



Monitoring disaster displacement in the context of climate change

Findings of a study by the United Nations Office for the
Coordination of Humanitarian Affairs and the Internal
Displacement Monitoring Centre



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- monitoring internal displacement worldwide and maintaining an online database on conflict and violence related internal displacement;
- increasing visibility and awareness of internal displacement and advocating for the rights of internally displaced people;
- providing training on the protection of IDPs;
- contributing to the development of guides and standards for the provision of assistance and protection to internally displaced people.

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Cover illustration: Budalangi residents are stranded as floods tear through their village in Busia, Kenya. More than 40,000 people were displaced after a dyke was washed away at Makunda in August 2007. © Edward Kale/IRIN

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Summary

Climate change is already increasing the frequency and intensity of natural hazards, and the numbers of natural disasters reported and people affected are rising. Although it is clear that natural disasters are one of the principal causes of forced displacement, data on disaster-related displacement has not been consistently collected and analysed. The lack of reliable baseline data on disaster-related forced displacement has prevented adequate evaluation of the scale of the phenomenon and the patterns of displacement. It also makes it difficult to extrapolate potential human mobility based on existing climate change models or scenarios, or to develop realistic assessments to be taken into account in climate change adaptation policy formation.

This study looks at natural disasters and forced displacement in the context of climate change. It has two aims: firstly, to provide an estimate of forced displacement related to disasters in 2008, specifically climate-related disasters; and secondly, to propose a methodology that could be applied to monitor disaster-related displacement on an ongoing basis. The study uses existing data sets on the impacts of natural disasters in 2008, cross-references various sources, and individually investigates a number of events to estimate the numbers of persons displaced by disasters in 2008.

The findings show that at least 36 million people were displaced by sudden-onset natural disasters in 2008. Of those, over 20 million were displaced by sudden-onset climate-related disasters. As a reference, the total population of people living in forced displacement due to conflict, including IDPs and refugees, was 42 million in 2008, with 4.6 million having been newly internally displaced during the year. It is likely that many more are displaced due to the other climate change-related drivers, including slow-onset disasters, such as drought and sea level rise; however the study does not present an estimate of their number.

The methodology proposed in this study could be applied with relatively limited additional resources to monitor disaster-related displacement on an ongoing basis. Monitoring of disaster-related displacement could be significantly enhanced through additional steps to collect data on the duration of displacement, returns, local integration and relocation and the needs of displaced populations.

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1. Introduction

In its Fourth Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) notes that climate change will contribute to an increase in the frequency and intensity of weather-related hazards, and that human mobility is one of the most critical potential impacts of this trend.¹

Climate change is already increasing the frequency and intensity of natural hazards – particularly floods, storms, and droughts. Associated natural disasters cause loss of life, destroy livelihoods and homes, and forcibly displace people from their homes. An increase in the number of people temporarily displaced will be an inevitable consequence of more frequent and intense extreme weather events affecting more people globally.

Although it is clear that natural disasters are one of the principal causes of forced displacement, data on such displacement has not been consistently collected and analysed. Therefore, while the frequency of recorded natural disasters has doubled from approximately 200 to over 400 per year over the past two decades,² and the number of people affected has steadily risen, there is currently no reliable data to analyse the extent to which human mobility may have also increased as a result of this trend.³

The lack of ongoing global monitoring of disaster-induced displacement is a gap in current global protection mechanisms. While important in its own right, this gap is all the more relevant in the context of climate change, as data on current trends in disaster-related forced displacement would also logically form the baseline for data collection on potential changes in displacement in light of future climate change impacts.

This study is a first step in addressing this global data gap. The study has three key facets. First, it provides an estimate of forced displacement related to natural disasters, and specifically sudden-onset climate related disasters, in 2008. However, no assumptions are made regarding the role of climate change in disaster-related displacement. Second, it proposes a methodology that could be applied in the future to monitor climate related disaster displacement on an annual basis. Finally, the study also assesses disaster-related forced displacement using a typology developed by the Inter-Agency Standing Committee (IASC) for classifying potential trends in forced displacement in the context of climate change, and suggests how this could be useful in linking improved disaster displacement data with climate change research in the future.

This study was initiated by the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) in partnership with the Internal Displacement Monitoring Centre (IDMC). The study was guided by a small team in OCHA and IDMC who worked with an independent consultant contracted for a period of eight weeks to determine and apply a test methodology based on available existing disaster data. The study also benefited significantly from the guidance of the IASC Informal Taskforce on Climate Change, and its migration and displacement working group and from the inputs of a number of independent experts in this field.

2. Aims and scope

Long before the IPCC identified the link between climate change and disasters, the United Nations Guiding Principles on Internal Displacement identified natural or human-made disasters as one of the main causes of internal displacement.⁴

Currently there is no global estimate for the number of people displaced by natural disasters. Global databases do collect approximate data on numbers of people affected, and in some cases made homeless, by disasters. However, current systems allow for little verification or analysis of this data and rely on primary data that is not comprehensively or systematically collected. As there is also no single mechanism to systematically track disaster-related displacement, the scale of displacement caused by natural disasters is still largely unknown.

This presents a major obstacle to evidence-driven responses, effective advocacy, adequate protection of IDPs, and the design of targeted assistance programmes. Furthermore, the magnitude of the impact of climate change on displacement is almost impossible to estimate given the lack of baseline information on disaster-related displacement. This makes it extremely difficult for policy makers to consider it in the context of climate change adaptation, as well as in wider humanitarian policy making.

In order begin to address these issues, the United Nations Office for the Coordination of Humanitarian Affairs

(OCHA) in partnership with the Internal Displacement Monitoring Centre (IDMC) carried out this study. The aims of this study were to provide:

1. An estimate of the number of people displaced by natural disasters in 2008, including a breakdown of those displaced by disasters associated with hazards that are likely to be affected by climate change;
2. A methodology for ongoing monitoring of forced displacement as a result of natural disasters;
3. An indication of the resources required to implement the methodology on an ongoing basis.

The study does not attempt to analyse how current levels of displacement will be affected by climate change and it does not attempt to analyse what proportion of current displacement can be considered a direct result of climate change.

However, climate change is likely to have an increasing influence on future displacement and discussions on how to adapt to such effects are underway as part of the negotiation of a new global climate change agreement to replace the Kyoto Protocol; the study aims to inform these discussions by providing an indication of the scale of displacement caused by natural disasters, both climate- and non-climate-related, in 2008.

Table 1 IASC typology for climate-change related drivers of migration and displacement

Cause of movement	Nature of movement
1. Hydro-meteorological extreme hazard events	- Temporary forced displacement as a result of a specific disaster / hazard event within national borders. - Temporary forced displacement across international borders as a result of a specific hazard event. - Forced displacement as a result of areas being designated as prohibited for habitation by authorities potentially resulting in internal displacement, forced cross-border movements and/or voluntary cross-border movements
2. Environmental degradation and/or slow-onset extreme hazard events	- Such processes will likely be gradual, beginning with voluntary movements (in- and outside the country) and potentially ending in forced displacement (in- and outside the country). - Environmental degradation whether at early or advanced stages and/or slow onset disasters may also result in areas being prohibited for habitation by authorities leading to internal displacement, forced cross-border movements and/or voluntary cross-border movements (see above).
3. Significant permanent losses in state territory as a result of sea level rise etc.	Such processes if not prevented by sufficient mitigation, could be gradual, beginning with voluntary movements (in- and outside the country) and potentially ending in forced displacement (in- and outside the country). These could include: Voluntary movements inside the country (to safe parts of country) and across internationally recognised borders. Displacement within the national territory Forced cross-border movements, including in extreme cases the entire loss of state territory.
4. Armed conflict/ violence over shrinking natural resources	Forced displacement in the case of such armed conflict or violence could result internal displacement or in people crossing international borders as refugees or people under temporary or subsidiary forms of protection.

To place its findings in a broader, comprehensive conceptual context, the study uses a typology that categorises the links between climate-induced disasters and forced displacement (Table 1). The typology was submitted to the UNFCCC interim negotiation session in Poznan, Poland in 2008 by a working group of the Inter-Agency Standing Committee (IASC).⁵ The typology provides a full picture of climate-change-related drivers of migration and displacement, identifying four such drivers: hydro-meteorological extreme hazard events; environmental degradation and/or slow onset extreme hazard events; significant permanent losses in state territory as a result of sea level rise etc; and armed conflict over shrinking natural resources.

This study is primarily concerned with the first category – sudden-onset hydro-meteorological extreme hazard events – because this is currently the only category for which reliable (although not collated) data on displacement could be accessed within the timeframe of the study. However, estimates from other sources relating to the other categories included in the IASC typology are provided alongside the study's results for comparative purposes. It is hoped that future phases of research will be able to provide information relating to the other categories.

3. Concepts and definitions

This study uses the United Nations International Strategy for Disaster Reduction's definition of a disaster:

*A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources. A disaster is a function of the risk process. It results from the combination of hazards, conditions of vulnerability and insufficient capacity or measures to reduce the potential negative consequences of risk.*⁶

So-called "natural disasters" are triggered by hazard events. The Emergency Events Database EM-DAT – a primary source used in this study – groups natural hazards by type as follows:

Geophysical – Events originating from solid earth. Main types: earthquake, volcano, mass movement (dry).

Meteorological – Events caused by short-lived/small to meso scale atmospheric processes (in the spectrum from minutes to days). Main type: storm.

Hydrological – Events caused by deviations in the normal water cycle and/or overflow of bodies of water caused by wind. Main types: flood, mass movement (wet).

Climatological – Events caused by long-lived/meso to macro scale processes (in the spectrum from intra-seasonal to multi-decadal climate variability). Main types: extreme temperature, drought, wildfire.

Biological – Disaster caused by the exposure of living organisms to germs and toxic substances. Main types: epidemic, insect infestation, animal stampede.

The following definitions were used in this study:

Climate-related disaster/hazard events were considered to include all events in the meteorological, hydrological and climatological categories of EM-DAT. The category "climate-related disaster" should not be confused with EM-DAT's definition of "climatological" disasters (see above definitions).

Sudden-onset climate-related disaster/hazard events (i.e. those events falling into the first category in the IASC typology) were considered to include all meteorological, hydrological and climatological events (according to the EM-DAT classification), with the exception of drought. Such sudden-onset disaster/hazard events were the primary focus of this study.

This study aims to look particularly at forced displacement as opposed to voluntary forms of human mobility. In using the term forced displacement, it draws on the definition of internal displacement provided by the United Nations Guiding Principles on Internal Displacement, which define IDPs as "persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalised violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognised State border." The study does not differentiate between people that have remained in their own countries and those who have crossed borders as a result of natural disasters.

4. Methodology

A three-step methodology for estimating disaster-related displacement

A detailed methodology is provided in Annexe 1. This is intended to facilitate follow-up studies or ongoing monitoring. However, a brief summary is provided here. A three-step methodology was used to estimate the number of people displaced by natural disasters in 2008.

Firstly, all meteorological, hydrological, climatological (except drought) and geophysical disasters that occurred in 2008 were identified in the EM-DAT data set managed by the Centre for Research on the Epidemiology of Disasters (CRED).⁷ EM-DAT recorded a total of 312 disasters in these categories in 2008. During the course of research, ten additional disasters were found to have resulted in displacement, bringing the total number of disasters included in this study to 322. These disasters affected a total of over 207 million people.

Secondly, a series of criteria were applied to identify which disasters were likely to have caused displacement and would therefore warrant detailed, case-by-case investigation. Through this process, 221 disasters were identified for further case-by-case investigation of levels of displacement. The criteria were:

1. All disasters for which EM-DAT reported figures for the number of people made “homeless” (defined as people needing immediate assistance for shelter). These accounted for 47 out of the 322 disasters.
2. All disasters for which EM-DAT reported figures for the number of people affected over 50,000. These accounted for 72 out of the 322 disasters, although there was some overlap with 1.
3. 15 disasters for which EM-DAT recorded an affected figure of less than 50,000 were chosen at random for further investigation. This was to ensure that they were not significant in terms of displacement and therefore that the level of significance defined in 2 was correct.
4. All disasters reported by the Dartmouth Floods Observatory (DFO)⁸ database which had a GLIDE reference (an internationally recognised unique disaster identification number). These were 53 out of 345 disasters recorded for 2008 in DFO.
5. Disasters identified through a search of the GLIDE database, where some indication of displacement was given in the GLIDE search description box. These were cross-

referenced against the EM-DAT data set and an additional five disasters were included in the study.

6. Multi-country disasters identified through research of EM-DAT reported disasters, that is, where a disaster had affected several countries.

Thirdly, the 221 identified disasters were individually researched using a variety of other sources to establish if they had resulted in forced displacement. The search through various sources started systematically with the International Federation of the Red Cross and Red Crescent’s Disaster Management Information System (DMIS) and related reporting sites, and OCHA’s ReliefWeb and related sources. Subsequently, regardless of whether the above sources provided data on displacement, a wide array of secondary sources were checked, both by following links found in the above sources, and by searching for other (including national) sources. These sources were selected according to comprehensiveness and availability of data, likelihood of accuracy, and ease of use. All sources were cross-referenced to produce an estimate of forced displacement for each disaster. A full list of sources used is given in Annexe 1.

5. Results

Interpreting the results

The results provide data on the following groups of people, for each disaster individually investigated in this study:

Affected – Figure from the EM-DAT data set, which represents the sum of all those injured, homeless or otherwise affected by a disaster, including displaced or evacuated people, and who required immediate assistance following the disaster.

Homeless – Figure from the EM-DAT data set, which represents the number of people in need of immediate assistance for shelter. This was used to provide an initial estimate for displacement (it is assumed that those recorded as homeless are effectively displaced).

Displaced – Figure showing the most accurate estimate of displacement, based on case-by-case investigation of the disasters (Step 3 of the methodology).

Evacuated – Figure showing the number of people evacuated, where it was clear from reports that people were evacuated from their homes either as a preventive measure before a disaster or as a reactive measure after it.

Total displaced – Figure showing the total number of displaced people for each disaster, which is based on adding the estimates for the number of people displaced to the number of people evacuated. The figures presented in this section are those for total displaced.

Summary of results

Table 2 below summarises the results of this study, according to the EM-DAT classification of hazard types. A full table of results is given in Annexe 2.

Of the 207,631,038 people reported to be affected by natural disasters in 2008, a total of 36,062,843 people were found to have been displaced. This included 28,650,653 people who were displaced due to complete destruction of their homes and 7,412,190 who had to be evacuated either as a preventive measure or after the disaster as their houses had been rendered temporarily uninhabitable.

Sudden onset climate-related disasters (hydrological, meteorological, and climatological disasters excluding drought, according to the EM-DAT classification) were responsible for displacing a total of 20,293,413 people in 2008. This represented 56 per cent of the total displacement.

Table 2 Summary of the results for this study showing the number of people displaced and evacuated by sudden-onset natural disasters in 2008

Hazard type (by EM-DAT classification)	Geophysical	Meteorological	Hydrological	Climatological (excl. drought)	All disasters	Climate-related disasters*
Number of disasters	21	61	128	11	221	200
Reported affected	46,789,006	15,308,823	65,896,025	79,225,502	207,219,356	160,430,350
Reported homeless	65,915	273,373	2,572,797	3,600	2,915,685	2,849,770
Estimated displaced	15,697,230	4,873,929	7,568,022	511,472	28,650,653	12,953,423
Estimated evacuated	72,200	3,372,594	3,917,396	50,000	7,412,190	7,339,990
Total displaced and evacuated	15,769,430	8,246,523	11,485,418	561,472	36,062,843	20,293,413
Percentage of affected people displaced / evacuated	34%	54%	17%	1%	17%	13%

* – Climate-related disaster/hazard events were considered to include all events in the meteorological, hydrological and climatological categories of EM-DAT, excluding drought. Note: this should not be confused with EM-DAT's definition of "climatological" disasters.

6. Analysis

The overall scale of disaster-related displacement

According to this study, 36 million people were newly displaced, within their countries and across borders, by sudden-onset natural disasters in 2008. Disasters can therefore be considered as an extremely significant driver of forced displacement globally. As a reference, the total population of people living in forced displacement due to conflict and violence, including IDPs and refugees, was 42 million in 2008, with 4.6 million people having been newly internally displaced during the year.⁹

2008: an “average” year?

Disasters associated with natural hazards, in particular major disasters, are inherently sporadic in nature. Although some hazards, such as cyclones, occur seasonally in reasonably predictable locations, others, such as major earthquakes, exhibit only a very small degree of predictability in time and location. Caution must therefore be applied when using disaster data from any one year to make observations about the nature of disaster impacts in general. There is no average year. This section contains a few observations about the nature of disaster-related displacement in 2008, in order to help assess the meaning of the results of this study for disaster-related displacement.

In 2008, one disaster – the Sichuan earthquake in China – was responsible for displacing 15 million people, nearly 50

per cent of the total. The largest ten disasters that caused most displacement were responsible for displacing 30.5 million people, 85 per cent of the total (see Table 3). These observations illustrate that larger disasters are generally responsible for the vast majority of recorded displacement (although displacement as a result of smaller disasters may not be recorded). Therefore, considerable variation in disaster-related displacement between years is likely. In particular, the occurrence of the Sichuan earthquake in 2008 may mean that disaster-related displacement in 2008 may be higher than average. Furthermore, the results from 2008 may over-estimate the overall contribution of geophysical disasters to displacement, since such large disasters associated with earthquakes do not occur every year. Investigation of several previous years using the methodology outlined in this study would provide a better basis for making general observations about disaster-related displacement.

Table 3 *Ten sudden-onset disasters causing most displacement in 2008*

Country	Type	Start date	Number displaced and evacuated	Percentage of 2008 total
China P Rep	Earthquake	12/5/2008	15,000,000	41.6
India	Flood	14/9/2008	2,442,920	6.8
India	Flood	30/8/2008	2,100,000	5.8
India	Flood	11/6/2008	2,055,925	5.7
Philippines	Storm		2,039,155	5.7
United States	Storm	1/9/2008	1,900,000	5.3
China P Rep	Flood	7/6/2008	1,660,000	4.6
China P Rep	Storm	24/6/2008	1,600,000	4.4
Cuba	Storm	8/9/2008	900,000	2.5
Myanmar	Storm	2/5/2008	800,000	2.2
TOTAL			30,498,000	84.6

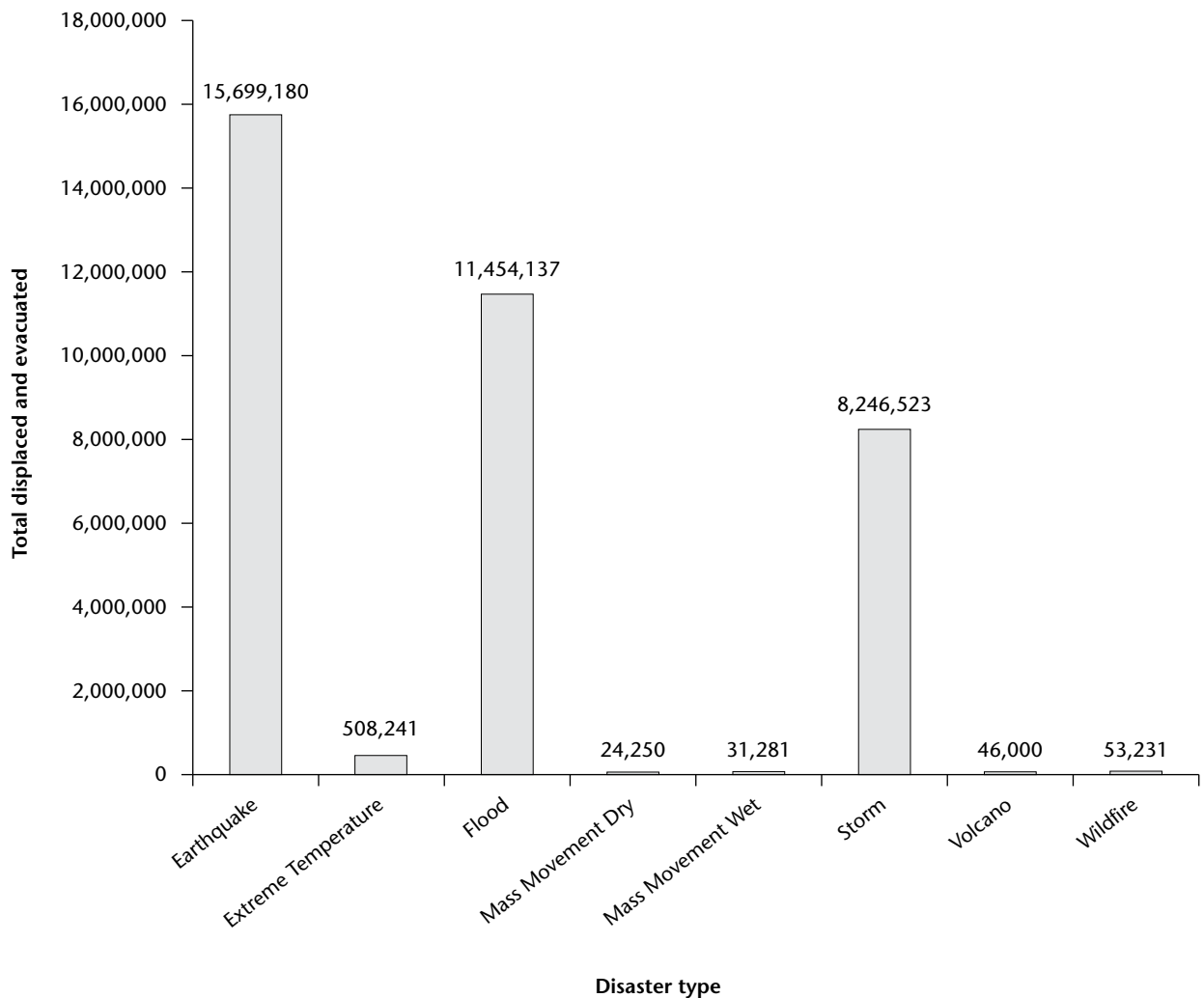
Displacement by disaster type

It is clear from the results of this study that the likelihood of displacement varies significantly according to the type of disaster. Figure 1 below shows the number of people displaced by each type of disaster in 2008, according to the EM-DAT classification.

In 2008, due to the Sichuan earthquake, earthquakes caused more displacement than any other type of disaster. However, as discussed, this is unlikely to be representative. If the Sichuan earthquake is removed from the analysis, floods and storms accounted for 93 per cent of disaster-related displacement in 2008. In addition, floods and storms accounted for 17 of the 20 disasters that caused most displacement in 2008.

Although there is likely to be significant variation between years, these results provide some insight into the types of disasters, and therefore locations, which are most likely to result in displacement. These are generally those disasters that destroy homes, such as major earthquakes, floods and storms. Although extreme temperatures may affect large populations, they do not result in large scale displacement. Disasters associated with climate-related hazards, particularly floods and storms, are likely to be the major drivers of disaster-related displacement overall and in most years. However, major earthquakes also cause large-scale displacement when they occur.

Figure 1 Total displaced and evacuated in 2008 by disaster type



Displacement by region

Figure 2 below shows the number of people displaced by sudden onset disasters in 2008 by region. Table 4 shows the countries with the highest levels of disaster-related displacement in 2008.

Asia was the region most affected, accounting for 31 million of those displaced by sudden onset disasters. Of the 20 disasters that caused most displacement in 2008,

17 were in Asia. This may simply be because Asia is the most disaster-prone region, being susceptible to the full range of natural hazards. However, further analysis is required to understand if there are any other underlying drivers, which mean disasters in Asia are more likely to result in recorded displacement than equivalent disasters elsewhere.

Figure 2 Total displaced and evacuated in 2008 by sudden onset disasters by region

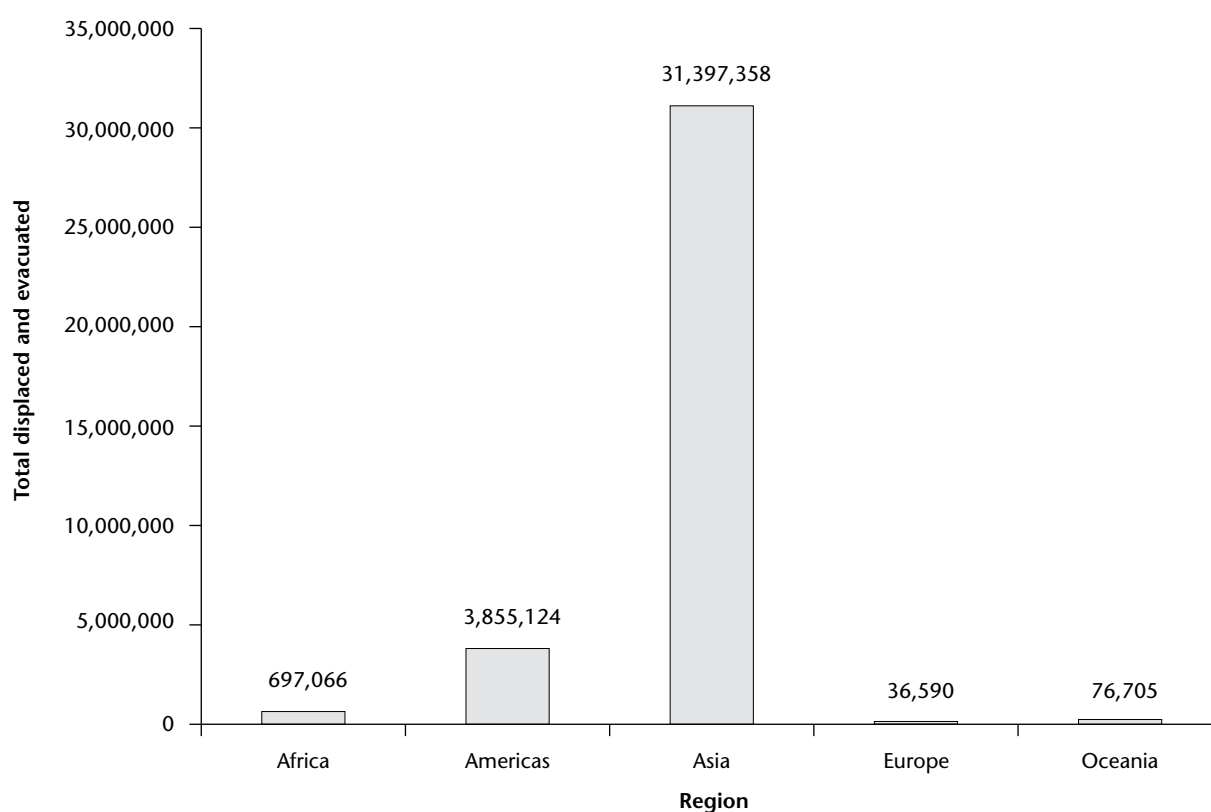


Table 4 20 countries with highest levels of disaster-related displacement in 2008

Country	Total displaced and evacuated	Country	Total displaced and evacuated
People's Rep. China	19,979,423	Nepal	197,500
India	6,705,085	Benin	150,000
Philippines	2,736,389	Sri Lanka	136,345
United States	2,014,473	Haiti	123,811
Cuba	980,000	Viet Nam	102,650
Myanmar	800,000	Pakistan	89,200
Indonesia	400,815	Papua New Guinea	75,000
Brazil	381,035	Chile	74,610
Mozambique	289,486	Ethiopia	72,805
Thailand	202,680	Honduras	70,250

Disaster-related displacement in the context of climate change

Climate-related disasters, that is, those resulting from hazards that are already being or are likely to be modified by the effects of climate change, were responsible for displacing approximately 20 million people in 2008. This study addresses just one possible cause of displacement relating to climate change – that of an increase in sudden-onset climate-related disasters such as floods and storms. It is clear from the results that disaster-related displacement is already significant and likely to become more so with the effects of climate change. The results do not confirm or counter the idea that slow-onset disasters are likely to increase as drivers of displacement and migration as the effects of climate change increase in intensity.

Since this study only includes displacement as a result of sudden-onset disasters, the results can be considered a minimum estimate of displacement as a result of climate-related events and processes in 2008. In order to better understand the overall effect of climate change on displacement and migration, further research is required to understand the contribution of events and processes in categories 2, 3 and 4 of the IASC typology (including environmental degradation and/or slow onset extreme hazard events, permanent losses of territory as a result of sea level rise, and armed conflict over shrinking natural resources; see Tables 1 and 5).

It is important to place the figure of sudden-onset climate-related displacement in the context of other pos-

sible types of climate-change-related displacement not included in this study. For example, in 2008, 26.5 million people were reported to be affected by 12 drought events, according to the EM-DAT data set managed by the Centre for Research on the Epidemiology of Disasters (CRED). Any displacement resulting from these droughts is not included in this study. Sources of data on displacement as a result of drought were not readily identified and ascribing causation is much more complex than in sudden-onset disasters, because drought may only be one of many drivers of population movement.

However, the link between drought or environmental degradation and human mobility is well documented. Research in sub-Saharan Africa in the 1990s indicated that some seven million people, out of 80 million considered to be food insecure, used migration as a coping strategy during drought.¹⁰ Research in Egypt has shown that water shortage and land degradation drive people to move. In Mozambique, 40 per cent of migrants to urban areas said that they moved from their original rural home in part because of environmental problems.¹¹

Recently, a number of studies have provided estimates of the scale of human displacement in the context of climate change. These range up to one billion by 2050. For example, the IPCC quotes estimates that, by 2050, 150 million people may be displaced as a result of the impacts of climate change, mainly the effects of coastal flooding, shoreline erosion and agricultural disruption.¹² The Stern Review of the Economics of Climate Change cites estimates of 200 million displaced by 2050.¹³ These estimates are generally accepted to be subject to high degrees of uncertainty, pri-

Table 5 Summary of the results of this study in the context of the IASC typology for climate-change related drivers of migration and displacement.

Cause of movement	Number of people reported displaced
1. Hydro-meteorological extreme hazard events	20,293,413 as a result of climate-related disasters in 2008 (Source: OCHA-IDMC methodology)
2. Environmental degradation and/or slow onset extreme hazard events	Estimates for slow onset disaster related displacement for 2008 are not readily available. Further research to provide improved data on this issue will be essential. According to the CRED database, 26,502,500 people were reported affected by drought in 2008, however not all of these people would have been displaced (Source: CRED EM DAT).
3. Significant permanent losses in state territory as a result of sea level rise etc.	As of 2008, the only found permanent relocation plans identified in the OCHA-IDMC study concerned the forced displacement for the 2,000 inhabitants of the Tulun (Carteret) and 400 of the Takuu (Mortlock) Islands in Papua New Guinea. However, according to current IPCC findings, this trend is likely to substantially accelerate in the future.
4. Armed conflict/violence over shrinking natural resources	4.6 million were newly internally displaced in 2008 as a result of armed conflicts around the world (Source: IDMC). 42 million were living in forced displacement due to conflict, including IDPs and refugees, in 2008. The potential consequences of climate change for water availability, food security, prevalence of disease, coastal boundaries, and population distribution may aggravate existing tensions and generate new conflicts (UNEP 2009).

marily because there is no baseline information on current levels of disaster-related displacement.

Permanent loss of territory as a result of sea level rise is not currently a significant driver of displacement, although examples do exist. Permanent re-location plans have been developed to address forced displacement for the 2,000 inhabitants of the Tulun (Carteret) and 400 of the Takuu (Mortlock) Islands in Papua New Guinea. However, sea level rise is likely to be a significant driver of forced displacement in the future. Approximately 146

million people live in areas with an elevation of less than one metre above sea level.¹⁴ More than a million people living in the Ganges-Brahmaputra, Mekong and Nile deltas will be directly affected if current rates of sea-level rise continue to 2050 and there is no adaptation.¹⁵

Table 5 on page 12 contextualises the results of this study in the context of the IASC typology. The results of this study provide an estimate for sudden-onset disasters (category 1). Information from other sources relevant to the other categories is also provided.

7. Limitations

Although this study provides the most accurate assessment available of the numbers of people displaced as a result of natural disasters which took place in 2008, a number of limitations apply. These add significant uncertainty, which should be taken into account when interpreting the results of this study. They are generally related to the availability or quality of primary data. More detailed analysis of this study's limitations is included in Annexe 1.

1. In most cases, no actual on-the-ground monitoring of disaster-related displacement is taking place. Thus data on displacement largely has to be taken from various sources, such as needs assessment reports, which often contain information on humanitarian needs without referring specifically to the number of people displaced. Furthermore, there is little consistency in the terminology used by the different sources, with terms such as "affected", "evacuated", "displaced", "homeless" and "population movements" often undefined or used interchangeably.

2. The results of this study can be considered to represent the peak of displacement as it occurs immediately after a disaster. It is not clear in most cases whether displaced people were able to return to their homes within a short period, what proportion remain displaced for longer periods, and what proportions remained permanently in the places of displacement or resettled elsewhere. This lack of data on returns and other durable solutions presents a major barrier to understanding the real scale of disaster-related displacement, and must be addressed if ongoing monitoring of disaster-related displacement is to be effective. Suggestions of how this might be achieved are given in Section 9.

3. The results are only relevant to 2008 and do not provide information on displacement trends over time or average displacement over a number of years.

8. Recommendations for future work

Even though this study is only a first step, it demonstrates that annual global monitoring of forced displacement related to natural disasters is achievable. It is strongly recommended that monitoring of disaster-related displacement, based on the methodology outlined in this study, is undertaken in future. This would provide an opportunity to investigate trends in disaster-related displacement, as well as to further improve the methodology.

As long as specific data on forced displacement is not collected systematically, the methodology for global monitoring should at a minimum include following up on reports of disasters as the situation unfolds, to try and determine whether people remain displaced and over what period of time. The databases currently available only present static information, from which it is not possible to extrapolate numbers of people displaced in the immediate aftermath of the disaster, during the rehabilitation phase, and in the long term. In parallel, governments and relief agencies should aim to systematically collect information on the number of people displaced by natural disasters.

At present, EM-DAT has the most comprehensive data on disasters. However, EM-DAT depends on having reliable sources with consistent reporting patterns and criteria.

One of the most significant problems is that the data recorded by all sources reflects numbers in the immediate aftermath or at the peak of the crisis. At present, no data set tracks subsequent developments including returns or other durable solutions, information that is critical for understanding and evaluating the entire scope of the relationship between disasters and displacement. Table 6 presents a framework for collecting improved data on disaster-induced displacement, which could be used to provide a more comprehensive assessment of returns. Future data sets should retain longitudinal data on displacement, including statistics on those displaced immediately after a disaster and at subsequent periods afterwards, as new data become available.

Given that many sudden-onset disasters of the type included in this study are transient, it is assumed that return would often be the most likely durable solution.

Table 6: Suggested framework for collecting disaster-related displacement data over time

Time-frame after disaster	Information needed (estimates)	Reported by whom
Immediate aftermath (up to one week maximum)	<ul style="list-style-type: none"> - number affected overall - number displaced and homeless (including those evacuated prior to or immediately after the event), or - number of totally damaged (destroyed) houses - number of partially damaged houses. 	Government, Red Cross/ Red Crescent societies, civil society groups present in affected areas, UNDAC or other designated agency present.
After two months	<ul style="list-style-type: none"> - updated number affected, - updated number and location displaced or homeless, - reason/s for continued displacement - number of people returned - number of people intending to stay in their place of displacement or resettling elsewhere. 	Government, revised flash appeal or joint needs assessment, if applicable, UN, RC/RC societies.
After six months	<ul style="list-style-type: none"> - updated number and location of displaced - reason/s for continued displacement - number unlikely to ever be able to return due to the land having been rendered non-conducive to human settlement, or other reasons (where applicable); - number of people returned - number of people staying in their place of displacement or resettling elsewhere. 	UN Country Report, government, RC/RC societies
After two years	<ul style="list-style-type: none"> - updated number and location of displaced - reason/s for continued displacement - number unlikely to ever be able to return due to the land having been rendered non-conducive to human settlement, or other reasons (where applicable); - number of people returned - number of people staying in their place of displacement or resettling elsewhere. 	UNDP Agency Annual Country Report, government

However, in the case of disasters having more permanent impact, data on local integration or resettlement would also be needed. Thus, the framework makes a distinction between those temporarily displaced and those more permanently displaced and seeks information on durable solutions other than returns.

If monitoring is to contribute to better protection, baseline data on numbers of people displaced must be complemented with a more comprehensive assessment of the enjoyment of rights by people displaced by natural disasters. Improved and ongoing collection of protection indicators,

not to mention reliable and cohesive baseline data, would require more resources over a sustained period.

Ideally, monitoring would be carried out by an institution with direct access to EM-DAT and / or DMIS or benefit from a formal agreement with both, to ensure necessary access to reports on natural disasters and numbers of affected / homeless, as well as access to sources of reports. This immediate access would facilitate follow up as disaster data is updated. IFRC's decision to include systematic data on displacement in its DMIS data set will go a long way to make accurate information available.

9. Conclusions

In 2008, approximately 36 million people were displaced as a result of sudden-onset natural disasters. To put this number in context, 4.6 million people were newly internally displaced as a result of conflict during the same period. Disasters can therefore be considered as an extremely significant driver of forced displacement globally.

Earthquakes, floods and storms are the types of sudden-onset natural disaster that cause most significant displacement. Large-scale disasters are responsible for the vast majority of recorded displacement. Asia was the region most affected by disaster-related displacement in 2008.

In 2008, at least 20 million people were forced to leave their homes due to sudden-onset climate-related natural disasters. Research from other sources suggests that many millions of people are also displaced annually as a result of climate-related slow-onset disasters such as drought. Had it not been for the Sichuan earthquake in China, which displaced 15 million people, climate-related disasters would have been responsible for over 90 per cent of disaster-related displacement in 2008.

Although it is clear that natural disasters are among the principal causes of forced displacement, data on climate-related natural disaster displacement has not been consistently collected or analysed. The lack of reliable baseline data on disaster-related forced displacement also makes it difficult to estimate potential human mobility based on climate change models, or to develop realistic scenarios to be taken into account in climate change adaptation policy formation.

From a research perspective, even though this study is a first step, it shows that it is possible and necessary to more accurately estimate existing disaster-induced displacement.

However, ongoing monitoring of disaster-related displacement is required. The methodology outlined could be applied with relatively limited additional resources both to future disaster data sets, and retroactively for a period in which data exists (for example since 1990). The data could also be significantly enhanced through additional steps to collect data on related factors, including the duration of displacement and needs of displaced populations. This should include efforts to systematically collect data on displacement, returns, local integration, or resettlement.

Climate change is likely to lead to increasing rates of displacement and it is vital that evolving frameworks for climate change adaptation address displacement issues. Consistent application of a disaster-induced displacement monitoring methodology such as the one outlined in this study would provide a baseline for informed estimates as to how current trends may be affected by climate change in the future, and would be a necessary element for any improvement in the response for the displaced. However, there is much additional work to be done in improving data on the social impacts of climate change, particularly in less developed contexts. Further research into displacement caused by slow-onset disasters and sea level rise is an obvious next step. There is also a clear need to address remaining gaps in policy, operational and legal frameworks, such as the legal framework to protect those forced to cross a border as a result of a natural disaster.

Given the scale of displacement highlighted in this study, further research and policy analysis on human mobility and disasters is essential. However, improved data will only be relevant if partnered with strengthened policy and action in the future. This presents both a significant and urgent challenge for policy makers and researchers in the future.

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Annexe 1 Detailed methodology

Data-gathering process and sources

A three-step methodology was devised to identify the disasters that would be included in the research and the sources and sequencing of sources to be used.

First, all meteorological, hydrological, climatological and geo-physical disasters that occurred in 2008 were identified from the EM-DAT data set managed by the Centre for Research on the Epidemiology of Disasters (CRED). The EM-DAT data included 312 disasters under these categories for that year.¹ During the course of research ten additional disasters were found to have resulted in displacement, bringing the total number of disasters covered in this study to 322, with a total of over 207 million people reported affected.

Second, a series of filters was applied to identify disasters to include in the study data set, on which to base a rough initial estimate. The following 221 disasters were included:

1. All disasters showing a figure for homeless in the EM-DAT database. These accounted for 47 of the 312 disasters, or 15 per cent. These disasters were included because, if houses are reported to be “totally damaged” or “destroyed”, it is reasonable to assume that their inhabitants were forced out of them and had to find alternative shelter solutions. When EM-DAT records destroyed houses, the figure is multiplied by five to estimate the number of individuals displaced in developing countries, and by three in developed countries.
2. Disasters in the EM-DAT datasheet which reported a number of affected people over 100,000. These accounted for 67 of the 322, or 21 per cent. Some in this filter had already been counted under the “homeless” count and were not researched again. These disasters were included because it is reasonable to assume that if the disaster was of such scale, people could have been forced out of their homes.
3. Disasters found in the Dartmouth Floods Observatory (DFO) database that had GLIDE references,² which came to 53 of 345 disasters noted for 2008 in DFO. Five disasters were detected in addition to those in the two groups

¹ Drought-related disasters were removed from this spreadsheet because they fall into the category of ‘slow onset’ disasters.

² GLIDE (Global unique disaster IDentifier) is a globally common, unique identification scheme for disaster events proposed by the Asian Disaster Reduction Center (ADRC): see www.glidnumber.net. The GLIDE system is becoming progressively more accepted by other reporting agencies.

above and included on the spreadsheet with their GLIDE number.

4. Disasters identified through a random search of the GLIDE database, where some indication of displacement was given in the GLIDE search description box. An additional 50 disasters were researched or double-checked with the EM-DAT data,³ which produced an additional five disasters which had not been detected previously.

5. Multi-country disasters identified through research of EM-DAT reported disasters, that is, where a disaster had affected several countries, eg. cyclones Kammuri, Fengshen and Nuri in S.E. Asia and hurricanes Gustav, Hanna and Ike in the Americas.

6. The 15 “mid-size” disasters in the EM-DAT datasheet where the number of affected people was between 50,000 and 100,000 were included. Additionally, 15 “smaller” disasters with an affected figure under 50,000 were chosen at random.

Third, the 221 disasters that were included (71 per cent of the total number of natural disasters that were reported by EM-DAT for 2008, with droughts and epidemics excluded) were individually researched using a variety of other sources to establish if they caused forced displacement. This third step of the process constituted the bulk of the research as it involved time-consuming case-by-case investigation.

This search was, in turn, carried out in two stages. First, through the International Federation of the Red Cross and Red Crescent’s Disaster Management Information System (DMIS) and related reporting sites, and OCHA’s ReliefWeb and related sources. Next, independently of whether the above sources provided data on displacement, a wide array of secondary sources were checked through a combination of links found in the above sources, or through a gradual learning process of where information could be found for different regions and countries. These sources were selected according to comprehensiveness and availability of data, likelihood of accuracy, and ease of use.

They included:

- ADRC – Asian Disaster Reduction Centre, for disasters in Asia;
- GDACS – Global Disaster Alert and Coordination System;
- Government websites, where available;
- NOAA – (US) National Oceanic and Atmospheric Ad-

³ Sixty-five GLIDE references were found in total.

ministration which also houses the National Hurricane Centre, for disasters occurring in the Western Hemisphere;

- RSOE-EDIS – National Association of Radio-Distress Signalling and Infocommunications, Emergency and Disaster Information Services;
- News agencies such as Reuters AlertNet, IRIN, Xinhua, BBC, CNN and local news sites;
- REDLAC – Risk, Emergency and Disasters Task Force, and La Red for disasters occurring in Latin America and the Caribbean;
- SADC – Southern African Development Community, for disasters in Africa;
- Other, such as UN country team needs assessments and situation updates, NGO reports, UN and NGO country websites.

Other authoritative databases containing information on disasters such as UN ISDR and Munich Re were not used because they did not provide further information relevant to population displacement resulting from disasters.

Characteristics of the methodology

Because this study systematically investigated displacement as a separate category of population affected by natural disasters, the data given here represent the most specific compilation of statistics available for displacement related to natural disasters.

Surprisingly few of the numbers for displaced people are contradictory or inconsistent. Hardly any cases have been detected where estimates between sources differ significantly, possibly as most sources can be traced back to the same sources, namely government.

The total number of displaced found in this study is far higher than the figure in the EM-DAT “homeless” column. This is because the study has researched displacement as a specific objective, seeking reports where displacement can be separated from “homeless”, “affected” or other categories. The EM-DAT data do not make this distinction. According to CRED explanatory notes, many of those who may be displaced are recorded under “affected”.

Double-checking of dates and events was used to minimise the risk of double counting disasters, for example when a secondary disaster results from a first one, or when there is a close sequence of storms, cyclones and floods. The names of cyclones and hurricanes have been added as a further distinguishing feature.

Weaknesses of the methodology which may have affected the accuracy of the results

Not all 322 natural disasters identified for 2008 were researched individually due to insufficient time. As shown in Table 1 below, 101 disasters were not further investigated for displacement. 19 per cent of these disasters reported affected populations above 5,000, and nine per cent above 10,000; however, the total population reported affected by these disasters was under 412,000, or only 0.2 per cent of the total population reported affected in the 322 disasters identified by this study.

- In most situations, no actual on-the-ground monitoring of disaster-related displacement is taking place. This resulted in data on displacement largely having to be extrapolated from reports which are most of the time putting forward information on humanitarian needs, material damage, etc., without referring specifically to movements of populations. At the same time, there was inconsistency in wording indicating displacement in documents used: reports often use wording such as “affected”, “evacuated”, “displaced”, “homeless” and “population movements” interchangeably and only in a few cases are distinctions made between these groups. In order to gather data for displacement, the proxies homeless and evacuated were used.
- While a wide array of information on natural disasters exists online from various local or subject-specific sources, it is not always possible to find specific information on disaster-related displacement. Many sources serve meteorological purposes and do not document the human impact of disasters. Some sources were readily identifiable whereas others were less well-known, took time to discover and were not used systematically – or were used only as a cross-check if information could not be found elsewhere. Searches were systematically conducted using the above sources to verify each disaster.
- In the majority of cases where no monitoring of movements is taking place on the ground, there is a large margin of uncertainty in relation to the data collected, especially in relation to whether people have remained in situations of displacement over any length of time. The figures arrived at are generally from the peak of the displacement situation. They do not include any reference to returns or subsequent developments after the disaster.
- Difficulty in distinguishing between the various storms and cyclones in the Caribbean (August to November) and South East Asia (May to September). These occur in almost overlapping timeframes and it is necessary to conduct careful research to ensure no double-counting or gaps.

- No trends in relation to internal displacement can be drawn from the data collected, or an analysis of only one year of data. Ideally monitoring of at least two or three years should have taken place to see whether trends could actually be determined.
- Its data come from national Red Cross and Red Crescent societies in each country and is either sourced from governments or from pre-existing RC/RC presence in-country.

Data sets and other sources of information

Strengths of the data sets and other sources used which make the results reliable

1. The EM-DAT database gives the most globally comprehensive and systematically collected and presented information from a variety of international sources, on the number, location, date(s) and type of sudden-onset disasters as well as their impact on people and property. For all these reasons it was selected as the main primary data source from which further searches could be conducted. Other advantages of CRED's EM-DAT is that it receives data from a variety of global, regional and local sources and then decides on the most authoritative estimate to use, according to set criteria; it has clear and logically-described Explanatory Notes on Guidance, Glossary, Criteria and Definitions. These have been followed in the present study to maintain consistency; it checks information from sources and updates information every three months, so the data can be considered accurate and up-to-date, therefore authoritative.

2. Very few disasters with reports of people affected were found which were not included in CRED's EM-DAT, despite extensive searches. The concern voiced by some that EM-DAT does not record all disasters and the claim that displacement is being missed out as a result is not borne out by the findings of this study.

3. IFRC's Disaster Management Information System (DMIS) appears comprehensive. Positive features include:

- Its information is fed from volunteers in all countries that suffer from repeated disasters such as cyclones, flooding or earthquakes, in which the Red Cross/ Red Crescent (RC/RC) movement is present. The movement's highly-organised system of data collection using a combination of government and its own sources, combined with a growing sophistication of government reporting methods, suggests that very few disasters, even small ones, go undetected.
- It provides not just statistical data but has links to substantive IFRC emergency reports, updates and appeals.
- Its reports provide relevant detail and information on the evolving situation and location of IDPs.
- Its reports are methodically presented and timely: as a "bulletin" a few hours or days after the disaster; the first detailed report within 30 days and an annual report released in December each year.

- GLIDE numbers are quoted more often than in other sources.
- EM-DAT data often mirrors the latest updates from IFRC reports, indicating that the latter is an important primary data source for CRED.
- The RC/RC in-country teams' rapid accessibility to disaster sites and the frequency of their updates make its data arguably the most widespread, accurate and authoritative.

4. The Dartmouth Floods Observatory (DFO) in the USA tracks global flooding events and is clearly presented in a readable table. It has proved a useful cross-reference for EM-DAT and DMIS data or a source to pick up new data. It includes a column for "displaced", which is a useful criteria to use for searches.

5. OCHA's ReliefWeb:

- It provides a comprehensive collection of information on disasters from a wide variety of sources.
- It provides good disaster-related maps.
- GLIDE references have recently been increasingly included in disaster reports.
- Searching the website is time-consuming due to the way it is configured and the time it takes to download material, especially maps.

6. Other sources, such as the Asian Disaster Reduction Center (ADRC), the Risk, Emergency and Disasters Task Force of the Regional Inter-Agency Standing Committee (REDLAC), the Pan American Disaster Response Unit (PADRU), are regional bodies that focus on regional disasters so they cannot be used comprehensively for global searches; however they are useful for cross-checking data.

- They provide good detail, specifically on displacement estimates and locations immediately after a disaster.
- They mainly use government statistics.
- ADRC has detailed and easily accessible disaster archive material spanning a decade, as well as links to other sources. Although originally intended as a regional reporting body, it reports increasingly on disasters outside of South East Asia.
- GLIDE's search page is useful but disasters searched for are not always found. Where searches are successful, there are often useful links to other sources.
- PADRU is a creation of IFRC and has regional specific data on disasters.
- The National Oceanic and Atmospheric Administration (NOAA) is run by the US Government and covers events in the Americas. It is useful for cross-checking the names and dates of the various cyclones and for presenting displacement estimates on certain disasters.

7. International news agencies have sophisticated disaster reporting systems useful for cross-checking data.

- They can be the sole source of details on displacement
- They use mainly government statistics.
- The main ones used in this study are Xinhua, Reuters AlertNet, Associated Press (AP), Agence-France Presse (AFP), Deutsche Press Agentur (DPA), BBC, CNN.

8. UN country offices can provide detailed information in situation updates and joint assessment reports but these are not always accessible. They are particularly authoritative because they collect primary data, directly from disaster sites.

9. Governments in disaster-prone areas have increasingly sophisticated disaster management departments that monitor, warn and report on disasters. The National Disaster Management Centres in India, the Philippines, Bangladesh and Thailand were particularly useful sources of information for this study. Their drawback is that information can be difficult to find in their websites.

Weaknesses of the data sets and sources which may have affected the reliability of the results:

1. None of the data sets (EM-DAT, DMIS, DFO) track returns or developments after the peak of the crisis. Therefore, data included are generally from the peak of displacement.

2. The data sets do not record numbers of people displaced consistently. That is why proxies and other filters were used.

3. In the majority of cases, data consist of best estimates. All sources acknowledge that their statistics are estimates only. In some cases they are more precise, usually where good registration systems exist.

4. Sources are not quoted in any of the data sets.

5. GLIDE numbers have not been systematically included. These must be searched and verified from the GLIDE website.

6. Some small disasters may have been omitted because they were not included in the EM-DAT database.¹ EM-DAT relies on the material received from a variety of sources through pre-existing agreements. It can not report on disasters where no data have been received. It acknowledges that it may have missed disasters that occurred in sparsely populated areas where no reporting has taken place.

¹ EM-DAT only records disasters where ten or more people were reported killed; a hundred or more people reported affected; a state of emergency was declared; a call for international assistance made.

7. EM-DAT data are updated every three months and the data entered supersedes all preceding data. There is no possibility to follow the historical progression of the disaster or its victims, that is, no way of knowing how many people may have been displaced in earlier reports – only the latest one. IFRC reports show historical progression, but usually these are focused on progress made in the recovery phase and do not provide the numbers of people who have been able to return home or find alternative housing solutions. This means that in the majority of cases we have only one estimate for displacement except on a few occasions where subsequent estimates were available.

8. GLIDE numbers are not provided in EM-DAT so it is difficult to distinguish different disasters occurring in the same country at close intervals, or to compare them across countries.

9. Until recently, DMIS did not report “displaced”, but only “affected” for 2008. Since it started to report “displaced” in 2009 it has become much easier to research events causing displacement.

10. DFO tracks only flood-related disasters. However, since 37% of disasters in 2008 occurred due to flooding (120 out of the 322, or 37 per cent), its coverage is wide.

11. Like EM-DAT, DFO relies on the material received from a variety of sources through pre-existing agreements. It can not report on disasters where no data has been received. It acknowledges that it may have missed disasters that occurred in sparsely populated areas where no reporting has taken place.

Annexe 2 Data tables

The following data tables provide the full results of this study. The tables are sorted in descending order with the disasters that have resulted in most displacement first.

The following information is provided: Country, Type (of disaster, according to the EM-DAT classification), Start date, Affected (the number of people affected, according to EM-DAT), Homeless (the number of people made homeless, according to EM-DAT, Displaced estimate 1, Displaced estimate 2 (estimate of displacement from various sources), Evacuated (number evacuated where this was explicitly stated), Final estimate (best estimate of displacement added to number evacuated), Sources (list of sources used).

Data is available in Excel format on request (includes GLIDE numbers and dates of estimates of displacement).

Country	Type	Start date	Affected	Homeless	Displaced estimate 1	Displaced estimate 2	Evacuated	Total displaced	Sources
China P Rep	Earthquake	12/5/2008	45,610,000	0	15,000,000	10,438,000		15,000,000	USAID/USAID
India	Flood	14/9/2008	25,000,000	2,400,000	961,549	497,936	1,481,371	2,442,920	IFRC Info bulletin/IFRC DREF rep/IFRC Info bulletin
India	Flood	30/8/2008	1,000,000	0	2,100,000	250,000		2,100,000	DFO/UNHCR Refworld
India	Flood	11/6/2008	7,900,000		2,055,925			2,055,925	UNCT Sitrep
Philippines	Storm		4,784,634	0	2,039,155	405,000		2,039,155	IFRC Op. Update/IFRC Op Update
United States	Storm	1/9/2008	2,100,000	0	0		1,900,000	1,900,000	USA Today
China P Rep	Flood	7/6/2008	1,600,000	0	0		1,660,000	1,660,000	IFRC Bulltn # 1
China P Rep	Storm	24/6/2008	340,000	0	1,600,000			1,600,000	CoC Xinhua/Rweb
Cuba	Storm	8/9/2008	0	0	0		900,000	900,000	The Guardian
Myanmar	Storm	2/5/2008	2,400,000	0	800,000			800,000	Joint Appeal PONJA
China P Rep	Earthquake	30/8/2008	950,000	50,000	650,000	50,000		650,000	Xinhua News Ag./Wikipedia
China P Rep	Extreme temperature	10/1/2008	77,000,000	0	506,000			506,000	DMIS, 29.1.08
Philippines	Flood	4/9/2008	365,675	0	0		350,000	350,000	Mindanews
China P Rep	Storm	28/7/2008	93,000	0	0		274,300	274,300	Xinhua News Ag.
Brazil	Flood	30/3/2008	190,000	0	190,000		70,000	260,000	Reuters AlertNet/PAHO
Indonesia	Flood	30/1/2008	40,000	0	219,515			219,515	OCHA ppp
Philippines	Flood	12/2/2008	875,306	0	205,974			205,974	DFO
Thailand	Flood	20/11/2008	700,000	0	200,000			200,000	Thai Gov /DFO data
Nepal	Flood	22/9/2008	180,000	0	180,000	100,000		180,000	IRIN/OCHA Appeal
Mozambique	Flood	8/28/2008	500,000		171,000			171,000	WFP
Benin	Flood	--/7/2008	158,235	0	150,000			150,000	IFRC
China P Rep	Storm	19/4/2008	274,000	0	0		120,000	120,000	NOAAUS Gov.
Mozambique	Storm	8/3/2008	165,000	55,000	102,486		13,000	115,486	UNCT sitrep # 8/UNCT sitrep # 1
Haiti	Storm	6/9/2008	125,000	0	111,391	1,500		111,391	IFRC/DMIS
India	Flood	27/11/2008	803,740	0	0		101,940	101,940	ACT Appeal
Viet Nam	Storm	8/8/2008	52,630	4,910	95,000			95,000	JPN MFA
Pakistan	Flood	2/8/2008	200,000	0	82,000			82,000	Reuters AlertNet
Sri Lanka	Flood	29/5/2008	362,582	0	80,000	1,235		80,000	SL News Portal/NDMC (GoSL)

Country	Type	Start date	Affected	Homeless	Displaced estimate 1	Displaced estimate 2	Evacuated	Total displaced	Sources
Brazil	Flood	22/11/2008	1,500,000	0	78,707			78,707	IFRC DREF Report
Papua New Guinea	Flood	8/12/2008	75,300	0	75,000			75,000	AFP
Honduras	Flood	19/10/2008	313,350	0	70,000			70,000	OCHA Sitrep # 9
Chile	Flood	29/8/2008	81,755	23,000	54,610	23,000		54,610	IFRC DREF report/IFRC update
Ethiopia	Flood	16/11/2008	23,831	0	52,000			52,000	IRIN
Philippines	Flood	1/12/2008	0	50,000	28,076		23,146	51,222	Gov. Ph. NDCC/Gov.PH. NDCC
United States	Wildfire	13/11/2008	55,000	0	0		50,000	50,000	Air Worldwide
Indonesia	Flood	1/2/2008	88,261	1,500	49,653			49,653	WHO Sitrep # 2
Peru	Flood	4/2/2008	450,000	45,000	45,000			45,000	DFO
China P Rep	Flood	31/10/2008	411,000	0	16,500		25,000	41,500	Gov.China/Xinhua
China P Rep	Flood	7/8/2008	810,000	0	2,400		36,474	38,874	Reuters India/Xinhua
China P Rep	Flood	27/5/2008	538,000	0	33,500		4,600	38,100	DMIS
United States	Storm	4/1/2008	0	0	0		38,000	38,000	CNN & Mahala
Indonesia	Flood	23/4/2008	34,514	0	34,000			34,000	OCHA ppp
Philippines	Storm	18/5/2008	1,496,635	0	34,000			34,000	DFO
Sri Lanka	Storm	4/27/2008	50,000	0	33,408			33,408	GoSL NDMC
Indonesia	Flood	--/10/2008	11,000	0	31,500	3,400		31,500	OCHA Sitrep/OCHA monthly
China P Rep	Flood	7/7/2008	3,000,000	0	0		31,000	31,000	NIDM Issue 1109
Philippines	Flood	21/11/2008	239,763	0	30,000			30,000	DFO
Cuba	Storm	29/8/2008	450,000	0	0		27,000	27,000	IFRC DREF Report
Brazil	Storm	6/5/2008	0	1,600	1,600		25,000	26,600	NOAA
Ukraine	Flood	26/7/2008	224,725	0	0		25,000	25,000	OCHA Sitrep # 1
Sri Lanka	Flood	22/11/2008	321,138	0	21,770	85,000		21,770	GoSL NDMC/HRW
Egypt	Mass Movement Dry	6/9/2008	0	625	250		20,000	20,250	IFRC Bulletin/IFRC Bulletin
Nicaragua	Flood	10/18/2008	10,663	0	0		20,000	20,000	DFO
Cuba	Storm	8/11/2008	49,445	0	0		20,000	20,000	DFO
Cuba	Flood	17/11/2008	20,000	0	20,000			20,000	UNCT Sitrep # 1
Colombia	Flood	13/12/2008	50,000	0	20,000			20,000	REDLAC

Country	Type	Start date	Affected	Homeless	Displaced estimate 1	Displaced estimate 2	Evacuated	Total displaced	Sources
Sudan	Flood	24/11/2008	50,900	0	20,000			20,000	IFRC/DMIS report
Ethiopia	Flood	20/8/2008	91,764	0	20,000			20,000	IRIN
Yemen	Flood	23/10/2008	25,000	0	18,000	22,000		18,000	IFRC/DMIS /IFRC Appeal
Madagascar	Storm	17/2/2008	332,391	191,182	18,000	0		18,000	OCHA sitrep #2/CARE Int'l
Nepal	Flood	--/7/2008	70,000	0	17,500	70,000		17,500	IRIN/UNHCR Refworld
Indonesia	Flood	6/9/2008	118,000	0	0		17,352	17,352	Antara News Ag
China P Rep	Earthquake	5/8/2008	0	13,500	16,000			16,000	China Bystander
Angola	Flood	31/1/2008	81,400	0	16,000			16,000	SADC website
Indonesia	Mass Movement Wet	/5/2008			16,000			16,000	OCHA ppp
Bangladesh	Flood	30/8/2008	600,000	15,638	15,638			15,638	UNCT Sitrep # 2
Central African Rep	Flood	--/7/2008	0	795	795		14,400	15,195	IFRC Emer.Appeal/OCHA sitrep #28
United States	Storm	12/9/2008	200,000	0	0		15,000	15,000	ReutersAlertnet
Uganda	Flood	17/11/2008	30,000	0	15,000			15,000	The Monitor Uganda
Brazil	Flood	12/1/2008	49,506	0	14,293			14,293	IFRC DREF Report
Ghana	Flood	--/7/2008	58,000	0	14,097			14,097	OCHA report
Ecuador	Flood	30/1/2008	275,000	14,122	13,871			13,871	PAHO report
Mexico	Storm	20/7/2008	500,000	0	0		13,100	13,100	Now Public news
Cuba	Storm	20/8/2008	0	0	0		13,000	13,000	IFRC
Colombia	Volcano	14/4/2008	14,201	0	0		13,000	13,000	DPA ReliefWeb
Philippines	Mass Movement Wet	6/9/2008	5,000	0	0		12,124	12,124	NDCC
Colombia	Volcano	20/11/2008	104,000	0	0		12,000	12,000	AFP ReliefWeb
Chile	Flood	19/5/2008	40,000		12,000	2,000		12,000	IFRC DREF report/IFRC update
Somalia	Flood	3/11/2008	52,000	0	12,000	400		12,000	IRIN /OCHA Sitrep #46
United States	Flood	--/6/2008	11,000,000	0	11,000			11,000	DMIS Field report
Guatemala	Flood	22/10/2008	180,000	0	10,764	7,540		10,764	OCHA Sitrep # 9/IFRC DREF Report
Romania	Flood	--/8/2008	10,520	0	0		10,520	10,520	OCHA Sitrep # 1

Country	Type	Start date	Affected	Homeless	Displaced estimate 1	Displaced estimate 2	Evacuated	Total displaced	Sources
Colombia	Flood	15/9/2008	1,200,000	0	10,100			10,100	REDLAC
Indonesia	Earthquake	17/11/2008	10,000		10,000			10,000	ReutersAlertNet
Colombia	Volcano	17/1/2008	150	0	0		8,000	8,000	CNN
Chile	Volcano	2/5/2008	8,000	0	0		8,000	8,000	IFRC DREF report
Pakistan	Earthquake	29/10/2008	75,000	0	7,000			7,000	OCHA Sitrep # 4
Costa Rica	Flood	11/26/2008	11,000		6,890	4,400		6,890	IFRC DREF report/GoCR /CNE
Haiti	Storm	18/8/2008	190	30	6,790			6,790	IFRC
Chad	Flood	20/7/2008	0	6,450	6,450			6,450	IFRC
Zambia	Flood	9/2/2008	15,000	0	5,796			5,796	UNCT sitrep # 4
Haiti	Storm	26/8/2008	72,970	0	5,610			5,610	IFRC DREF Report
Philippines	Storm	22/9/2008	41,630	4,485	5,215	850		5,215	NDCC Sitrep No. 8/NDCC Sitrep 13
Indonesia	Flood	10/3/2008	60,000	0	0		5,060	5,060	WordPress.com
Indonesia	Volcano	15/4/2008	600	0	0		5,000	5,000	OCHA ppp
Morocco	Flood	23/10/2008	20,000	0	0		5,000	5,000	IFRC Em. report
Guatemala	Storm	21/7/2008	0	0	5,000			5,000	ReutersAlertnet
Rwanda	Flood	1/10/2008	11,295	0	5,000			5,000	IFRC DREF W004
Venezuela	Flood	20/11/2008	1,500		200		4,695	4,895	BBC News/Thaindian News
Kenya	Flood	10/11/2008	30,770	0	4,600	5,400		4,600	IFRC DREF report/OCHA Sitrep# 4
Zaire/Congo Dem Rep	Earthquake	3/2/2008	12,590	0	4,575			4,575	OCHA Sitrep # 2
Dominican Rep	Storm	18/8/2008	0	0	4,565	0		4,565	IFRC/Prevent.Evac.
Viet Nam	Storm	25/9/2008	51,755	6,695	4,485			4,485	IFRC Info bulletin
Dominican Rep	Storm	26/8/2008	6,255	0	0		4,360	4,360	IFRC DREF report
Niger	Flood	--/7/2008	33,000	0	4,300			4,300	WHO
Burkina Faso	Flood	--/8/2008	0	4,292	4,292	28,000		4,292	OCHA
Malaysia	Mass Movement Dry	12/6/2008			0		4,000	4,000	Gov Malaysia
Philippines	Storm	22/8/2008	429,450	0	3,530			3,530	NDCC Sitrep No. 10
Indonesia	Earthquake	20/2/2008	0	0	3,315		200	3,515	OCHA ppp/BBC News
Indonesia	Flood	11/2/2008	3,500	0	3,500			3,500	ReutersAlertnet

Country	Type	Start date	Affected	Homeless	Displaced estimate 1	Displaced estimate 2	Evacuated	Total displaced	Sources
Afghanistan	Earthquake	4/17/2008	3,900		3,250			3,250	DMIS report
Philippines	Storm	18/7/2008	31,129	0	0		3,080	3,080	NDCC Update
Mozambique	Wildfire	1/9/2008	0	3,000	3,000			3,000	IHT
Nicaragua	Flood	24/9/2008	3,525	0	3,000			3,000	DFO
Sudan	Flood	--/8/2008	38,891	0	3,000			3,000	IFRC/DMIS
India	Flood	5/7/2008	50,000	0	0		2,800	2,800	Thaindian News
Burundi	Flood	20/9/2008	2,770	0	2,770			2,770	IFRC DREF Report
Costa Rica	Flood	13/10/2008	92,000	0	0		2,529	2,529	IFRC DREF Report
Indonesia	Flood	15/11/2008	83,000	1,420	2,400			2,400	OCHA Sitrep
Bangladesh	Flood	--/7/2008	2,250	0	2,250			2,250	IFRC Info bulletin #2
Guatemala	Extreme temperature	12.08			2,241			2,241	REDLAC
Costa Rica	Flood	2/9/2008	9,498	0	0		2,140	2,140	RC Report Summary
Viet Nam	Flood	27/10/2008	600,000	0	0		2,000	2,000	IFRC Bulletin 1
Indonesia	Earthquake	8/7/2008			0		2,000	2,000	OCHA ppp
Tanzania Uni Rep	Flood	17/3/2008	0	1,500	2,000			2,000	IFRC report
Togo	Flood	1/7/2008	44,735	0	2,000			2,000	OCHA ROWA
China P Rep	Flood	2/5/2008	780,000	0	0		1,900	1,900	DFO
Canada	Flood	26/4/2008	2,000	0	0		1,830	1,830	Govmt of Ontario
Thailand	Flood	11/9/2008	839,573	0	1,680			1,680	IRIN
Bangladesh	Mass Movement Wet	16/8/2008	0	0	0		1,657	1,657	IFRC DMIS
Philippines	Storm	6/11/2008	300	160	460		1,185	1,645	NDCC Sitrep No. 8/NDCC Sitrep 8
Jamaica	Storm	28/8/2008	4,000	0	0		1,520	1,520	IFRC DREF report
India	Mass Movement Wet	8/2/2008	0	0	0		1,500	1,500	ABC News
Nicaragua	Flood	11/26/2008			1,500			1,500	IFRC Em. Update 3
Brazil	Flood	2/2/2008	49,506	1,435	1,435	1,435		1,435	IFRC DREF report
Nicaragua	Storm	29/5/2008	1,390	0	0		1,390	1,390	IFRC DREF report

Country	Type	Start date	Affected	Homeless	Displaced estimate 1	Displaced estimate 2	Evacuated	Total displaced	Sources
Sri Lanka	Flood	12/3/2008	54,323	0	1,167			1,167	GoSL NDMC
Australia	Storm	16/11/2008	12,000	0	0		1,000	1,000	The Daily news
Liberia	Flood	--/7/2008	0	340	1,000			1,000	IFRC
Thailand	Storm	2/5/2008	0	1,000	1,000			1,000	Thai Gov
Cameroon	Flood	--/7/2008	24,000	1,000	1,000			1,000	IFRC
France	Storm	3/8/2008	1,500	600	870			870	Croix Rouge Fr.
China P Rep	Earthquake	6/10/2008	0	735	855			855	China Post
Viet Nam	Flood	19/10/2008	12,000	0	840			840	GoVN
Indonesia	Earthquake	9/9/2008	565	0	820			820	OCHA ppp
Ethiopia	Flood	30/5/2008	0	810	805			805	Africa Press
Japan	Flood	28/7/2008	50,000	0	0		800	800	AP
Guinea Bissau	Flood	--/7/2008	0	750	750			750	IFRC
Cayman Islands	Storm	26/8/2008	0	0	0		715	715	IFRC Emerg.App.
Kyrgyzstan	Earthquake	5/10/2008	0	1,055	665			665	IFRC DREF report
Argentina	Flood	28/1/2008	85,000	0	0		635	635	IFRC DREF report
Marshall Is	Flood	10/12/2008	600	0	0		600	600	AFP News
Iraq	Flood	10/9/2008	0	600	600			600	ICRC Op. update
Costa Rica	Flood	22/11/2008	53,000	0	600			600	ICRC DREF report
China P Rep	Storm	8/8/2008	42,000	0	0		500	500	Xinhua News Ag.
Zaire/Congo Dem Rep	Flood	2/4/2008	0	500	500			500	RSOE, Hungary
Mali	Flood	18/8/2008	0	2,500	500			500	All Africa News
Bahamas	Storm	7/9/2008	3,000	0	500			500	IFRC Emer.Appel
Indonesia	Earthquake	/2/2008			500			500	OCHA ppp
United States	Flood	12/26/2008			0		473	473	Seattle Times
Philippines	Storm	28/7/2008	22,079	0	0		444	444	NDCC Sitrep 4
Gambia The	Flood	--/9/2008	0	400	400			400	IFRC Emer.Appel
Belize	Flood	19/10/2008	38,000	0	400			400	IFRC Em. Update 3
China P Rep	Storm	22/8/2008	900,000	0	394			394	ReliefWeb
Honduras	Flood	12/12/2008			0		250	250	REDLAC

Country	Type	Start date	Affected	Homeless	Displaced estimate 1	Displaced estimate 2	Evacuated	Total displaced	Sources
Turkey	Wildfire	1/8/2008	0	300	231			231	Today's Zaman
Canada	Flood	10/4/2008	400	0	0		200	200	Govmt of Ontario
Moldova Rep	Flood	26/7/2008	4,000	0	0		200	200	OCHA Sitrep # 1
Pakistan	Flood	9/8/2008	90,752	0	0		200	200	Thaindian News
Tanzania Uni Rep	Flood	10/1/2008	7,500	442	200			200	IFRC DREF report
Viet Nam	Storm	17/11/2008	8,585	235	200			200	Cov Viet Nam
Afghanistan	Flood	--/8/2008	1,000	180	180			180	IFRC Info bulletin
Viet Nam	Storm	30/9/2008	30,860	820	125			125	CoVN CCFSC
Kenya	Flood	17/3/2008	700	0	100			100	OCHA Sitrep #3
El Salvador	Flood	16/10/2008	3,000	0	95			95	IFRC DREF report
Kiribati	Flood	9/12/2008	0	85	85			85	OCHA sitrep # 1
Paraguay	Storm	7/8/2008	47,655	0	60			60	IFRC DREF report
Antigua and Barbuda	Storm	15/10/2008	25,800	0	45			45	Antigua Met Service
Fiji	Storm	28/1/2008	0	0	20			20	ABC News
Haiti	Storm	2/9/2008	48,000	0	20			20	Radio Haiti Vision
Argentina	Volcano	7/5/2008	0	0	0			0	
Austria	Storm	29/2/2008	0	0	0			0	
Belgium	Storm	29/2/2008	0	0	0			0	
Bulgaria	Extreme temperature	--/1/2008	0	0	0			0	
Cayman Islands	Storm	8/11/2008	0	0	0			0	
China P Rep	Mass Movement Wet	8/7/2008	0	0	0			0	
China P Rep	Mass Movement Wet	8/9/2008	0	0	0			0	
Guatemala	Flood	2/7/2008	0	0	0			0	
Honduras	Storm	28/5/2008	0	0	0			0	
Hong Kong (China)	Storm	22/9/2008	0	0	0			0	
Hong Kong (China)	Storm	25/9/2008	0	0	0			0	

Country	Type	Start date	Affected	Homeless	Displaced estimate 1	Displaced estimate 2	Evacuated	Total displaced	Sources
Hong Kong (China)	Storm	5/8/2008	0	0	0	0		0	
Hungary	Extreme temperature	--/1/2008	0	0	0	0		0	
Indonesia	Mass Movement Wet	5/5/2008	0	0	0	0		0	
Mexico	Mass Movement Wet	17/9/2008	0	0	0	0		0	
United States	Extreme temperature	11/12/2008	0	0	0	0		0	
Zaire/Congo Dem Rep	Storm	--/1/2008	0	0	0	0		0	
United States	Wildfire	20/6/2008	0	300	0	0		0	
South Africa	Storm	14/11/2008	0	3,500	0	0		0	
Portugal	Flood	18/2/2008	72	38	0	0		0	
Burundi	Flood	10/4/2008	500	0	0	0		0	
Burkina Faso	Flood	--/7/2008	560	0	0	0		0	
Indonesia	Flood	2/1/2008	1,000	0	0	0		0	
Australia	Flood	20/11/2008	1,200	0	0	0		0	
Australia	Flood	3/1/2008	3,000	0	0	0		0	
Guinea	Flood	--/7/2008	4,200	0	0	0		0	
Madagascar	Storm	27/1/2008	5,457	3,156	0	0		0	
Bolivia	Storm	8/11/2008	6,655	0	0	0		0	
Belize	Storm	31/5/2008	10,000	0	0	0		0	
Dominican Rep	Storm	3/9/2008	10,745	0	0	0		0	
Mexico	Flood	6/7/2008	20,000	0	0	0		0	
Panama	Flood	22/11/2008	23,287	0	0	0		0	
Philippines	Storm	29/9/2008	27,683	0	0	0		0	
Namibia	Flood	30/1/2008	30,000	0	0	0		0	
Costa Rica	Storm	28/5/2008	55,000	0	0	0		0	
Algeria	Flood	1/10/2008	59,000	0	0	0		0	

Country	Type	Start date	Affected	Homeless	Displaced estimate 1	Displaced estimate 2	Evacuated	Total displaced	Sources
Guyana	Flood	8/12/2008	100,000	0	0			0	
Afghanistan	Extreme temperature	--/1/2008	170,502	0	0			0	
Lao P Dem Rep	Flood	12/8/2008	204,190	0	0			0	
Tajikistan	Extreme temperature	--/1/2008	2,000,000	0	0			0	
India	Flood	20/7/2008	225,000	0	0			0	