# DRM – A (meteorological) outcome of ensemble modelling

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From a meteorological perspective, Disaster Risk Management (DRM) could logically be perceived as the outcome of modelling the meteorological parameters of weather events that are likely to have high impact on particular communities or areas, once that modelling has been interpreted by forecasters and disaster managers. To ensure that DR managers develop appropriate warning systems and responses to high impact events, they must have a comprehensive understanding of the likely outcomes that weather will have on the people or infrastructure which is vulnerable. Vulnerability is determined from the results of past events and increasingly, by modelling extreme meteorological conditions and applying the results to models of impacts. As such, ensemble modelling is becoming an increasingly important tool not only in forecasting the weather, but in assisting in the development of appropriate community responses. It is becoming increasingly apparent that at no time in human history is this more important or relevant than it is now.

According to a recent joint United Nations Office of Disaster Reduction (UNISDR)/Centre for Research on the Epidemiology of Disasters (CRED) report, between 1998 and 2017 climate-related and geophysical disasters killed 1.3 million people and left a further 4.4 billion injured, homeless, displaced or in need of emergency assistance. While the majority of fatalities were due to geophysical events, mostly earthquakes and tsunamis, 91% of all disasters were caused by floods, storms, droughts, heatwaves and other extreme weather events.

In 1998-2017 disaster-hit countries also reported direct economic losses valued at US$ 2,908 billion[[1]](#footnote-1), of which climate-related disasters caused US$ 2,245 billion or 77% of the total. This is up from 68% (US$ 895 billion) of losses (US$ 1,313 billion) reported between 1978 and 1997. Overall, reported losses from extreme weather events rose by 251% between these two 20-year periods (UNISDR 2018).

Despite significant progress in strengthening early warning systems across the world, often by making use of advances in science and technology, including ensemble modelling, unmet needs remain. The UNISDR report shows that disasters are increasing in frequency and severity in most areas, with climate change and variability exacerbating the situation. Many developing countries, in particular least developed countries (LDCs), small island developing states (SIDS), and landlocked developing countries (LLDCs), have not benefited as much as they could have from advances in the science, technology and governance behind early warning systems. Significant gaps remain, especially in reaching the "last mile" - the most remote and vulnerable populations at the community level with timely, understandable and actionable warning information), including lack of capacities to make use of the information. The resulting societal benefits of early warning systems have thus been spread unevenly across regions, countries and communities. DR Reduction (DRR) is what DR managers aim to achieve and DRR is a focus of many activities and agreements around the world including possibly the foremost strategy - the Sendai Framework for Disaster Risk Reduction 2015-2030 (UNISDR, 2015).

DRR is central to the World Meteorological Organization’s mission and WMO has a number of projects that are aimed at assisting their Members in obtaining and sharing improved, timely and useful meteorological, hydrological and climate data and warning information. Projects such as the Global Multi-hazard Alert System (GMAS), the Severe Weather Forecast Demonstration Project (SWFDP), the Flash Flood Forecasting Guidance System (FFGS), the Integrated Drought Management Program (IDMP) and the project to characterize and catalogue extreme weather, water & climate events, which is being developed to assist Members in measuring the events and their impacts, are examples of these and a few will be touched on during the presentation.

# References

UNISDR 2015: Sendai Framework for Disaster Risk Reduction 2015-2030.

(from <https://www.unisdr.org/we/inform/publications/43291>)

UNISDR/CRED 2018: Economic Losses, Poverty and Disasters 1998-2017

(from <https://www.unisdr.org/2016/iddr/IDDR2018_Economic%20Losses.pdf>)

1. All economic losses and GDP are adjusted at 2017 US$ value [↑](#footnote-ref-1)