlier in the year [49], with two additional events appearing in the top 10. In March (#10), severe storms affected the central and southern USA, bringing heavy rain, strong winds, tornadoes, and destructive hail [55]. From 6 to 10 May (#8), a major tornado outbreak swept across the central, southern, and southeastern states, producing more than 165 tornadoes — including a devastating event in Oklahoma — and causing US$6.6 billion in damage [59].

Outside the USA, the Noto Peninsula earthquake ranks third in Table 3, with total losses of US$15 billion [19–21]. In Spain, the Valencia DANA floods of late October and early November [52,53] were among the ten costliest disasters worldwide in 2024, with losses estimated at US$11–16 billion [8,9]. In April–May, floods in Rio Grande do Sul, southern Brazil, caused record damage, with estimates ranging from US$5 to US$18 billion depending on the source, accounting method, and exchange rate [8,54]. A joint report by the Inter-American Development Bank, the World Bank, and ECLAC provides the most comprehensive estimate, placing direct material losses at roughly US$7–8 billion (aligned with Table 3) and indirect economic effects at about US$9 billion [54].

These floods in Brazil contrast with the severe compound drought, heatwave, and fire conditions observed across the Amazon during 2023-2024 [56,57]. Those conditions affected 59% of Brazil's territory, and generated cascading impacts on water access, health, food security, and livelihoods [58], with losses reported at around US$6 billion [8,50]. With the addition of the seasonal floods in China, the widespread drought across the southern, eastern, and northwestern USA dropped out of the EM-DAT top 10 [7]. That drought was especially severe in Texas and persisted throughout the year, peaking in summer and intensifying again in autumn and winter. It caused major agricultural losses in several states, estimated at US$5.4 billion [49]. According to the American Farm Bureau Federation, drought- and heat-related crop losses in the USA totaled US$11 billion in 2024 [60].

Historical Revisions (1900–2023)

A comparison of the unique 'DisNo.' identifiers shows that 150 entries were withdrawn and 124 were added. These changes may reflect newly identified events, the withdrawal of events that no longer meet the inclusion criteria, or the integration of new sources. In many cases, however, events were not simply added or removed but restructured at a finer or coarser resolution to match the reporting framework of the source considered most accurate or up to date. Such splitting and merging can require new 'Dis No.' identifiers.

Based on the 'Last Update' fields, 8,996 entries were manually edited between the 2023 and 2024 archives over the shared 1900–2023 period. The most frequently edited field was 'External IDs', with 2,372 edits, followed by 'Location', with 571 edits. These updates reflect efforts to improve EM-DAT interoperability and substantial work on disaster geocoding. These improvements are discussed below, along with the most important changes in the impact figures; more detailed figures are available in the supplementary materials.

Improvements of Interoperability

References to disaster event identifiers in external catalogs ('External IDs' in EM-DAT) have increased between the two archives (Table 4). The most significant increase is relative to the Global Unique Disaster Identifier Number (GLIDE), which is a unique, standardized identifier assigned to disaster events that enables unambiguous cross-referencing and data linkage across different disaster information systems [1,61]. The 1,504 additional GLIDE references primarily result from a reanalysis of existing assignments using machine-learning suggestions, which were then reviewed by two human operators [62].

The second most significant update concerns historical European floods and a newly introduced pairing of EM-DAT events with those found in the Historical Analysis of Natural Hazards in Europe (HANZE) [63]. The HANZE ID assignments were performed manually by a single operator, who

Table 4. Updates in the ´External IDs´ Column Between the 2023 and 2024 Archives

External ID Label	Catalog Full Name	2023	2024	Diff.
DFO	Dartmouth Flood Observatory	294	296	+2
GLIDE	GLobal Unique Disaster IDEntifier Number	1,832	3,336	+1,504
USGS ComCat	USGS ANSS Comprehensive Earthquake Catalog	425	544	+119
HANZE	Historical Analysis of Natural Hazards in Europe	0	878	+878

reviewed the HANZE catalog. The focus remained on event pairing rather than a systematic review of impact figures. The pairing enables explicit links between the two catalogs to compare impact figures and to exploit HANZE's higher administrative resolution at the third level of the Nomenclature of Territorial Units for Statistics (NUTS3).

Lastly, most identifiers pointing to the US Geological Survey (USGS) Earthquake Catalog were added based on a prior mapping conducted for loss-model development [64]. This linkage enables users to query seismological data and ShakeMaps for earthquake events in EM-DAT.

New Geocoding Reference

Until 2025, EM-DAT used the FAO's Global Administrative Unit Layers (GAUL 2015) to geocode disaster events at the sub-national level (up to Admin-2). Since 2014, natural-hazard disasters, excluding biological ones, have been geocoded in EM-DAT, with retrospective work starting in 2000.

From 2026 onwards, the outdated GAUL reference was replaced by GADM 4.1 (Database of Global Administrative Areas). The transition relied on an automated migration procedure in which GAUL and GADM geometries were compared using overlap and proximity indicators — primarily the Jaccard index and the Hausdorff distance — to identify the best-matching GADM unit(s) for each GAUL entry. Where no satisfactory match was found, a fallback strategy assigned the nearest parent administrative unit, at the cost of some spatial precision.

As of April 2026, approximately 90% of GAUL footprints had been successfully migrated. In practice, the ‘Admin Units’ column containing GAUL identifiers remains in the Archive to avoid introducing breaking changes without a deprecation period, while a new ‘GADM Admin Units’ column has been introduced. Figure 1 provides a breakdown of completion status by year for GAUL and GADM units. Because GAUL geocoding was not systematic in recent years, especially for the latest years under review, the remaining backlog in GADM geocoding will need to be cleared manually in the coming months. More comprehensive or alternative sub-national geocoding coverage can be found in the literature [65–67].

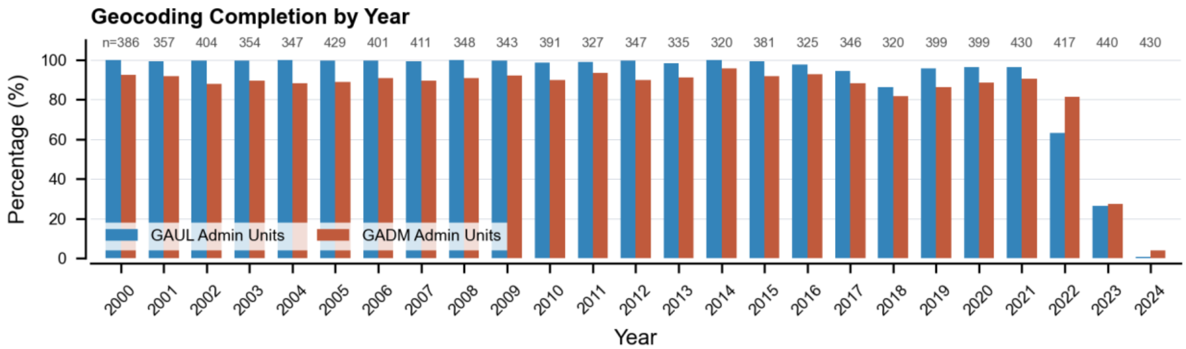

Figure 1. Subnational Geocoding Completion by Year for GAUL 2015 and GADM 4.1 Administrative Units. Bars show the percentage of disaster events geocoded at the sub-national level under the legacy GAUL 2015 framework (blue) and the replacement GADM 4.1 framework (red). Annotations report the total number of geocodable events per year (n). Only natural-hazard disasters excluding biological events are considered; GADM coverage reflects the automated migration procedure described in the text, with residual unmatched entries assigned to the nearest parent unit or flagged for manual geocoding.

Impact Figure Updates

In Figure 2, we summarize the most significant changes in the EM-DAT impact figures between the two archives by examining absolute and relative shifts in annual totals. More detailed breakdowns are provided in the supplementary materials. In general, the largest changes were introduced during the 1900–1965 period, excluding years influenced by World Wars I and II, and in the last decade, reflecting source availability for impact review. Most historical updates resulted from the reanalysis of other catalogs, primarily HANZE [62] for European floods and Wikimpacts [68], a global catalog of climate-related disasters extracted from Wikipedia, or from recalled disasters brought back to attention by recent disasters or commemoration events.

The most important changes in reported 'Total Deaths' relate to the 1934 Bihar-Nepal earthquake in Nepal and India [69], a major event that was initially excluded from EM-DAT because of insufficient source material. The event, which resulted in 8,519 deaths in Nepal and 7,188 additional deaths in Bihar, India [69], was reconsidered in the context of the 10-year anniversary of the 2015 Gorkha earthquake. Likewise, the 2025 magnitude-8.8 Kamchatka earthquake (July 30) brought renewed attention to a historical earthquake in the same region: the 1952 Severo-Kurilsk earthquake and tsunami. The latter was revised from 0 to 2,336 deaths, aligning with the lower bound reported by Wikipedia sources [70]. In addition, the death toll of Typhoon Wanda (1956) in China was increased from 2,000 to 4,935, also based on Wikipedia figures [68,71]. Finally, the 1930 San Zenón hurricane

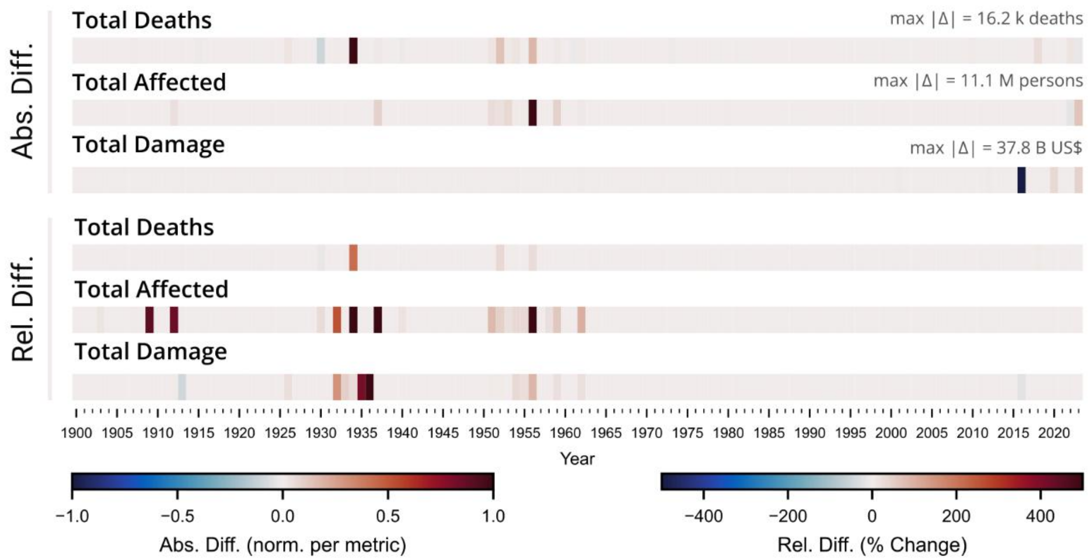

Figure 2. Year-by-year impact differences between two EM-DAT database releases (1900–2023). Each row represents one impact metric: total deaths, total persons affected, and total damage in nominal US$. Top panel — absolute differences, normalized independently per metric to [−1, 1]; Right-aligned gray labels report the actual maximum absolute difference used for normalization. Bottom panel — relative differences expressed as percentage change relative to the earlier release, clipped at ±500%. Color scale: blue, new release reports lower values; red, new release reports higher values; white, no change.

[72] had been encoded twice, with 2,000 deaths reported for the Dominican Republic—the correct country—and once for Dominica, an error corrected in the 2024 Archive.

Regarding the number of affected people, the most significant change again concerns Typhoon Wanda (1956), which rose from no recorded value to 11 million [68,71]. Other changes are at least an order of magnitude lower; however, they remain relatively important (Figure 2) because less information is available for earlier periods. For instance, only five people were reported as affected by disasters in 1934 in the 2023 Archive, making the addition of 15,000 affected people for the 1934 hurricane season in the USA an important relative change.

Relative changes in economic losses may also be high in historical periods for the same reason. Nonetheless, the largest relative change concerns the Pittsburgh flood of 1936 [73], with an added US$200 million, equivalent to US$4.51 billion in 2024 prices. In absolute terms, the most important change in economic losses is the removal of double counting for the 2016 Kumamoto earthquake sequence in Japan, recorded in EM-DAT as two events in close temporal proximity, resulting in a downward revision of US$38 billion.

Discussion

The 2024 EM-DAT Archive documents several revisions relative to the 2024 annual report [7], reflecting data updates made after the report's publication. The most consequential is the near-fivefold increase in total natural-hazard deaths, driven almost entirely by the addition of the European heatwave mortality estimate published in September 2025 [11], more than nine months after the disaster year closed. Economic losses for Hurricane Helene and the inclusion of seasonal floods in China were also revised substantially. Together, these examples illustrate a central challenge in disaster-impact reporting: some disasters are initially documented using provisional “hot” figures, reported during or immediately after the emergency phase, whereas more comprehensive impact reports or reanalyses may only become available months or years later.

This delay is especially clear for heat-related mortality. Unlike sudden-onset hazards, heat-related deaths are rarely observable in real time and typically require method- or data-sensitive estimates derived from excess-mortality or exposure-response epidemiological analyses published in scientific journals, such as the sources recently used in EM-DAT [11,74,75]. These studies are currently limited to the past few years and to European countries. Accordingly, while EM-DAT heatwave-related figure availability is increasing, related biases are also becoming more apparent. Overall, 50.37% of heatwave mortality in EM-DAT is reported in the last three years of the 2024 archive; 91.44% of heatwave-related deaths are recorded in Europe, and no number is available for Africa [76].

Moreover, while these studies provide a more consistent framework, they report mortality figures for the whole summer period, which does not align neatly with the EM-DAT definition of disasters as emergency situations, nor with impact-based early warning systems [77]. This mismatch may inflate reported totals, alongside other factors such as reporting that increasingly focuses on more detailed population subgroups.

We are currently in a transitional period for evaluation and reporting of heat-related deaths, and EM-DAT heatwave impact figures will likely be revised again, as more EM-DAT or DRR-aligned frameworks are proposed. By design, EM-DAT reports disasters based on published materials. Yet, the main limitation for heatwave mortality remains the global lack of available or accessible mortality data [78], which constrains the epidemiological evaluation of heatwave-related deaths.

The 2024 Archive also reflects targeted efforts to improve EM-DAT's interoperability and spatial precision. The addition of 1,504 GLIDE references [61,62], 878 HANZE linkages [63], and expanded

USGS earthquake identifiers [64] enables users to augment EM-DAT records with hazard, exposure, or impact data from complementary catalogs without re-ingesting those sources—a federated approach that respects data ownership while broadening analytical reach. On the geocoding side, the ongoing transition from GAUL 2015 to GADM 4.1, approximately 90% complete as of April 2026, provides a more current and openly maintained spatial reference, which is essential for joining EM-DAT records to population or exposure datasets in risk analysis.

Finally, the historical revisions documented between the 2023 and 2024 archives position EM-DAT as an evolving knowledge base that continues to improve while also making its current limitations more visible. These revisions further demonstrate the scientific value of openly published catalogs such as HANZE [63] and Wikimpacts [68] as sources for systematic EM-DAT reanalysis. Complementarily, historical disaster events, such as the 1934 Bihar–Nepal earthquake and the 1952 Severo-Kurilsk earthquake, were revised or newly incorporated following renewed attention during recent or anniversary events, supported by the increasing availability of digitized sources. More broadly, FAIR and open data products—including the EM-DAT Archive itself—provide a traceable foundation on which the scientific community can both contribute to and build upon EM-DAT, supporting reproducible disaster research without dependence on the live, access-controlled database.

Data, Software, & Code Availability

The 2023 and 2024 EM-DAT archives are accessible through the UCLouvain Dataverse [4,6]. The archive is technically validated with the EM-TEST framework [79] before publication. Tables and figures were generated in Python, using matplotlib and pandas [80,81]. Differences between the two archives were computed with the pandas 'compare' method.

CRediT Authorship Contribution Statement

DD: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Investigation, Formal analysis, Data curation, Conceptualization. VW: Writing – review & editing, Validation, Software, Data curation. RB: Writing – review & editing, Validation, Project administration, Investigation, Data curation. AA: Writing – review & editing. NS: Writing – review & editing, Supervision.

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Declaration of Competing Interest

None declared.

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