



# IDRiM

## 8<sup>th</sup>

# Lecture Series

**Date:** 26th May 2025

**Time:** 11:00 (UTC) / 13:00 (CEST)

**Lecturer:** Prof. Cees van Westen  
University of Twente,  
the Netherlands

**Title**

**Multi-Hazard Risk Dynamics**

# Guest Lecturer



## Cees van Westen

Full professor, Multi-Hazard Risk Dynamics at the Earth System Analysis Department of the faculty of Geo-information Science and Earth Observation (ITC), Twente University, the Netherlands

Cees van Westen is a Full professor Multi-Hazard Risk Dynamics at the Earth System Analysis Department of the faculty of Geo-information Science and Earth Observation (ITC), Twente University, the Netherlands. After obtaining his MSc in Physical Geography from the University of Amsterdam in 1988, he joined the International Institute for Geo-Information Science and Earth Observation (ITC) as a PhD researcher and specialised in the use of Remote Sensing and Geographic Information Systems for natural hazard and risk assessment. He obtained his Ph.D. in Engineering Geology from the Technical University of Delft in 1993, with research on "Geographic Information Systems for Landslide Hazard Zonation". He is working in the Department of Earth Systems Analysis, and contributes to the research theme 4D-Earth, specifically to Natural Hazards and Disaster Risk Management. He was involved in projects related to the development of open source GIS software and developed many training materials on the use of GIS for hazard and risk assessment.

# Guest Lecturer

From 2005 - 2015 he was Director of the United Nations University - ITC Centre on Geoinformation for Disaster Risk Management. The overview of activities of the UNU-DGIM can be [downloaded here](#).

He has carried out research on different hazard and risk related aspects: landslide hazard and risk (e.g. Austria, Switzerland, Italy, Romania, India, China, Vietnam, Colombia, Central America, Caribbean), volcanic hazard and risk assessment (Colombia, Philippines, Central America, South America) and technological risk assessment (India). He worked on national scale risk assessment projects in Central America, the Caribbean, Caucasus, and Central Asia. His current research interest is to develop methods for the analysis of changing multi-hazard risk. These changes can be abrupt, e.g. after major disasters (e.g. earthquakes, tropical storms, volcanic eruptions), or gradual (e.g. analyzing how future scenarios of climate change, land-use change and population change have an impact on risk) or as a decision support tool for the planning of risk reduction measures.

He is currently contributing to the research theme on [Disaster Risk Management](#) in ITC. He has carried out research on different hazard and risk related aspects: landslide hazard and risk (e.g. Austria, Switzerland, Italy, Romania, India, China, Vietnam, Colombia, Central America, Caribbean), volcanic hazard and risk assessment (Colombia, Philippines, Central America, South America) and technological risk assessment (India). He worked on national scale risk assessment projects in Central America, Caribbean, and the Caucasus.

# Guest Lecturer

His current research interest is to develop methods for the analysis of changing multi-hazard risk. These changes can be abrupt, e.g. after major disasters (e.g. earthquakes, tropical storms, volcanic eruptions), or gradual (e.g. analyzing how future scenarios of climate change, land use change and population change have an impact on risk) or as decision support tool for the planning of risk reduction measures.

Cees van Westen and Funda Atun are coordinating the ‘Promoting disaster preparedness and resilience by co-developing stakeholder support tools for managing the systemic risk of compounding disasters’ (PARATUS, 2022-2026) Horizon Europe Project. The project aims to provide stakeholders in disaster risk management with tools to account for cross-sectoral impacts and the dynamic nature of compounding disasters. The team develops an open-source platform for dynamic risk assessment and evaluating multi-hazard impact chains, risk reduction measures, and disaster response scenarios.

[Homepage - PARATUS](#)



# Abstract

## Multi-Hazard Risk Dynamics

Cees van Westen

Many of the disaster events that had an important impact on societies were actually combinations of several events that have a worsening effect on the damage and losses. These *compounding* events often have different origins and causes (e.g. a heatwave during a pandemic), but might also have the same origin (e.g. a storm producing damage by wind, and flooding due to heavy rain). In other cases such events occur as a chain of events, where an initial event (e.g. an earthquake) may cause subsequent events (e.g. landslides in mountainous areas) that may cause yet other events (e.g. a dam-break flood caused by a landslide). Or disaster events may have negative consequences that change the conditions so that over time other events are more likely to happen (e.g. wildfires that may lead to increase likelihood of flooding). It is a major challenge to predict such compounding multi-hazard events in future, and most approaches for multi-hazard risk assessment that have been applied thus far, tend to ignore these relationships between hazards, and the differences in impact caused by multi-hazard events. This chapter explores the approaches that can be followed to evaluate multi-hazard risk. It starts by exploring the definitions used and proceeds to make a classification of hazard relationships and their implications for assessing the impact of compounding events. Multi-hazard risk not only considers the changes in hazard frequency and intensity, but also on the other risk components, such as exposure, vulnerability and capacity.

# Abstract

They also have important implications for disaster (risk) management that should be considered, especially in light of worsening trends in risk related to climate change. The chapter highlights the importance for disaster managers to evaluate the entire impact chain, consisting of complicated interactions between hazardous events, build-up environment, socio-economic and risk governance. Through impact chains they can evaluate how future events could cause direct damage and indirect losses in different sectors of society, under the current conditions and for possible future developments, with the aim to develop strategies and measures that have the largest reduction of damage and losses. Some of these impacts can be quantified, while others can only be described in a qualitative manner. The chapter provides an overview of tools that can be applied to analyse multi-hazard impact.





# Zoom & Time

<https://kyoto-u-edu.zoom.us/j/99221353830?pwd=7CU3XdNbNVN0lUEQTXWYJP9EzNMIgT.1>

Meeting ID: 992 2135 3830

Passcode: 981141

---

Time Zone	Time
EST	7:00
UTC	11:00
CEST	13:00
IST	16:30
JST	20:00