Nat Hazards (2010) 55:405–422
DOI 10.1007/s11069-010-9537-2

ORIGINAL PAPER

A digitized global flood inventory (1998–2008): compilation and preliminary results

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Received: 13 February 2010 / Accepted: 8 April 2010 / Published online: 8 May 2010

Abstract Floods have profound impacts on populations worldwide in terms of both loss of life and property. A global inventory of floods is an important tool for quantifying the spatial and temporal distribution of floods and for evaluating global flood prediction models. Several global hazard inventories currently exist; however, their utility for spatiotemporal analysis of global floods is limited. The existing flood catalogs either fail to record the geospatial area over which the flood impacted or restrict the types of flood events included in the database according to a set of criteria, limiting the scope of the inventory. To improve upon existing databases, and make it more comprehensive, we have compiled a digitized Global Flood Inventory (GFI) for the period 1998–2008 which also geo-references each flood event by latitude and longitude. This technical report presents the methodology used to compile the GFI and preliminary findings on the spatial and temporal distributions of the flooding events that are contained in the inventory.

Keywords Flood database · Global hazard assessment · Spatiotemporal analysis · Fatality, impact assessment · Hydrological modeling

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1 Introduction

Floods account for about one-third of all geophysical hazards globally and adversely affect more people than any other natural hazards (Smith and Ward 1998). Events such as the 1931 and 1938 flooding of the Yellow River in China, the great floods of the Mississippi in 1993 and flooding in Myanmar from Cyclone Nargis in 2008 serve as grave testimony to the immense consequences floods can inflict on populations worldwide. The International Flood Network indicates that from 1995 to 2004, natural disasters caused 471,000 fatalities worldwide and economic losses totaling approximately $49 billion USD, out of which approximately 94,000 (20%) of the fatalities and $16 billion USD (33%) of the economic damages were attributed to floods alone. Flooding claims more than 20,000 lives per year over the globe and adversely affects 140 million people on average each year (Smith 1996; WDR 2003, 2004). However, the nature and scale of flood impacts vary greatly around the globe.

The worldwide impact of flooding events and their devastating consequences highlight the increasing importance of flood hazard studies, not only at sub-national and national levels but at continental and global scales as well. A detailed flood database is an important tool for such studies. There are several hazard databases that catalog flooding events which are described in Sect. 2 below. However, the utility of these databases for modeling or hazard assessment is limited because the entries either do not include specific geospatial characteristics of the flooding impacts (i.e., latitude and longitude) or fail to enlist all flood events due to their variable entry criteria. In order to evaluate and improve hydrologic modeling predictions and provide better information for more effective flood hazard mitigation and preparedness strategies, it is vital to develop comprehensive, standardized and detailed flood information about the historic flood events including their frequency, intensity/severity and societal impacts. This is even more pertinent at the time when advances in satellite remote sensing technology have made it feasible to monitor global flooding and its impacts, even in remote areas and developing regions. Therefore, we develop a digitized Global Flood Inventory (GFI) with the specific objectives of: (a) compiling a comprehensive and openly accessible digitized GFI for the period 1998–2008, and (b) analyzing the spatiotemporal distribution of global flood events and their impacts at the national, regional, and global level. The 1998–2008 period of the GFI database was chosen to coincide with the availability of Tropical Rainfall Measurement Mission (TRMM) Multi-satellite Precipitation Analysis products (TMPA; Huffman et al. 2007). In the future, the digitized GFI will be used to assess flood vulnerabilities and to evaluate the skill of a NASA Global Flood Model (GFM; http://trmm.gsfc.nasa.gov; Hong et al. 2007a, b, 2009).

This report provides a brief review of the existing flood hazard databases and introduces the methodology used to compile the GFI. Furthermore, it presents some preliminary findings based on GFI-derived global flood statistics and maps. The report concludes with a list of future studies.

2 Review of current flood hazard databases

There are several multi-hazard databases that catalog flooding events, which vary depending on their sources, scope and the intended purpose of the study. The search criteria, sources consulted and definition of specific hazard terms also differ amongst databases, leading to difficulties when attempting to standardize flood event records at the global scale. We briefly review some of the major flood databases below.

The Emergency Disasters Database (EM-DAT), compiled and managed by the Center for Research on the Epidemiology of Disasters (CRED), is an international database that includes all types of natural and man-made disasters from 1900 to present (EM-DAT, http://www.emdat.be/). EM-DAT includes events only if 10 or more people were killed, 100 or more people were affected, a state of emergency was declared, or there was a call for international assistance. Because these criteria are impact-based, the database has the potential to be biased towards reporting more events in populated areas. The EM-DAT database is freely accessible online and has a sorting tool to define location, time, and disaster category.

The United Nations Office for the Coordination of Humanitarian Affairs (OCHA) launched ReliefWeb to provide disaster information on humanitarian emergencies and disasters in order to assist the international humanitarian organizations (http://www.reliefweb.int/). ReliefWeb provides reliable and relevant information on natural disasters, including floods, as events unfold. ReliefWeb continuously posts updated disaster reports for cataloged events and maintains a listing of past events, which can be accessed in the disaster history section of the website. The website does not intend to provide a comprehensive database of disaster events, but can serve as a valuable resource to verify current events and obtain additional details for rapid response and humanitarian support.

The International Flood Network (IFNET) maintains flood information which is voluntarily submitted to its secretariat (http://www.internationalfloodnetwork.org/). The IFNET records flood events with 50 or more fatalities for the years 2005–2007 and includes maps of the impacted region. But the usefulness of IFNET information for global flood analysis is limited by its 3-year temporal coverage.

The Dartmouth Flood Observatory (DFO) has created an international and comprehensive flood database entitled the Global Archive of Large Flood Events, which covers events from 1985 to the present in a simple Excel spreadsheet format (DFO, http://www.dartmouth.edu/~floods/). The data were derived from news and governmental sources and remote-sensing images. Each entry includes information on the flood start and end date, country, detailed names of the affected area/locations, name of the flooded river, number of killed and displaced people, damage incurred and extent of the flooding impacts. This database also includes links to high-quality maps for selected events, showing the entire affected region. The database stores locations of floods based on the center of the polygon enclosing the affected area, irrespective of administrative or political boundaries. Although the DFO database has fairly good global coverage, it does not present an exhaustive list of events when cross-checked with other databases. Presently, the flood event locations in the DFO database are only geo-referenced since 2006, making it difficult to use for evaluating hydrological model predictions of floods during the early years of TRMM. More detailed analysis on the different types of natural and man-made hazard databases and their scope can be found in Tschoegl et al. (2006), Smith and Ward (1998) and Kirschbaum et al. (2009).

3 Compilation of the flood database

3.1 Definition

In the GFI database we define several categorical terms to describe the flood events:

3.1.1 *Flood Identification (FID)*

Each entry has been assigned a unique Flood Identification number (FID) starting from the beginning of the record in 1998. Entries are event-based, and an event affecting multiple countries is assigned only one FID.

3.1.2 *Date of Occurrence (YYYY-MM-DD)*

Represents the start date of the flood event.

3.1.3 *Location*

The entry provides geographic location (latitude and longitude, in decimal degrees) and nominal listings of the area(s) affected by the flood, which we refer to hereafter as the flood hit location.

3.1.4 *Duration*

Time in day(s) elapsed between the start and estimated end date of the event.

3.1.5 *Fatality*

The number of people confirmed dead or missing and assumed dead as the result of the event. Governmental official figures from impacted countries or regions are quoted whenever available. In the absence of governmental official statistics, EM-DAT-reported numbers or newspaper report estimates are used.

3.1.6 *Severity*

This study employs three different severity classes: 1, 2 and 3; 1 being least severe while 3 the most severe as defined by the DFO. The severity classes are based on the estimated recurrence interval of flooding. Class 1 describes a small to medium flood event having a recurrence interval of less than 20 years. Class 2 represents large events having recurrence intervals of more than 20 years and less than 100 years. Class 3 identifies an extreme event as having a recurrence interval of more than 100 years (DFO, http://www.dartmouth.edu/).

3.1.7 *Cause*

A cause (trigger) is listed for each flood entry, when information is available, and lists events according to the DFO database definitions. Triggers include heavy rain, snowmelt, dam and levy break, and tidal surges, among others, and exclude earthquake-triggered tsunamis. More details of the terms associated with triggers can be found in American Metrological Society (AMS) glossary pages available at http://amsglossary.allenpress.com/glossary.

3.1.8 *Event source*

The flood event data are compiled from different sources. They include the DFO, the EM-DAT, IFNET and ReliefWeb. Other secondary sources include news reports, online documents and other publicly available event information. All events in the GFI were verified with the available news and online reports from governmental and non-governmental agencies.

3.2 Methodology

The step-by-step methodology adopted for the compilation of the GFI is presented in Fig. 1. The major work involved (1) assigning a latitude and longitude for each flood event from 1998 to 2006, and (2) standardizing the reports so there were no redundancies. Flood characteristics are associated to each event. A majority of the latitude and longitude estimates for flood locations from 2006 through 2008 were taken from the DFO database. The assigned latitude and longitudes correspond to the centroid (geometric center) of the polygon enclosing the inundated area. For events prior to 2006, we primarily used Google Earth™ to determine the latitude and longitude of the reported flood locations. These locations were verified and cross-checked with additional reports, aerial photographs and remote-sensing images, when available. Compiling and verifying these geo-referenced points for each flood location was rather tedious and often required multiple searches using Google Earth™ to match the exact location. Several issues emerged when attempting to

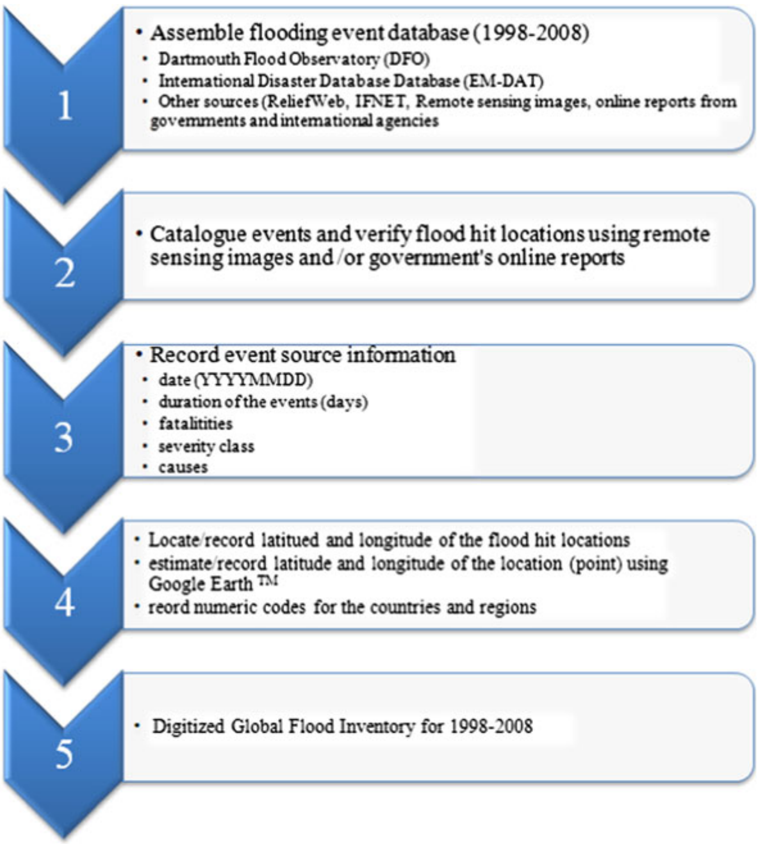

Fig. 1 Step-by-step methodology to compile digitized Global Flood Inventory (GFI)

identify the flood locations, including ambiguity in the spatial extent of the reported impacts and differences in the naming convention of such locations. In such instances, we associated the name to a location after cross-checking with local online reports and primarily used the spelling of the place according to local language. The flooded area is located by identifying the larger administrative units first (e.g., region, country, province, state, and district) and then moving to smaller spatial areas (e.g., county, town, village, and block), serving to minimize possible errors in locating the latitude and longitude.

Redundant listings were eliminated by validating with other sources like ReliefWeb, IFNET, nationally available databases and online, local newspaper reports. A straightforward, user-friendly spreadsheet was used for compiling the collected information, including the categories described above (Table 1). When multiple countries were affected by a single flooding event, the GFI includes separate entries for each affected location in each country, but uses the same FID to describe the event. This helped to clarify any confusion regarding the characteristics of the flood while still identifying specific flood locations, allowing for both event- and country-specific analysis on global flooding.

3.3 Uncertainty and possible biases of the inventory

There are several factors which limit our ability to accurately compile a hazard inventory at the global scale as well as to assess its completeness. One of the major factors is inconsistent reporting of flood events. Flooding events are reported differently at local, subnational, national, regional and international levels, primarily based on scales of impact. For example, at the global level, only flood events with large impacts are reported, whereas smaller events are usually reported at the local level. Therefore, there is a high likelihood of underreporting flooding events at the global level compared to the local level. Even at the local scale, event reporting is prone to under or over-reporting depending on the context and the purpose for which reports are prepared. For example, if an affected community makes a request for financial or other support in the aftermath of a flooding event, they may inflate damage estimates from their area. In contrast, flood events may not be reported in areas that experience minor damages from flooding.

Another challenge in developing a comprehensive inventory stems from the source data from which the inventory is compiled. This inventory draws on publicly available databases and online resources, which may be impacted by reporting biases or events that occur in more remote locations. Regional disparities in flood event reporting and accuracy tend to vary by continent. North America, Europe and Australia (and proximate Pacific Islands, which we refer to hereafter as Oceania) have a high reported number of events compared to the developing regions in Africa, South America and Asia. The number of the compiled data in the developing regions could be more prone to underestimation than in developed regions due to a lack of effective and systematic cataloging of flooding data records and their subsequent reporting from local to international scales. While existing hazard databases can provide a more evenly distributed representation of flooding events spatially, the databases can be limited by their search and selection criteria, as described in Sect. 2. As a result of these geographic and reporting biases, the GFI likely underestimates the actual number and extent of flooding events but presents a lower boundary on global floods.

The approach taken to compile the GFI by assigning a point value to represent a flood hit location may contribute additional uncertainty to the exact flood location and extent of damage. Latitude and longitude points for multiple locations in the flood area are recorded if the flood covered a wide area, serving to minimize such uncertainty. In some cases,

Table 1 Example from the GFI database for mid September, 2000

ID	Year	Month	Day	Duration (days)	Fatalities	Severity	Cause	Lat	Long	Location/country	Region/continent	Sources
494	2000	9	18	34	1468	2	4	22.58	88.35	Murshidabad, India	Asia	DFO
495	2000	9	18	1	−9999	−9999	−9999	43.02	132.54	Primorye, Russia	Europe	EM-DAT
495	2000	9	18	1	−9999	−9999	−9999	50.22	143.00	Sakhalin, Russia	Europe	EM-DAT
495	2000	9	18	1	−9999	−9999	−9999	62.51	172.10	Koryak, Russia	Europe	EM-DAT
496	2000	9	19	2	6	1	1	43.30	5.38	Marseille, France	Europe	DFO
496	2000	9	19	2		1	1	43.61	3.90	Montpellier, France	Europe	DFO
497	2000	9	19	4	9	1	2	14.91	−92.27	Tapachula, Mexico	Central America and Caribbean	DFO
497	2000	9	19	4		1	2	16.86	−99.88	Acapulco, Mexico	Central America and Caribbean	DFO
497	2000	9	19	4		1	2	23.28	−106.08	Concordia, Mexico	Central America and Caribbean	DFO
497	2000	9	19	4		1	2	17.00	−100.09	Lazaro Cardenas, Mexico	Central America and Caribbean	DFO
498	2000	9	20	2	−9999	1	9	6.44	3.42	Lagos city, Nigeria	Africa	DFO
499	2000	9	20	84	9	1	1	11.03	−74.83	Magdalena, Colombia	South America	DFO
500	2000	9	20	1	−9999	−9999	−9999	45.46	12.23	Vénétie, Italy	Europe	EM-DAT
500	2000	9	20	1	−9999	−9999	−9999	45.83	10.54	Lodrone, Italy	Europe	EM-DAT
501	2000	9	23	1	−9999	−9999	−9999	12.03	4.63	Kebbi, Nigeria	Africa	EM-DAT

Note: −9999 indicates no data. In the case of fatalities for the same event, if data were not available for each of the locations, then the very first row of the selected event indicates the total number of fatalities for that event irrespective of location(s). For example, for the event with and ID of 497, 9 indicate the total fatalities for the entire event, not the fatality rate for that particular location identification of the correct location was hampered due to differences in spelling or language amongst the reports and database. The media reports consulted for the inventory events were primarily taken from English-speaking news, which also contributes to regional reporting biases in the inventory.

4 Preliminary results

4.1 Flooding: a global phenomenon and its causes

Following the GFI compilation and digitization, the global flood event inventory was analyzed spatially and temporally according to event severity, cause and fatalities. Figure 2 shows the spatial distribution of the 2,900 flooding events recorded in the GFI. The GFI

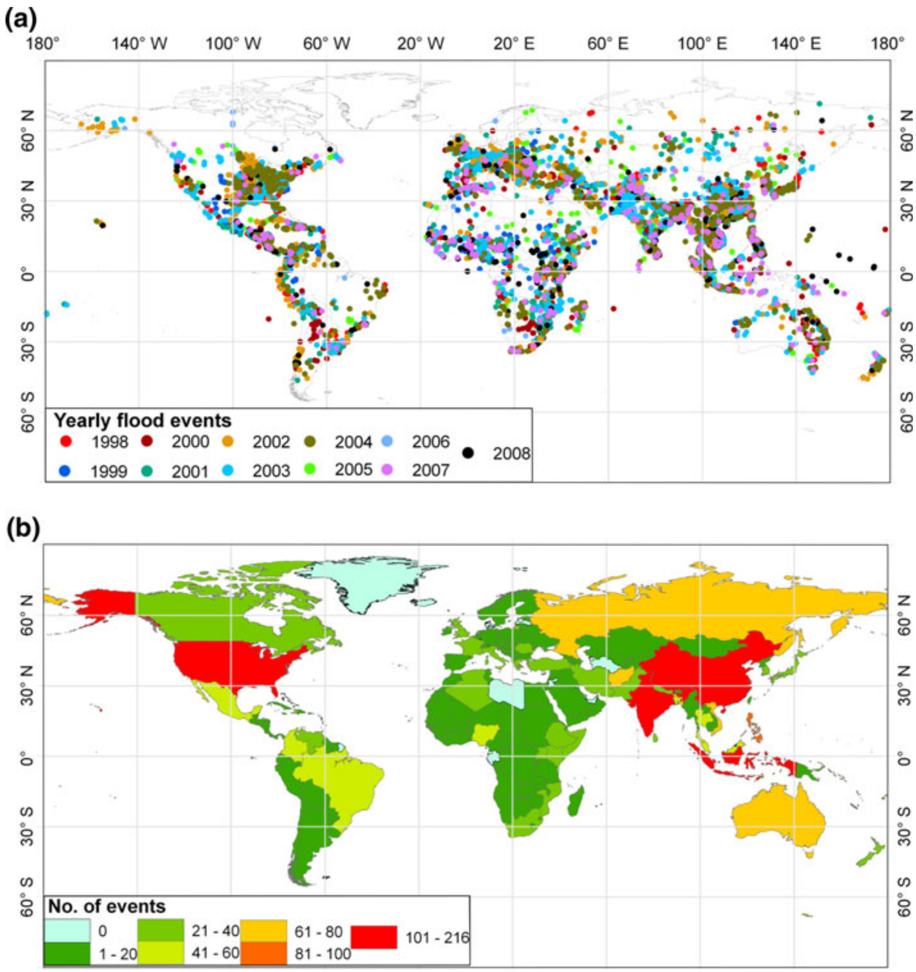

Fig. 2 **a** Flooding for each year from 1998–2008 as recorded in GFI, **b** Number of flooding events by countries

Table 2 Top ten countries with the most flooding events reported for 1998–2008

Rank	Name	No. of events
1	United States	216
2	China	193
3	India	126
4	Indonesia	120
5	Philippines	92
6	Vietnam	80
7	Australia	79
8	Russia	76
9	Afghanistan	63
10	Thailand	53

illustrates that nearly all countries in the world are prone to flooding, except for those that lie at latitudes greater than 60°. Table 2 lists the top ten countries with the highest number of recorded floods within the 11 years of the GFI record. The United States ranks first on the list, followed by China, India, and Indonesia. Interpretation of Fig. 2 indicates the causative meteorological controls of the flooding range from continental heavy rainfall in the northeast U.S., Europe, and China, monsoons in India and Southeast Asia, and land-falling tropical cyclones in the Far East, Caribbean, and Central America.

When considering event causative factors, “heavy rain” is the most frequently reported cause of flooding (64%); monsoon rain is the second most reported cause (11%) followed by brief torrential rain (9%) and tropical cyclones (6%; Fig. 3). It is quite likely that many “heavy rain” reports could have been more accurately assigned to a more specific class such as “tropical cyclone” or “monsoon rain”, both of which yield heavy rain.

4.2 Flooding events and fatalities

The GFI indicates that Asia (i.e., India, China and Bangladesh), Southeast Asia (i.e., Myanmar, Philippines and Vietnam), Africa (i.e., Tanzania and Ethiopia), Central America

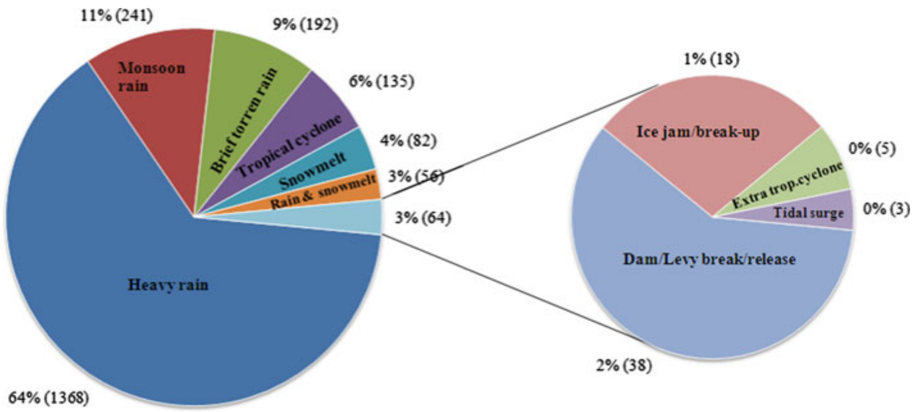

Fig. 3 Causes of flooding. Heavy rain, monsoon rain, and brief torrential rains are the major causes of flooding globally. Data in parentheses show the number of flooding events

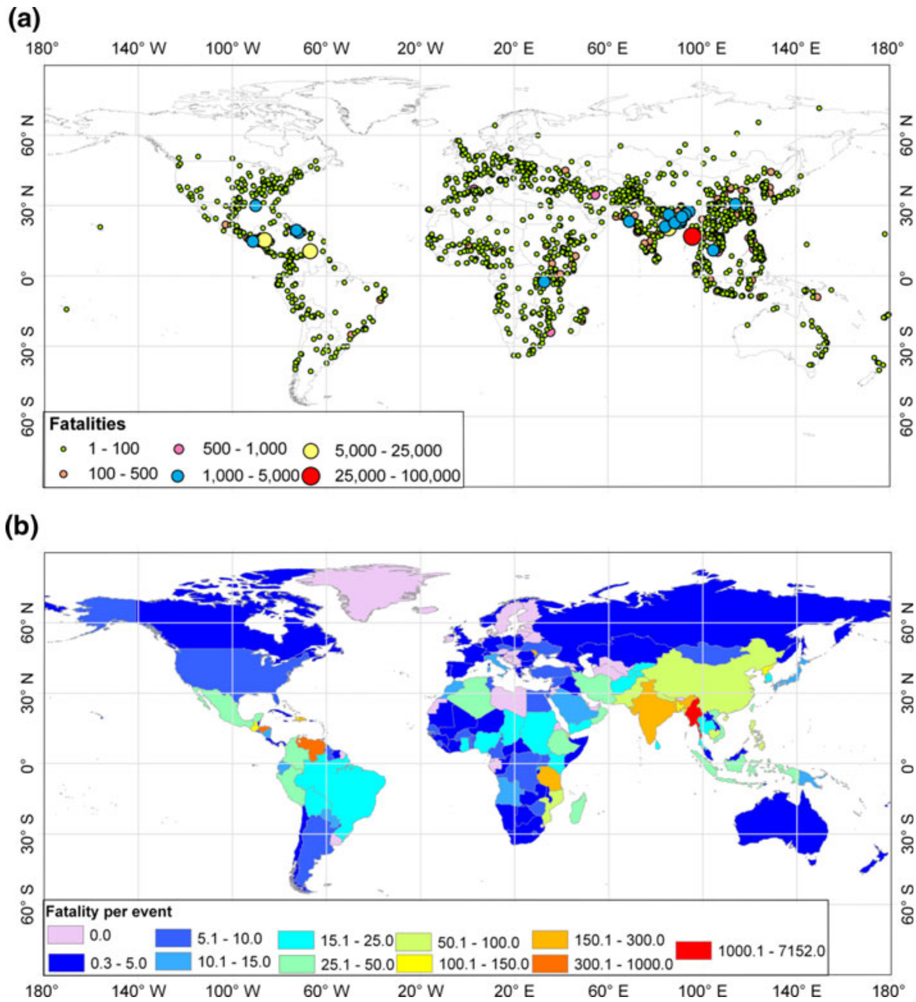

Fig. 4 **a** Total number of fatalities for 1998–2008. Results show that Asia, Southeast Asia, Eastern Africa, Central America, and the Caribbean region experienced the most fatal floods. **b** Countrywide fatalities per flooding event. Myanmar has the most deaths per events followed by Venezuela, Honduras, India and Moldova which shows the flood vulnerability of these countries

and the Caribbean region (i.e., Honduras, Dominican Republic and Haiti) experienced the most fatal floods (Fig. 4). For 1998–2008, the GFI shows that flooding killed around 247,000 people worldwide, averaging about 22,500 fatalities per year. 2002 has the highest number of flooding events (339), while 2008 was the deadliest year (109,818 reported deaths). The latter is attributed to the flooding and consequent devastation caused by tropical cyclone Nargis that struck Myanmar in May 2008. If we omit this event, 1999 becomes the most fatal year, killing almost 35,000 people worldwide. It is important to note that 1999 had the lowest number of flooding events reported for the decade for the entire globe. But a single flash flood event killed 20,000 people as a result of torrential rain in Venezuela in mid-December 1999. The fatality in this event is, however, attributed not only to the flash flood but the subsequent landslide that occurred in Caracus regions.

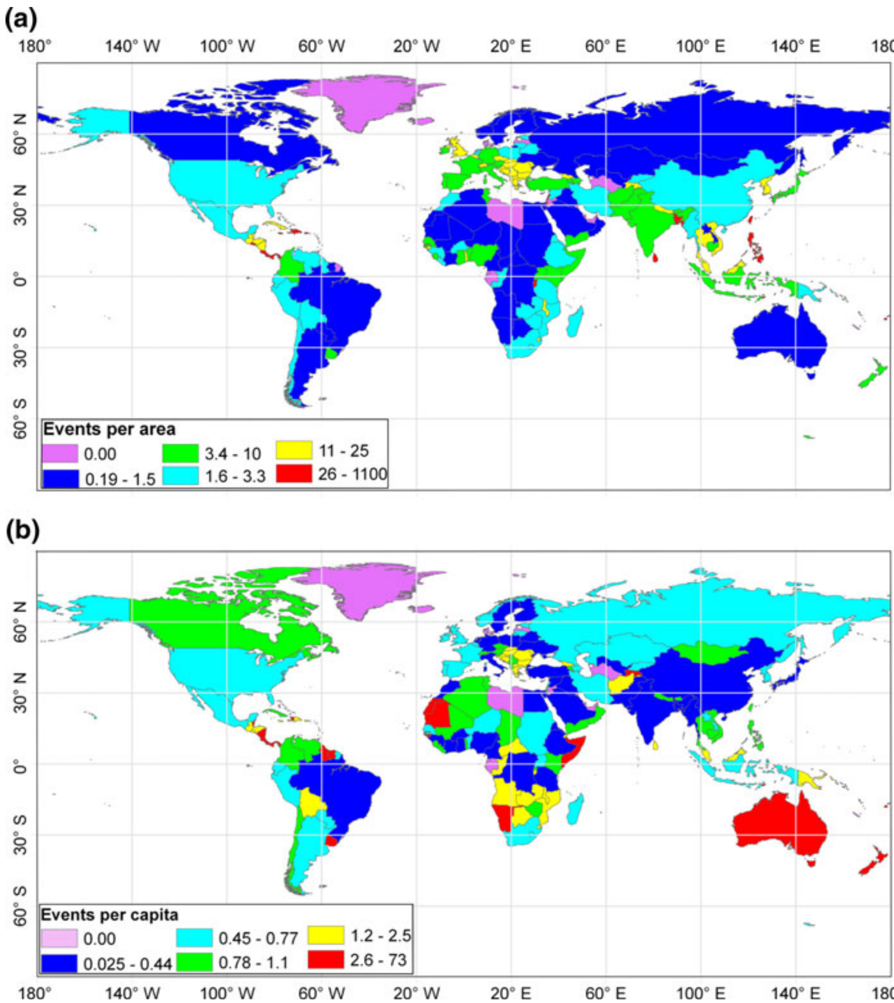

Fig. 5 Flood event normalized by **a** the area (in $\times$100,000 km^2) and **b** by the population (in $\times 10^6$) based on the quantile classification excluding 0.00 values

4.3 Exposure to floods

Based on recorded flooding events and fatalities for the 11 years of GFI data, we have come up with flooding event and fatality exposure indices by normalizing the statistics with the area and population of the countries respectively (Figs. 5, 6).

Results reinforce the fact that island countries, countries or the regions either with more shoreline or river networks (e.g., South East Asia, East Asia, Central America and Caribbean) are more exposed to flooding events (Fig. 5a). The number of flooding events per capita is higher in Australia and many of the African countries with low population density compared to flooding events per area for the same locations (Fig. 5b). Analyzing the flood fatality it is found that most of Asia, South East Asia and Central America and Caribbean regions are highly prone to flood fatality based both on the per area and per capita (Fig. 6a, b).

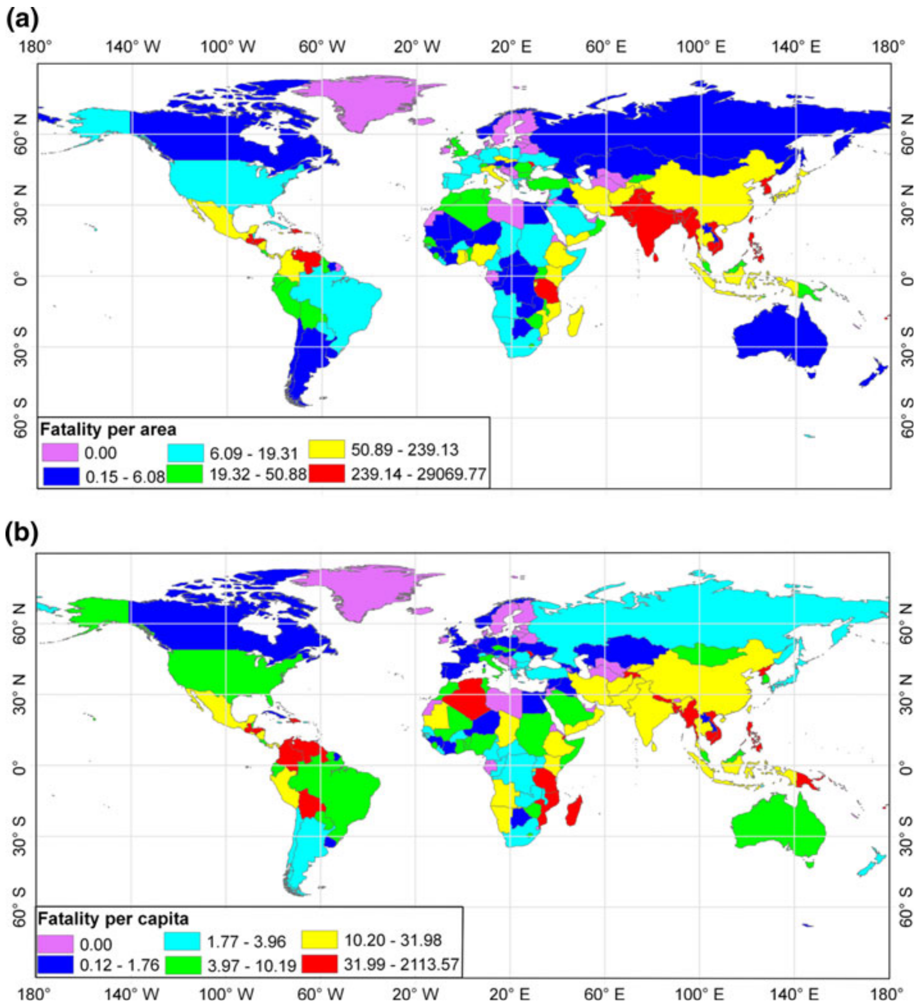

Fig. 6 Flood fatality normalized by **a** the area (in $\times$100,000 km^2) and **b** by the population (in $\times 10^6$) based on the quantile classification excluding 0.00 values

It is found that Asia and Africa continuously recorded the highest percentage of annual flooding events followed by Southeast Asia, Central America, and the Caribbean for 1998–2008 (Fig. 7). For the past decade, North America, Europe, and Oceania experienced much fewer fatalities compared to the rest of the world, with the exception of North America in 2005 due to Hurricane Katrina. It is observed that almost 75% of the fatalities worldwide occurred in Asia and Southeast Asia combined in the 11-year period (Fig. 8a). Specifically, Southeast Asia had the highest number of flood fatalities, mainly as a result of cyclone Nargis that hit Myanmar in May 2008. Figure 8b highlights the deadliest years for each region, including primarily Asia (1998, 2001–2003 and 2005–2007), as well as South America (1999), Africa (2000), Central America and the Caribbean (2004) and Southeast Asia (2008).

The trend of flooding events reports and average fatality rate per event from 1998 to 2008 are presented in Fig. 9. 2002 and 2003 had the largest number of flooding events, but

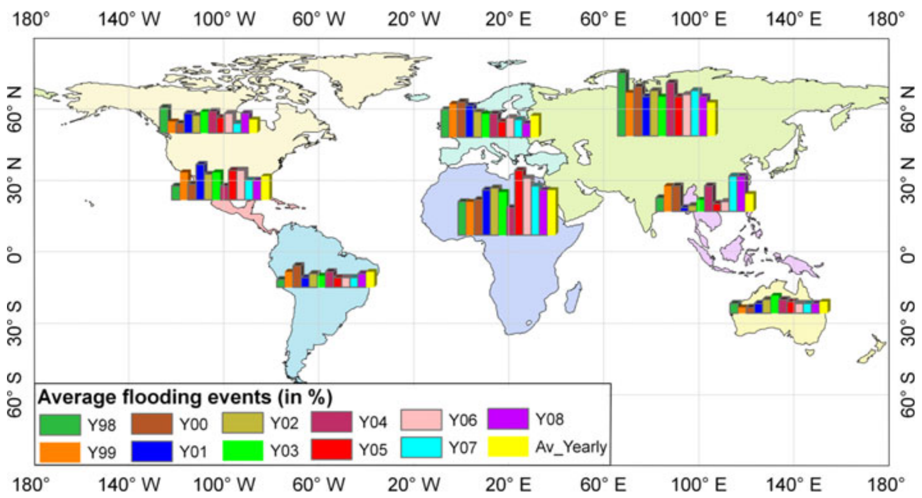

Fig. 7 Average yearly flooding events (in percentage) across the regions. Africa and Asia are the two regions with maximum number of flooding events for 1998–2008

they were not particularly deadly years. The average number of fatalities per event is highest for 2008 followed by 1999. Both of these years are dominated by a single flooding event, highlighting the impact of such catastrophic events on the long-term trend analysis of flood fatalities. If both damaging events are withheld, we can observe a slightly decreasing trend globally from about 100 fatalities per event down to about 50 fatalities over the period of record.

4.4 Seasonal variation in flooding and flood fatalities

Flooding occurs seasonally depending on the weather patterns, monsoon activity and regional tropical cyclone activity. Globally, it is observed that flood events start increasing during May and reach a peak in July and August (Fig. 10). The seasonal trend in flood fatalities is similar to that of flood events, except that the fatality numbers remain high throughout the months of August through November. In these late summers to autumn months, tropical cyclone activity is still high in the Northern Hemisphere and likely explains the continuance of fatalities through the autumn months (Fig. 11).

The GFI is further analyzed for the flooding events and fatalities by 10° latitude bands both in the Northern and Southern Hemispheres (Fig. 12). The results indicate that there are four times more events and 19 times more fatalities in the Northern Hemisphere compared to the Southern Hemisphere. The highest flood-prone latitude band is 10°–20°N, closely followed by 30°–40°N.

5 Discussion

We developed a methodology and database to catalog flooding events for an openly accessible flood hazard database for 1998–2008. The inventory shows that most of the countries in the world have experienced floods unless they were situated at latitudes greater than approximately 60°. When the flooding reports were grouped by region, Asia and

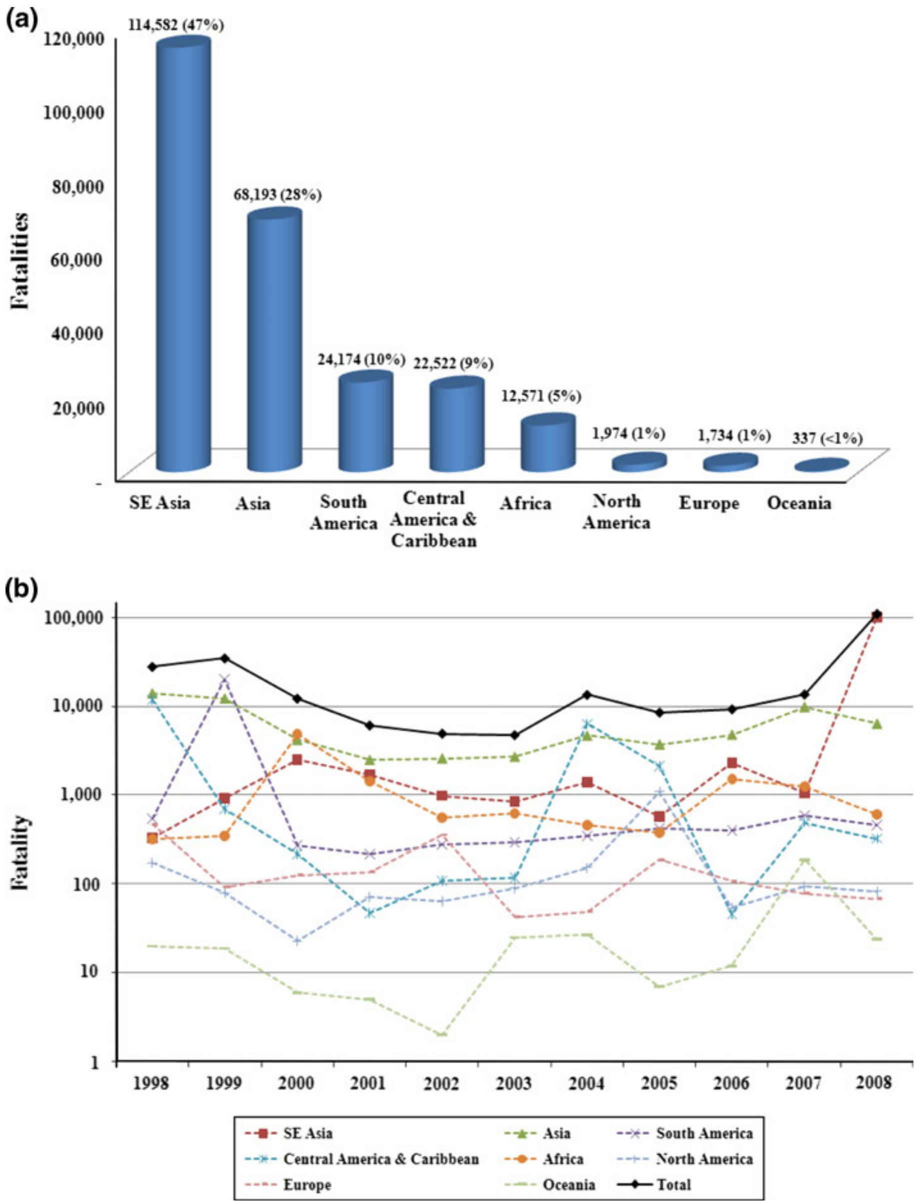

Fig. 8 Total fatalities for 1998–2008, showing: **a** Fatality reported for each region; **b** fatalities separated by year and region

Africa regularly have the highest percentage of flooding events per year, followed by Southeast Asia, and Central America and the Caribbean. Almost 75% of the total world-wide fatalities from flooding occurred in Asia and Southeast Asia combined. The Northern Hemisphere, with more land area and the larger share of world's population, have a significantly higher proportion of flood events (4:1) and fatalities (19:1) compared to

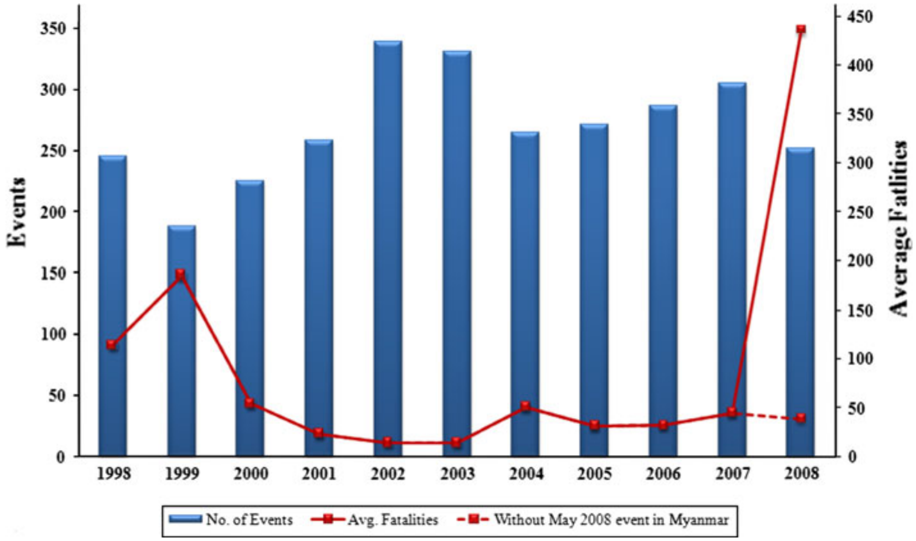

Fig. 9 Number of flooding events (*blue*) and average fatalities per event (*red*) for 1998–2008

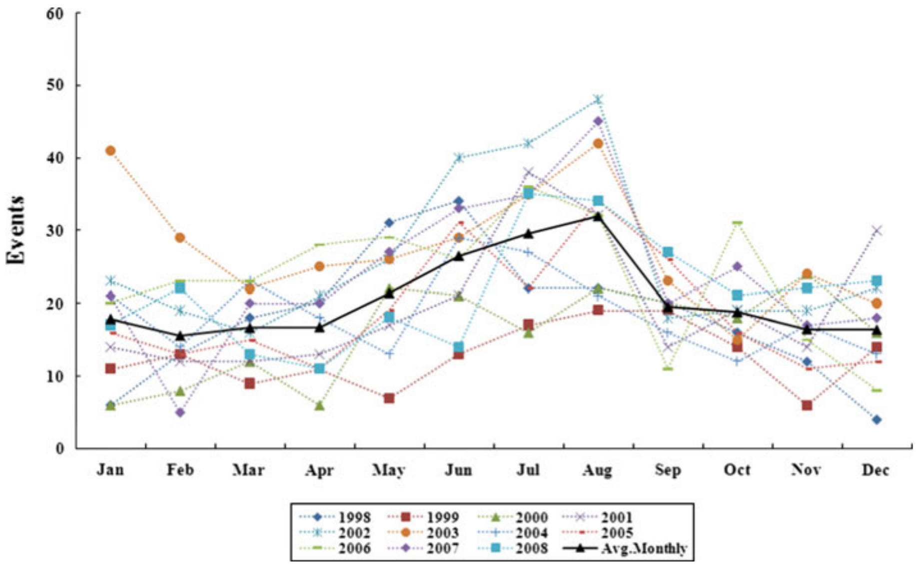

Fig. 10 Seasonal variation of flood events segregated by year

the Southern Hemisphere, with the highest flood-prone latitudinal bands occurring at 10°–20°N and 30°–40°N.

Densely populated countries in Asia (i.e., India, Bangladesh and China) and Southeast Asia (i.e., Vietnam, Indonesia and Philippines) sustain repeated damages from floods annually as a result of rainfall events which are strongly linked to the onset of the Asian monsoon. A notable observation from the GFI is the disproportionate number of fatalities to total flooding events for different countries and regions. The GFI shows that developed

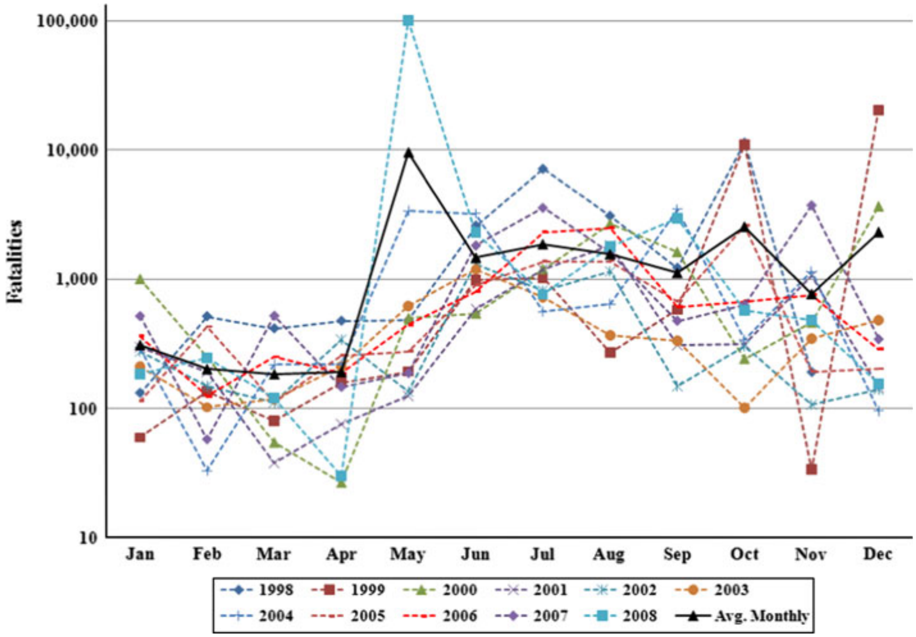

Fig. 11 Seasonal variation in flood fatalities for 1998–2008. Fatalities on vertical axis are in log scale

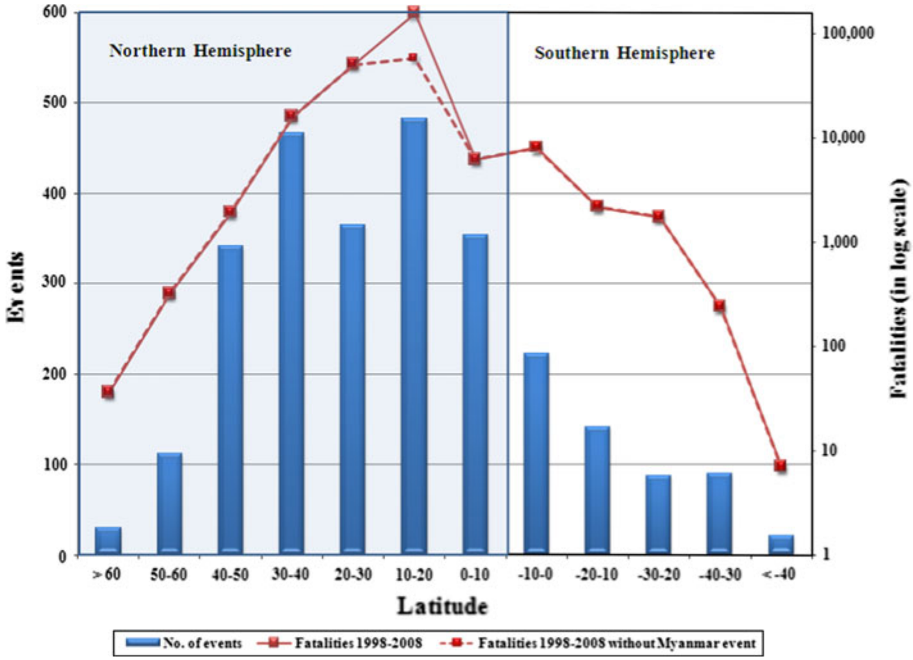

Fig. 12 Flooding events (*blue*) and flood fatalities (*red*) sorted by 10-degree latitude bands

countries, such as the U.S., had the highest number of recorded flood events but comparatively little loss of life. On the other hand, there was a relatively high fatality rate per event in developing regions. This can be attributed to the better flood prediction and mitigation measures. This calls for establishment of flood prediction system and mitigation efforts in minimizing the impact of flood hazard in the affected developing countries. It has been found that investment in early warning and mitigation measures have greatly improved the situation in Bangladesh, one of the worst affected countries, over the years (Adikari and Yoshitani 2009).

The GFI shows a seasonal pattern in flooding, with the number of events increasing in May and peaking in the months of July to August. In terms of flood fatalities, May also exhibited the highest fatality values; however, this has been skewed by the previously described tropical cyclone in Myanmar in 2008. The seasonal trend of flood fatalities generally follows that of flooding events, but deaths remain high into August through November, which concur with the land falling of Tropical cyclones in the Northern Hemisphere (Neumann 1993). The GFI shows that individual, catastrophic events typically stemming from land-falling tropical cyclones account for the bulk of the fatalities in the inventory.

The GFI can be improved by incorporating available remote sensing images. But at this stage it is found really challenging to build up a searchable and standardized GFI database incorporating those images. This would be one of the aspects that will be looked into in future upgrade of GFI.

6 Future work

The methodology adopted in the compilation of the GFI serves as a guideline to maintain and update a simple, digital, standardized database for flood hazard studies. This can be an important tool for the analysis of the spatiotemporal coverage of flood hazards not only at the sub-national and national level but at the regional and global scale as well, despite having some regional biases. Flood prediction at global scale has become a reality even in un-gauged basin upon the availability of a fairly accurate rainfall estimate from TRMM products. These products help generate hydrological process from which flood can be predicted (Yong et al. 2009; Hong et al. 2007a, b). This will be a tremendous contribution to flood ravaged countries located in the latitude band up to 40°N as found in this study.

In the future, we intend to analyze the GFI further and try to establish correlations among the number of events, severity, fatalities with the change in hydro-climatology, area and population exposed to the flood events. The high number of flooding events and flood fatalities in the Northern Hemisphere will be investigated further. Most importantly, a digitized and geo-referenced database like the GFI is a step forward to evaluate the performance of hydrologic models implemented on a global scale to detect floods spatially and to predict flood return periods. But it is likely that the model might not detect all flooding event (a miss) due to the limitation resulting from the source of GFI compilations. The issue of hits and misses will be defined before testing of such global flood models.

The entire database will be available to the public upon a complete analysis of GFI via email request or by visiting http://hydro.ou.edu.

Acknowledgments This study is supported by NASA Applied Science Global Flood and Landslide Project, NASA SERVIR-Africa Project, and National Science Foundation's REU award to School of Civil Engineering and Environmental Sciences at the University of Oklahoma. The authors would like to extend their appreciation to many institutions, particularly the EM-DAT and DFO for sharing the flood hazard data for the current study. Similarly, the authors would like to thank two anonymous reviewers for thoughtful comments and suggestion which helped to improve the earlier manuscript.

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