Chapter 10
A Special Focus on Natural Disasters in the Field of Earth Sciences:
What Do the Reports Tell Us?

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ABSTRACT

This study analyzes 9,116 scientific reports to explore research trends in natural disasters within Earth sciences. Keyword network and clustering analyses reveal that "natural disasters" and "climate change" are the most central themes, highlighting their strong interconnection. Technologies such as GIS, remote sensing, and artificial intelligence (deep learning, neural networks) play crucial roles in disaster prediction, risk assessment, and damage evaluation. Tsunami-related research exemplifies advancements in early warning and management systems, particularly in Japan, Indonesia, and Turkey. The study also emphasizes societal resilience and recovery processes after disasters. Based on the World Risk Index, India and Indonesia show the highest vulnerability, while the U.S. and Germany

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demonstrate strong adaptive capacities. Turkey's moderate index underlines the need for improved preparedness. Bibliometric data identify China, the U.S., and India as leading contributors to disaster-related research.

INTRODUCTION

It is possible to define a disaster as the damage caused by an ordinary movement of nature to humans, other living beings, and settlements. Disasters, which may be of technological or natural origin, lead to significant economic and social losses (Ergünay, 2007; Erkal et al., 2009). To avoid being affected by disasters or to minimize their damage, it is essential to establish a Disaster Management Plan and to form well-trained and equipped disaster response teams. Effective disaster management depends on the proper implementation of the stages of *mitigation, preparedness, rescue, first aid, recovery, and reconstruction* (Varol & Gültekin, 2016). Holding nature responsible for losses caused by human mistakes-such as poor site selection, the use of substandard materials, or the lack of a disaster management plan-is unreasonable, since such activities are a natural part of the Earth's dynamics. Following the Industrial Revolution, the demand for labour led to increased employment and urbanization. Consequently, the rise in production caused greenhouse gases and chemical pollutants released from various industrial facilities to trigger untimely and abnormal natural phenomena in the Earth's climate and components (Bilke, 2018).

While technological advancement undeniably enhances human comfort, humanity also experiences the cost of disrupting nature's balance through exposure to disasters. Hydrological disasters resulting from geological movements, particularly in coastal cities, have become increasingly destructive. In recent years, emerging technologies have been used to reduce or even prevent such destructive impacts. Highly efficient early warning systems have been developed to detect potential disasters, along with software such as *VOSviewer* and *GIS* that enable the collection and analysis of disaster data. Through education and public awareness, it is possible to transform natural events into manageable phenomena and minimize their damage.

Recent years have seen a notable expansion of bibliometric and science-mapping studies that quantify how disaster scholarship is evolving across hazards, regions, and methodological toolkits. New bibliometric evidence (2023–2025) highlights accelerating growth in topic clusters that integrate climate change, compound risk, and technology-enabled assessment (e.g., remote sensing and AI) with governance and resilience outcomes. For example, bibliometric syntheses have recently examined earthquake-focused research surges following major events, as well as hazard-specific domains such as flood mitigation and tsunami vulnerability modelling, showing increasing reliance on Scopus- indexed datasets and network-based indicators (e.g.,

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