The Worldwide CATDAT Damaging Earthquakes and Damaging Volcanoes Databases: Socio-economic trends, values and analysis including 2010.

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CATDAT is made up of natural disaster catastrophe data collected by the author over the years from many sources with global data on floods, volcanoes and earthquakes (and associated effects). This paper focusses on two of these worldwide databases.

The global CATDAT Damaging Earthquakes and secondary effects (tsunami, fire, landslides, liquefaction and fault rupture) Database has been created to validate, remove discrepancies and expand greatly upon the existing global databases; and to better understand the trends in vulnerability, exposure and possible future impacts of historic earthquakes. As of January 2011, over 16000 sources of information in over 50 languages have been utilized to present data from over 11600 damaging earthquakes historically, with over 6500 earthquakes since 1900 examined. Similarly, for the CATDAT Damaging Volcanoes Database, over 900 damaging volcanic events including over 550 damaging volcanic events since 1900 have been recorded. The sporadic nature of major world-changing volcanic eruptions means that the socio-economic effects as seen from Tambora 1815 are difficult to quantify for present conditions.

Each validated earthquake and volcano in the databases includes seismological/volcanological information, secondary effects (social, economic and type), building damage (levels, important infrastructure etc.), ranges of social losses to account for varying sources (deaths, injuries, homeless and affected) and ranges of economic losses (direct, indirect, aid contribution and insurance details).

In the CATDAT Damaging Earthquakes Database, 91 damaging earthquakes around the world were added during 2010, with 59+ earthquakes causing injuries and 26+ causing deaths being recorded, with between 95785 and 229215 deaths, 337500+ injured, ±2.855 million homeless, economic losses ranging from USD47.1-69.5 billion and insured losses between USD11.1-18.4 billion. 13 Chinese and 10 Iranian earthquakes dominate the number of damaging earthquakes during this year, with increasing economic losses associated with each of these countries. The Darfield Earthquake in NZ caused comparatively minor damage to many homes, but shows the potential economic loss to developed nations of about USD3-5.5 billion insured damage. The Yushu Earthquake in China also caused between USD8.9-12 billion damage, with a very small insurance takeout (approx. 0.7%). The Maule Earthquake in Chile caused the largest economic loss (USD30 billion) of the year and the Haiti Earthquake was country-changing (substantial death toll, USD7.8 billion loss, over 100% nominal GDP).

For the entries into the CATDAT Damaging Volcanoes Database for 2010, 64 erupting volcanoes have been analysed, with the main economic losses coming from the Eyjafjalla eruption with its associated worldwide air travel disruptions (±USD5 billion) and from the Merapi eruptions in Indonesia (>USD1.5 billion). At least 7 fatal volcanic eruptions have been recorded in 2010, with the worst being that of Merapi with over 350 deaths recorded.

Hundreds of social and economic loss values not reported in existing databases have been collected. Historical GDP, exchange rate, wage information, HDI, social indicators, population and insurance information have been collected globally to form comparisons. The difference in physical and socio-economic vulnerability, building practices and population trends through time shows the increasing worldwide baseline economic losses. However, reduced social losses are seen relative to population through time.

These databases are some of the largest known cross-checked historic damaging natural disaster socio-economic effects databases and should have far-reaching consequences for earthquake and volcano loss estimation, socio-economic risk analysis and the global reinsurance field.