Contents

Part I  Keynote

1  Urban Landslides: Challenges for Forensic Engineering Geologists and Engineers  ............................................. 3  
   S.F. Burns

2  Large-Scale Thematic Geological Mapping of Moscow Area ....... 11  
   Victor Osipov

3  Remote Sensing Role in Emergency Mapping for Disaster Response ...... 17  
   Piero Boccardo and Fabio Giulio Tonolo

4  Underground Urban Development: An Overview  ......................... 25  
   Eduardo F.J. De Mulder, C.C. Derk F. Van Ree and Kenny Wang

Part II  Aggregates: The Most Widely Used Raw Material

5  A Study of Fine Aggregate Properties and Their Effect on the Quality of Cementitious Composite Materials  .................................................. 33  
   Revekka Fournari, Ioannis Ioannou and Dimitris Vatyliotis

   Isabel Fernandes, Maria dos Anjos Ribeiro, Helena Martins, Maarten Broekmans, Ian Sims, Philip Nixon and Fernando Noronha

7  Environmental Impact and Sustainability in Aggregate Production and Use  ................................................................. 41  
   S.W. Danielsen and E. Kuznetsova

8  Contrast Behavior of Sandstone from Mount Nemrut (Adiyaman-Turkey) After the Accelerated Weathering Tests  ...................... 45  
   Tamer Topal and Burcu Ertas Deniz

9  The ReAVA Project: Assessment of the Potential Alkali-Reactivity of Volcanic Aggregates from Azores Islands  ............................. 51  
   Sara Medeiros, João Carlos Nunes, Tetsuya Katayama, Isabel Fernandes, António Santos Silva, Vidália Miranda and Dora Soares
10 Potential Reactivity to Alkalis of Portuguese Volcanic Aggregates for Concrete ................................................. 55
Violeta Ramos, Isabel Fernandes, Fernando Noronha, Tetsuya Katayama, Dora Soares and Antônio Santos Silva

11 Production of Lightweight Aggregates from Phosphate Washing Plant Sludge .............................................. 59
Emna Fakhfakh, Imen Khiari, Walid Hajjaji, Mounir Medhioub, Fernando Rocha, Alberto López-Galindo and Fakher Jamoussi

12 Some Variations in Petrography of South African Karoo Dolerites and the Effects Thereof on Aggregate Properties ............. 65
Robert Leyland

13 Environmental Issues Connected to the Quarry Lakes and Chance to Reuse Fine Materials Deriving from Aggregate Treatments. 71
Sara Castagna, Giovanna Antonella Dino, Manuela Lasagna and Domenico Antonio De Luca

14 The Aggregates from Tunnel Muck and their Use as Secondary Raw Material: The Case Study of Turin Underground ........... 75
Rossana Bellopede, David Colaiacomo, Paola Marini, Pierpaolo Oreste and Oscar Radis

15 Alkali Aggregate Reaction for Concrete Made with Tunnel Muck: Experimental Investigations ........................................ 81
Rossana Bellopede, Marco Francini, Paola Marini, Alessandra Migheli, Enrico Moretti and Pierpaolo Oreste

16 Mix Design Parameters of Restoration Mortars: The Effect of Aggregate Characteristics ............................................. 85
Maria Amenta, Ioannis Karatasios, Anna Kalagri, Pagona Maravelaki-Kalaitzaki and Vassilis Kilikoglou

17 Treatment and Exploitation of Waste Coming from Quarry Industries: Reuse as Aggregate ................................. 89
Giovanna Antonella Dino and Massimo Marian

18 The Effect of Feldspar, Mica and Clay Minerals on Compressive Strength of Mortar ................................................. 93
Atiye Tugrul, Selahattin Hasdemir and Murat Yılmaz

19 Petrographic Examination of Mortar Bars of Swedish Aggregates Exposed to RILEM AAR2 ........................................ 97
Karin Appelquist, Jan Trägårdh, Magnus Döse and Mattias Göransson

20 Risk Assessment of Swedish Concrete as a Construction Material in Relation to Naturally Occurring Radiation from Different Aggregates ............................................. 101
Magnus Döse
21 Aggregate Quality Mapping of Sustainable Substitutes for River Sand for Concrete Production in Eastern Botswana ................ 107
Mattias Göransson, Lena Persson, Vincent Lekula and Onkgopotse Ntibinyane

22 Influence of Geological Characteristics on Mechanical Properties of Crushed Stone Aggregates Produced from Meta-Volcanic Rocks in Finland. ........................................... 111
Torppa Akseli and Seppo Leinonen

23 Los Angeles and Micro-Deval Values of Volcanic Rocks and Their Use as Aggregates, Examples from Hungary ................... 115
Ákos Török

24 Polished Stone Value of Volcanic Rocks Used as Aggregates: A Case Study from the Bohemian Massif, Czech Republic .............. 119
Kateřina Krutilová and Richard Přikryl

Part III Analysis and Control of Ground Deformations by Remote Monitoring

25 Land Subsidence Due to Deep Groundwater Withdrawal in Northern Yangtze River Delta Area. .......................... 125
Guang-ya Wang, Dan Zhang, Jin-shun Feng, Ming-zhu Chen and Wei-hua Shan

26 Observing Dam’s Movements with Spaceborne SAR Interferometry .... 131
Milan Lazecký, Daniele Perissin, Wang Zhiying, Lei Ling and Qin Yuxiao

27 Deformation Monitoring Using Ground-Based SAR Data .......... 137
Michele Crosetto, Oriol Monserrat, Guido Luzi, Maria Cuevas and Núria Devanthéry

28 Map and Monitoring Slow Ground Deformation in NW Italy Using PSI Techniques ...................................... 141
Davide Notti, Claudia Meisina, Francesco Zucca, Alessio Colombo and Luca Paro

29 Integrated Use of Advanced InSAR and GPS Data for Subsidence Monitoring .............................................. 147
G. Bitelli, F. Bonsignore, S. Del Conte, F. Novali, I. Pellegrino and L. Vittuari

30 Observation of Expansive Clay Movement with DInSAR ............ 151
M. Kurka and K.H. Gutjahr

31 Analysis of a Subsidence Process by Integrating Geological and Hydrogeological Modelling with Satellite InSAR Data .......... 155
Francesca Bozzano, Carlo Esposito, Stefania Franchi, Paolo Mazzanti, Daniele Perissin, Alfredo Rocca and Emanuele Romano
32 Satellite and Terrestrial Radar Interferometry for the Measurement of Slope Deformation ...................................................... 161
Tazio Strozzi, Hugo Raetzo, Urs Wegmüller, Jessica Papke, Rafael Caduff, Charles Werner and Andreas Wiesmann

33 Satellite and Ground-Based Interferometric Radar Observations of an Active Rockslide in Northern Norway ................................................................. 167

34 The Ligosullo (UD, Italy) Landslide, Revisiting of Past Data and Prospects from Monitoring Activities ................................................................. 171
Luca Gandolfo, Alessandro Brunetti, Francesca Bozzano, Antonio Bratus, Enrico Busnando, Mario Floris, Rinaldo Genevois, Paolo Mazzanti and Federico Saporito

35 Advanced Characterization of a Landslide-Prone Area by Satellite a-DInSAR ................................................................. 177
Alfredo Rocca, Paolo Mazzanti, Francesca Bozzano and Daniele Perissin

36 Integration of Geotechnical and Remote Monitoring Systems for the Analysis and Control of Ground Deformation in Marble Quarrying (Apuan Alps, Italy). ................................................................. 183
Riccardo Salvini, Claudio Vanneschi, Domenico Gulli, Federico Forchione, Silvia Riccucci and Mirko Francioni

37 Terrestrial SAR Interferometry Monitoring of Natural Slopes and Man-Made Structures ................................................................. 189
Paolo Mazzanti, Francesca Bozzano, Alessandro Brunetti, Carlo Esposito, Salvatore Martino, Alberto Prestininzi, Alfredo Rocca and Gabriele Scarascia Mugnozza

38 Monitoring Swelling Soils in Eastern Paris (France) Through DinSAR and PSI Interferometry: A Synthesis ................................................................. 195
B. Deffontaines, F. Kaveh, B. Fruneau, A. Arnaud and J. Duro

Part IV Building Stones & Ornamental Rocks—Resource Evaluation, Technical Assessment, Heritage Designation

39 A Global Heritage Stone Province in Association with the UNESCO World Heritage City of Salamanca, Spain ................................. 205
Dolores Pereira and Barry Cooper

40 Characterization of the Natural Variability of Macael Serpentinite (Verde Macael) (Almería, South of Spain) for Their Appropriate Use in the Building Industry ................................................................. 209
Rafael Navarro, Dolores Pereira, Ana Gimeno and Santiago del Barrio

41 Some Examples of Heritage Stones from Australia ................................................................. 213
Barry Cooper
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
<td>The Karst Region of Slovenia: A Potential Global Heritage Stone Province</td>
<td>Sabina Kramar, Breda Mirtič, Ana Mladenović, Mojca Bedjanič, Boštjan Rožič and Andrej Šmuc</td>
<td>223</td>
</tr>
<tr>
<td>44</td>
<td>The Natural Stone in the Historic Buildings of the City of Granada (Southern Spain). Features as a Possible Candidate for the Designation of “Global Heritage Stone Province”</td>
<td>Rafael Navarro, Josefina Sánchez-Valverde and José Manuel Baltuille</td>
<td>229</td>
</tr>
<tr>
<td>45</td>
<td>Petrographic, Physical–Mechanical and Radiological Characterisation of the Rosa Beta Granite (Corsica-Sardinia Batholith)</td>
<td>S. Cuccuru and A. Puccini</td>
<td>233</td>
</tr>
<tr>
<td>46</td>
<td>Changes in Marble Quality After Sodium Sulphate Crystallization and Long-Lasting Freeze-Thaw Testing</td>
<td>Tatiana Durmeková, Peter Ružička, Miroslav Hain and Mária Čaplovičová</td>
<td>237</td>
</tr>
<tr>
<td>47</td>
<td>Assessment of Potential Natural Stone Deposits</td>
<td>Hannu Luodes, Heikki Sutinen, Paavo Härmä, Heikki Pirinen and Olavi Selonen</td>
<td>243</td>
</tr>
<tr>
<td>48</td>
<td>P-T-XCO2 Pseudosection Modelling of Talc-Magnesite Soapstone</td>
<td>Seppo Leinonen</td>
<td>247</td>
</tr>
<tr>
<td>49</td>
<td>Adnet ‘Marble’, Untersberg ‘Marble’ and Leitha Limestone—Best Examples Expressing Austria’s Physical Cultural Heritage</td>
<td>Beatrix Moshammer, Christian Uhlir, Andreas Rohatsch and Michael Unterwurzacher</td>
<td>253</td>
</tr>
<tr>
<td>50</td>
<td>The Wiborg Granite Batholith—The Main Production Area for Granite in Finland</td>
<td>Paavo Härmä, Olavi Selonen and Hannu Luodes</td>
<td>259</td>
</tr>
<tr>
<td>51</td>
<td>Methods for Evaluating the Natural Stone Weathering Condition in Selected Historical Buildings Within the Project “Efficient Use of Natural Stone in the Leningrad Region and South–East Finland”</td>
<td>Nike Luodes, Hannu Luodes, Heikki Pirinen, Paavo Härmä, Heikki Sutinen, Aleksei Shkurin and Claudio De Regibus</td>
<td>263</td>
</tr>
<tr>
<td>52</td>
<td>Granites of the Verbano-Cusio-Ossola District (Piedmont, Northern Italy): Possible Candidates for the Designation of “Global Heritage Stone Province” and a Proposal of a Geotouristic Route</td>
<td>Alessandro Cavallo and Giovanna Antonella Dino</td>
<td>267</td>
</tr>
<tr>
<td>No.</td>
<td>Title</td>
<td>Pages</td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>Building Stone Evaluation Applied to Weathered Granites—The Example of Amarelo Real Granite (Northern Portugal)</td>
<td>273</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LMO Sousa and JMM Lourenço</td>
<td></td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>Production of Granitic Press Rollers in Finland</td>
<td>279</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Arto Peltola, Olavi Selonen and Paavo Härnä</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>The Uses of Natural Stone in the Building of Canberra, Australia’s National Capital City</td>
<td>283</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wolf Mayer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>Fire on the Rocks: Heat as an Agent in Ancient Egyptian Hard Stone Quarrying</td>
<td>291</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tom Heldal and Per Storemyr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>57</td>
<td>Environmental Background in Apricena Quarries (Apulia, Southern Italy)</td>
<td>297</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alessandro Reina and Maristella Loi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>Size Effect in Flexural Strength Test on Dimension Stones</td>
<td>303</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rossana Bellopede, Paola Marini and Lorenzo Collaro</td>
<td></td>
<td></td>
</tr>
<tr>
<td>59</td>
<td>CE-Marking of Natural Stone—Practical Application and Solutions in Sweden</td>
<td>309</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Linus Brander and Björn Schouenborg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>Hierarchical Approaches Toward Safeguarding Heritage Building Stone Resources in England and Wales</td>
<td>313</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ian A. Thomas and Barry J. Cooper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>61</td>
<td>The Relation Between the Petrographic, Physico-Mechanical Properties and the Use of Some Deposit Paving in Algeria</td>
<td>319</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chentout Malika, B. Alloul and D.J. Belhai</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Part V  Communicating Engineering Geology with Urban Planners

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>62</td>
<td>Geohazard Studies for Urban Planning in the Santiago Metropolitan Region, Chile: Some Lessons for Future Interactions Between Engineering Geoscientists and Urban Planners in Developing Countries</td>
<td>327</td>
</tr>
<tr>
<td></td>
<td>Sergio A. Sepúlveda, Sofía Rebolledo, Ximena Bórquez, Joel Prieto and Juan A. Muñoz</td>
<td></td>
</tr>
<tr>
<td>63</td>
<td>A Decision Support System Suggestion for the Optimum Railway Route Selection</td>
<td>331</td>
</tr>
<tr>
<td></td>
<td>C. Gokceoglu, H.A. Nefeslioglu and N. Tanyildiz</td>
<td></td>
</tr>
<tr>
<td>64</td>
<td>Communication of Geological Information in Planning of Urban Areas</td>
<td>335</td>
</tr>
<tr>
<td></td>
<td>Marker Brian</td>
<td></td>
</tr>
</tbody>
</table>
65 The Use of a Spatial Multi—Criteria Technique for Urban Suitability Assessment, Due to Extensive Mass Movements. The Case Study of Vitala Village, Kimi, Euboea, Greece .......................... 339
P. Tsangaratos, D. Rozos, I. Ilia and K. Markantonis

66 Communicating Applied Geoscientific Expertise to Rural and Urban Planners: Some Lessons Learned .............................. 345
Eduardo F.J. De Mulder

67 Urban Engineering Geological Maps for Bradford, UK .................. 351
M.G. Culshaw and K.J. Northmore

68 The COMCOM Process: Informing and Transforming Communities in the Developing World Through Geotechnical Information ........................................... 355
Lionel E. Jackson Jr., Mike Ellerbeck and Fernando Munoz Carmona

69 3D Mapping of Geological Base Data and Its Utilization for Urban Planning in Straubing, Germany ................................. 359
Silvia Beer, Gerhard Lehrberger and Kurosch Thuro

Part VI Complexity in Hazard and Risk Assessment

70 Geotechnical Basis for Building Instability and Failure: Case Study from Lagos, Nigeria .................................................. 365
Ibrahim Adewuyi Oyediran and Julius Omotayo Famakinwa

71 Applying the Disruption Index Procedure to Evaluate the Urban Seismic Risk in the Mt. Etna Area (Italy) ........................................... 371

72 Environmental Impact Assessment of Geological Processes in Russia .... 375
Kharkina Marina, Barykina Olga and Shanina Vinyaleta

73 Complexity in Seismic Risk Assessment at Different Levels with GIS Technology Application .................................................. 381
Nina Frolova, Jean Bonnin, Valery Larionov and Aleksander Ugarov

74 Landslide Susceptibility of the La Catola Torrent Catchment Area (Daunia Apennines, Southern Italy): A New Complex Multi-step Approach .................................................. 387
Gioacchino Francesco Andriani, Giuseppe Diprizio and Vito Pellegrini

75 Microzonation of Gölbaşi Special Environmental Protection Area with Respect to Geoenvironmental Criteria ................................. 393
Şule Tüdeş, Derya Polatkan and Kadriye Burcu Yavuz

76 The Role of Rockfall Protection Barriers in the Context of Risk Mitigation: The Case of the Autonomous Province of Bolzano .................. 397
Govoni Laura and Claudia Strada
Integrated Study of Landslides in the Southern Apennines (Val d’Agri: Basilicata Region) Using a Multidisciplinary Approach
Summa Vito, Colaiacovo Rosy, Giannossi Maria Luigia and Margiotta Salvatore

Master Plan of Hazard Assessment in Ijen Volcano Complex
Ade Triyunita, Shaskia Herida Putri and Dicky Muslim

Sinkholes Susceptibility Assessment in Urban Environment
Using Heuristic, Statistical and Artificial Neural Network (ANN) Models in Evaporite Karst System: A Case Study from Lesina Marina (Southern Italy)
Annachiara D’Angella, Filomena Canora and Giuseppe Spilotro

Geomorphological Complexity in Landslide Susceptibility Modelling
Giuseppe Spilotro and Roberta Pellicani

Analysis of Interaction Between Waves and Cliff Along the Adriatic Coast of Polignano (Apulia, Italy)
Giuseppe Spilotro, Roberta Pellicani, Daniela Miccoli and Filomena Canora

Hazard of Karstic Sinkhole Formation in an Area South of Pretoria, South Africa
Anna Catharina Oosthuizen

Review of Soil Degradation in the Region of Nazareno, Minas Gerais: Brazil

Subsidence of Buried Soils in Cyclic Loess Sequences of the Northern Eurasia
V.T. Trofimov, S.D. Balykova, T.V. Andreeva and A.V. Ershova

An Overview of Engineering Geology and Sustainable Rural Infrastructure Development
Jasper Cook, Gareth Hearn, Phil Paige-Green and Dominic Hagues

Changes in the Natural Drainage Channel System Due to Anthropogenic Land Uses: Itaqueri Region, State of São Paulo, Brazil
Cláudia Marisse dos Santos Rotta and Lázaro Valentin Zuquette

Determination of Priorities and Importance of Some Geotechnical Factors in Grouting of Karst in Large Dam Sites with Decision Tree Model (CART). The Case Study of Salman Farsi Dam, Fars Province, Southern Iran
Mehrdad Rahnemaei, Kouros Yazdjerdi and Farzan Faraz
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>88</td>
<td>Earthen Dike Leakage at the Dead Sea</td>
<td>Damien Closson and Najib Abou Karaki</td>
</tr>
<tr>
<td>89</td>
<td>Mapping of Salt Consolidation and Permeability Using MASW Method in the Dead Sea Sinkhole Problem</td>
<td>Michael Ezersky and Anatoly Legchenko</td>
</tr>
<tr>
<td>90</td>
<td>Subsurface Dams as a Solution for Supplementary Recharge and Groundwater Storage in Karst Aquifers in Arid Areas</td>
<td>Zoran Stevanovic</td>
</tr>
<tr>
<td>91</td>
<td>Analysis of Condition of Underground Cavities, Odessa (Ukraine)</td>
<td>Olena Dragomyretska, Oleksandr Dragomyretskyy and Mikhail Skipa</td>
</tr>
<tr>
<td>92</td>
<td>Facing Engineering Problems in the Fragile Karst Environment</td>
<td>Mario Parise, Damien Closson, Francisco Gutiérrez and Zoran Stevanovic</td>
</tr>
<tr>
<td>93</td>
<td>Geological and Geophysical Techniques for the Identification of Subterranean Cavities</td>
<td>Pietro Pepe, Vincenzo Martimucci and Mario Parise</td>
</tr>
<tr>
<td>94</td>
<td>Engineering Geological Characterization of the Antalya Karstic Rocks</td>
<td>Sopaci Evrim and Akgün Haluk</td>
</tr>
<tr>
<td>95</td>
<td>Tectonics versus Karst Relationships in the Salento Peninsula (Apulia, Southern Italy): Implications for a Comprehensive Land-Use Planning</td>
<td>Vincenzo Festa, Antonio Fiore, Maria Nilla Miccoli, Mario Parise and Luigi Spalluto</td>
</tr>
<tr>
<td>96</td>
<td>Problems with Caves During Tunneling in Dinaric Karst (Croatia)</td>
<td>Mladen Garašić and Davor Garašić</td>
</tr>
<tr>
<td>97</td>
<td>Sinkholes and Land Use Regulation in South Africa</td>
<td>G.J. Heath and S. Constantinou</td>
</tr>
<tr>
<td>98</td>
<td>Geophysical Investigation to Delineate Hazardous Cavities in Al-Hassa Karstic Region, Kingdom of Saudi Arabia</td>
<td>Tareq Abdallatif, Abdel-Samad A.B. Khafagy and Ashraf Khozym</td>
</tr>
<tr>
<td>99</td>
<td>Environmental Aspects of Proposed Engineering Solution for Inter-basin Transfer in East Herzegovina</td>
<td>Marina Cokorilo, Zoran Stevanovic and Vesna Ristic Vakanjac</td>
</tr>
<tr>
<td>100</td>
<td>General Engineering-Geological Principles of Karst Risk Assessment</td>
<td>Victor Khomenko, Alexander Potapov and Vladimir Tolmachev</td>
</tr>
</tbody>
</table>
102 Current Status and Strategic Planning of Sinkhole Collapses in China ........................................ 529
Mingtang Lei, Yongli Gao and Xiaozhen Jiang

103 Validation of Rated Sinkhole Span for Building in Covered Karst Areas ..................................... 535
Stanislav Makhnatov and Mikhail Utkin

104 Potential Karst Collapse Assessment Along a Bridge Foundation of High-Speed Rail, Anshan, China ........................................ 539
Xiaozhen Jiang, Mingtang Lei and Yongli Gao

105 Uncertainties in the Application of Rock Mass Classification and Geomechanical Models for Engineering Design in Carbonate Rocks ....................................... 545
Gioacchino Francesco Andriani, Mario Parise and Giuseppe Diprizio

106 Karst Remediation in the Variant to the National Road 9 Between Cascais and Abuxarda, Portugal ....................... 549
Bernardo P.B. Monteiro, João Azevedo, Isabel Caspurro and Paulo Durão

107 Sinkhole Field Above Karst Caves: Detection and Analysis Through Integrated Techniques ...................................... 553
Stefano Margiotta, Sergio Negri, Mario Parise and Tatiana A.M. Quarta

108 Evaluating the Potentialities of Hydro-stratigraphic, Geomorphological and Geophysical Analyses to Detect Underground Cavities ........................................ 559
Stefano Margiotta, Sergio Negri, Mario Parise and Tatiana A.M. Quarta

109 With the Rich Experience Gained in the Construction of Motorways We are Planning the Course of the 5th European Railway Corridor Crossing the Classical Karst (Slovenia) .................. 563
Martin Knez, Mitja Prelovšek and Tadej Slabe

110 Experience of Quantitative Assessment of Karst Risk in Russia............. 567
Vladimir Yolkin

111 Study on Groundwater System Effect of Tunnel Drainage Control in Karst Valley ........................................ 571
Xiaoguang Jin, Yayong Li, Hongwei Liu and Yuan Jin

112 Safeguarding of Assets Roads and Protection of Land in the Valley of Acquaresi. Deepening and Widening of the Studies the Area Subject to Risk Sinkhole. Proposal for Monitoring. (Italy: Sardinia) .... 577
Mureddu Alessio and Corda Angelo Salvatore

113 Challenges of Renewable Energy Source Utilisation at Section of Future Highway E-763 Belgrade-Southern Adriatic Across Karst Plateau of Pešter Plateau (Western Serbia) .......................... 581
Milenic Dejan, Stevanovic Zoran, Dragisic Veselin, Vranjes Ana and Savic Nevena
114 Some Considerations on 3-D and 2-D Numerical Models for the Assessment of the Stability of Underground Caves........... 585
Lollino Piernicola, Parise Mario and Vattano Marco

115 Speleological and Hydrogeological Factors of Urbanization and Development of Road Network on Mountain Zlatibor (Western Serbia) ........................................... 589
Milenic Dejan, Djuro Milankovic, Nenad Doroslovac, Bojan Doncev and Marina Jovanovic

116 Engineering Problems in Karst: Three Case History................ 595
Vigna Bartolomeo and Marchionatti Federico

117 Karst Risk Assessment for Underground Engineering:
Comparison of the KarstALEA Method with a Random
Karst Distribution Approach ..................................................... 603
Marco Filipponi

118 The Role of Tectonic Structures and Density-Driven
Groundwater Flow for Salt Karst Formation ............................. 609
Peter Huggenberger, Ali Zidane, Eric Zechner and Daniel Gechter

Part IX Excavation in Potentially Asbestos-Bearing Rocks:
Methodologies for Risk Evaluation and Safety Management

119 Asbestiform Amphiboles in a Serpentine Quarry in Operation,
Province of Córdoba, Argentina .............................................. 615
L. Lescano, A. Bonalumi, P. Maiza, J. Sfragulla and S. Marfil

120 Geological and Analytical Procedures for the Evaluation
of Asbestos-Related Risk in Underground and Surface
Rock Excavation ................................................................. 619
Francesco Turci, Roberto Compagnoni, Fabrizio Piana, Luca Delle Piane,
Maura Tomatis, Bice Fubini, Sergio Tallone,
Stefano Fuoco and Massimo Bergamini

121 The Asbestos Risk in Meta-Ophiolitic Rocks: A Protocol for
Preliminary Field and Laboratory Investigations During
Geological Mapping ............................................................... 623
Marescotti Pietro, Crispini Laura, Poggi Eugenio,
Capponi Giovanni and Solimano Monica

122 Geological Characterizion of Potentially Asbestos-Bearing Rocks
for the Project “Hydraulic and Structural Works for Embankment
of the Varenna Stream, Genoa Pegli” ................................. 627
Sara Bini and Giorgio Grassano
### Part X  Experiences and Potentialities of Data-Driven Modeling in Earth Science Issues

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>123</td>
<td>Variational Data Assimilation with TELEMAC. Proof of Concept for Model State Correction on the Berre Lagoon 3D-Model</td>
<td>S. Ricci, A. Piacentini, A. Weaver, R. Ata and Nicole Goutal</td>
</tr>
<tr>
<td>124</td>
<td>Developing an Adequate Approach to Model the Geotechnical Parameters for Reducing the Ventures of Underground City Development</td>
<td>Mei Dong, Christoph Neukum, Hui Hu and Rafig Azzam</td>
</tr>
<tr>
<td>125</td>
<td>Calculation of Water Retention Curves of Rock Samples by Differential Evolution</td>
<td>Maria C. Caputo, Sabino Maggi and Antonietta C. Turturro</td>
</tr>
<tr>
<td>126</td>
<td>Data Mining and Data-Driven Modelling in Engineering Geology Applications</td>
<td>Angelo Doglioni, Annalisa Galeandro and Vincenzo Simeone</td>
</tr>
<tr>
<td>127</td>
<td>Predicting Landslide Displacements by Multi-objective Evolutionary Polynomial Regression</td>
<td>Angelo Doglioni, Giovanni B. Crosta, Paolo Frattini, Nicola L. Melidoro and Vincenzo Simeone</td>
</tr>
<tr>
<td>128</td>
<td>Data-Driven Analysis of Discharge Variations at Mercure Spring South Italy</td>
<td>Salvatore Grimaldi, Giuseppina Cristino, Angelo Doglioni, Gianpietro Summa and Vincenzo Simeone</td>
</tr>
</tbody>
</table>

### Part XI  Geohazard in Urban Scenarios: Forecasting and Protective Monitoring

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>129</td>
<td>Landslide Processes of Active Phase of under Conditions of Technogenesis with the Example of Pridneprovsk Industrial Region of Ukraine</td>
<td>T.P. Mokritskaya and V.M. Shestopalov</td>
</tr>
<tr>
<td>130</td>
<td>Discussion on Geological Hazards Caused by Exploitation of Deep Groundwater in North China</td>
<td>Xiuyan Wang and Lin Sun</td>
</tr>
<tr>
<td>131</td>
<td>Assessment of Geo-hazards Triggered by both Natural Events and Human Activities in Rapidly Urbanized Areas</td>
<td>A. Kaitantzian, C. Loupasakis and D. Rozos</td>
</tr>
<tr>
<td>132</td>
<td>Pre-identification of Staging Areas for Probable Earthquake of Tehran (Municipality No.5) Using OWA Method</td>
<td>Bahram Mohaghegh, Fatemeh Mahshadnia and Shabnam Aghnianejad</td>
</tr>
</tbody>
</table>
133 Application of Laser Scanning for Monitoring Coastal Cliff Instability in the Pozzuoli Bay, Coroglio Site, Posillipo Hill, Naples 687

134 The Use of UAV to Monitor and Manage the Territory: Perspectives from the SMAT Project 691
S. Farfaglia, G. Lollino, M. Iaquinta, I. Sale, P. Catella, M. Martino and S. Chiesa

135 GNSS Hardware and Software Solutions for Environmental Hazards 697
Nicola Perfetti, Luigi Fiorentini, Giuliano Molinelli, Luca Pasquini, Giuseppe Perrucci, Alberto Pettinari, Patrizio Buscemi and Doriano Zanette

136 The Use of Micro-UAV to Monitor Active Landslide Scenarios 701
L. Torrero, L. Seoli, A. Molino, D. Giordan, A. Manconi, P. Allasia and M. Baldo

137 A Geotechnical Monitoring Project for Early Warning: The Monte Stregone Landslide 705
Mauro Battaglio, Mario Lovisolo and Thierry Rosset

138 Rockfall Analysis During Emergency Scenarios 711
Luca Lanteri, Daniele Bormioli, Michele Morelli, Furio Dutto, Daniele Giordan and Andrea Manconi

139 The Kostanjek Landslide in the City of Zagreb: Forecasting and Protective Monitoring 715
Martin Krkač, Snježana Mihalić Arbanas, Željko Arbanas, Sanja Bernat and Kristijan Špehar

140 Risk Analysis of a Major Pit Slope Failure at the Batu Hijau Open Pit Mine Operation PT Newmont Nusa Tenggara 721
Y. Adriansyah, D. Muslim and Z. Zakaria

Part XII Geo-Hydrological Risk and Town and Country Planning

141 Landslide Risk Reduction—Complementary Routes to Learning 727
Jerome V. De Graff, Malcolm G. Anderson and Elizabeth Holcombe

142 Recovery Measures of the Erosion Features: Some Examples in Brazil 731
Cláudia Marisse dos Santos Rotta and Lázaro Valentin Zuquette

143 The Use of Risk Information in Spatial Planning in Europe: Examples from Case Study Sites in Italy and Romania with a Focus on Flood and Landslide Hazards 737
Kathrin Prenger-Beminghoff and Stefan Greiving
144 Scenarios of Land Cover Change and Landslide Susceptibility: An Example from the Buzau Subcarpathians, Romania .............................. 743
Žiga Malek, Veronica Zumpano, Dagmar Schröter, Thomas Glade, Dan Balteanu and Mihai Micu

145 Material Intrusion as a Key Factor for the Physical Vulnerability of the Built Environment to Debris Flows .............................. 747
Bruno Mazzorana, Silvia Simoni, Jan Kobald, Omar Formaggioni and Cristiano Lanni

146 Analysis of Hydrological and Landslide Hazards at Castellammare Del Golfo (Northern Sicily) ............................................. 753
Maria Sabatino, Antonio Bambina and Salvatore Monteleone

147 Geo-hydrological Risk Mitigation Measures and Land-Management in a Highly Vulnerable Small Coastal Catchment .............. 759
Pierluigi Brandolini and Andrea Cevasco

148 Geotechnical Study of Urban Soil and Subsoil of Fez City (N. Morocco) and Natural Risk Mapping Using Geographic Information System (GIS) ........................................ 763
Sidi Mohamed El Boumehsouli, Abderrahim Lahrach, Abdel-Ali Chaouni and Benoît Deffontaines

149 Implementation of Landslide Susceptibility in the Perugia Municipal Development Plan (PRG) .............................................. 769
F. Fiorucci, G. Antonini and M. Rossi

150 Integrating Natural Hazards in Spanish and Italian Land Use Planning ................................................................. 773
Jesús Garrido, Alejandro L. Grindlay, Salvatore Martino, Alberto Prestininzi and Gabriele Scarascia Mugnozza

151 Landslide Occurrences During the High-Intensity Rainfall Event of March–April 2013 in the Emilia-Romagna Region (North Apennines, Italy) .................................................. 777
Marco Pizziolo, Matteo Bernardi, Giovanna Daniele, Mauro Generali and Daniela Piacentini

152 Challenges in Assessing and Managing Geo-hydrological Risk Related to Natural and Anthropogenic Pressures in Alpine Ski Resorts ............................................... 781
Carmen de Jong, Franco Previtali and Gloria Carletti

153 A Flood Can Point Out Improper Land-Use Planning: The Case of Alessandria Town (Piedmont, Northern Italy) .................. 787
Fabio Luino

154 Comparison Between Flooded Areas and Flood-Risk Areas. Case of Var Department (France) .................................................. 793
Esposito Christophe, Jean-Louis Ballais and Chave Sylvain
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>155</td>
<td>Flash Flood Events and Urban Development in Genoa (Italy): Lost in Translation</td>
<td>F. Faccini, F. Luino, A. Sacchini and L. Turconi</td>
</tr>
<tr>
<td>156</td>
<td>Observations and Seismic Response Analysis of Urban Landslide Induced by the 2011 off the Pacific Coast of Tohoku Earthquake</td>
<td>Toshitaka Kamai and Issei Doi</td>
</tr>
<tr>
<td>157</td>
<td>Search and Assessment of Decompression Zones in Landslide Slopes of the North-West Coast of the Black Sea (Ukraine)</td>
<td>Oleksandr Dragomyreetskyy, Olena Dragomyretska and Mikhail Skipa</td>
</tr>
<tr>
<td>158</td>
<td>Geo-hydrological Risk Management on the Amalfi Coast: The Village of Atrani Emergency Plan</td>
<td>Antonio Caruso, Giuseppe Esposito, Santina Scarpino and Pasquale Versace</td>
</tr>
<tr>
<td>159</td>
<td>Climate Change, Landslide Risk Assessment and Adaptation Policies: The Urban Area of Ancona Municipality</td>
<td>Daniele Spizzichino, Alessio Capriolo and Fiorina Di Gioia</td>
</tr>
<tr>
<td>160</td>
<td>Engineering Geological Analyses for Hazard Assessment of the Urbanized, Relict Lemeglio Coastal Landslide (Eastern Liguria, Italy)</td>
<td>Andrea Cevasco and Pantaleone De Vita</td>
</tr>
<tr>
<td>161</td>
<td>Landslides in Urban Areas of Luxembourg, Caused by Weak Rheatian Clay</td>
<td>Stefan Van Baars, Miguel Bautista and Rolf Becker</td>
</tr>
<tr>
<td>162</td>
<td>The Urban Flooding Early Warning System of the Greater Turin (North-Western Italy) Based on Weather-Radar Observations</td>
<td>Roberto Cremonini, Davide Tiranti and Secondo Barbero</td>
</tr>
<tr>
<td>163</td>
<td>Population Exposed to Landslide and Flood Risk in Italy</td>
<td>Alessandro Trigila, Carla Iadanza, Michele Munafò and Ines Marinosci</td>
</tr>
<tr>
<td>164</td>
<td>A Cost Effective Methodology for the Rapid Evaluation of the Flood Susceptibility Along Anthropized Rivers</td>
<td>Stefano Morelli, Alessandro Battistini, Samuele Segoni, Goffredo Manzo, Leonardo Ermini and Filippo Catani</td>
</tr>
<tr>
<td>165</td>
<td>The Role of Geophysics in Urban Landslides Studies: Two Case Histories in Rome</td>
<td>Valeria Eulilli, Fernando Ferri and Luca Maria Puzzilli</td>
</tr>
<tr>
<td>166</td>
<td>The Role of Fieldwork in Courses Developed to Avoid Accidents and Disasters in São Paulo City, Brazil</td>
<td>Erica Akemi Goto and Jefferson Lima de Picanço</td>
</tr>
</tbody>
</table>
167 The 1773 Cava de’ Tirreni Flash Flood (Southern Italy), an Opportunity to Further Enhance the Use of Documentary Sources as Hazard and Risk Assessment .................................. 861
Eliana Esposito, Sabina Porfido, Crescenzo Violante, Giuseppe Tranfaglia, Flavia Molisso, Salvo Mazzola, Marco Sacchi, Gaetana Santoro and Efisio Spiga

168 Reactivation of Old Inclinometers to Monitor a Slow Landslide in Roma Urban Area: Reliability of Old and New Measurements ........ 865
Amanti Marco, Paolo Maria Guarino and Luca Maria Puzzilli

169 Landslide Risk Assessment in the Reconstructed Bridge Area (Rostov-on-Don, Russia) .................................................. 869
Batrak Gleb and Galitskaya Irina

170 Landslide Problem and Its Investigations in Miskolc (Hungary) ...... 873
Mariann Vámos, Péter Görög and Balázs Vásárhelyi

Part XIV Mapping Urban Subsurface for Geohazard Assessment and Risk Management

171 A 3D Geological Model for Christchurch City (New Zealand): A Contribution to the Post-earthquake Re-build ......................... 881
John G. Begg, Katie E. Jones, Mark S. Rattenbury, David J.A. Barrell, Razel Ramilo and Dick Beetham

172 Collapse Susceptibility Mapping Using SRTM Data Obtained from Topodata Project ......................................................... 885
José Augusto Lollo, Jaime M. Cabrera Vivanco and Juliano Suman Curti

173 Geological Modeling in the Urban Subsurface Using the Microtremor Array Survey ....................................................... 893
Takao Sasaki, Hisaya Sawano, Hiroshi Shimizu, Abdol Halim, Tatsuro Matsuoka, Yukihiro Mizuochi, Hisao Hayashi and Atsushi Tanase

174 A Model of Como (N Italy) Urban Subsurface: A Multidisciplinary Tool for Hydraulic, Hydrogeologic and Subsidence Risk Management ........ 899
M.F. Ferrario, L. Bonadeo, F. Brunamonte, F. Livio and A.M. Michetti

175 Zoning of Bereznyaki Urban Area (Perm Krai, Russia) According to the Geohazard Degree .................................................. 903
Osipov Victor, Mamaev Yuri, Yastrebov Alexei and Eremina Olga

176 Identification of Ground Engineering Hazards in London Through the Use of Predictive 4D Geomodelling Tools ........................... 907
Richard C. Ghail, Skipper Jacqueline and Philippa J. Mason

177 Assessment of Karst-Suffosion Hazard Along the Routes of Designed Metro Lines in Moscow ................................................. 913
Aleksandr Anikeev, Nadezda Anisimova, Irina Kozhevnikova and Irina Kozlyakova
Contents

178  The Map of Radon Hazard of Moscow ................................. 919
Petr Miklyaev, Tatiana Petrova and A.V. Klimshin

179  Engineering Geological Zoning of Moscow by the Conditions
for Subsurface Construction .............................................. 923
Irina Kozlyakova, Oleg Mironov and Olga Eremina

180  3-Dimensional Geological Mapping. Applications to Urban
Geological Environment .................................................. 927
Oleg Mironov

181  The Numerical Map of Known Mine Shafts in Wallonia:
A Useful Tool for Land Planning and Risk Management ............ 933
Ali Kheffi, Daniel Pacyna and Philippe Delforge

182  Structural-Geodynamic Mapping with Using the Geostatistical
Analysis of the Platform Areas on the Example of Moscow........... 937
Makeev Vladimir, Karfidova Ekaterina and Dorozhko Anastasia

Part XV Off-Fault Coseismic Surface Effects and Their Impact
in Urban Areas

183  Geochemical and Geomorphological Analyses on Liquefaction
Occurred During the 2012 Emilia Seismic Sequence .................. 945
Alessandra Sciarra, Barbara Cantucci, Nasser Abu Zeid,
Carmela Vaccaro and Fedora Quattrocchi

184  Geological and Geophysical Approaches for the Definition
of the Areas Prone to Liquefaction and for the Identification
and Characterization of Paleoliquefaction Phenomena,
the Case of the 2012 Emilia Epicentral Area, Italy ................... 951
P.M. De Martini, L. Alfonsi, C.A. Brunori, P. Campagnoli, F.R. Cinti,
R. Civico, L. Cucci, R. Gambillara, F. Livio, A.M. Michetti,
F. Molisso, D. Pantosti, S. Pinzi, S. Pucci and A. Venuti

185  Simulation of Off-Fault Surface Effects from Historical Earthquakes:
The Case of the City of Thessaloniki (Northern Greece) .............. 957
Anastasia Kiratzi, Zafeiria Roumelioti, Alexandros Chatzipetros
and George Papathanassiou

Part XVI Remote Sensing Applications for the Detection, Monitoring,
Modeling, and Damage Assessment of Critical
Structures and Complex

186  Integrations of Multiple Observations to Estimate Hydraulic
Parameters in Choushui River Fluvial Plain of Central Taiwan ...... 967
Chih-Heng Lu, Chuen-Fa Ni, Chung-Pai Chang,
Jiun-Yee Yen and Wei-Chia Hung
187 Characterization of Longwall Mining Induced Subsidence by Means of Automated Analysis of InSAR Time-Series. .......................... 973
Jean Pascal Iannacone, Alessandro Corsini, Matteo Berti, Jessica Morgan and Giacomo Falorni

188 Geological Application of UAV Photogrammetry and Terrestrial Laser Scanning in Marble Quarrying (Apuan Alps, Italy) ................. 979
Riccardo Salvini, Silvia Riccucci, Domenico Gulli, Riccardo Giovannini, Claudio Vanneschi and Mirko Francioni

189 Ground Settlement Assessment in Urban Areas Through SBAS-DInSAR Measurements: The Case Study of Roma (Italy) ............... 985
Manuela Bonano, Fabiana Calò, Michele Manunta, Maria Marsella, Silvia Scifoni, Alberico Sonnessa and Vincenzina Tagliafierro

190 Satellite Techniques: New Perspectives for the Monitoring of Dams .......... 989
Marco Corsetti, Michele Manunta, Maria Marsella, Silvia Scifoni, Alberico Sonnessa and Chandrakanta Ojha

191 Monitoring Land Subsidence in the Tokyo Region with SAR Interferometric Stacking Techniques ................................. 995
Paolo Pasquali, Alessio Cantone, Paolo Riccardi, Marco De Filippi, Fumitaka Ogushi, Masayuki Tamura and Stefano Gagliano

Part XVII Surface Fault-Rupture Hazard in Urban Areas

192 Characterisation of Surface Fault Rupture for Civil Engineering Design .......................................................... 1003
Clark Fenton and Juliet Kernohan

193 The Contribution of Airborne LiDAR Data to the Assessment of Surface Faulting Hazard for Lifelines Crossing Active Faults: An Example from the Central Apennines, Italy .................. 1009
Riccardo Civico, Daniela Pantosti, Stefano Pucci and Paolo Marco De Martini

194 Microzonation of the Liwa City on the Great Sumatera Active Fault and Giant Ranau Volcanic Complex in South Sumatera, Indonesia .... 1015
Asdani Soehaimi, Dicky Muslim, Ir Kamawan and Robby Setia Negara

195 Surface Faulting Hazard in Italy: Towards a First Assessment Based on the ITHACA Database .............................................. 1021
Luca Guerrieri, Anna Maria Blumetti, Valerio Comerci, Pio Di Manna, Alessandro Maria Michetti, Eutizio Vittori and Leonello Serva

196 Ground Fracturation in Urban Area: Monitoring of Land Subsidence Controlled by Buried Faults with InSAR Techniques (Ciudad Guzmán: Mexico) .................................................. 1027
Carlo Alberto Brunori, Christian Bignami, Francesco Zucca, Gianluca Groppelli, Gianluca Norini, Norma Davila Hernández and Salvatore Stramondo
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>197</td>
<td>Active Normal Faulting and Large-Scale Mass Wasting in Urban Areas:</td>
<td>Stefano Gori, Emanuela Falcucci, Giuseppe Di Giulio, Marco Moro,</td>
</tr>
<tr>
<td></td>
<td>The San Gregorio Village Case Study (L’Aquila, Central Italy),</td>
<td>Michele Saroli, Maurizio Vassallo, Andrea Ciampaglia, Paolo Di Marcantonio and Domenico Trotta</td>
</tr>
<tr>
<td></td>
<td>Methodological Insight for Seismic Microzonation Studies</td>
<td></td>
</tr>
<tr>
<td>198</td>
<td>The Origin of Scarps in Urban Areas Affected by Active and Capable</td>
<td>Emanuela Falcucci and Stefano Gori</td>
</tr>
<tr>
<td></td>
<td>Normal Faulting: Only Faults? Examples from the 2009 L’Aquila</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Earthquake Region (Central Italy)</td>
<td></td>
</tr>
<tr>
<td>199</td>
<td>Repeated Major Episodes of Tectonic Deformation, Lateral Spread and</td>
<td>Sjoerd Van Ballegoooy, Kelvin Berryman, Bruce Deam and Mike Jacka</td>
</tr>
<tr>
<td></td>
<td>Liquefaction in Christchurch During the Canterbury Earthquake</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sequence of 2010–2011</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Part XVIII The Seismic Microzonation: Input Data, Methodology,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and Impact on Planning</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>Geo-engineering Aspects of the Van Earthquakes (Turkey) of October</td>
<td>Resat Ulusay, Halil Kumsar and Ömer Aydan</td>
</tr>
<tr>
<td></td>
<td>and November 2011 and Associated Geotechnical Damages</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>The Characteristics of 2011 Simav Earthquake (Turkey) with an</td>
<td>Halil Kumsar, Erhan Ar and Ömer Aydan</td>
</tr>
<tr>
<td></td>
<td>Emphasis on Geotechnical Damage</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>Ground Zoning Map of the Piedmont Region (NW Italy): Methodology and</td>
<td>Gianluigi Perrone, Armando Riccardo Gaeta, Davide Tiranti, Paola Cadoppi and Gianfranco Fioraso</td>
</tr>
<tr>
<td></td>
<td>Preliminary Results</td>
<td></td>
</tr>
<tr>
<td>203</td>
<td>A New Empirical Method to Predict Liquefaction-Induced Lateral</td>
<td>Nilsun Hasançebi, Reşat Ulusay and K. Önder Çetin</td>
</tr>
<tr>
<td></td>
<td>Spread</td>
<td></td>
</tr>
<tr>
<td>204</td>
<td>Evaluation of the Ground Motion Amplification at Poggio Picenze</td>
<td>Nicola Tarque, Carlo G. Lai, Francesca Bozzoni, Enrico Miccadei, Tommaso Piacentini, Guido Camata and E. Spacone</td>
</tr>
<tr>
<td></td>
<td>(Italy)</td>
<td></td>
</tr>
<tr>
<td>205</td>
<td>A Methodology for Advanced Seismic Microzoning Using 2D Analyses:</td>
<td>Claudia Madiai, Johann Facciorusso, Elisa Gargini, Giovanni Vannucchi and Massimo Baglione</td>
</tr>
<tr>
<td></td>
<td>The Case Study of Barberino di Mugello, Florence, Italy</td>
<td></td>
</tr>
<tr>
<td>206</td>
<td>Seismic Microzonation in a Small Municipality: The Canazei Case</td>
<td>Floriana Pergalani, Massimo Compagnoni, Giuseppe Di Capua, Daniela Famiani, Andrea Franceschini and Alfio Viganò</td>
</tr>
<tr>
<td></td>
<td>Study (Trentino, N Italy)</td>
<td></td>
</tr>
</tbody>
</table>
207 The Seismic Site Characterization of Palazzo Centi in L’Aquila City Centre: The Case Study of a Historical Building Damaged by the April 6th 2009 Earthquake ................................. 1091
Sara Amoroso, Giuseppe Di Giulio, Salomon Hailemikael,
Giuliano Milana, Paola Monaco, Marco Tallini, Gianfranco Totani,
Maurizio Vassallo and Fabio Villani

208 Local Seismic Response in the Southern Part of the Historic Centre of L’Aquila ................................................................. 1097
Sara Amoroso, Ferdinando Totani, Gianfranco Totani and Paola Monaco

209 The Experience of Seismic Microzonation in Lazio Region (Italy) Mountain Municipalities ......................................................... 1101
Antonio Colombi, Salomon Hailemikael, Guido Martini, Salvatore Martino,
Antonella Paciello, Alessandro Peloso, Lorella Salvatori,
Gabriele Scarascia Mugnozza and Vladimiro Verrubbi

210 Soil Liquefaction During the Emilia, 2012 Seismic Sequence: Investigation and Analysis ......................................................... 1107
Roberto W. Romeo, Sara Amoroso, Johann Facciorusso, Luca Lenti,
Claudia Madiai, Salvatore Martino, Paola Monaco,
Dario Rinaldis and Ferdinando Totani

211 Soil Liquefaction Analyses in a Test-Area Affected by the 2012 Emilia-Romagna Earthquake (Italy) ............................................ 1111
Johann Facciorusso, Claudia Madiai and Giovanni Vannucchi

212 Seismic Microzonation of the Cassino Plain ......................................................... 1115
Matteo Albano, Michele Lancia, Michele Saroli, Giuseppe Modoni,
Gabriele Scarascia Mugnozza and Paolo Croce

213 The ShakeMap and the Emilia-Lombardia 2012 Earthquake ................. 1119
Alberto Marcellini, Alberto Tento and Rosastella Daminelli

214 A GIS-Based Tool for Reliability Assessment of Seismic Microzonation Studies According to Italian Instructions and Criteria ... 1123
Bruno Quadrio, Maurizio Ambrosanio and Maria Ioannilli

215 The High Damaging Mw 5.1 Lorca 2011 Earthquake: Possible Role of Local Seismic Amplification ......................................................... 1127
Luca Lenti, Salvatore Martino, Juan Luis-Soler, Carlos López-Casado,
Pedro Jáuregui, José Giner, Joaquin Garcia-Mondéjar and José Delgado

216 Parametric Numerical Study of Observed Amplification Effects on the Colle di Roio Limestone Ridge (Central Italy) ......................... 1133
Salomon Hailemikael, Luca Lenti, Salvatore Martino,
Antonella Paciello and Gabriele Scarascia Mugnozza
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>217</td>
<td>The Seismic Microzonation of San Gregorio Through a Multidisciplinary Approach. Seismic Amplification in a Stiff Site</td>
<td>Giuseppe Di Giulio, Sara Amoroso, Deborah Di Naccio, Emanuela Falciu, Stefano Gori, Salomon Hailemikael, Maurizio Vassallo, Andrea Ciampaglia, Gaetano De Luca, Alfredo Del Grosso, Paolo Di Marcantonio, Katia D’Onofrio, Massimiliano Porreca, Domenico Trotta, Fabio Villani and Giuliano Milana</td>
</tr>
<tr>
<td>218</td>
<td>V$<em>S$ and N$</em>{SPT}$ Measures for Seismic Characterization of Soils</td>
<td>Giovanna Vessia, Mario Luigi Rainone and Patrizio Signanini</td>
</tr>
<tr>
<td>219</td>
<td>On the Performances of Site Parameters for Soil Classification</td>
<td>Rodolfo Puglia, Dario Albarello, Lucia Luzi, Dino Bindi, Maria Rosaria Gallipoli, Marco Mucciarelli, Giuseppe Naso, Francesca Pacor and Edoardo Peronace</td>
</tr>
<tr>
<td>220</td>
<td>Local Seismic Response in a Large Intra-mountain Basin as Observed from Earthquakes and Microtremor Recordings: The Avezzano Area (Central Italy)</td>
<td>Daniela Famiani, Paolo Boncio, Fabrizio Cara, Rocco Cogliano, Giuseppe Di Giulio, Antonio Fodarella, Giuliano Milana, Stefania Pucillo, Gaetano Riccio and Maurizio Vassallo</td>
</tr>
<tr>
<td>221</td>
<td>Analytical and Experimental Investigation of the Frequency Content of Ground Motions Recorded in Bucharest During Strong Vrancea Earthquakes</td>
<td>Iolanda-Gabriela Craifaleanu and Elena-Andreea Calarasu</td>
</tr>
<tr>
<td>222</td>
<td>Diezma Landslide (Southern Spain): Geological Model and Seismic Response</td>
<td>José Delgado, Jesús Garrido, Carlos López-Casado, Luca Lenti, Salvatore Martino and F. Javier Sierra</td>
</tr>
<tr>
<td>223</td>
<td>A New Step for Seismic Microzonation Studies in Italy: Standards for Data Storage and Representation</td>
<td>Bruno Quadrio, Fabrizio Bramerini, Sergio Casteneto and Giuseppe Naso</td>
</tr>
<tr>
<td>224</td>
<td>Cross-Correlation Analysis of Seismic Noise Data in the Fucino Plain (Central Appennines, Italy)</td>
<td>Maurizio Vassallo, Giuseppe Di Giulio, Fabrizio Cara, Rocco Cogliano, Daniela Famiani, Antonio Fodarella, Stefania Pucillo, Gaetano Riccio and Giuliano Milana</td>
</tr>
<tr>
<td>225</td>
<td>Shear-Wave Velocity Reconstruction via Unconventional Joint Analysis of Surface Waves: A Case Study in the Light of Some Theoretical Aspects</td>
<td>Giancarlo Dal Moro, Velio Coviello and Gabriele Del Carlo</td>
</tr>
<tr>
<td>226</td>
<td>A Brief Method for Evaluation of the Liquefaction Susceptibility in Bucharest Area</td>
<td>Mihaela Stânciucu</td>
</tr>
<tr>
<td>Page</td>
<td>Title</td>
<td>Authors</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>227</td>
<td>Evaluate on Geological Environment Quality in Pengzhou Baishui and Bailu River Basin</td>
<td>Sheng Luo, Xiaobing Kang, Mo Xu and Na Ning</td>
</tr>
<tr>
<td>228</td>
<td>The Development of Linked Databases and Environmental Modelling Systems for Decision-Making in London</td>
<td>K R Royse, S H Bricker, C R Jackson, A Kingdon and A G Hughes</td>
</tr>
<tr>
<td>229</td>
<td>Effect of Thermal Change by Ground Source Heat Pumps on Groundwater and Geoenvironment in the Late Pleistocene Terrace Area of Tokyo, Japan</td>
<td>Takato Takemura, Ayako Funabiki, Atsunori Kaneki, Yoshiharu Ito, Shoichiro Hamamoto, Takeshi Saito and Toshiko Komatsu</td>
</tr>
<tr>
<td>230</td>
<td>Planning for Underground Development: Principles and Problems</td>
<td>Marker Brian</td>
</tr>
<tr>
<td>231</td>
<td>Investigation of Geological Limitations for Subway Tunneling in Ahvaz City, Iran</td>
<td>Arash Barjasteh</td>
</tr>
<tr>
<td>233</td>
<td>10 Dimensions Town Planning Research Project</td>
<td>Pierre Duffaut and Monique Labbé</td>
</tr>
<tr>
<td>234</td>
<td>Is There a Role for Subsurface Lease in Urban Development to Gain Community Support?</td>
<td>C.C.D.F. Van Ree, M. Halstead and A.E. Warning</td>
</tr>
<tr>
<td>235</td>
<td>Spatial Planning Measures for the Enhancement of Urban Resilience Against Flooding Risk</td>
<td>Enrique J. Calderón and Javier Diez</td>
</tr>
<tr>
<td>236</td>
<td>Direct and Indirect Impact of Landslide on Environment</td>
<td>Toni Nikolic</td>
</tr>
<tr>
<td>237</td>
<td>Risk Analysis for Swelling Clays to Buildings is South Madrid, Spain</td>
<td>Carlos Delgado Alonso-Martirena, Félix Escolano Sánchez and Javier Ángel Ramírez Masferrer</td>
</tr>
<tr>
<td>238</td>
<td>Various Approaches to Risk Assessment in Urban Development</td>
<td>Galitskaya Irina and Batrak Gleb</td>
</tr>
</tbody>
</table>
239 The Importance of a Proper Risk Management Plan for a Safe Use of the Underground Space in Densely Urbanised Areas. Two Case Histories

Giuseppe M. Gaspari, Domenico Parisi and Giuseppe Astore

1251

Part XXI Construction Materials

240 Usability of Pyroclastic Rocks as Construction Materials; Example from Nigeria

O.P. Aghamelu and C.O. Okogbue

1259

241 Study of the Water Effects on the Tensile Strength and Cracking Processes of Molded Gypsum

Louis Ngai Yuen Wong and Ming Chuan Jong

1263

242 Slope’s Design for Quarry’s Remediation Using Ground Materials of Piraeus Subway Excavation

M. Chatziangelou, B. Christaras, K. Botsou and Em. Malliaroudakis

1269

243 Use of Dune Sand as an Alternative for River Sand for Construction Industry in Sri Lanka

U. de S. Jayawardena and H.M.L. Indratilaka

1277

244 Asbestiform Amphiboles in a Marble Quarry: A Case Study from the Province of Còrdoba (Argentina)

Francisco Locati, Leticia Lescano, Juan Murra, Silvina Marfil, Pedro Maiza and Edgardo Baldo

1281

245 An Experimental Study for Evaluating the Disintegration Behavior of Clay-Bearing Rocks under Field Conditions

Tej P. Gautam and Abdul Shakoor

1285

246 Methods to Increase Effectiveness ofInjective Chemical Stabilisation ofLoess Soils

Abramova Tamara and Larionova Nina

1289

247 Experimental Study on Rock Deterioration by Repetition of Freezing and Thawing, and by Repetition of Dry and Wet in Cold Region

Yoshihiko Ito, Yuki Kusakabe and Shuji Anan

1293

248 The Pinhole Test for Dispersive Soil Identification

Amrita Maharaj and Philip Paige-Green

1299

249 Dust from Mineral Extraction: Regulation of Emissions in England

Marker Brian

1305

250 Industrial Chance to Recover Residual Sludge from Dimension Stones in Civil and Environmental Applications

Giovanna Antonella Dino, Paolo Clemente, Manuela Lasagna, Iride Passarella, Franco Ajmone Marsan and Domenico Antonio De Luca

1309
The District Tourism Lake of Castel Volturno: An Example of Territorial Requalification of Abandoned Quarries
Marina Maura Calandrelli and Roberto Calandrelli

The Effect of Temperature and Moisture Content on the Behaviour of Pyritic Fill: Development of an In Situ Monitoring System
Amy J. Taylor, John C. Cripps and Samuel D Clarke

Investigations into the Self-Healing of Desiccation Cracks in Compacted Clays
John C. Cripps and Krishna K. Parmar

Study of Moisture and Cement Rates Influence on Hydraulic Conductivity of a Stabilized Sandy Soil by Means of a Factorial Design of Experiments
F.C. Loch and O.J. Pejon

Weathering of Pyritic Clay in the Vicinity of Concrete Undergoing Thaumasite Sulphate Attack
J.C. Cripps, F. Abubaker, C.J. Lynsdale and A.J. Taylor

An Investigation of Noise Effects on Natural Heritage and Historic Building Materials
Adil Binal

Part XXII Aquifer Vulnerability and Springs/Wells Protection Zones

Wellfields under Heavy Urban Pressure—Monitoring, Simulation, Maintenance
Algirdas Klimas and Marius Gregorauskas

Groundwater Protection for Human Consumption and Its Integration in Regional Planning: Gpz Method
A. Jiménez-Madrid, C. Martinez and F. Carrasco

Vulnerability of Mountain Springs Affect by Climatic Change: A New Method in a Porous Media Aquifer in Regione Automa Valle d’Aosta
Gianpiero Amanzio, Enrico Suozzi and Marina De Maio

Natural Occurrence of Sulphates in Ground and Surface Waters in Aosta Plain (Italy)
Marina De Maio, Laura Pia Lodi and Enrico Suozzi

Hydrochemistry Applied to Water Supply System: A Case Study from a Brazilian Urban Area
Sandra Gabas Garcia, Giancarlo Lastoria and Cavazanna Guilherme Henrique
262  Effects of Peri-Urban Occupation in the Recharge Area of the Guarani Aquifer in São Carlos, São Paulo, Brazil ........................................ 1369
Geisy Candido da Silva, Denise Balestrero Menezes and Marcilene Dantas Ferreira

263  Global Warming in the Alps: Vulnerability and Climatic Dependency of Alpine Springs in Italy, Regione Valle d’Aosta and Switzerland, Canton Valais .......................................................... 1375
Gianpiero Amanzio, Davide Bertolo, Marina de Maio, Laura Pia Lodi, Luca Pitet and Enrico Suozzi

264  The Importance of Monitoring for the Determination of Aquifer Vulnerability and Spring Protection Areas .................................................. 1379
C. Banzato, M. Governa, M. Petricig and B. Vigna

265  Vulnerability Assessment of Mazzoccolo Spring Aquifer (Central Italy), Combined with Geo-Chemical and Isotope Modeling .................. 1387
Giuseppe Sappa, Sibel Ergul and Flavia Ferranti

Author Index ........................................................................................................... 1393
Engineering Geology for Society and Territory - Volume 5
Urban Geology, Sustainable Planning and Landscape Exploitation
Lollino, G.; Manconi, A.; Guzzetti, F.; Culshaw, M.; Bobrowsky, P.T.; Luino, F. (Eds.)
2015, XXXV, 1400 p. 748 illus., 616 illus. in color. In 2 volumes, not available separately. Hardcover
ISBN: 978-3-319-09047-4