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Introduction to Weathering and Slope Movement papers

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Weathering includes all the processes of chemical alteration and physical breakdown of rock masses at, or near, the Earth's surface. Intense and/or continuous weathering processes may result in thick sequences of complex and heterogenous materials characterized by physical and geotechnical properties which have been strongly altered by the action of weathering. As a consequence, they may be prone to slope failures, erosion and landslides. In addition, availability of large amounts of weathered materials and loose debris in catchment basins may represent a serious hazard during, or following, intense rainfall, contributing significantly to the transport of sediment and debris during floods.

Landslides in weathered materials occur in many different geological, morphological and environmental settings: shallow and rapid landslides (mostly soil slips evolving into debris flows) are among the most common type of slope movements, although large, deep-seated landslides also occur on slopes affected by weathering processes. Despite the high frequency of landslides in weathered materials, and the damage and casualties they cause, the relationship between weathering and slope movements is not well documented.

In 1995, most of an issue of the *Quarterly Journal of Engineering Geology* (vol. 28, part 3) was devoted to weathering, with particular reference to the description and classification of weathered rocks for engineering purposes. Landslides and erosion were discussed in some of the papers included in that issue, however, the focus was not specifically on the instability of slopes in weathered materials. Nevertheless, the complexities of the topic of weathered rocks, as well as discussion concerning appropriate description and classification strategies, were highlighted.

In April 2003 we convened the symposium on "Slope movements in weathered materials: recognition, analysis, and hazard assessment" held at the Joint Assembly of the European Geophysical Society (EGS), the American Geophysical Union (AGU), and the European Union of Geosciences (EUG) in Nice, France. The symposium was intended to provide scientists from complimentary disciplines with an opportunity to discuss methodologies and techniques in order to obtain a better understanding of the weathering conditions of rock masses on slopes, of their susceptibility to slope movements, and of the related risks for the anthropogenic environment. An effort was made to gather expertise from different fields, including, but not limited to, petrography, mineralogy, geomorphology, and engineering geology, with, in addition, a particular emphasis being placed on the role that geophysical surveys might have for providing useful information to detect thickness and lateral continuity of weathered horizons.

This issue of the *Quarterly Journal of Engineering Geology and Hydrogeology* contains three of the papers presented in Nice. The 31 contributions to the symposium (from France, Italy, Switzerland, United Kingdom, Portugal, United States, Iran, Korea, Japan, Nepal and Brazil) dealt with many different aspects of the study of weathered materials, and of their influence in promoting slope instability. A few examples of the topics discussed include the geological and petrographical analysis of weathering in crystalline rocks, the classification of weathered horizons, the use of geophysical methods to understand failure mechanisms in deep-seated landslides, and the evaluation of susceptibility and hazard related to the outcropping of thick sequences of weathered materials on slopes. Some of these topic areas (e.g. the geotechnical characteristics of weathered clayey soils and the development of shallow landslides, the stability of excavated and weathered rock slopes, erosion and sedimentation on slopes in weathered deposits, etc.) are covered in the papers selected for this issue.

These contributions highlight the need for a multidisciplinary approach to studying slope movements in weathered materials and it is hoped to publish some of the other papers submitted on this subject in future editions of the Journal. Additionally, we are hopeful that scientists will continue these types of studies, to increase our understanding of temporal and spatial landslide processes, prediction, and hazard.

As Guest Subject Editors, we thank all the participants in the symposium. We also express our warmest thanks to Fausto Guzzetti, chairman of the Natural Hazards Working Group of the European Geophysical Society for providing the opportunity to organize the symposium. We are also grateful to the QJEGH Editorial Board for publishing these papers. The editorial efforts were partly supported by the Institute for Hydrogeological Protection, Section of Bari, of the Italian National Research Council.

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