



Characteristics of Natcat Databases, and their Role in Disaster Risk Financing Strategies

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Global Disaster Loss Databases

EM-DAT: Centre for Research on the Epidemiology of Disasters (CRED),
Université catholique de Louvain, Brussels, Belgium

NatCatSERVICE: Munich Re, Munich, Germany

Sigma: Swiss Re, Zurich, Switzerland, also man made

CATDAT: James Daniell, Karlsruhe Institute of Technology, Karlsruhe,
Germany

No Name: AON, Chicago, IL, USA

PERILS: Non-profit industry initiative, Zurich, Switzerland, not global, only
selected perils (EU winter storms, Italy EQ, Flood/UK, Turkey EQ and Flood,
AUS, Canada (CatIQ)).

Desinventar: Decentralised disaster inventory system, governed by
UNDRR



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Characteristics of Global Disaster Loss Databases

	Owner	Start of Database
Sigma	Swiss Re, Sigma Research, Zurich, Switzerland	1969
NatCatSERVICE	Munich Re, Munich, Germany	1977
EM-DAT	Centre for Research on the Epidemiology of Disasters (CRED), University of Louvain, Belgium	1988
CATDAT	James Daniell, Risklayer, Karlsruhe, Germany	2003
AON	AON, Chicago, IL, USA	2009

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Characteristics of Global Disaster Loss Databases

	First Year Covered	Thresholds for documentation
Sigma	1969	Thresholds 2017: Insured losses: Maritime disasters USD 20.3 million, aviation USD 40.7 million, other losses USD 50.5 million. Economic losses USD 101.0 million or 20 dead or missing.
NatCatSERVICE	79 (Eruption of Vesuvio)	No threshold for documentation. Thresholds for consideration in analyses depending on income group of affected country: US\$ 100 k (2015 values) in low income countries, US\$ 300 k in lower/middle income countries US\$ 1 m in upper/middle income countries, US\$ 3 m in high income countries or 1 fatality
EM-DAT	1900	At least 10 fatalities or at least 100 people affected/injured/ homeless, or declaration of a state of emergency and/or an appeal for international assistance. Secondary criteria also taken into account such as "worst disasters in decade and/or disaster with largest damage for the country".
CATDAT	BC	Damage >\$100k; at least 1000 affected; fatalities or injuries; differing relative scales for smaller or bigger countries; double reporting from separate trusted sources.
AON	Pre-1900	At least one of these criteria: Economic Loss: USD 50m, Insured Loss USD 25m, Fatalities 10, Injured 50, Homes/Structures Damaged or Filed Claims 2,000

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Characteristics of Global Disaster Loss Databases

	Period: complete coverage	Total number of entries
Sigma	1990-2018, with low quality also from 1970 onwards	5630 Natcat 6439 Man made
NatCatSERVICE	1980-2018 (all), 1950-2018 (bn \$ events)	45,000
EM-DAT	Reliable data since 1960, from 1980 reporting of the information and coverage is much better, close to a hundred percent for all the events meeting our eligibility criteria.	22,000
CATDAT	Depends on the threshold. It is the most complete database globally since 1900 (1900-2018 35,000 events)	64,000+; with 45,000 since 1900; about 125,000 additionally are saved in PDFs and other datasets and not yet added into the documentation due to pending queries and adherence of independent double check - so around 185k as far as can be worked out for the completeness are being slowly added.
AON	1950	Entire Database: 25,000+, since 1950: 20,500+

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Characteristics of Global Disaster Loss Databases

	Peril Classification	Intensity Classes
Sigma	Standardised with NCS and EM-Dat, 4 peril families with types of main events and sub perils	None
NatCatSERVICE	Standardised with SIGMA and EM-Dat, 4 peril families with types of main events and sub perils	4 intensity classes defined by income class dependent losses or number of fatalities
EM-DAT	Standardised with SIGMA and NCS, 4 peril families with types of main events and sub perils. In addition "Biological"	Intensity is recorded according the scientific scale used to measure the disaster (e.g. EQ Intensity Richter, windspeed, km ² affected). Currently plan for an index of severity based on the human and economic loss.
CATDAT	Hybrid - uses some IRDR-DATA standards, some ASAMPSA-E terminologies, and various things picked up along the way	Natural hazard intensity is documented for the events; classification of loss intensities "green", "orange", "red", "dark red", each with absolute and relative cutoffs
AON	Tropical Cyclone, Severe Weather (Tornado, Hail, Damaging Winds), Flooding (Non-Tropical Cyclone), European Windstorm, Winter Weather, Earthquake, Wildfire, Drought, Other	None

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Characteristics of Global Disaster Loss Databases

	Loss normalisation?	Geocoding?
Sigma	Losses are normalised on GDP basis, but only inflation adjusted values are published	Yes
NatCatSERVICE	Yes, with Grid Cell Product (GCP) methodology	Yes
EM-DAT	Losses are recorded at the value of the time the disasters occurred, but they are adjusted for inflation in trend analysis	All natural events from year 2000 are geocoded. Cooperation with Max Planck team in Jena and ETH.
CATDAT	Losses are normalised on average every 9 months	Yes
AON	Standardized normalization utilizing changes in population/exposure/wealth from 1960 to today. Losses in nominal (actual), inflation-adjusted, and normalized (hypothetical if occurs today)	Latitude/longitude for each event for centralized "worst affected" area

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Characteristics of Global Disaster Loss Databases

	Annual number of new entries	Accessibility of data
Sigma	Average for last 10 years 181 Natcat, 147 Man made	Open to clients via the SR CatNet tool. Occasionally sharing data with external organisations. Due to legal restrictions from PCS, this has been put on hold
NatCatSERVICE	Around 1,000 in total, 700 starting with intensity class 1	Rather general data can be accessed by NCS online tool (https://natcatservice.munichre.com/), complete data will have to be purchased in the future, no sales model available, yet.
EM-DAT	About 350 events per year meet eligibility criteria	Free access only to a limited set of data. Larger access is charged, geocodes only shared with scientific partners.
CATDAT	Ca. 1,500 each year since 2010; about to be increased through the expansion of the Earthquake Report network - expected to be around 3000	Available as part of humanitarian collaboration projects and various consultancies on a case-by-case basis.
AON	400	Aon (Impact Forecasting) makes segments of data available for view via Catastrophe Insight website: http://catastrophe.insight.aon.com . Database remains a proprietary piece of intellectual property utilized for various internal Aon analytics solutions. It is also available as a commercial product for Aon clients and projects.

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Increasing Demand for NatCat Loss Data

- Developing countries are most vulnerable for disasters caused by natural perils
- Especially in Central and South America and Asia awareness of risks caused by natural perils is increasing quickly
- Many countries (Peru, Mexico, Pakistan, India, Philippines, Myanmar, Cambodia..) are developing Disaster Risk Financing (DRF) Strategies
- The precondition for DRF STRATEGIES is to be able to quantify the risks
- The basis for this are data of losses caused by historical disasters
- Such data in general are not openly available in the effected countries
- Existing global natcat data bases could support the development of better DRF
- Part of DRF Strategies is the development of national insurance markets and international insurance pools.

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Concrete Example of Demand of NatCat Data

ASEAN Disaster Risk Financing and Insurance Programme, Phase 2 (ADRFI-2)

Objectives: strengthening ASEAN's capabilities in ex-ante risk financing and risk transfer strategies

Programme offices: ASEAN Secretariat and Institute of Catastrophe Risk Management NTU, Singapore

ADRFI's 3 focus areas over the next 3 years: Risk Assessment, Risk Advisory, Capacity Building.

Risk Assessment

- Good quality data is necessary to quantify ASEAN's economic and insurance exposure to natural disasters
- Good data and analytical tools will allow policy makers to identify disaster risk zones, and to quantify the risks as well as the potential fiscal impact. This will in turn, empower governments, regulators and industry to make more informed decisions on disaster risk management, from infrastructure planning, to the use of disaster financing strategies and the development of solutions
- ADRFI will establish a new ASEAN Data and Analytics Platform, to construct a high resolution and objective natural catastrophe database for ASEAN
- This has started already in ADRFI-1 with Natural Catastrophe Data Analytics Platform (or NatCatDAX), led by ICRM.

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Open question:

Which database/s will play a role in the future for national and international risk management strategies?