

Is climate change increasing the frequency of hazardous events?

By Pascal Peduzzi*

With growing population and infrastructures the world's exposure to natural hazards is inevitably increasing. This is particularly true as the strongest population growth is located in coastal areas (with greater exposure to floods, cyclones and tidal waves). To make matters worse any land remaining available for urban growth is generally risk-prone, for instance flood plains or steep slopes subject to landslides. The statistics in the graph opposite reveal an exponential increase in disasters. This raises several questions. Is the increase due to a significant improvement in access to information? What part does population growth and infrastructure development play? Finally, is climate change behind the increasing frequency of natural hazards?

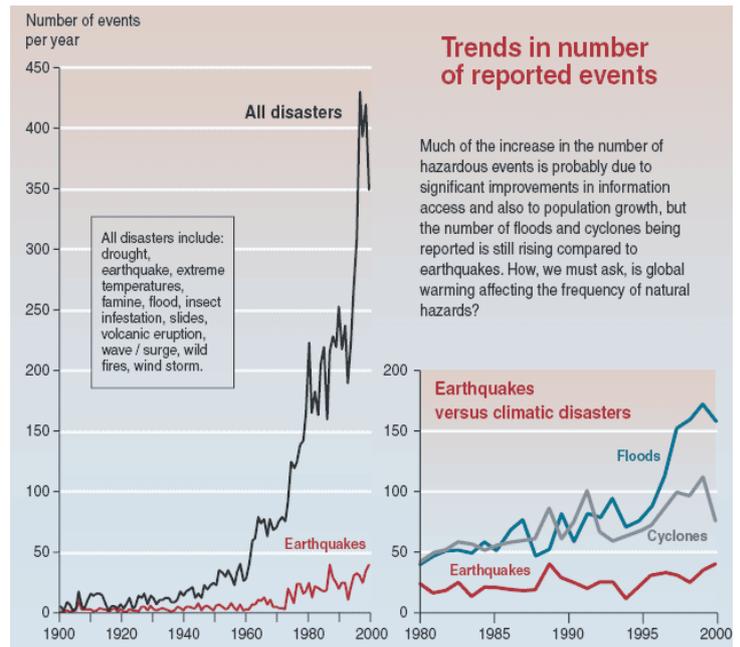
As it seems less likely for tectonic hazards (such as earthquakes, volcanoes) to be influenced by climate trends we may take them as a benchmark. If we look at data from EM-Dat1, the only publicly available global database on the impact of hazards on humans, we can see that the occurrence of reported earthquakes is increasing along similar lines to other hazards. The increase is certainly exponential but mainly due to a significant improvement in access to information worldwide. How, the reader may ask, do we know that?

The number of earthquakes (of sufficient magnitude to register on a seismograph) that hit populated areas has not increased. On the contrary it is steady. But EM-DAT only reported some of them. In the 1970s only 11% of earthquakes affecting human settlements were reported. The figure for the 1980-92 period increased sharply reaching 25%. It carried on rising, to 31%, for 1993-2003. Demographic factors cannot explain the sudden increase in reporting. The most

logical explanation is the tremendous improvement in information technology. By the end of the 1970s the media had achieved global coverage. For the first time television channels broadcast live coverage of a war (in Vietnam). Before 1980 only places with a powerful information network supplied data on events involving natural hazards and only major disasters were likely to be reported.

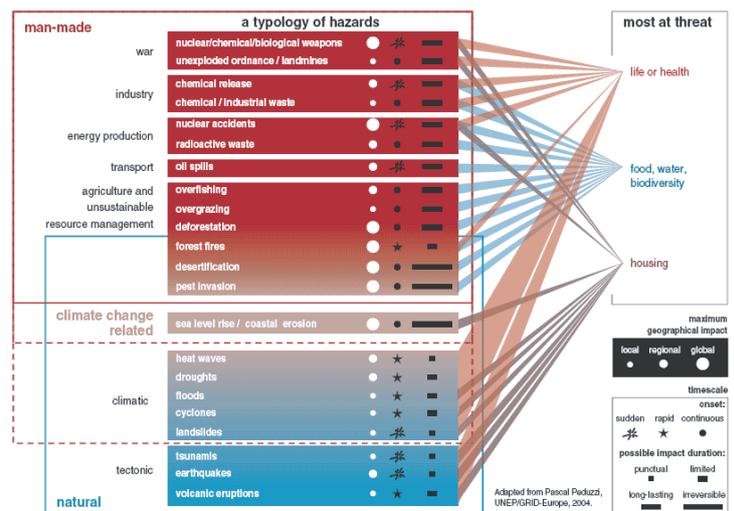
The second sharp increase appears in the mid-1990s (circa 1995). The emergence of the internet as a global means of information access immediately springs to mind. But we cannot rule out the impact of climate change on the frequency of hazardous events. The small graph shows that though the number of reported earthquakes is very steady (with an annual range of 20 to 40 events), the number of reported floods and cyclones increases dramatically over time (a correlation of $R^2 = 0.81$ and 0.64 respectively, compared with 0.25 for earthquakes). If the flow of information was increasing the number of reported earthquakes would be increasing too. But if tectonic events are steady and climatic events on the increase, there is cause for serious concern about the impacts of climate change on the frequency of associated hazards.

If the scientists can demonstrate that global warming is causing higher casualty rates then countries facing higher risks may decide to sue the largest CO2 producers to cover the extra cost of adaptation. It is equally possible that families of the victims of tropical cyclones may sue them for gross negligence. The failure to introduce measures to combat global warming may rebound, with victims sending in the bill much as they did in the United States when they took the tobacco industry to court.



Data analysis: UNEP/DEWA/GRID-Europe

Data sources: EM-DAT, Centre for Research on the Epidemiology of Disasters (CRED), 2004.



Natural hazards are mostly occurring suddenly, but their impacts are likely to be mitigated within few years. Man-made hazards on the other hand, can be sudden (e.g. nuclear or chemical accident) or a result of a slow process (e.g. deforestation, overfishing,...) in both cases their impacts are likely to have a much longer duration.

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