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A Special Issue of Geosciences: Mapping and Assessing Natural Disasters Using Geospatial Technologies

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Editorial

A Special Issue of *Geosciences*: Mapping and Assessing Natural Disasters Using Geospatial Technologies

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Natural disasters, including floods, wildfires, volcanic eruptions, earthquakes, tsunamis, tropical storms, droughts, and landslides, can cause major losses of human lives and livelihoods, the destruction of economic and social infrastructure, as well as environmental damages. In considering society, the economy, and the environment as the three main components of sustainable development, natural disasters have a negative impact on the sustainable development of human society [1]. Over the last several decades, the frequency and intensity of natural disasters have increased. According to the World Disaster Report 2011 [2], 4022 natural disasters occurred between 2001 and 2010 worldwide, and a total of 1,221,332 people were killed. Therefore, mapping and assessing natural disasters is not only an issue for consideration in the sustainable development agenda but also a cross-cutting issue relating to social, economic, environmental, and humanitarian sectors [1].

A natural disaster is a major adverse event resulting from the natural processes of the Earth. Such processes can be efficiently investigated and well understood with modern geospatial technologies. Given the facts that some natural disasters, such as tsunamis, tornados, and earthquakes, occur in an abrupt manner and impact large areas, while others, such as floods and landslides, tend to be more easily mapped and can be predicted in advance because the vulnerable areas in which these events occur are generally known [3]. Most geospatial technologies, such as, remote sensing, GIS, GPS, and spatial statistics can be utilized in mapping, predicting, monitoring, and assessing the natural disasters. Because of their broad applicability and accessibility, geospatial technologies are valuable tools for natural hazard and disaster management. Geospatial tools are frequently used in pre- and post-disaster applications for natural disaster management [4]. Pre-disaster application efforts are associated with attempts to mitigate the vulnerability of societies to the impacts of a disaster and with strengthening preparedness to respond to a disaster when it occurs. Post-disaster application efforts are related to the response to the effects of a disaster and to the recovery toward pre-disaster conditions [5]. Coupled with geological, geomorphological, and climatological information, geospatial technologies can be substantially used in pre- and post-disaster activities, such as mapping the spatial extent of a disaster and assessing property damage and the loss of human lives.

This Special Issue of Geosciences marks an important milestone by collecting and presenting contemporary applications and theoretical studies of geospatial technologies in mapping, monitoring, and assessing natural disasters. Specifically, in this issue, advanced applications and theoretical discussion of geospatial tools in natural disasters are related to mapping, monitoring, and assessing landslides before and after they occur [6–8], assessing and monitoring tropical storm-induced flooding and coastal erosion [9,10], mapping and measuring floods and droughts [11,12], and wildfire and anomaly detection, mapping, and management [13,14]. We believe that, with the superlative articles published in this special issue, geospatial technologies will be more extensively accepted and applied in mapping, monitoring, and assessing natural disasters.

Conflicts of Interest: The author declares no conflict of interest.

References

1. Vijayaraghavan, C.; Thirumalaivasan, D.; Venkatesan, R. Utilization of remote sensing and GIS in managing disasters—A review. *Int. J. Sci. Eng. Res.* **2012**, *3*, 1–8.
2. International Federation of Red Cross and Red Crescent Societies (IFRC). *World Disaster Report 2011*; International Federation of Red Cross and Red Crescent Societies: Geneva, Switzerland, 2011. Available online: http://www.ifrc.org/ (accessed on 9 January 2017).
3. Sorensen, M.B.; Spada, M.; Babeyko, A.; Wiemer, S.; Grünthal, G. Probabilistic tsunami hazard in the Meditarranean Sea. *J. Geophys. Res.* **2012**, *117*, B01305. [CrossRef]
4. Manfré, L.A.; Hirata, E.; Silva, J.B.; Shinohara, E.J.; Giannotti, M.A.; Larocca, A.P.C.; Quintanilha, J.A. An analysis of geospatial technologies for risk and natural disaster management. *ISPRS Int. J. Geo-Inf.* **2012**, *1*, 166–185. [CrossRef]
5. Mansourian, A.; Rajabifard, A.; VZoej, M.J.V. SDI Conceptual Modeling for Disaster Management. In Proceedings of the ISPRS Workshop on Service and Application of Spatial Data Infrastructure, Hangzhou, China, 14–16 October 2005.
6. Hölbling, D.; Betts, H.; Spiekermann, R.; Phillips, C. Identifying spatio-temporal landslide hotspots on North Island, New Zealand, by analyzing historical and recent aerial photography. *Geosciences* **2016**, *6*, 48. [CrossRef]
7. Bossi, G.; Mantovani, M.; Frigerio, S.; Schenato, L.; Marcato, G.; Pasuto, A. A monitoring network to map and assess landslide activity in a highly anthropized area. *Geosciences* **2016**, *6*, 40. [CrossRef]
8. Dahigamuwa, T.; Yu, Q.; Gunaratne, M. Feasibility study of land cover classification based on normalized difference vegetation index for landslide risk assessment. *Geosciences* **2016**, *6*, 45. [CrossRef]
9. Karlin, A.; Fulkerson, M.; Altman, G. Using SPOT and aerial false-color infrared (fCIR) imagery to verify floodplain model results in west central Florida. *Geosciences* **2016**, *6*, 24. [CrossRef]
10. Cheng, J.; Wang, P.; Guo, Q. Measuring beach profiles along a low-wave energy microtidal coast, west-central Florida, USA. *Geosciences* **2016**, *6*, 44. [CrossRef]
11. Ogilvie, A.; Belaud, G.; Massuel, S.; Mulligan, M.; Goulven, P.L.; Calvez, R. Assessing floods and droughts in ungauged small reservoirs with long-term Landsat imagery. *Geosciences* **2016**, *6*, 42. [CrossRef]
12. Rodríguez-Espíndola, O.; Albores, P.; Brewster, C. GIS and optimisation: potential benefits for emergency facility location in humanitarian logistics. *Geosciences* **2016**, *6*, 18. [CrossRef]
13. O'Connor, C.D.; Thompson, M.P.; Silva, F.R. Getting ahead of the wildfire problem: Quantifying and mapping management challenges and opportunities. *Geosciences* **2016**, *6*, 35. [CrossRef]
14. Guo, Q.; Pu, R.; Cheng, J. Anomaly detection from hyperspectral remote sensing imagery. *Geosciences* **2016**, *6*, 56. [CrossRef]