Preface

In this Volume 5, we present four different sessions: Landslide Interactions with the Built Environment, Landslides in Natural Environment, Landslides and Water, Landslides as Environmental Change Proxies—Looking at the Past. The main objective is to draw attention to the different types of landslides with respect to communities, infrastructure and cultural heritage. Landslides in the natural environment are also covered, including all forms of aquatic environments. Recent progress in dating techniques has greatly improved the ability to determine the age of landslides allowing us to address the challenge of relating established landslide chronologies to regional paleoenvironmental changes (e.g. paleoseismic events, deglaciation, climatic changes, human-induced deforestation). The relations between climatological (and climate change) and geomorphological zones or settings are important in that they determine the dominant landslide type and the associated triggering mechanisms.

Research into landslides that are causally related to precipitation has recently been discussed in relation to climate change. Climate change may be a triggering effect for modifications to climatic parameters (weather), which are difficult to quantify and which play an important (or even key) role in the emergence of individual types of slope movement. Conditions may be different from region to region. For instance, regelation processes are of key importance for rock falls, increases in temperature for shallow slope movements in periglacial zones and increases in the sea level for coastal areas. Aridization of climate in certain areas can cause an increased frequency of fires and subsequently increase susceptibility to the formation of debris flows. Nevertheless, it is generally accepted that mountain environments are very susceptible to climatic change. The impact of changes in weather that results from climatic change, on slope stability must be studied and understood in the context of different geomorphological conditions (e.g. fluvial, glacial or periglacial types of relief) and geotechnical conditions (e.g. rock massifs, weathered mantle), as well as adaptation strategies.

However, in mountainous as well as tectonically active areas we often find a combination of different impacts generating conditions favourable to the development of slope deformations. There are steep slopes formed by intensive erosion, tectonically crushed zones, a higher degree of seismicity, and anthropogenic impacts can also be important (road construction, deforestation, agriculture, etc.) due to an increase in population. While precipitation may be the trigger, the contribution of other factors may also be important albeit difficult to quantify as their influence may be variable with time.

A clear understanding of the influence of hydraulic conditions on slope instability is necessary when water is the trigger for such movements. This may be achieved by using precipitation triggers as a proxy for the more direct factors related to the condition of the soil with respect to water. Alternatively, where a very clear, and generally straightforward, ground model exists it may be possible to use directly measured soil-moisture parameters to understand the triggering processes.

Kinematics of movements (for instance continuous movement with acceleration, seasonal movements, etc.) must also be taken into consideration. In terms of climatic factors, we cannot neglect temperature as it affects, for example, pore pressure through evapotranspiration and phase changes of precipitation.

This Volume 5 presents a wide range of papers that will make a substantial contribution to the state-of-the-art, aiding researchers in taking forward and increasing our knowledge and understanding of the effect of landslides on different environments. This is particularly the case in those environments in which humans and their infrastructure form an important part of that environment and thus comprise a significant part of the elements that are at risk from landslide hazards.

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