
Foreword

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The sustainability of society has always been linked to the availability of water. This resource has proven to be absolutely essential for mankind, both as drinking water and as a source of irrigation for agriculture. Water is also needed for sanitation purposes; this need has grown more significantly as population densities have increased around urban centers in historic times. But water is not only an essential ingredient for life; it also affects people through strong precipitation events, floods, droughts, and the change in the quality and availability of water resources due to natural and anthropic reasons.

This special issue of *Geologica Acta* addresses several of the issues that are currently being investigated on the relationships between hydrology and other Earth Sciences. Sustainable management of water is not solely a technical, economical and societal issue, but needs also an increased knowledge of the natural processes that control the quantity, quality and availability of water. Research is also needed on rather technical aspects, especially those necessary for increasing non-conventional water resources such as desalination and recycling.

Technological aspects in exploration and exploitation of water are discussed in two of the articles. Pulido-Bosch and Pulido-Leboeuf discuss technical aspects related to the exploitation of seawater from coastal aquifers. Desalination is nowadays becoming an important source of water in regions where the access to fresh water is severely limited. The article by Yaramanci presents the use of Surface Nuclear Magnetic Resonance as a new geophysical tool, mainly to estimate water contents and hydraulic conductivities of shallow aquifers.

The issue of desalination is also discussed in the article by Salgot and Tapias, together with the use of other non-conventional water resources in coastal areas. The use of reclaimed water could help solving water availability problems.

The relationship between rainfall, runoff and the availability of water is addressed by a group of three articles. Pfister et al. introduce hydro-climatological monitoring at the catchment scale and the connection between seasonal changes in precipitation and runoff patterns and changes in atmospheric circulation. Tesar et al. show the importance of understanding flow through the soil, as it modulates the impact of rainfall pulses on runoff through attenuation or amplification. Finally, Calder et al. focus on the discrepancies between public perception and scientific knowledge, regarding the impact of forest areas on runoff and soil water content. System understanding becomes critical when water policies at a national level are implemented.

The study by Siwek and Chelmicki has the goal of determining the causes of pollution and changes in water chemistry in a given catchment. In the examples that they use, a principal component analysis of the changes in water chemistry points to the type of human activity responsible for those changes.

Lastly, Jordana and Batista introduce the subject of natural water quality and health, through concepts such as essential and toxic elements and their concentrations in natural waters, effects on human health and recommended international guidelines for water composition.