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NATURAL DISASTER REDUCTION: WARNING SYSTEMS

Technical session

Addendum

Forecasts and warnings of natural disasters and the roles of national and international agencies

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Keynote topic

1. Natural disasters are caused by natural events which can be grouped as (a) extreme unstable events associated with rapidly growing instabilities of geographical "systems" in the earth, atmosphere and ocean, such as volcanic eruptions and tropical cyclones; (b) large "variability" events associated with extremes of the inherent variability and chaotic behaviour of geophysical systems, such as precipitation over long periods, El-Niño oscillations and extreme hydrothermal activity; and (c) global change events on decadal or secular timescales, which may have anthropogenic causes and which lead to such disasters as desertification or severe loss of ocean plankton.

2. Following any of the above-mentioned primary events, there may be equally harmful secondary events, such as mud slides or tsunamis following volcanic eruptions. Whether these events lead to disasters depends to a large extent on the preparedness and resistance of the afflicted community (i.e., its vulnerability). Forecasts for these different categories of events are of two types: first, precautionary forecasts or risk assessments based on data of previous events and, second, real-time forecasts for specific primary events derived by observations and by calculations, which may be deterministic

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or may be based on a combination of deterministic and statistical methods. For group (a) events, these forecasts only begin following some initial detection, whereas for groups (b) and (c), forecasts are made before any indication of the event. For different events in the ocean-atmosphere system, these forecasts may range from days to years. Once the location, nature and scale of the primary event is forecast or known, many (but not all) types of secondary events may be also forecast with increasing accuracy using local geophysical data (e.g., derived from satellites) and computational models of relevant processes (e.g., lava flow, flood waves, etc.)

3. The paper to be presented to the Conference describes the organization of forecasts and warnings and how it involves geophysical and disaster or emergency centres at the national, regional and international levels. A satisfactory system for issuing, receiving and acting on forecasts and warnings between countries by these centres (including the use of broadcasting media) requires carefully negotiated procedures at the intergovernmental level; for some kinds of meteorological and flooding disasters, these procedures have been agreed through the World Meteorological Organization. No such international procedures have been agreed for other geophysical events and disasters and since this may lead to a confused response by disaster and emergency services, it would be appropriate to investigate whether procedures similar to those developed through the World Meteorological Organization might be developed for these situations.

4. The final section of the paper reviews the need for defining targets for improvement in forecasting during the International Decade for Natural Disaster Reduction and considers that this should be preceded by establishing the accuracy of current methods (i.e., the baseline). Clarification of objectives and targets may well lead to greater financial support from Governments and other donors.

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