Space-based information for disaster-risk reduction
KEY MESSAGES

Key message 1: Satellite-derived information is essential for disaster-risk reduction and disaster management. The high temporal resolution and the increasing spatial resolution make it an indispensable source of information to replace or complement local measurements or assessments.

With geospatial and space-based information we can detect, map, monitor and visualize indicators relevant to risk analysis on global scale.
Earth observation provides advanced products and related tools that can be used to support risk analysis and risk reduction. Such products can be used in indicators related to infrastructure and land use (e. g. topography, urbanization, transportation networks), to measure atmospheric and environmental variables (e. g. soil moisture, precipitation and temperature) and to detect changes over time caused by both planned development and unforeseen crises.

With geospatial and space-based information we can map the uneven distribution of risk across national borders in an objective way.
Risk is unevenly distributed across continents, regions and countries. Disasters do not stop at national borders. National datasets from different countries are not always comparable. Spatially-consistent information is needed to measure and understand the uneven distribution of risks and losses. In addition, satellite-derived datasets facilitate the large-scale assessment of risk exposure. Further analyses of the spatial-temporal distribution of hazards are possible with regard to settlement areas, system services, and assets.

Using space-based information, we can access data from the 1960s to date even in areas where no statistical data or ground-based measurements are available.
Many countries face the difficulty of lacking environmental data. Ground-based monitoring systems like climate stations involve high costs, maintenance and data sharing policies. Therefore, they are often not available. Due to large-scale reprocessing activities the archives of satellite imagery are constantly growing. We can access time series covering almost 50 years. This facilitates the assessment of underlying risk factors and impacts of global change over time. Satellite information is increasingly available for free. The opening of the Landsat archives and the newly launched and planned Sentinel satellites are just two examples. Also, products derived from satellite imagery like global land-cover classifications, precipitation estimates, vegetation indices or soil moisture are available for free, in some cases even as near-real-time products. Satellite information cannot substitute all ground-based measurements that are necessary for risk assessment; they can complement them and at times provide the only available data source to determine environmental indices. In combination with ground-based measurements, satellite-derived information is invaluable for cross-validation and to improve the interpolation of data as a way to cover larger areas.

Satellite data and related products aiming at improved decision-support have improved immensely over the last ten years. They have matured to become a key source of information for risk assessment and the sustainability of human interventions.
During the last ten years, the quality of satellite sensors and the accessibility to satellite imagery has improved immensely. Additionally, algorithms to analyze long-time series have been enhanced in this period. Furthermore, semi-automated object-recognition has been improved with regard to quality and speed. Tremendous progress has been achieved in the continuous development of powerful free and open-source software packages to process geospatial data. Improved processing facilities, the possibility to access archives and to disseminate datasets in near-real time via geo-web-services have led to new applications which can be used in disaster-risk management efforts. All this was not yet possible to such an extent when the Hyogo framework for Action was endorsed by the UN General Assembly following the 2005 World Conference on Disaster Reduction.

Key message 2: The use of geospatial and space-based information should be emphasized in the post-2015 framework for disaster-risk reduction.

Satellite information is essential to contribute to the monitoring system and periodic review of the post-2015 framework for disaster-risk reduction and to the monitoring of sustainable development goals.

An enhanced HFA Monitor – the reporting mechanism for governments managed by UNISDR – will need to accompany the post-2015 framework for disaster-risk reduction. Such a monitoring system could also be instrumental to assess future sustainable development goals (SDGs) and targets related to the upcoming climate agreement. Since 2013, UNISDR has led the process to develop targets and indicators to monitor the reduction of risk and the implementation of the post-2015 framework for disaster-risk reduction. Geospatial and space-based data provide a unique source of information to monitor large areas in regular time-intervals.

Several of the indicators under debate for the enhanced monitoring system can be monitored optimally using space-based data, for example:

- Environmental degradation including ecological footprint, water stress, deforestation rate, environmental health, and ecosystem vitality;
- Urbanization; and
- Monitoring of extreme events.

Being convinced of the benefits of geospatial and space-based information in efforts related to disaster-risk reduction sustainable development,

we strongly recommend integrating a respective paragraph into the post-2015 framework for disaster-risk reduction.

This paragraph could be drafted following the example of the UN General Assembly in 2012 (GA resolution 66/288) following the UN Conference on Sustainable Development in 2012. In paragraph 274 the resolution stresses the “importance of space-technology-based data, in situ monitoring, and reliable geospatial information for sustainable development policy-making, programming and project operations” and recognizes “the need to support developing countries in their efforts to collect environmental data”.

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