

Both surface and groundwaters are under increasing pressure from the continuous growth in demand for sufficient quantities of good quality water for all purposes. Hence the development of research aiming to provide the basic knowledge for management and protection tools of freshwater is a strategic matter all over the world and in Italy. At the beginning of the millennium, the European Parliament adopted a Directive that established a framework for Community action in the field of water policy. The purpose was the protection of inland surface waters, transitional waters, coastal waters and groundwater, promoting sustainable use based on a long-term protection of available water resources and ensuring the progressive reduction and prevention of pollution of groundwater. These challenging goals stimulated fast developments in the field of characterization and modelling of porous aquifers, with emphasis on surface-groundwater exchange, salt-freshwater interference, flow and contaminant transport paths, local vs. regional hydrogeological balances. These developments were possible thanks to a multidisciplinary approach, from geological and geophysical modelling of hydrostratigraphy and hydrogeochemical characterization, to mathematical modelling and simulation of flow and transport processes. During the last decades, innovative results in these fields have been achieved thanks to a renewed attention to the good knowledge of the geological architecture and evolution of aquifer stratigraphy, that is widely recognized as the starting point for any hydrogeological application.

A contribution to summarize the state of the art of these researches in Italy came from a first National Workshop held in Parma (June 2004), whose results are documented by the Proceedings Volume edited by Renzo VALLONI (Developments in Aquifer Sedimentology and Groundwater Flow Studies in Italy, *Mem. Descr. Carta Geol. d'It.*, **76** (2007), pp. 316). Following this line, the **Second National Workshop “Multidisciplinary approach for porous aquifer characterization”** was held in Rimini in September 2009, in the frame of the VII FIST Forum “Geitalia 2009” (Workshop W1 Program and Abstracts of the 36 presentations can be found in *Epitome*, **3** (2009), p. 3 – 12). The Workshop aimed to contribute to update the state of the art, evaluate the research perspectives and stimulate scientific cooperation between different groups and expertises, stimulating a broad discussion about the multidisciplinary approach to characterization and modelling of porous aquifers, solution of flow and transport problems, quantification of the exchanges between atmospheric, surface and subsurface water reservoirs, and elaboration of sustainable scenarios for management of the water resource.

The good success of the Workshop stimulated printing of these Proceedings, that represent the ideal prosecution of the previous volume. Nineteen papers have been accepted for publication, all of them stressing the need for a multidisciplinary approach based on the robust geological knowledge of hydrostratigraphy.

Among the **review papers**, LONGINELLI & SELMO provide a summary of isotope geochemistry with respect to the water cycle with emphasis on Italy, GUADAGNINI *et alii*, discuss experiments and models on carbonates dissolution and heavy metals competition in porous media and GIUDICI reviews modelling water flow and solute transport in alluvial sediments.

Under the **methodology**, DELL’ARCIPRETE *et alii*, describe different techniques for simulation of heterogeneity in a meandering river aquifer analogue, MELE *et alii*, introduce an integrated geological-geophysical methodology for multiscale characterization of alluvial aquifers architecture, BONZI *et alii*, illustrate the Web 2.0 technology for the presentation of analytical data and results of the speciation calculation in groundwaters of the plain area of Emilia-Romagna region and VINCENZI *et alii*, demonstrate general analytical solutions of the linearized Richards equation that describes space and time evolution of the soil water content in an unsaturated medium.

A wide number of **regional case studies** has been collected. Under this group of papers, some deal with the **western Po plain hydrostratigraphy**: IRACE *et alii*, describe a new hydrostratigraphic framework of the Late Messinian-Quaternary basins of Southern Piedmont and VIGNA *et alii*, analyse the relations between stratigraphy, groundwater flow and hydrogeochemistry in some areas of the Tertiary Piedmont Basin. Still in Piedmont, FORNO *et alii* suggest the hydrogeological implications of the architecture of Pliocene-Pleistocene torrential and debris flow sediments of the Lanzo Massif region.

The **Central and Eastern Po plain hydrostratigraphy** are dealt with by AMOROSI & PAVESI, that illustrate aquifer stratigraphy from the Middle-Late Pleistocene succession of the Mantova area, BERSEZIO *et alii*, that describe the relations between aquifer building processes and Apennine tectonics in the southern most plain of Lombardy, BONOMI *et alii*, that provide the assessment of groundwater availability in the Milan province aquifers, MARTELLI & GRANATI that formulate a comprehensive hydrogeological view of the Friuli alluvial plain thanks to a multi-annual quantitative survey, and PISANI *et alii*, that show a case study of application of groundwater flow modelling to support a remediation project within a chemical facility.

Moving to **Central and Southern Italy**, BUTTERI *et alii*, describe the hydrogeological and hydrogeochemical frame of aquifers in the Arno coastal plain near Pisa, RUSI & TATANGELO provide the conceptual model of Sangro and Vomano plains for management of alluvial aquifers, CILUMBRIELLO *et alii*, illustrate sedimentology, stratigraphic architecture and hydrostratigraphy of the Metaponto coastal-plain and MARGIOTTA *et alii*, document the hydrogeological implications of the stratigraphic revision of the Brindisi-Taranto Plain.

Looking forward the next meeting on these relevant topics, we would like to thank all those who contributed to the success of the 2009 Workshop and to the edition of this Volume and specifically Maria Luisa VATOVEC who took care of the edition of this Volume.