



3rd International Multidisciplinary Conference on Mineral
and Thermal Waters

Caserta (Italy), June 26th – 30th, 2022

CONGRESS PROGRAMME



Università
degli Studi
della Campania
Luigi Vanvitelli



UNIVERSITÀ DEGLI STUDI DI NAPOLI
FEDERICO II



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Istvan Forizs - Hungarian Scientific Academy – Hungary

Patricia Fosselard – Natural Mineral Waters Europe NMWE – Belgium

Patrick Lachassagne - Danone – France

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Teodora Szocs - IAH Vice President, Geological Institute of Hungary – Hungary

Orlando Vaselli - Università di Firenze – Italy

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Giovanni Forte - Università degli Studi di Napoli "Federico II" – Italy

Stefano Viaroli – Università degli Studi Roma Tre – Italy

Topics and Sessions

The Conference intends to be an opportunity to stimulate ideas and discussion on different topics related to the world of mineral and thermal waters. Interactions of varied viewpoints will be encouraged. Topics and sessions are addressed to broaden the participation of experts and professionals in the fields of research, industry, medicine, consulting and management. A special session will be dedicated to Italian mineral and thermal waters.

Topic 1 - Hydrogeology and geochemistry of mineral and thermal waters

Hydrogeological origin and hydrogeochemistry of mineral and thermal waters – Hydrogeological conceptual models of hydrostructures – Hydrogeochemical models for mineral water prospection - Isotope geochemistry for mineral water investigation – Water/gases/rock interactions: origin and investigation of mineral aquifers – Undesirable natural solutes in mineral waters - Hydrogeology of mineral and thermal waters in islands and coastal areas.

Topic 2 – Protection and management of mineral and thermal waters

Protection of mineral and thermal water resources, risk assessment and quality protection policies – Protection areas of mineral and thermal waters - Exploitation and management of mineral and thermal waters – Sustainable yield of hydrothermal areas – Mathematical modelling of thermal and mineral hydrosystems - Maintenance of the quantity and quality of mineral and thermal waters - Environmental aspects of sustainable management with mineral and thermal waters - Legislation of mineral waters in the world.

Topic 3 - Bottled mineral waters

Challenges and opportunities of the bottled water sector - The original (pristine) purity of natural mineral waters – Tools and methods able to detect emerging contaminants - Mineral water brands and the health claims based on the recent EU legislation – Mineral waters as part of food, and legislation on health and nutrition - Safety of packaging: the issue of plastics (the safety of PET bottles) - Daily intake of mineral waters links with the definition of natural mineral waters, contents of natural minerals and its effect on health - The issue of medicinal effect of bottled mineral waters – Microbiological quality of natural mineral waters - Environmental sustainability of mineral water bottling – Bottled water in developing countries.

Topic 4 - Health issues, balneology and balneotherapy

Medical use of mineral and thermal waters in diseases of locomotion apparatus and in breathing apparatus diseases - Medical use of the sulphurous waters in skin diseases - Medical use of mineral and thermal waters in gastroenterology and dermatology diseases - Use of mineral and thermal waters in sports rehabilitation - Application of mineral and thermal waters in cosmetology – Mud therapy as a natural anti-inflammatory treatment.

Round table: Italian Mineral and Thermal Waters, from research to sustainable management

In Italy, 322 types of mineral waters are recognized by the EU. In 2014, the production of mineral waters was of about 12 billion liters for a turnover of about 2.4 billion euros. Enterprises classified as thermal establishments are about 380. In 2012, the total revenue of the spa industry was approximately 720 million euros. Over the last five years spa tourism involved 12 to 15 million visitors per year, corresponding to approximately 4% of tourists in Italy. Despite the flourishing bottled water market and thermal tourism, the debate on sustainable management of the Italian mineral and thermal water resources among researchers, managers and policy makers does not appear to be sufficiently developed. The session is an opportunity to stimulate discussion among the different actors on these important groundwater resources via invited speaker seminars and a round table.

Congress Programme

Sunday, June 26th

16:30-19:00	Registration
17:30-19:00	Ice Breaker

Monday, June 27th

9:00-10:30	Opening ceremony
10:30-11:00	Coffee break
11:00-11:30	T1 Keynote Lecture <i>When Poseidon meets Hephaestus: hot springs of Greece</i> <i>Walter D'Alessandro (INGV)</i>
11:30-12:45	T1 Oral session
12:45-14:15	Lunch
14:15-15:15	T1 Oral session
15:15-15:45	Coffee break
15:45-16:45	Poster session
17:00-19:00	Caserta Royal Palace Tour
20:00-21:00	Concert

Tuesday, June 28th

9:00-9:30	T2 Keynote Lecture Socio-hydrogeology at the service of Natural Mineral Waters preservation, key components and multi-benefits for people and nature <i>Nathalie Dörfliger (Danone SpA)</i>
9:30-10:30	T2 Oral session
10:30-11:00	Coffee break
11:00-13:00	T2 Oral session

13:00-14:30	Lunch
14:30-15:00	T3 Keynote Lecture Natural mineral and spring waters: turning today's challenges into opportunities' <i>Patricia Fosselard (NMWE)</i>
15:00-15:40	T3 Oral session
15:40-16:10	Coffee break
16:10-17:00	T3 Oral session
17:00-18:00	Poster session
18:00-19:00	CMTW - IAH Meeting
From 20:30	Gala dinner

Wednesday, June 29th

9:00-19:00	Field Trip
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Thursday, June 30th

9:00-9:30	T4 Keynote Lecture The modern thermalism between tradition and innovation <i>Fausto Bonsignori (FEMTEC)</i>
9:30-10:15	T4 Oral session
10:15-10:45	Coffee break
10:45-12:30	T1 Oral session
12:30-14:00	Lunch
14:00-15:30	Round table: Italian mineral and thermal waters, from research to sustainable management
15:30-16:00	Coffee break
16:00-17:00	WWD22 IAH Italy photo contest – award ceremony and MinWat2020 closing ceremony

Technical programme

Monday, June 27th

T1 KEYNOTE LECTURE - Hydrogeology and geochemistry of mineral and thermal waters

Chair: Dario Tedesco

11:00-11:30

When Poseidon meets Hephaestus: hot springs of Greece

Walter D'Alessandro (INGV)

T1 Hydrogeology and geochemistry of mineral and thermal waters

Chairs: Paula Carreira, Emilio Cuoco

11:30- 11:45

Development of a comprehensive hydrogeological conceptual model ascribed to CO₂-rich thermal and mineral waters worldwide

José M. Marques, Max Pisolkar, Paula M. Carreira , Manuel Antunes da Silva

11:45-12:00

Electrical geophysical methods for detection and understanding of CO₂-rich mineral groundwater systems - Application in the Ardennes Region, South-East of Belgium

Agathe Defourny, Thomas Kremer, Arnaud Collignon, Patrick Jobé, Frédéric Nguyen, Alain Dassargues

12:00-12:15

Combining geochemical and isotopic tools to explain mineral groundwaters diversity in complex geological layout (Corsica - France)

Marqaux Dupuy, Frédéric Huneau, Emilie Garel, Sebastien Santoni

12:15-12:30	<p>A pair of thermal water wells within the Buda Thermal Karst System, Budapest, Hungary</p> <p><u>István Fórizs</u>, András Kordé, Árpád Ferenc Lorberer</p>
12:30-12:45	<p>Geochemistry of Ree in CO₂-rich mineral waters of Krynica Zdroj Spa, Outer Carpathians, Poland.</p> <p><u>Adam Porowski</u>, Irena Wysocka, Dorota Kaczor-Kurzawa, Anastasiia Romanova, Anna Rogowska, Przemysław Drzewicz</p>

T1 Hydrogeology and geochemistry of mineral and thermal waters

Chairs: José Marques, Stefano Viaroli

14:15-14:30 (Virtual presentation)	<p>Geochemistry of rare earth elements in mineral waters of the Sudetic Geothermal Region, SW Poland</p> <p><u>Anastasiia Romanova</u>, Adam Porowsky</p>
14:30-14:45	<p>Tracing groundwater circulation in a valuable mineral water basin with geochemical and isotopic tools: the taste of Ferrarelle, Riardo Basin, Southern Italy</p> <p><u>Elisa Sacchi</u>, Emilio Cuoco, Harald Oster, Vittorio Paolucci, Dario Tedesco</p>
14:45-15:00	<p>Geochemistry of the thermomineral waters of Greece</p> <p>Lorenza Li Vigni, Kyriaki Daskalopoulou, Sergio Calabrese, Konstantinos Kyriakopoulos, Filippo Brugnone, <u>Walter D'Alessandro</u></p>
15:00-15:15 (Virtual presentation)	<p>Hydrochemical and radiometric evaluation of mineral and surface waters from Araxã City, Minas Gerais State, Brazil</p> <p><u>Daniel Marcos Bonotto</u></p>

Tuesday, June 28th

T2 KEYNOTE LECTURE - Protection and management of mineral and thermal waters

Chair: Vincenzo Piscopo

9:00-9:30

Socio-hydrogeology at the service of Natural Mineral Waters preservation, key components and multi-benefits for people and nature
Nathalie Dörfliger (Danone Spa)

T2 Protection and management of mineral and thermal waters

Chairs: Tamara Markovic, Adam Porowski

9:30-9:45

Hydrogeochemical characterization of the Matese Massif springs: water chemistry and geological implications

***Francesco Rufino**, Emilio Cuoco, Gianluigi Busico, Stefano Caliro, Rosario Avino, Alessandro Santi, Freano Meto, Martina Avella, Dario Tedesco*

9:45-10:00

Benchmarking thermal water management practice in six countries of the Pannonian Basin

***Nina Rman**, Teodóra Szócs*

10:00-10:15
(Virtual presentation)

Impact of variability of geothermal well capacity on the geothermal heating plant operation - case study from Choszczno Region, Szczecin Trough, NW part of Poland

***Anna Wachowicz-Pyzik**, Anna Sowiżdżał, Leszek Pajqk*

10:15-10:30

Renewability and sustainability evaluation of a fault-controlled geothermal system: the Euganean Geothermal Field case study (NE Italy)

*Filippo Torresan, Leonardo Piccinini, **Paolo Fabbri**, Dario Zampieri*

T2 Protection and management of mineral and thermal waters

Chairs: Giovanni Forte, Nina Rman

11:00-11:15	<p>A hydrogeological and geochemical approach of a simulation study of the cretaceous geothermal reservoir for Aquifer Thermal Energy Storage</p> <p><i><u>Elżbieta Hałaj</u>, Leszek Pajqk, Bartosz Papiernik</i></p>
11:15-11:30	<p>The ecological and hydrogeological services for health tourism of the Hévíz thermal lake and engineering solutions for their sustainability</p> <p><i><u>Gyorgy Toth</u>, Gyorgy Nemeth</i></p>
11:30-11:45	<p>Game-theoretical model for the sustainable use of thermal water resources: the case of Ischia volcanic island (Italy)</p> <p><i>Richard Kicsiny, Vincenzo Piscopo, <u>Antonino Scarelli</u>, Zoltán Varga</i></p>
11:45-12:00 (Virtual presentation)	<p>Characterization of lower Jurassic aquifer in Szczecin-Mogilno-Łódź Trough for geothermal water utilization purposes with application of seismic methods</p> <p><i>Anna Sowizdżał, Tomasz Maćkowski, <u>Anna Wachowicz-Pyzik</u>, Michał Stefaniuk</i></p>
12:00-12:15	<p>Characteristics and utilization of geothermal aquifers of Bjelovar Subdepression</p> <p><i><u>Tamara Marković</u>, Željka Sladović, Igor Karlović, Dragutin Domitrović, Ozren Larva</i></p>
12:15-12:30	<p>Application of electromagnetic methods in geothermal and mineral water prospection based on examples from Poland</p> <p><i><u>Michał Stefaniuk</u>, Adam Cygał, Jakub Ważny</i></p>
12:30-12:45 (Virtual presentation)	<p>Hydrogeology and geochemistry characterization of a mineral and thermal spring water in Central Mexico</p> <p><i><u>Selene Olea-Olea</u>, Oscar Escolero, Jürgen Mahlkecht, Jorge Alejandro Montiel-Mona, Laura Beramendi-Orosco</i></p>
12:45-13:00	<p>Geothermal utilization effects on mineral water spring in Alaşehir (Manisa) geothermal area</p> <p><i><u>Ali Bülbül</u></i></p>

T3 KEYNOTE LECTURE - Bottled mineral waters

Chair: Giuseppe Dadà

14:30-15:00

Natural mineral and spring waters: turning today's challenges into opportunities'

Patricia Fosselard (NMWE)

T3 Bottled mineral waters

Chairs: Patricia Fosselard, Giuseppe Dadà

15:00-15:20

Microplastics in mineral water – analytics and legislation

Moritz Hawly

15:20-15:40

The recast of EU Drinking Water Directive: analysis and impact on spring waters

Annick Moreau

T3 Bottled mineral waters

Chairs: Annick Moreau, Vittorio Paolucci

16:10-16:25

Perception of bottled water in Central Europe through time

Mihael Brencic

16:25-16:40

Determination of the emerging contaminants in mineral waters by combination of Seafast-Pico preconcentration system and ICP-MS: Rare Earth Elements as a case study

Irena A. Wysocka, Dorota Kaczor-Kurzawa, Adam Porowski

16:40-16:55	Sartorius filtration solution to improve the quality of water <i>Franco Golin, <u>Valerio Ferone</u></i>
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Thursday, June 30th

T4 Health issues, balneology and balneotherapy

Chair: Alfonso Corniello

9:00-9:30	The modern thermalism between tradition and innovation <i>Fausto Bonsignori (FEMTEC)</i>
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T4 Health issues, balneology and balneotherapy

Chairs: Fausto Bonsignori, Paolo Fabbri

9:30-9:45 <i>(Virtual presentation)</i>	Therapeutic muds: chlorophyll a variation over two years and relationships with mineralogy and geochemistry in the Euganean Thermal District (ETD), NW Italy <i>Andrea Calderan, Anna Carraro, Claudia Honisch, Alberto Lalli, Paolo Ruzza, <u>Fabio Tateo</u></i>
9:45-10:00	Characterization of the bioaerosol in a natural thermal cave and assessment of the risk of transmission of SARS-COV-2 virus <i>Eleonora Carota, Mauro Scungio, <u>Silvia Crognale</u>, DavideLelli, Giuseppe Calabrò</i>
10:00-10:15 <i>(Virtual presentation)</i>	The therapeutic properties of the mineral groundwaters of the Essentyki spa <i>Ekaterina Baranovskaya, <u>Natalia Kharitonova</u>, Elena Fillimonova, Anna Korzun, Alexey Maslov, Elena Maximova</i>

T1 Hydrogeology and geochemistry of mineral and thermal waters

Chairs: Daniela Ducci, Istvan Forizs

10:45-11:00 (Virtual presentation)	<p>Isotopic signature of the nitric thermal groundwaters from Kuldur Spa</p> <p><u>Larisa Lyamina</u>, Natalia Kharitonova, Georgy Chelnokov, Ivan Bragin, Aleksandr Karabzov, Elena Zippa</p>
11:00-11:15	<p>The Mauritius mineral spring in St. Moritz (Upper Engadine Valley, SE-Switzerland) from Paracelsus to today an overview of its chemical composition over more than two centuries</p> <p>Enrico Piatti, <u>Balderer Werner</u></p>
11:15-11:30 (Virtual presentation)	<p>Major ion and stable isotope compositions of thermal and mineral waters in eastern Turkey</p> <p><u>Halim Mutlu</u>, Harun Aydın, Hüseyin Karakuş</p>
11:30-11:45	<p>Multidisciplinary approach to assess the alluvial aquifer hydrodynamic role in Connate mineral groundwater upwelling (Vomano Valley, Central Italy)</p> <p>Diego Di Curzio, <u>Sergio Rusi</u></p>
11:45-12:00	<p>Investigation of mineral water origin using hydrochemical and isotopic criteria (on the case study of two platform mineral water occurrences)</p> <p>Natalia Vinograd, <u>Adam Porowski</u>, Igor Tokarev</p>
12:00-12:15	<p>Assessing the sustainable yield of a hydrothermal system: the case of the Viterbo area (Italy)</p> <p><u>Francesca Lotti</u>, Vincenzo Piscopo</p>
12:15-12:30 (Virtual presentation)	<p>Hydrothermal basal aquifer of Angra Do Heroismo (Terceira Island, Azores): chemical, isotopic and hydraulic characterization</p> <p><u>Maria do Rosario Carvalho</u>, Henrique Sá, Ana Freitas, João C. Nunes, Paula M. Carreira, José M. Marques, José M. Carvalho</p>

Round table: Italian mineral and thermal waters, from research to sustainable management

Chair: Vincenzo Piscopo

14:00-15:30

Round-table meeting with participation of:

Dirigente della Regione Campania

Carlo Pontecorvo, Ferrarelle spa

Ettore Fortuna, Mineracqua

Costanzo Jannotti Pecci, Federterme

Maria Costantino, FIRS Thermae

The session will be in Italian with simultaneous translation into English.

The posters will be visible until the end of the Conference

Poster Session

Chairs: Elzbieta Halaj, Elisa Sacchi, Gyorgy Toth

Monday, June 27th 15:45-16:45

T1_003 (Virtual presentation)	<p>Hydrogeochemistry and chemical geothermometry studies of a low temperature Savcili-Büyükoba (Kirsehir) geothermal system, Central Anatolia</p> <p><u>Cansu Yurteri</u></p>
T1_039 (Virtual presentation)	<p>Hydrochemistry and origin of mineral waters from Mukhen spa (Far East of Russia)</p> <p><u>Natalia Kharitonova</u>, Georgy Chelnokov, Ivan Bragin, Anna Korzun</p>
T1_041 (Virtual presentation)	<p>Thermomineral springs in Caldas da Rainha thermal hospital (Portugal): a hydrodynamic and biogeochemical characterization</p> <p>Rita Carvalho, Marina Paiva, <u>Maria do Rosário Carvalho</u>, Carlos Costa Almeida, Ricardo Dias</p>
T1_045 (Virtual presentation)	<p>Sources of heat in low-enthalpy mineral waters from Essentuki region (Russia, Caucasian mineral water area)</p> <p><u>Natalia Kharitonova</u>, Elena Fillimonova, Vasiliy Lavrushin, Alexey Maslov, Ekaterina Baranovskaya, Anna Korzun, Elena Maksimova, Natalia Muromets</p>
T1_054 (Virtual presentation)	<p>Condition and processes of precipitation of iron compounds upon discharge of high-mineralized artesian water from artesian borehole R-30, Starooryahovo, Bulgaria</p> <p><u>Aleksey Benderev</u>, Mila Trayanova, Mihail Tarassov</p>
T3_007 (Virtual presentation)	<p>Mineral water bottling in Bulgaria</p> <p>Vladimir Hristov, Radostina Atanassova, <u>Aleksey Benderev</u></p>
T1_019	<p>Conceptual model of the Euganean geothermal system (NE Italy)</p> <p><u>Paolo Fabbri</u>, Leonardo Piccinini, Filippo Torresan, Dario Zampieri</p>

T1_010	<p>Multiparameter hydrogeochemical approach in regional groundwater flow systems (stable isotopes, noble gases, $^{87}\text{Sr}/^{86}\text{Sr}$ and $\delta^{11}\text{B}$)</p> <p><u>Nina Rman</u>, Peter Junež, Laszlo Palcsu, Andrej Lapanje, Luka Serianz</p>
T1_013	<p>Isotopic and geochemical approaches to update the conceptual model of thermal waters from Graciosa Island - Azores, Portugal</p> <p><u>Paula M. Carreira</u>, Maria do Rosário Carvalho, José M. Marques, Fausto Grassa, Giorgio Capasso, João Carlos Nunes</p>
T1_020	<p>Trace elements in the thermomineral waters of Greece</p> <p>Lorenza Li Vigni, Kyriaki Daskalopoulou, Sergio Calabrese, Konstantinos Kyriakopoulos, Lorenzo Brusca, Sergio Bellomo, Filippo Brugnone, <u>Walter D'Alessandro</u></p>
T1_022	<p>Groundwater dynamics and hydrochemistry of the Acque Albule hydrothermal basin: a comprehensive review</p> <p><u>Chiara Sbarbati</u>, Francesco La Vigna, Roberto Mazza, Marco Petitta</p>
T1_026	<p>Combined geochemical and microbiological approach for groundwater quality control and management</p> <p><u>Francesco Rufino</u>, Emilio Cuoco, Lidia Muscariello, Gianluigi Busico, Dario Tedesco</p>
T1_027	<p>Geochemical self-removal dynamics of Fe and As in mineral waters: evidences from analytical data of the Ferrarelle groundwater system</p> <p><u>Emilio Cuoco</u>, Stefano Viaroli, Vittorio Paolucci, Roberto Mazza, Dario Tedesco</p>
T1_028	<p>Natural and anthropogenic groundwater mineralization processes in a volcanic-sedimentary coastal aquifer in the archaeological site of Cumae (Phlegraean Fields, Southern Italy)</p> <p><u>Luisa Stellato</u>, Michele Arienzo, Silvio Coda, Pantaleone De Vita, Brunella Di Rienzo, A. D'Onofrio, Luciano Ferrara, Fabio Marzaioli, Marco Trifuoggi, Vincenzo Allocca</p>
T1_035	<p>The geological survey of Italy contribution to thermal-mineral water resource inventory within the H2020 Geoera Hover Project</p> <p>Barbara Dessi, Rossella Maria Gafà, <u>Lucio Martarelli</u>, Gennaro Maria Monti, Angelantonio Silvi</p>

T1_036	<p>Deep fluid source contribution to groundwater in Central Apennine: from regional to local scale</p> <p><u>Marino Domenico Barberio</u>, Maurizio Barbieri, Andrea Billi, Tiziano Boschetti, Antonio Caracausi, Carlo Doglioni, Stefania Franchini, Francesca Gori, Marco Petitta</p>
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Tuesday, June 28th 17:00-18:00

T1_038	<p>The thermomineral waters identity of Caldas de Carlão Spa - NE Portugal</p> <p>Sara Pereira, Alcino Oliveira, <u>Paula Carreira</u></p>
T1_042	<p>Hydrochemical and isotopic features of the Na-Cl and Ca-SO₄ groundwaters of Salice Terme (northern Apennines - Italy)</p> <p>Franco Cavanna, Paola Guado, Giancarlo Guado, Giorgio Pilla, <u>Elisa Sacchi</u></p>
T1_047	<p>An isotopic study on the origin of sulphates in the Boario Terme groundwaters (Southern Alps - Italy)</p> <p>Giorgio Pilla, Elisa Sacchi, <u>Vittorio Paolucci</u>, Gian Maria Zuppi</p>
T1_051	<p>Hydrochemical, isotopic and microbiota characterization of Telese mineral waters (Southern Italy)</p> <p>Alfonso Corniello, Marco Guida, Luisa Stellato, Marco Trifuoggi, Federica Carraturo, Elena Del Gaudio, Carmela Del Giudice, <u>Giovanni Forte</u>, Antonella Giarra, Marina Iorio, Fabio Marzaioli, Maria Toscanesi</p>
T1_052	<p>Mineral waters and dolomites weathering: a case study in the Salerno area (Southern Italy)</p> <p>Paolo Budetta, Alfonso Corniello, <u>Daniela Ducci</u></p>
T1_053	<p>Geochemical and isotopic anomalies in groundwater as precursory signs for earthquakes: the case of Ischia Island</p> <p><u>Daniela Ducci</u>, Elena Del Gaudio, Mariangela Sellerino, Giuseppe Onorati</p>
T1_055	<p>Conceptual gas and geochemical model of genesis of carbonic mineral waters of the Borjomi group of deposits</p> <p>Vladimir Abramov, Boris Borevsky, Vadim Altaev, <u>Levan Bagdavadze</u>, Teimuraz Koroshinadze</p>

T1_057	<p>Determination of radionuclides in borehole water in the Adenta municipality of Greater Accra region</p> <p><i>H.K. Agyeman, B.J. Nyarko, S. Osaе, E.O. Darko, J.K. Amoako Tata, F. Adeku, J. Owusu-Banahene, B.K. Agyeman, M. Abubakar, P.O. Manteaw, E. Amoatey, O. Gyamfi, D.F. Charles</i></p>
T2_007	<p>Protection of mineral and thermal waters in Italy: some considerations on how to bridge the gap between regulatory and hydrogeological aspects</p> <p><i>Vincenzo Piscopo, Fulvio Formica, Luigi Lana, Luigi Pianese</i></p>
T2_012	<p>Temperature and discharge variations in natural mineral water springs due to climate variability: a case study in Piedmont (NW Italy)</p> <p><i>Leone Bastiancich, Manuela Lasagna, Mauro Falco, Susanna Mancini, Domenico Antonio De Luca</i></p>
T2_013	<p>Groundwater flow processes in the active volcanic system of Ischia Island (Italy)</p> <p><i>Silvia Fabbrocio, Antonio Giardino, Lucia Marino, Sandro de Vita, Mauro A. Di Vito, Enrica Marotta, Rosario Avino, Antonio Carandente, Pasquale Belviso, Fabio Todisco</i></p>
T3_005	<p>Perla Moldovei - an exceptional combination of pH (8,8) and alkalinity (250 mg/L)</p> <p><i>Draęos-Marcel Vespan, Alina-Mihaela Ion</i></p>
T4_002	<p>The therapeutic effect of Värška mud and Värška mineral water baths on the overuse pain and muscle tension syndromes in working age population</p> <p><i>Varje-Riin Tuulik, Monika Kumm, Viiu Tuulik</i></p>
T4_004	<p>Thermal water healing practices in the ancient Greek world: a philosophical approach</p> <p><i>Maria Ntoumani, Konstantina Gongaki, Helen Soultanakis</i></p>
T4_010	<p>Oxidative stress and natural spa mineral waters: data of literature</p> <p><i>Maria Costantino, Valeria Conti, Gianluca Napolano, Francesco Marongiu, Mario Farroni, Amelia Filippelli</i></p>
T4_012	<p>Exploring thermal perception paradox of carbonated baths</p> <p><i>Maria Ntoumani, Benoit Dugué, Constantin Kouskoukis, Sofia Tzouvara</i></p>

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