

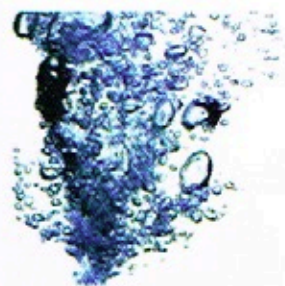
# MinWat2014

International Multidisciplinary Conference on

## Mineral Waters

Genesis, Exploitation, Protection and Valorisation

Karlovy Vary (Carlsbad), Czech Republic, 8-11 September 2014



*a. Jirka*

International Multidisciplinary Conference on

## MINERAL WATERS: Genesis, Exploitation, Protection and Valorisation

8 - 11 September 2014

Karlovy Vary, Czech Republic

### VOLUME OF ABSTRACTS

Conference jointly convened by

- *International Association of Hydrogeologists (IAH), IAH Commission on Mineral and Thermal Waters*
- *IAH National Chapter of Czech Republic*
- *Faculty of Science, Charles University, Prague, Czech Republic*
- *T. G. Masaryk Water Research Institute (VUV), Prague, Czech Republic*



Edited by  
Zbyněk Hrkal and Karel Kovar





## About this publication

---

The abstracts in this volume were submitted to the MinWat2014 conference. This volume contains only those abstracts that are expected to be actually presented at the conference. The Editors and the Organizing Committee take no responsibility for any error and omission or for the opinions of the authors.

### Scientific Advisory Committee

#### Theme A: HYDROGEOLOGY AND HYDROGEOCHEMISTRY — ORIGIN, PROTECTION AND MANAGEMENT

**Vadim Altaev**, Borjomi IDS Group, Russia

**Levan Bagdavadze**, Borjomi IDS Group, Georgia

**Werner Balderer**, Geological Institute, Engineering Geology, ETH Zürich, Switzerland; also IAH Commission on Mineral and Thermal Waters

**István Fórizs**, Institute for Geological and Geochemical Research, Hungarian Academy of Sciences, Hungary, also IAH Commission on Mineral and Thermal Waters

**Joseph Guttman**, Chief Hydrogeologist at Mekorot, National Water Company, Tel-Aviv, Israel

**Patrick Lachassagne**, Evian - Volvic Sources - Danone Eaux France, France

**Jim LaMoreaux**, President of IAH Commission on Mineral and Thermal Waters, USA

**Clemens Reimann**, Chairman of EuroGeoSurveys Geochemistry Expert Group, Past-President of International Association of GeoChemistry (IAGC), Geological Survey of Norway (NGU), Trondheim, Norway

**Milan Trnka**, Správa přírodních léčivých zdrojů a kolonád, Mineral Water Bureau of Karlovy Vary, Czech Republic

#### Theme B: BOTTLED WATER — MARKET AND DEMAND, HEALTH ISSUES

**Hélène Budzinski**, Université de Bordeaux I, Bordeaux, France

**Patricia Fosselard**, Secretary General of EFBW — European Federation of Bottled Waters, Brussels, Belgium

**Laurent Le Bellego**, Danone Research, France

**Annick Moreau**, Danone Waters, France

**Alessandro Pasquale**, Karlovarské minerální vody a.s. (Mattoni), Czech Republic

**Michal Voldřich**, Vysoká škola chemicko-technologická v Praze, Institute of Chemical Technology, Prague, Czech Republic

**Frank Welle**, Fraunhofer Institute, Germany

#### Theme C: BALNEOLOGY — BALNEOTHERAPY AND BALNEOTECHNICS

**Pedro Cantista**, President of the Portuguese Society of Medical Hydrology, Professor of Medical Hydrology in the University of Porto, Medical Doctor - Physical and Rehabilitation, Portugal

**Antonella Fioravanti**, Department of Clinical Medicine and Immunology, Rheumatology Unit, University of Siena, Siena, Italy

**M. Zeki Karagülle**, President of International Society of Medical Hydrology and Climatology (ISMH), Professor of Medical Ecology and Hydroclimatology, Director of Department of Medical Ecology and Hydroclimatology, Istanbul Medical Faculty, Istanbul University, Turkey

**Francisco Maraver**, Escuela Profesional de Hidrología Médica, Facultad de Medicina – Universidad Complutense Madrid, Spain

**Yoshinori Ohtsuka**, Department of Human Developmental Science, Faculty of Education, Hokkaido University, Japan

**Christian-François Roques**, Emeritus Professor Physical & Rehabilitation Medicine, Toulouse University; President AFRETH (French Association for Thermal Research) Scientific Committee, Paris; Dax Thermal Institute President (Bordeaux University), France

**Umberto Solimene**, State University of Milan, Italy, President of Research Center for Medical Bioclimatology, Balneotherapy, Complementary Medicine and Wellness Sciences; Postgraduate Medical School for Balneotherapy; Director of World Health Organization (WHO) Collaborating Center for Traditional Medicine; Secretary General of the World Federation of Hydrotherapy and Climatotherapy (FEMTEC)

Organizers wish to thank to the following sponsors  
of the MinWat2014 conference:

**Mattoni, Karlovarské minerální vody a.s.,  
is the main conference sponsor**



**Other conference sponsors are**





## Scientific Sponsors and Institutional Supporters



**Karlovy VARY°**



NSF International



## COMPANY PROFILE

Karlovarské minerální vody, a.s. (KMV) is the largest producer of mineral and spring water in the Czech Republic. The company was founded in 1873 by Heinrich Mattoni, a native of Karlovy Vary with Italian roots. However, it acquired its present-day form only in the 1990s thanks to considerable investments of its new owners – the Pasquale family from Italy.

At present, the KMV Group fills and bottles mineral and spring water under the Mattoni, Magnesia, Aquila, Poděbradka and Dobrá voda brands; and exports them to 20 countries worldwide. It also distributes Yo, Granini, Schweppes, and Dr Pepper trademark products. The company extensively participates in the cultural, sports, and social life in the Czech Republic. In addition, it supports projects aimed at environmental protection and ecological issues.

KMV is committed to creating world-renowned brands with a distinctive image that contribute to increasing the quality and culture of beverage consumption in the Czech Republic and beyond. The professional approach of the company and its employees to product quality has been recognized by numerous awards, as well as by the fact that Mattoni became the official water during the Czech Presidency of the EU Council.

## PRODUCT PORTFOLIO

176

kinds of beverages



Mineral water from the virgin nature around Karlovy Vary with a well-balanced mineral content.

Unique mineral water rich in natural magnesium with a low sodium content.



Spring water from the pristine natural countryside around Karlovy Vary.

Natural, slightly mineralized water with the lightest minerals.



Natural acidulous mineral water with a distinct delicate flavor and beneficial effects for the human body.

Yo sirups with a high fruit content and free of preservatives bring a one-of-a-kind enjoyment from fruit.



Granini juices guarantee the best experience that fruit can offer. Moreover, they are free of preservatives.

Soft-drinks with the bitter taste of quinine ideal alone or for mixed drinks during the day or in the evening.



A unique mixture of 23 flavors with a matchless taste. A soft-drink with a 125 year-long history.

## SOCIAL RESPONSIBILITY

As we are aware of the importance of environmental protection, we support the development of approaches and technologies that lead to the best results in this field. What is our approach?

### 100% RECYCLABILITY

All the PET bottles that we produce can be reused for further processing. Including the bottle caps and the labels.



### REDUCED PET VOLUME

When designing a new bottle, we consider not only its practicality and design but also its friendliness to the environment. That is why we have been continuously reducing the volume of plastics necessary for the production of our bottles.



### WE PROTECT OUR SOURCES

Drawing water from the depths of nature brings along with it the obligation to protect the surroundings of the source and the mineral water itself. Our mineral water sources are safe-guarded as a primary protection zone and are continuously monitored.

### WE STRIVE TO IMPROVE

We continuously reduce our impact on the environment. Over the past decade, for example, we have reduced our environmental impact by 20 percent in the case of Mattoni mineral water. We are able to do so thanks to innovations, savings, more effective energy use or transport by rail.



### WE SET THE STANDARD

Karlovarské minerální vody, a.s. became one of the founding members of EKOKOM, markedly participating in the system of waste sorting and recycling in communities.



**Danone waters are present in 22 countries  
25 Bn L in 2013**



1890

დაბადდა - ESTABLISHED

**BORJOMI®**

**Gets rid of the unnecessary**



# TABLE OF CONTENTS

ORAL PRESENTATIONS.....	11
ABSTRACT NUMBER 7 – ARE BOTTLED MINERAL WATERS IN EUROPE LIQUIDS FOR HYDRATION OR SOURCES OF ESSENTIAL MINERAL NUTRIENTS FOR A HUMAN HEALTH?.....	13
ABSTRACT NUMBER 14 – A CONTINENTAL-SCALE SURVEY OF THE GEOCHEMISTRY OF BOTTLED WATER.....	13
ABSTRACT NUMBER 16 – MINERAL WATERS OF CASTELLAMMARE DI STABIA (SOUTHERN ITALY): A PARTICULAR CASE OF SEAWATER INTRUSION IN A CARBONATE AQUIFER.....	14
ABSTRACT NUMBER 17 – HOW TRACER TESTS SIMULATIONS STRONGLY CONSTRAIN FLOW AND SOLUTE TRANSPORT MODELS IN FRACTURED CHALK AQUIFERS.....	14
ABSTRACT NUMBER 18 – A CONCEPTUAL MODEL FOR CABEÇO DE VIDE MINERAL WATERS (PORTUGAL): ABIOTIC METHANE FROM LOW TEMPERATURE SERPENTINIZATION AS A POTENTIAL ANALOG FOR PLANETARY WATER-ROCK INTERACTION.....	15
ABSTRACT NUMBER 19 – MATURATION OF THE PELOID OF BANJA KOVILJACA.....	16
ABSTRACT NUMBER 22 – REGIONAL SPATIAL DISTRIBUTION OF MINERAL WATERS (N-PORTUGAL): AN ISOTOPIC AND GEOCHEMICAL APPROACH.....	17
ABSTRACT NUMBER 26 – DISCUSSION ON THE QUALITY PROBLEMS OF BOTTLED WATER IN CHINA, CASE STUDY OF NONGFU SPRING “QUALITY CRISIS”.....	18
ABSTRACT NUMBER 28 – PESTICIDE METABOLITES AS TRACERS IN DEEP GROUNDWATER.....	18
ABSTRACT NUMBER 31 – DETERMINATION OF PESTICIDES IN WATER SAMPLES USING SOLID EXTRACTION (SPE) COMBINED WITH GAS CHROMATOGRAPHY MASS SPECTROMETRY (GC-MS/MS) IN THE WATER ANALYSIS LABORATORY OF THE GEOLOGICAL SURVEY.....	19
ABSTRACT NUMBER 32 – DRINKING MINERAL WATERS, THE ACTUAL MEDICAL BENEFIT – DATA OF EVIDENCE.....	20
ABSTRACT NUMBER 33 – BALNEOTHERAPY FOR COMMON METABOLIC CONDITIONS – THE FRENCH EXPERIENCE.....	20
ABSTRACT NUMBER 34 – BALNEOTHERAPY AND COMMON MUSCULO-SKELETAL CONDITIONS, DATA FROM RANDOMISED CONTROLLED TRIALS.....	21
ABSTRACT NUMBER 35 – BALNEOTHERAPY FOR ANXIETY AND PSYCHOTROPIC DRUG WITHDRAWAL.....	21
ABSTRACT NUMBER 45 – EVALUATION OF MINERALIZED WATERS OF EASTERN AND CENTRAL JAMAICA FROM CHEMOMETRICS.....	22
ABSTRACT NUMBER 47 – EFFECTS OF HEALTH PROMOTION ACTIVITY UTILIZING HOT SPRING WATER ON GLUCOSE METABOLISM AND PHYSICAL FITNESS.....	23
ABSTRACT NUMBER 50 – ESSENTUKY MINERAL WATER: ORIGIN AND RESOURCES.....	23
ABSTRACT NUMBER 51 – HYDROGEOCHEMISTRY OF MINERAL WATERS OF SERBIA.....	24
ABSTRACT NUMBER 52 – ALGORITHM OF STUDY OF MINERAL WATERS IN UKRAINE.....	25
ABSTRACT NUMBER 55 – A NEW LOOK AT THE HYDROGEOLOGICAL STRUCTURE OF THERMAL WATERS IN PIEŠŤANY SPA, SLOVAKIA.....	25
ABSTRACT NUMBER 58 – WHAT FRACKING MEANS TO THE UK MINERAL WATER INDUSTRY- A REVIEW.....	26
ABSTRACT NUMBER 59 – THE EFFECTS OF SULPHURIC MINERAL WATER ON EXPERIMENTAL OSTEOPOROSIS.....	27
ABSTRACT NUMBER 60 – CALCIUM CONTENT OF SPANISH NATURAL MINERAL WATER AND EFFECT ON HEALTH.....	28
ABSTRACT NUMBER 63 – ISOSCAPES OF BOTTLED WATER AS A TOOL FOR GLOBAL GROUNDWATER RESOURCES MONITORING.....	29
ABSTRACT NUMBER 64 – A MULTI-DISCIPLINARY INVESTIGATION OF IRISH WARM SPRINGS AND THEIR POTENTIAL FOR GEOTHERMAL ENERGY PROVISION.....	30
ABSTRACT NUMBER 65 – SKIN EFFECTS OF PELOIDS PREPARED WITH SULPHUR MINERAL WATER FROM	



**VOLUME OF ABSTRACTS (Z. Hrkal & K. Kovar, editors)**

"TERMAS DE CUNTIS SPA" ACCORDING TO THEIR MATURATION TIME.....	31
ABSTRACT NUMBER 66 – RADIOACTIVITY DUE TO DISSOLVED RADIUM IN BRAZILIAN MINERAL WATERS .....	32
ABSTRACT NUMBER 67 – STROKE TREATMENT IN HEALTH RESORTS .....	32
ABSTRACT NUMBER 73 – A MODEL FOR THE ORIGIN OF CARBONATED MINERAL WATERS OF CENTRAL VICTORIA.....	33
ABSTRACT NUMBER 74 – DRINKING REGIME AND MINERAL DEFICITS – A MYTH OR A SERIOUS PROBLEM? .....	33
ABSTRACT NUMBER 76 – THE ORIGIN OF HUNGARIAN BOTTLED MINERAL WATERS BY ENVIRONMENTAL ISOTOPES.....	34
ABSTRACT NUMBER 78 – GUARANTYING THE PURITY OF NATURAL MINERAL WATER: THE 20 YEARS TECHNICAL AND SOCIO-ECONOMIC EVIAN EXPERIENCE CONCILIATING COLLECTIVE RESPONSIBILITY FOR ENVIRONMENT PROTECTION, AND LOCAL DEVELOPMENT.....	35
ABSTRACT NUMBER 79 – ROLE OF DEEP FRACTURES AND ANCIENT WEATHERING PROFILES IN A HARD ROCK SPARKLING NATURAL MINERAL WATER HYDROSYSTEM. IMPLICATION FOR THE LONG TERM MANAGEMENT OF THE SAINT-GALMIER, FRANCE, SPRING .....	36
ABSTRACT NUMBER 80 – THE NEED OF A MULTIDISCIPLINARY APPROACH FOR DETERMINING THE STRUCTURE AND HYDROGEOCHEMICAL FUNCTIONING OF COMPLEX SPARKLING NATURAL MINERAL WATER SYSTEMS: A CASE STUDY FROM SOUTHERN FRANCE .....	37
ABSTRACT NUMBER 81 – USE OF SEVERAL ENVIRONMENTAL DATING TRACERS WITH LUMPED PARAMETER MODELS FOR THE UNDERSTANDING OF COMPLEX NATURAL MINERAL WATER SYSTEMS (EVIAN, FRANCE, CASE STUDY) .....	38
ABSTRACT NUMBER 82 – GEOCHEMICAL CHARACTERISTICS OF THE DARUVAR THERMAL AQUIFER..	39
ABSTRACT NUMBER 83 – OPTIMIZING PUMPING RATES AT JELESNIA WELLFIELD USING GROUNDWATER FLOW MODELLING IN CONJUNCTION WITH CONTRASTED HYPOTHETIC CLIMATIC SCENARIOS .....	39
ABSTRACT NUMBER 89 – THE ISSUES OF CLAIMING MEDICINAL EFFECT OF BOTTLED SODIUM-BICARBONATED MINERAL WATER.....	40
ABSTRACT NUMBER 90 – HYDROCARBONATE MINERAL WATER IN THE TREATMENT AND PREVENTION OF THE DIGESTIVE DISEASES.....	41
ABSTRACT NUMBER 92 – ISOTOPIC INVESTIGATION OF THE ORIGIN OF AMMONIA AND NITRATE IN THE MINERAL SPRING WATERS OF SCUOL / LOWER ENGADINE, SOUTH EASTERN SWITZERLAND.	41
ABSTRACT NUMBER 93 – THE THERMAL SPRING OF BAD RAGAZ SWITZERLAND: CHARACTERISATION OF ORIGIN, CHEMICAL PROPERTIES AND OBSERVED VARIATIONS OF FLUORESCENCE SPECTRA .....	42
POSTER PRESENTATIONS .....	43
ABSTRACT NUMBER 6 – A HYDROGEOLOGICAL MODEL OF THERMAL WATER DISCHARGE AREAS IN THE RUSSIAN FAR EAST.....	45
ABSTRACT NUMBER 12 – A REVIEW OF THE OCCURENCE, HYDROGEOLOGICAL ENVIRONMENT AND CHEMICAL CHARACTERISATION OF NIGERIA'S MINERAL/THERMAL WATERS .....	45
ABSTRACT NUMBER 15 – INFORMATION SUMMARY FROM IMPLEMENTATION OF A BOREHOLE VLÚ-3 IN HYDROGEOLOGIC STRUCTURE OF NATURAL HEALING WATERS IN PIEŠŤANY SPA, SLOVAKIA	46
ABSTRACT NUMBER 20 – GEOCHEMICAL AND ISOTOPIC CHARACTERIZATION OF THE THERMAL SPRINGS IN SOUTHERN GAOLIGONG MOUNTAINS, CHINA.....	46
ABSTRACT NUMBER 30 – POSSIBILITIES FOR GEOTHERMAL WATER AND ENERGY USES FROM LOWER CRETACEOUS FORMATIONS IN MOGILNO – ŁÓDŹ TROUGH, POLAND.....	47
ABSTRACT NUMBER 36 – THE MAIN OBSTACLES OF USING UNDERGROUND WATER IN POLAND ON THE EXAMPLES OF SELECTED FACILITIES.....	47
ABSTRACT NUMBER 37 – CONTRIBUTION OF CHEMICAL AND ISOTOPIC CONTENTS TO THE	



**VOLUME OF ABSTRACTS (Z. Hrkal & K. Kovar, editors)**

<i>CHARACTERIZATION OF GROUNDWATER'S CIRCULATION IN A THERMO-MINERAL SYSTEM. A CASE STUDY IN AUVERGNE, MASSIF CENTRAL (FRANCE).....</i>	<i>48</i>
<i>ABSTRACT NUMBER 44 – CHANGES IN STABLE ISOTOPE COMPOSITION OF BOTTLED WATER DURING STORAGE AND THEIR APPLICATION IN DEVELOPMENT OF BOTTLED WATER AUTHENTICATION METHODOLOGY.....</i>	<i>49</i>
<i>ABSTRACT NUMBER 46 – THERMAL AND MINERAL WATERS FROM THE ISLAND OF CORSICA (FRANCE). FROM THE HYDROGEOLOGICAL CHARACTERIZATION TO THE REBIRTH OF THE HYDROTHERMAL INDUSTRY.....</i>	<i>50</i>
<i>ABSTRACT NUMBER 56 – FERROUS AND RADON MINERAL WATER IN KARELIA.....</i>	<i>51</i>
<i>ABSTRACT NUMBER 57 – REGIONAL PREFERENCES IN MINERALOGICAL COMPOSITION OF BOTTLED WATER.....</i>	<i>51</i>
<i>ABSTRACT NUMBER 61 – EFFECT OF SULFUROUS NATURAL WATER ON AFFECTED SHOULDER AFTER STROKE.....</i>	<i>52</i>
<i>ABSTRACT NUMBER 68 – MINERAL WATERS: HOW TO DEAL WITH THIS THEME IN ENVIRONMENTAL EDUCATION PROGRAMS.....</i>	<i>52</i>
<i>ABSTRACT NUMBER 69 – OCCURENCE OF THE CHLORIDE CARBONATED WATERS IN THE POLISH CARPATHIANS AND THEIR BALNEOTHERAPAUTIC UTILIZATION.....</i>	<i>53</i>
<i>ABSTRACT NUMBER 70 – BOTTLING MINERAL WATERS IN THE AREA OF THE POPRAD RIVER VALLEY IN THE POLISH CARPATHIANS.....</i>	<i>54</i>
<i>ABSTRACT NUMBER 72 – HYDROGEOLOGICAL RESEARCH AS A BASIS FOR MANAGEMENT AND UTILIZATION OF THERMOMINERAL WATERS IN BALNEAL THERAPY, RECREATION AND TOURISM ON THE EXAMPLE OF RIBARSKA SPA (SERBIA).....</i>	<i>55</i>
<i>ABSTRACT NUMBER 75 – PELOIDS USE IN AESTHETIC MEDICINE.....</i>	<i>56</i>
<i>ABSTRACT NUMBER 77 – GEOCHEMICAL CHARACTERISTICS OF THE DONGRAE HOT SPRING WATER, SOUTH KOREA.....</i>	<i>56</i>
<i>ABSTRACT NUMBER 84 – GROUNDWATER WITH GLUCOSE REGULATION PROPERTIES – DIA PETRA, SERBIA.....</i>	<i>57</i>
<i>ABSTRACT NUMBER 86 – RESEARCH IN ACTIVATION PROCESSES FOR THE ORIGIN OF HIGH RADON LEVELS IN SPRING WATERS IN THE ST. VOJTĚCH SPRINGS IN HORNÍ MALÁ ÚPA (GIANT MOUNTAINS): THE EXPERIENCE WITH TRACER TESTS.....</i>	<i>57</i>
<i>ABSTRACT NUMBER 87 – HEALTH BENEFITS OF REGULAR CONSUMPTION OF NATURAL MINERAL RICH WATER RADENSKA CLASSIC.....</i>	<i>58</i>
<i>ABSTRACT NUMBER 88 – HYDROCHEMISTRY, STABLE ISOTOPES AND NOBLE GAS ISOTOPES OF GEOTHERMAL WATERS IN THE BUGOK-MAKUMSAN AREA OF SOUTH KOREA.....</i>	<i>59</i>
<i>ABSTRACT NUMBER 94 – THE EFFECT OF BALNEOLOGICAL AGENTS ON THE OVERUSE SYNDROMS BY LASER-DOPPLER.....</i>	<i>60</i>
<i>ABSTRACT NUMBER 95 – RADON-CHLORIDE MINERAL WATERS FROM ALBRECHTICE NEAR FRYDLANT: A NEW TYPE OF MINERAL WATER FROM EGER RIFT ZONE.....</i>	<i>61</i>
<i>ABSTRACT NUMBER 96 – NATURAL HYDROGEOLOGICAL MODEL OF BORJOMI CARBONATED MINERAL WATER DEPOSIT. NEW LOOK.....</i>	<i>61</i>



There is a lack of evidence for Thalassotherapy after stroke. Better and larger studies are therefore required, but according to preliminary data of this study and other prior pilot studies, the scientific group will continue on this thematic area.

---

**Abstract number 73 – A model for the origin of carbonated mineral waters of Central Victoria**

SHUGG, A.

DAHLHAUS, P.

Federation University, Victoria  
Australia

In Central Victoria (Australia) carbonated mineral waters occur in fissure flow systems developed in consolidated Lower Palaeozoic rocks. The carbonated water type is one of several groundwater water types developed or that evolves in these rocks. Carbonated species appear to be associated with very low flux deep flow systems.

A model for the evolution of carbonated mineral waters is illustrated as an extension or adjunct of the evolution of high bicarbonate groundwater in extensive aquifer systems.

An explanation for the formation of the similar water type the sodium bicarbonate water facies in extensive aquifer systems involves a dynamic of cation exchange, clay mineral reaction and carbonate solution. The model suggested for the carbonated variant incorporates the role of natural acidulates that modulates of the pH in the flow system. Then as the mineral water ascends, mixes, evolves or discharges to the surface a change a change in pressure and in pH occurs. Bicarbonate, being a part of a diprotic acid dissociation continuum combined with the requirement for the maintenance of electro neutrality of the solution results in expulsion of carbon dioxide.

Typically the carbonated mineral water possesses a relatively low chloride concentration, a high iron concentration and is mildly acidic. Chemical differentiation between the deep low flow mineral water and the shallow groundwater can be marked, but evolution down the fissured flow systems may produce a convergence in water characteristics.

At mineral springs the nature of the ascending mineral water is often masked by near surface processes such as reflux, mixing and dilution by fresh water. These features have been identified during drilling. Delineation of fissure flow systems is based on the duopoly of water chemistry and rock mass structure, confirmed by deep hard rock gold mining activities.

---

**Abstract number 74 – Drinking regime and mineral deficits – a myth or a serious problem?**

ZADÁK, Z.

HYSPLER, R.

TICHÁ, A.

Department of Research and Development, University Hospital Hradec Kralove, Sokolska 581, 500005  
Hradec Kralove, Czech Republic

Distribution of body fluids

Total body water is the sum of the volumes in the individual body compartments, which in the stable condition of the patient possess an overall constant composition.

Disorder in sodium metabolism

An increase in sodium intake and its retention in the organism (increased storage of Na) does not result in hypernatraemia and hyperosmolality provided there is free access to liquids.