ÚJ SZÉCHENYI TERV

University of Miskolc,
Hungary

MultiScience - XXIX. microCAD International Multidisciplinary Scientific Conference 9-10 April 2015

PROGRAMME

Nemzeti Fejlesztési Ügynökség
www.ujszechenyiterv.gov.hu
06 40 638 638

MAGYARORSZÁG MEGÚJUL

A projekt az Európai Unió támogatásával, az Európai Szociális Alap társfinanszírozásával valósul meg.

ME.TNRT- 108 /2015.

University of Miskolc,
Hungary

MultiScience - XXIX. microCAD International Multidisciplinary Scientific Conference 9-10 April 2015

PROGRAMME

WELCOME ADDRESS FROM THE RECTOR

The University of Miskolc, which is the legal successor of the Academy of Mining and Metallurgy (Bergschule) founded in 1735 in Selmecbánya (Banska Stiavnica), extends its greetings to the Reader on the occasion of organising the ***XXIXth MultiScience - microCAD International Multidisciplinary Scientific Conference***.

The scope of this conference is exceptionally wide. Experts in engineering, economics, humanities and health sciences present and discuss their scientific results. Having completed profound scientific investigations and having reached interesting conclusions, all the active participants should be proud of their achievements and all the colleagues and guests should be interested in the scientific value behind the research teams. It is also our hope that the professional and personal relations between the experts will remarkably contribute to the efficient co-operation between participants and institutions as well.

Over the last 28 years, this annual international conference has become the most significant meeting of professionals at the University of Miskolc.

More than 7700 presentations from about 15 different countries, 41 thousand pages of publications and many agreements signed between universities and numerous academic and research proposals witness the achievements of the last 28 years.

I recommend you the program of the ***XXIXth MultiScience - microCAD International Multidisciplinary Scientific Conference*** in the hope that the presentations, discussions and social events will give you a golden opportunity to cherish and widen your professional relations. I truly believe that your presence, either as a proud speaker or as an interested participant, will contribute to the success of this great scientific event.

Prof. András TORMA
Rector of the
University of Miskolc

SCIENTIFIC COMMITTEE OF THE CONFERENCE

Chairman:	**Tamás KÉKESI**	Pro-Rector for International Relations and Scientific Affairs
Members:	**Péter SZŰCS**	Dean of the Faculty of Earth Science and Engineering
	Árpád Bence PALOTÁS	Dean of the Faculty of Materials and Metallurgical Engineering
	Edgárd BERTÓTI	Dean of the Faculty of Mechanical Engineering and Informatics
	Ákos FARKAS	Dean of the Faculty of Law
	Mariann SOMOSI VERES	Dean of the Faculty of Economics
	Mária KOVÁCS ILLÉS	Dean of the Faculty of Humanities
	Emőke KISS-TÓTH	Dean of the Faculty of Health Sciences

DETAILED PROGRAMME

of the MultiScience - XXIX. microCAD International Multidisciplinary Scientific Conference
University of Miskolc, 9-10 April 2015

9 April (Thursday) 2015

$10^{30} - 10^{35}$ **International Scientific Conference**
Opening address
***András TORMA** – professor, Rector of the University of Miskolc*
Venue: Lecture hall, Bld.

PLENARY SESSION

Venue: Lecture hall, Bld.

$10^{35} - 11^{05}$ **Pál TARDY** *professor, Association of the Hungarian Steel Industry*
Climate Policy of the EU and the Steel Industry

$11^{05} - 11^{35}$ **György SÁRKÖZI** *director, Észak-magyarországi Közlekedési Központ Zrt.*
Effects of Global Megatrends within the Hungarian Automotive Industry

$11^{35} - 12^{05}$ **Tamás KÉKESI** *vice-rector, University of Miskolc*
Development and Recycling Environment Friendly Soldering Materials for the Automotive Industry

$12^{05} - 12^{15}$ *Break*

$12^{15} - 13^{30}$ **Reception**
Venue: Main Building A/4. Assembly Hall (*Entry: only with invitation cards*)

$13^{30} - 14^{00}$ Break

$14^{00} - 18^{00}$ **Presentations in the parallel sessions**
Venue: as listed in the section table

$19^{00} - 21^{30}$ **Gala Dinner**
Venue: University Dining Hall (*Entry: only with invitation cards*)

10 April (Friday) 2015

$9^{00} - 12^{00}$ **Presentations in the parallel sessions**
Venue: as listed in the section table

OPTIONAL PROGRAMME

10 April 2015 $13^{00} - 22^{00}$ **Excursion to TOKAJ**

REGISTRATION FOR THE CONFERENCE

Venue: The Registration Desk is opposite to the entrance of the Main Building (A/4.)

Registration is open:

8 April (Wednesday) 2015	---	12^{00} - 19^{00}
9 April (Thursday) 2015	8^{00} - 12^{30}	13^{30} - 17^{00}
10 April (Friday) 2015	8^{00} - 11^{00}	----

ORGANISATIONAL COMMITTEE OF THE CONFERENCE

The organiser of the Conference is the *UNIVERSITY OF MISKOLC*

Address of the Scientific and Organisational Committee:
University of Miskolc, Rector's Office, International Affairs Team
H-3515 Miskolc Egyetemváros
Phone: (36-46) 565-111/ ext. 1016
Fax: (36-46) 563-423
e-mail: microcad@uni-miskolc.hu
www.uni-miskolc.hu/~microcad

SESSIONS AND VENUES OF THE CONFERENCE

Sign	Name	Venue	
Plenary	Plenary session	Lecture hall XXI.	Bld. A/6. groundfloor, 32.
A	Environment- and Energy Management	Lecture hall VII.	Bld. A/1. 1st floor, 102.
B	Applied Materials Science and Nanotechnologies	Room 312.	Bld. B/1. 3rd floor, 312.
C1	Logistics	Room 106.	Bld. A/5. 1st floor, 106.
C2	Natural Sciences	Room 13.	Bld. A/1. mezzanine, 13.
C3	Electrical Engineering and Informatics	Room 311.	Bld. A/1. 3rd floor, 311
D1	Innovative Mechanical Engineering Technologies	Room 1.	Bld. C/1. groundfloor, 1.
D2	Mechanical Engineering Design and Technologies, Numerical Modelling and Laboratory Measurements	Room 206.	Bld. A/3. 2nd floor, 206.
D3	Innovative mechanical engineering design	Room 105.	Bld. A/5. 1st floor, 105.
E	Legal Sciences	Faculty of Law	Bld. A/6. groundfloor, 31.
F	Economic Challenges in the 21st Century	Room 11.	Bld. A/1. mezzanine, 11.
G	Humanities and Social Sciences	Room 306.	Bld. C/1. 3rd floor, 306.
H	Health and Medical Sciences	Bosch Room	Bld. B3-B4. 2nd floor, 207.

SUSTAINABLE NATIONAL RESOURCES MANAGEMENT SYMPOSIUM

Chairman: Gábor MUCSI *assoc.professor*

A: ENVIRONMENT- AND ENERGY MANAGEMENT

VENUE: Lecture hall **VII.**, Bld. **A/1.** 1st floor, 102.
Chairman: **Ljudmilla BOKÁNYI** *assoc. professor*
Secretary: **Ádám RÁCZ** *research assistant*

Date: **April 9, 2015**

14.00 **Roland Dócs** University of Miskolc, Hungary
Determination of Connate Water Saturation Using Gas Displacement Method

14.20 **Marin-Silviu Nan, Tomus Ovidiu-Bogdan,Ungur Andreea, Popescu Razvan** University of Petrosani, Romania
Research on Possibilities of Improving Oil Transportation System Parameters Through Main Lines

14.40 **Katalin Bohács, Zoltán Pap, Tamás Magyar, Zoltán Molnár** University of Miskolc, Hungary
Some Segments of the Project Criticel

15.00 **László Kis** University of Miskolc, Hungary
Mechanical Net Torque Optimization of Sucker-Rod Pumping Units

15.20 *Break*

15.40 **Richárd Tompa[1], László Ézsiás[2]** University of Miskolc[1], Colas Északkő Ltd.[2], Hungary
New Testing Equipment to Determine the Swelling Clay Content in Central Laboratory of Colas Északkő Ltd., Tállya

16.00 **Claudia Butean[1], Cristina Mihali[1], Angela M. Michnea[2], Zoita M. Berinde[1], Anamaria Gavra[2], Mirela Simionescu[2]** Technical University of Cluj Napoca, North University Center of Baia Mare[1], Maramures Environmental Protection Agency[2], Romania
Nitrogen Species in Wet Atmospheric Deposition in Maramurescounty (NW of Romania)

16.20 **Ádám Koncz** University of Miskolc, Hungary
Innovative Developments in Sucker Rod Pumped Well Analysis

16.40 **Attila Garami** Ministry of National Development, Hungary
Petroleum Coke Fired Steam Power Plant at the Danube Refinery

17.00 *Summary*

SUSTAINABLE NATIONAL RESOURCES MANAGEMENT SYMPOSIUM

Chairman: Gábor MUCSI *assoc.professor*

A: ENVIRONMENT- AND ENERGY MANAGEMENT

VENUE: Lecture hall **VII.**, Bld. **A/1.** 1st floor, 102.
Chairman: **Ljudmilla BOKÁNYI** *assoc. professor*
Secretary: **Ádám RÁCZ** *research assistant*

Date: **April 10, 2015**

9.00 **Zoltán Fejes, Péter Szűcs, Zsombor Fekete, Endre Turai, Mátyás Krisztián Baracza** University of Miskolc, Hungary
A Geothermal System on the Western Slopes of the Tokaj Mountains

9.20 **Csaba Ilyés, László Kompár** University of Miskolc, Hungary
Interpretation of Monitoring Data from the Miskolc University Meteorological Station

9.40 **Sorin Mihai Radu, Andras Iosif** University of Petrosani, Romania
Improved Mechanised Extraction Technologies in Underground Hardcoal Mines from Jiul Valley-Romania

10.00 **László Kompár[1], Péter Szűcs[1], László Palcsu[2], József Deák** University of Miskolc[1], Institute for Nuclear Research, Hungarian Academy of Sciences[2], GWIS Ltd.[3], Hungary
Tritium Peak Method and 3H/3HE Dating Technique use for Estimating Shallow Groundwater Recharge

10.20 **Dorin Tataru, Stanci Andreea Cristina, Stanci Aurora, Radu Sorin Mihai** University of Petrosani, Romania
Identification of Possibly Polluted Areas with Particles Coming from the Tailing Ponds from Cet Paroseni

10.40 *Break*

11.00 **Ildikó Bölkény, József Konyha** University of Miskolc, Hungary
Prevention of Hydrate Formation On Gas Well

11.20 **Andreea Cristina Stanci, Aurora Stanci, Dorin Tataru, Nan Marin Silviu** University of Petrosani, Romania
Use of Curved Panels for the Noise Reduction Produced by Belt Conveyors from Oltenia Energy Complex

11.40 **Roland Szabó, Gábor Mucsi** University of Miskolc, Hungary
Generally About Geopolymer Foams

12.00 **László Kompár[1], Péter Szűcs[1], László Palcsu[2], Mihály Braun[2]** University of Miskolc[1], Institute for Nuclear Research, Hungarian Academy of Sciences[2], Hungary
Complex Isotopehydrochemical Method to Investigate Shallow Groundwater Recharge

12.20 **Péter Kókai, Csaba Póliska, Bernadett Csordás** University of Miskolc, Hungary
An Assessement of the Correlation Between Fuels and Depositions in the Combustion Chamber of the Miskolc Biomass Heating Plant

12.40 *Summary*

APPLIED MATERIALS SCIENCE AND NANOTECHNOLOGY SYMPOSIUM

Chairman: Tamás TÖRÖK *professor*

B: APPLIED MATERIALS SCIENCE AND NANOTECHNOLOGY

VENUE: **Room 312**, Bld. **B/1.** 3rd floor, 312.
Chairman: **Tamás TÖRÖK** *professor*
Co-chairman: **László VARGA** *assoc. professor*
Secretary: **Imre BUDAVÁRI** *PhD Student*

Date: **April 9, 2015**

14.00 **Ali H. Hasan Al-Azzawi, Péter Baumli, Gábor Mucsi** University of Miskolc, Hungary
Mechanical Alloying and Milling

14.15 **Jürgen Antrekowitsch, Gernot Rösler** Montanuniversitaet Leoben, Chair of Nonferrous Metallurgy – CD Laboratory for Heavy Metal Recycling, Austria
Steel Mill Dust Recycling in the 21st Century

14.30 **Rösler Gernot, Jürgen Antrekowitsch** Montanuniversitaet Leoben, Chair of Nonferrous Metallurgy – CD Laboratory for Heavy Metal Recycling, Austria
Product Upgrade of Waelz Oxide Using an Alternative Resource

14.45 **Bernhard Wolfram** METSO, Austria
Tungsten, From Mineral Processing To Metallurgical Operations

15.00 **Zoltán Harangi, Gábor Nagy, Tamás Kékesi** University of Miskolc, Hungary
Leaching Behavior of the Anode Slime Generated by the Electrorefining of Sn-Ag-Cu Alloys

15.15 *Break*

APPLIED MATERIALS SCIENCE AND NANOTECHNOLOGY SYMPOSIUM

Chairman: Tamás TÖRÖK *professor*

B: APPLIED MATERIALS SCIENCE AND NANOTECHNOLOGY

VENUE: **Room 312**, Bld. **B/1.** 3rd floor, 312.
Chairman: **Tamás TÖRÖK** *professor*
Co-chairman: **László VARGA** *assoc. professor*
Secretary: **Imre BUDAVÁRI** *PhD Student*

Date: **April 9, 2015**

15.30 **Peter Futáš[1], Alena Pribulová[1], Stefan Niznik[1], Gabriel Dúl[1], László Varga[2]** Technical University Košice, Slovakia[1], University of Miskolc, Hungary[2]
The Elimination of Unfavourable Influence of the Steel Scrap in the Charge on the Cast Iron Quality

15.45 **Noémi László, Pál Tóth** University of Miskolc, Hungary
3D Reconstruction of Turbulent Flames by Stereoscopic Photography

16.00 **Imre Budavári, László Varga, Dániel Molnár** University of Miskolc, Hungary
Improvement the Gating- and Feeding System of the ASTM-B 108 Tensile Test Bar Using Control Volume Simulation

16.15 **Majoros Csaba** Csaba Metál Zrt., Hungary
Nyomásos Alumínium-öntvény Gyártástechnológiája és Optimalizálása

16.30 **Laura Mádi, Jenő Dúl,Csaba Császár** University of Miskolc, Hungary
Strength Properties Variation of Resin Bonded Core Materials Affected by Thermal Load

16.45 **Dávid Angel[1], Márton Benke[2], Dávid Cseh[1], Valéria Mertinger[1]** University of Miskolc[1], MTA-ME Material Science Research Group, University of Miskolc[2], Hungary
Residual Stress Evolution During the Production of an Automotive Component

17.00 **Zoltán Kéri[1], Zsolt Leskó[2]** University of Miskolc[1], Nemak Győr Ltd.[2], Hungary
Analyses of Aluminium High Pressure Die Casting Alloys' Mechanical Properties

17.15 **Viktória Dargai[1], Hartmut Polzin[2], László Varga[1], Jenő Dúl[1]** University of Miskolc, Hungary[1], Bergakademie Freiberg, Germany[2]
Öntödei homokok granulometriai tulajdonságainak meghatározása képelemzéssel

17.30 *Summary*

MECHATRONICS AND LOGISTICS SYMPOSIUM

Chairman: Béla ILLÉS *professor*

C1: LOGISTICS

This section is organized by the University of Miskolc and the Czestochowa University of Technology

VENUE: Room **106.**, Bld. A/5. 1st floor, 106
Chairman: **Béla ILLÉS** *professor*
Secretary: **Péter TELEK** *assist. professor*

Date: **April 9, 2015**

14.00 *Opening Ceremony*

14.05 **Julio César Cancio Ferrer** ambassador, Republic of Cuba
Hungarian-Cuban-German Cooperation in the Field of Logistics Research and Higher Education

14.20 **Gábor Bohács, Angéla Rinkács** Budapest University of Technology and Economics, Hungary
Adaptive Simulation-Based Concept for Construction Logistics

14.35 **Péter Telek** University of Miskolc, Hungary
Computer Design of Materials Handling Equipment

14.50 **Beata Borodavko** University of Miskolc, Hungary
The Sensibility Inspection of Supply Chains Based on Logistic Aspects

15.05 **Corneliu Alexandrescu, Nan Marin-Silviu, Nicola Aurelian,** Cucu Ioan University Politehnica Bucuresti, Romania
Comparative Study on the Influence of Road Traffic on the Air Quality

15.20 **József Kovács, Andras Andrei** University of Petrosani, Romania
Reliability Analysis of the Belt Conveyors at Vulcan Mine Plant, Jiu Valley, Romania

15.35 **Béla Illés, János Németh** University of Miskolc, Hungary
Analysis of the Statically Forces of Belt Conveyors in Case of More than One Driving Points

15.50 *Break*

MECHATRONICS AND LOGISTICS SYMPOSIUM

Chairman: Béla ILLÉS *professor*

C1: LOGISTICS

This section is organized by the University of Miskolc and the Czestochowa University of Technology

VENUE: Room **106.**, Bld. A/5. 1st floor, 106
Chairman: **Béla ILLÉS** *professor*
Secretary: **Péter TELEK** *assist. professor*

Date: **April 9, 2015**

16.05 **Elke Glistau[1], Michael Schenk[1], Coello Machado Norge Isaias[2]** Otto von Guericke University, Germany[1], Central University "Marta Abreu" of Las Villas, Santa Clara, Cuba[2]
Logistics Strategies and Tools

16.20 **Heike Mrech** Hochschule Merseburg - University of Applied Sciences, Germany
STEM Education and the Talent Crisis in Logistics in Germany

16.35 **Béla Illés[1], József Gál[2], Antal Véha[2]** University of Miskolc[1], University of Szeged[2], Hungary
Some Aspects of e-Commerce in Agriculture

16.50 **Marta Kadłubek** Czestochowa University of Technology, Poland
Theoretical Aspects of Sustainable Development in Transport and Logistics

17.05 **Katarzyna Sukiennik, Katarzyna Grondys, Iga Kott, Oksana Seroka-Stolka** Czestochowa University of Technology, Poland
The Importance of Supplier Selection Process in Business Relationships

17.20 **Katarzyna Sukiennik, Skowron-Grabowska Beata, Szczepanik Tomasz** Czestochowa University of Technology, Poland
Growth of Transport Industry and Economic Development in Poland

17.35 **János Korponai[1], Ágota Bányainé Tóth[2], Béla Illés[2]** Contitech Fluid Automotive Hungária Kft.[1], University of Miskolc[2], Hungary
Analyses of the Key Performance Indicators in the Logistics System

17.50 **Péter Veres, Tamás Bányai, Béla Illés** University of Miskolc, Hungary
Modelling of Networked Service Processes

18.05 *Summary*

MECHATRONICS AND LOGISTICS SYMPOSIUM

Chairman: Béla ILLÉS *professor*

C2: NATURAL SCIENCE

VENUE: Room **13.**, Bld. A/1. mezzanine 13.
Chairman: **Béla PARIPÁS** *professor*
Secretary: **Péter KÖRTESI** *assoc. professor*

Date: **April 9, 2015**

14.00 *Opening Ceremony*

14.05 **György Vikor** Guardian Orosháza Ltd., Hungary
Optical Properties of Dielectric Mirrors, Produced by Large Area Glass PVD Coating Technology

14.20 **Béla Paripás, Béla Palásthy** University of Miskolc, Hungary
Angular Dependent Measurement and Evaluation of Autoionization Spectra of Helium

14.35 **Csaba Takács[1], I. Bárány[2]** University of Miskolc[1], Kecskemét College[2], Hungary
Numerical Evaluation of Relativistic Shock Waves in a Magnetized Plasma Dominated by Radiation

14.50 **László Ujfaludi** Eszterházy Károly College, Hungary
Physics and Fine Arts - An Approach with System's Concept

15.05 **Endre Kovács[1], Michael Forrester[2], Feodor Kusmartsev[2]** University of Miskolc, Hungary[1], Loughborough University, United Kingdom[2],
Indications of Possible Chaos in Arrays of Single-domain Nanomagnets

15.20 *Break*

15.35 **Attila Körei** University of Miskolc, Hungary
Cell Formation Algorithms Based on Formal Concepts

15.50 **Péter Körtesi[1], Desislava Georgieva[2]** University of Miskolc, Hungary[1], "Anghel Kanchev" University of Ruse, Bulgaria[2]
Development of Mathematical Skills with Commonly used Computer Software

16.05 *Summary*

MECHATRONICS AND LOGISTICS SYMPOSIUM

Chairman: Béla ILLÉS *professor*

C3: ELECTRICAL ENGINEERING AND INFORMATICS

VENUE: Room **311.**, Bld. A/1. 3rd floor 311.
Chairman: **Csaba BLÁGA** *assoc. professor*
Secretary: **Dávid VINCZE** *assist. lecturer*

Date: **April 9, 2015**

14.00 *Opening Ceremony*

14.05 **Balázs Villányi, Roland Juhos, Máté Benyó** Budapest University of Technology and Economics, Hungary
The Significance of the Application of Column-Oriented Database, SAP HANA Platform and Prediction Methods in Motorsports

14.20 **Tamás Fekete[1], Gergely Mezei[2]** Evosoft Hungary Ltd.[1], Budapest University of Technology and Economics[2], Hungary
Using GPGPU for Graph Transformations – An Introductory Survey

14.35 **Tamás György, Károly Ágoston Bíró, Tamás Szabó** Technical University of Cluj-Napoca, Romania
An Experimental Comparison of Stereo Vision Algorithms Using Middlebury Dataset

14.50 **Csaba Vörös** University of Miskolc, Hungary
Development of Water Quality Monitoring Station

15.05 **Gábor Knyihár** Hungary
Intelligent Research Robot

15.20 **Zsolt Péter Pázmándi** Hungary
Particle Detection with Time-Projection Chamber and Data Acquisition System

15.35 *Break*

15.50 **Peter Bober** Technical University of Kosice, Slovakia
Measurement of BLDC Motor Efficiency for Commutation Angle Optimisation

16.05 **Marin-Silviu Nan, Tomus Ovidiu-Bogdan, Popescu Razvan, Ungur Andreea** University of Petrosani, Romania
Analysis and Evaluation of Optimum Operational Status of Electrical Stations

16.20 **Tamás György, Áron Attila Popp, Károly Ágoston Bíró** Technical University of Cluj-Napoca, Romania
Supplementary Iron Losses in Asynchronous Machines with External Rotor

16.35 **Nándor Kiss** University of Miskolc, Hungary
Special Induction Motor Driving

16.50 **Gábor Fekete** University of Miskolc, Hungary
Definition of the Energy and Force Based on the Unified Theory of Energy (UTE, UNITHE)

17.05 *Summary*

INNOVATIVE MECHANICAL DESIGN AND TECHNOLOGY SYMPOSIUM

Chairman: Károly JÁRMAI *professor*

D1: INNOVATIVE MECHANICAL ENGINEERING TECHNOLOGIES

VENUE: Room 1. Bld. C/1. ground floor, 1.
Chairman: **János KUNDRÁK** *professor*
Co-Chairman: **Wojciech ZEBALA** *professor*
Secretary: **István SZTANKOVICS** *assist. lecturer*

Date: **April 9, 2015**

14.00 **Numan M. Durakbasa, Bas Gökcen** Vienna University of Technology, Austria
An Analysis of the Metrology Techniques to Improve Quality and Accuracy

14.20 **Anatoly I. Grabchenko, Vladimir L. Dobroskok, Yaroslav N. Garashchenko, Andrei Shpilka N. Poltava, Y. Kondratyuk** National Technical University "Kharkiv Polytechnic Institute", Ukraine
Morphological Analysis of Triangulated Models of Grinding Wheels Working Surfaces

14.40 **Wojciech Zebala, Bogdan Slodki, Grzegorz Struzikiewicz** Cracow University of Technology, Poland
Chip Breakage Control in Ti6Al4V Longitudinal Turning with HPC System

15.00 **Ferenc Dömötör, Balázs Zsolt Farkas, Tibor Szalay, Zoltán Újvári** Budapest University of Technology and Economics, Hungary
Condition Monitoring of Drilling Tools

15.20 *Break*

15.40 **Balázs Mikó, Ágota Drégelyi-Kiss** Óbuda University, Hungary
Case Study in Investigation of Accuracy of Hole Drilling

16.00 **Viktória Ferencsik , Gyula Varga** University of Miskolc, Hungary
Examination of Surface Roughness of Burnished Workpiece Surfaces

16.20 **Dénes Tóth, Péter Zoltán Kovács, Miklós Tisza** University of Miskolc, Hungary
3D Printing in the Vehicle Industry

16.40 **István Sztankovics, János Kundrák** University of Miskolc, Hungary
The Characteristics of Chip Removal in Rotational Turning

17.00 **Zsuzsa Balajti** University of Miskolc, Hungary
Up to Date Constructive Geometry to Dimensioning of Bearing Pattern of Cylindrical Worm Gear Driving Having a Profile Circle Arc in Axial Section

17.20 *Summary*

INNOVATIVE MECHANICAL DESIGN AND TECHNOLOGY SYMPOSIUM

Chairman: Károly JÁRMAI *professor*

D2: MECHANICAL ENGINEERING DESIGN AND TECHNOLOGIES, NUMERICAL MODELLING AND LABORATORY MEASUREMENTS

VENUE: Room **206**. Bld. **A/3.** 2nd floor, 206.
Chairman: **Szilárd SZABÓ** *professor*
Co-chairman: **György SZEIDL** *professor emeritus*
Secretary: **Péter BENCS** *assist. lecturer*

Date: **April 9, 2015**

14.00 **György Szeidl, László Kiss** University of Miskolc, Hungary
A Nonlinear Kinematical Model for Heterogeneous Circular Beams

14.20 **Dávid Gönczi** University of Miskolc, Hungary
Determination of Displacements and Stresses in Functionally Graded Hollow Spherical Bodies

14.40 **Ákos József Lengyel, István Ecsedi** University of Miskolc, Hungary
Composite Beam with Weak Shear Connection Subjected to Thermal Load

15.00 **Dániel Burmeister** University of Miskolc, Hungary
Buckling of Annular Plates with Shell-stiffening and Elastic Restrains on the Boundary

15.20 **Krzysztof Jesionek[1], Polko Krzysztof[1], Krzysztof Jesionek[1], Badur Janusz[2]** Wroclaw University of Technology[1], Institute of Fluid Flow Machinery PAS-ci, Gdańsk[2], Poland
Condensing Heat Exchanger in Coal-Fired Power Plant

15.40 *Break*

16.00 **József Nagy, Béla Tolvaj, Szilárd Szabó** University of Miskolc, Hungary
Thermodynamic Properties of Refrigerants

16.20 **Sándor Hajdú, Tibor Czibere, László Kalmár** University of Miskolc, Hungary
Hidraulic Design of an Impeller of a Cross-Flow Turbine

16.40 **Dávid Czeglédi, István Lakatos, József Polák** Széchenyi István University, Hungary
Operation of Diesel Engines for Commercial Vehicles Using Alternative Fuels

17.00 **Dávid Czeglédi, István Lakatos, József Polák** Széchenyi István University, Hungary
Research of Electric Motor Mechanical Losses.

17.20 *Summary*

HEALTH AND MEDICAL SCIENCES SYMPOSIUM

Chairman: Olivér RÁCZ *professor*

H: HEALTH AND MEDICAL SCIENCES

VENUE: **Room BOSCH**, Bld. **B3-B4.** 2nd floor, 207.
Chairman: **Olivér RÁCZ** *professor*
Secretary: **Andrea LUKÁCS** *assist. professor*

Date: **April 9, 2015**

14.00 **Veronika Rajki[1], Henriett Éva Hirdi[2], Judit Mészáros[1]** Semmelweis University[1], National Tax and Customs Administration of Hungary Training[2], Hungary
Hungarian Health Care Workers' Attitudes and Habits Regarding Blood Donation Based on a Survey

14.20 **Veronika Rajki, Mária Csóka, Judit Mészáros** Semmelweis University, Hungary
Professional Knowledge- and Practice Mapping Among Nurses Regarding Transfusion Therapy – National Study

14.40 **Rita Dénes** Budapest University of Technology and Economics, Hungary
Healthcare Quality Development in the Light of the Demographic Situation of Hungary

15.00 **Krisztina Mayer, Andrea Lukács, Emőke Kiss-Tóth** University of Miskolc, Hungary
Interrelation of Sensation Seeking, Resilience and Achievement Motivation with Risk-Taking Behaviour

15.20 **Eva Sedlákova[1], Jan Sedlák[2], Olivér Rácz[1,3], Bertalan Fodor[3]** Safarik University, Slovakia[1], East Slovakian Institute of Cardiovascular Diseases, Slovakia[2], University of Miskolc, Hungary[3]
MicroRNA and Their Possible Therapeutic Applications in Cardiovascular Disease

15.40 *Break*

16.00 **Frantisek Nistiar[1], Olivér Rácz[1,2], Agnesa Lukacinová[1], Jan Kolesár[1], Bertalan Fodor[2]** Safarik University, Slovakia[1], University of Miskolc, Hungary[2]
The Role of Microbiome in Health and Disease

16.20 **Olivér Rácz[1,2], László Barkai[1,3], Frantisek Nistiar[2]** University of Miskolc, Hungary[1], Safarik University, Slovakia[2], Velkey László Center of Child Care, Miskolc, Hungary[3]
Advance in Stem Cell Research and the Perspectives of Diabetes Mellitus Cure

16.40 **Denisa Maceková[1], Stefan Lukacin[2]** Safarik University, Medical School[1], 1st Private Hospital Kosice-Saca Ltd.[2], Slovakia
Role of Oxidative Stress and Antioxidant Systems in Preeclampsia

17.00 **Bertalan Fodor[1], Bettina Kovács[2], Anett Kovács Bartókné[3], Andrea Lukács[1], Olivér Rácz[1,4]** University of Miskolc[1], B-A-Z County Teaching Hospital[2], Velkey László Center of Child Care, Miskolc[3], Hungary, Safarik University, Slovakia[4]
The Assessment of Glomerular Filtration Based on Serum Cystatin C

17.20 *Summary*

OPTIONAL PROGRAMME

The Organisational Committee of the Conference would like to make your stay more pleasant by organising the

Gala Dinner
19.00, 9 April 2015

Venue: University Dining Hall (*Entry: only with invitation cards*)

Programme

19[00]- 19[20]	***Performance of the Bartók Béla Institute***
19[30]- 19[40]	***Inauguration of the honorary members of the conference***
20[00]- 21[30]	***Dinner***

Excursion to TOKAJ

10 April 2015

Departure:	13.00
Arrival in Miskolc:	22.00
Meeting place:	outside the Main Building entrance of the university

TRITIUM PEAK METHOD AND $^{3}H/^{3}HE$ DATING TECHNIQUE USE FOR ESTIMATING SHALLOW GROUNDWATER RECHARGE

László Kompár[1], Péter Szűcs[2], László Palcsu[3], József Deák[4]
research fellow[1], DSc, head of department, professor[2]
PhD, head of department[3], PhD, manager[4]
Department of Hydrogeology and Engineering Geology, University of Miskolc [1 2],
MTA-ME Research Group of Geoengineering[2],
Institute for Nuclear Research, Hungarian Academy of Sciences[3], GWIS Ltd.[4]

INTRODUCTION

The Danube-Tisza Interfluves is one of the largest recharge areas in Europe. The aim of this study was to build a flow and transport model for an agricultural field. In previous studies in Méntelek the derived average groundwater recharge has been obtained to be 53 mm/year, and the vertical dispersivity is 0.3 m [1]. Close to this natural environment, about 16 km apart, there is an agricultural field close to a larger city, Kecskemét, where artificial irrigation occurred between the middle 1970 and 1980 (Fig. 1-2.).

Fig. 1. The location of the agricultural research site in Hungary
(source: Google Earth, author: László Kompár, 2015)

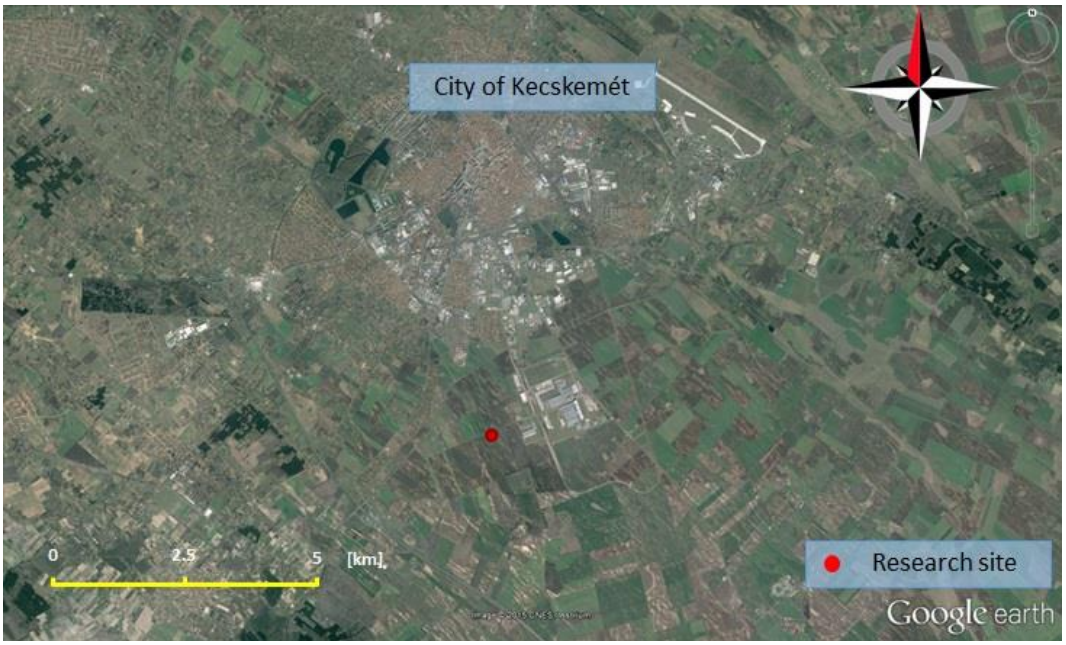

Fig. 2. The location of the agricultural research site near Kecskemét (source: Google Earth, author: László Kompár, 2015)

This irrigation water was supposed to be free of tritium since it had been used for drinking exploited from artesian wells. Afterwards, the contaminated domestic sewage water was treated and purified and then irrigated to the field. The annual precipitation of this site is 506 mm, while since 1974 about 300-400 mm/year water was used for irrigation. In 2001 6 wells were installed on the site (Fig. 3.).

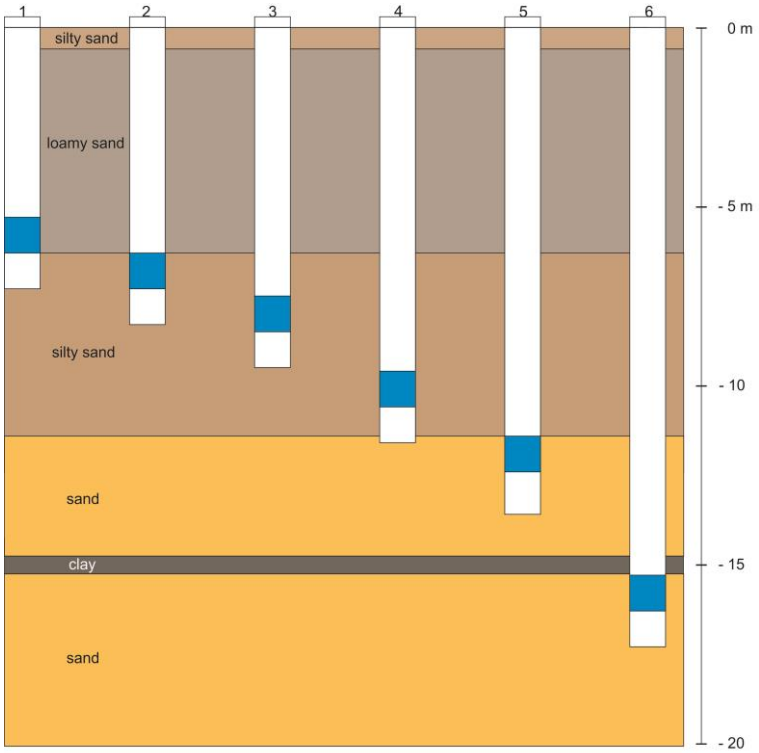

Fig. 3. The well group near Kecskemét (screened section with blue) (author: László Kompár, 2015)

MATERIAL AND METHOD

Tritium (^{3}H), the radioactive isotope of hydrogen with a half-life of 12.32 years [2] has been extensively used for the groundwater studies. Most studies used the ^{3}H release from nuclear bomb tests in the atmosphere as a time marker. In addition, ^{3}H has been combined with its decay product $^3He_{trit}$ (tritiogenic ^{3}He) to determine the so called ^{3}H/^{3}He water age [3] [4] [5].

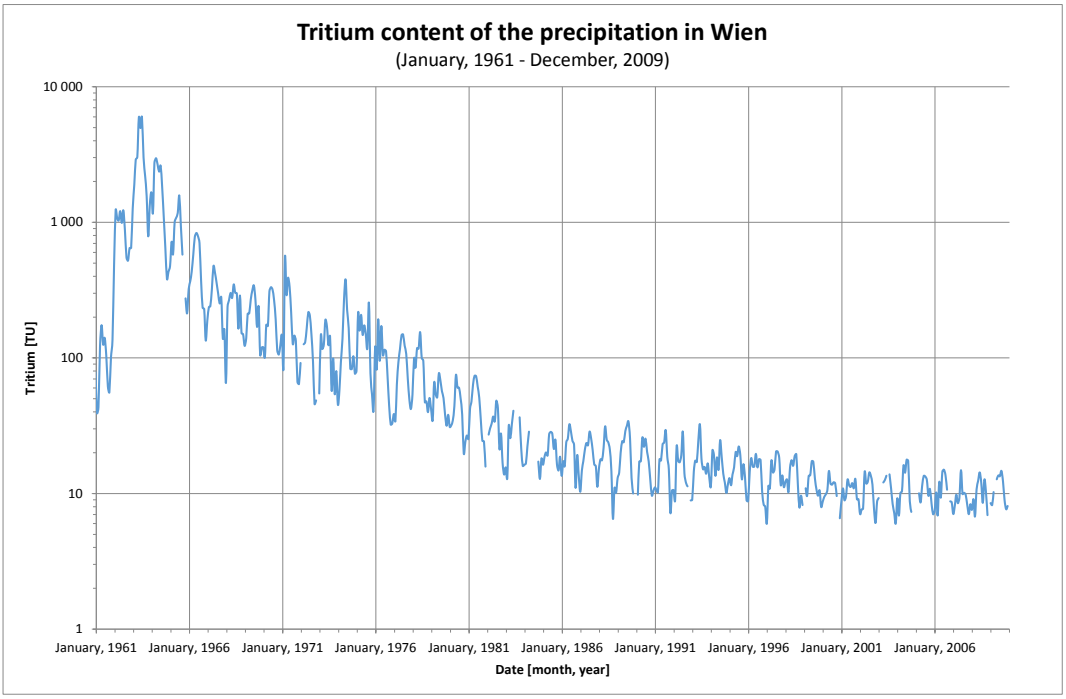

Fig. 4. The tritium content of the precipitation of Wien
(source: IAEA WISER database; author: László Kompár, 2015)

There are some cases, when ^{3}H alone cannot be used. The ^{3}He/^{3}H ratio provides information on the groundwater age. The concentration of dissolved ^{3}He increases as soon as the groundwater is isolated from the atmosphere, because ^{3}He produced by ^{3}H decay can no longer escape. Therefore the $^3He_{trit}$/^{3}H ratio is a measure for the time elapsed since a water parcel was last in contact with the atmosphere. The ^{3}H/^{3}He age τ is defined as [6]:

$$\tau = \frac{1}{\lambda}\ln\left(1 + \frac{^3He_{trit}}{^3H}\right) \quad (1)$$

where λ=0.0556 yr^{-1} is the decay constant of ^{3}H and [^{3}H] the measured ^{3}H concentration. It is usually expressed in tritium units (TU). 1 TU corresponds to a ^{3}H/^{1}H ratio of 10^{-18} and decays to 2.488 $\times 10^{-15}$ cm^{3}STP(^{3}He)/g(H_2O). [$^3He_{trit}$] is defined as the fraction of the total ^{3}He produced by ^{3}H decay, i.e. the difference between the measured concentration [$^3He_{meas}$] and the concentrations of all other ^{3}He components ([$^3He_{eq}$]: equilibrium, [$^3He_{air}$]: excess air and [$^3He_{ter}$]: terrigenic):

$$^{3}He_{trit} = {}^{3}He_{meas} - {}^{3}He_{eq} - {}^{3}He_{air} - {}^{3}He_{ter} \quad (2)$$

RESULTS

We took samples for isotope-hydrological investigations including ^{3}H, noble gases, CFC's, stable isotopes, ^{14}C and water chemistry. The tritium bomb peak could be obviously observed looking at the tritium values determined in the year 2001, but the effect of the tritium-free irrigation water could be also seen in the shape of the tritium peak (Fig. 5.).

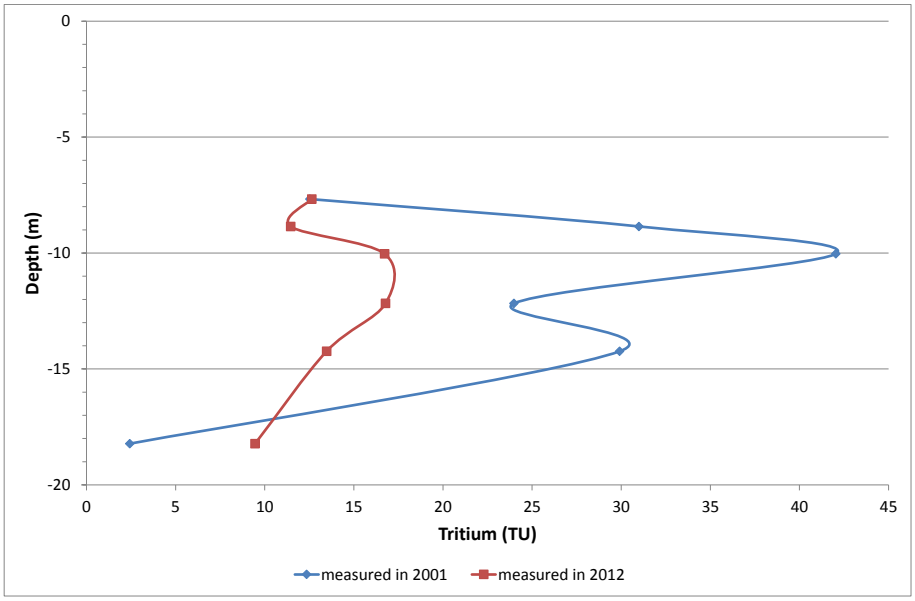

Fig. 5. The tritium profiles at the well group near Kecskemét (author: László Kompár, 2012)

From the two tritium profiles taken in 2001 and 2012 it can be seen that the tritium concentrations of almost all groundwater samples have been changed since 2001 [7]. The maximum values at 10 and 14 m depths have decreased, while in the deepest well the tritium has elevated. These effects can be explained on one hand by the hydrodynamic dispersion and on the other hand by the radioactive decay of tritium. Hydrodynamic flow models will be used to reveal how groundwater is moving, and what recharge rates are reliable to this field.

To improve the age estimation of the groundwater, we attempted to use the $^{3}H/^{3}He$ dating of the water. The tritium amount of groundwater samples was determined using the ^{3}He-ingorwth method [8], the noble gas concentrations were determined mass spectrometricaly [9]. However, the dissolved noble gases in the water samples show a degassed pattern, as if some of the noble gases have been lost (Fig. 6.). The lighter the noble gas the more significant the lack of the concentration: this is clear evidence that solubility driven degassing is going on in the aquifer.

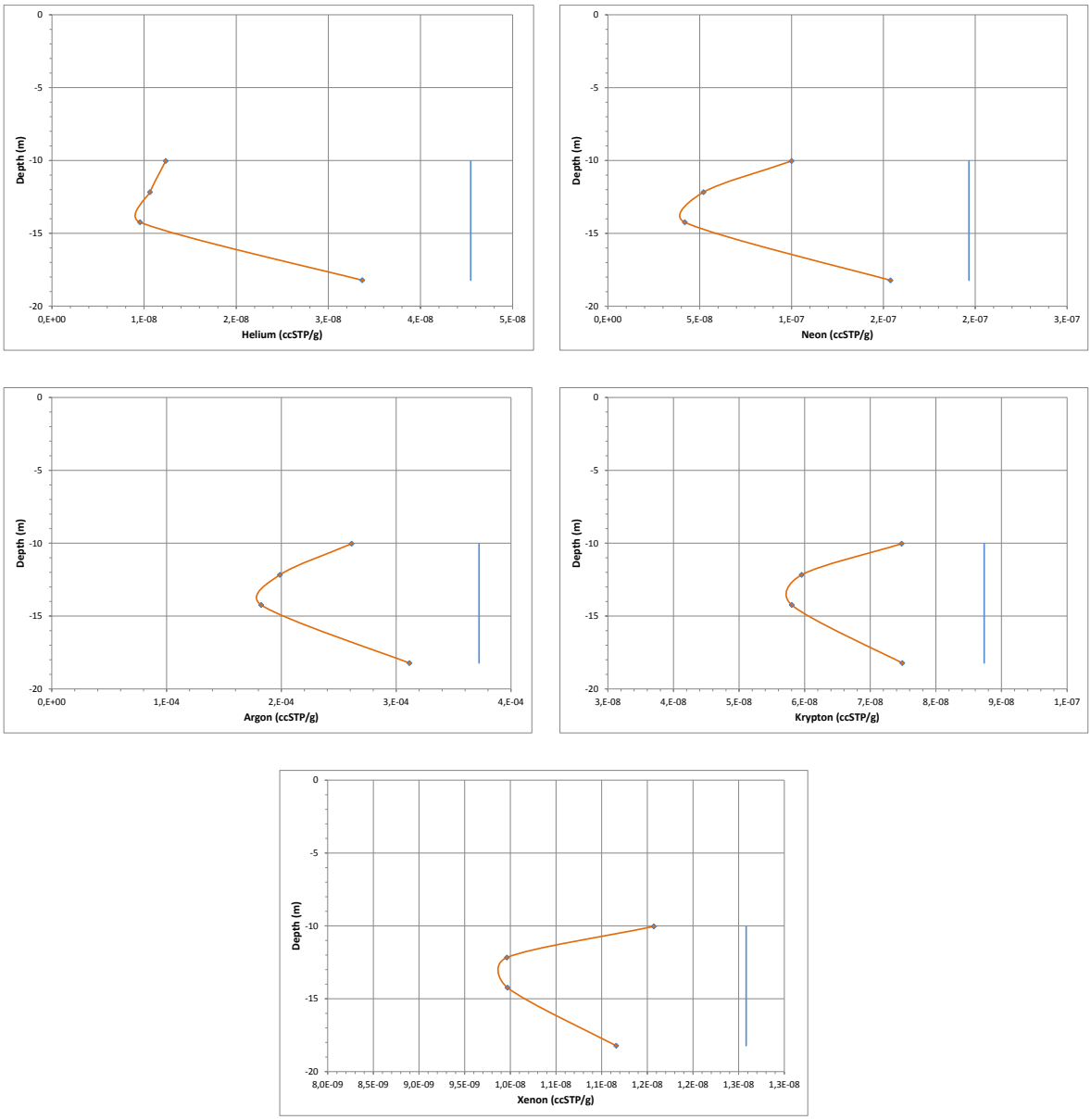

Fig. 6. Noble gas concentrations of the groundwater samples (orange line) and AEW (air equilibrated waters, blue line)
(the authors own figure)

It might happen when gas formation occurs in the saturated zone, and small noble gas free gas bubbles (for example: nitrogen from denitrification) are entrapped between the soil particles. In such circumstances, noble gases dissolved in the groundwater are diffusing out to the gas phase until new solubility equilibrium has been reached. The main problem with degassing effects is that $^{3}H/^{3}He$ dating cannot provide definite apparent water ages since it is not known how tritiogenic ^{3}He has been affected. If the degassing occurs at time zero (t=0), and then there is not any further noble gas loss, all tritiogenic ^{3}He remain in the water phase. However, if degassing processes is going on along the flow path, the produced ^{3}He can escape from the water and a portion accumulates in the gas phase, which is not included in the groundwater samples. In this case two $^{3}H/^{3}He$ apparent water age can be provided, a minimum and a maximum age. Fig. 7. shows the

$^3He/^4He$ isotope ratios (expressed in R/R_a, i.e. compared to the atmospheric ratio), the minimum ages of the water, and the sum of the tritium and the tritiogenic ^3He. These ages have been calculated under the assumption that the tritiogenic ^3He has suffered the same degassing pattern as the whole helium amount has. It can be seen that the age is increasing with the depth (that is what we have expected). In addition, the sum of the tritium and the $^3He_{trit}$ has reached the maximum values between 14 and 18 m depths. It shows that the bomb peak tritium seems to be here.

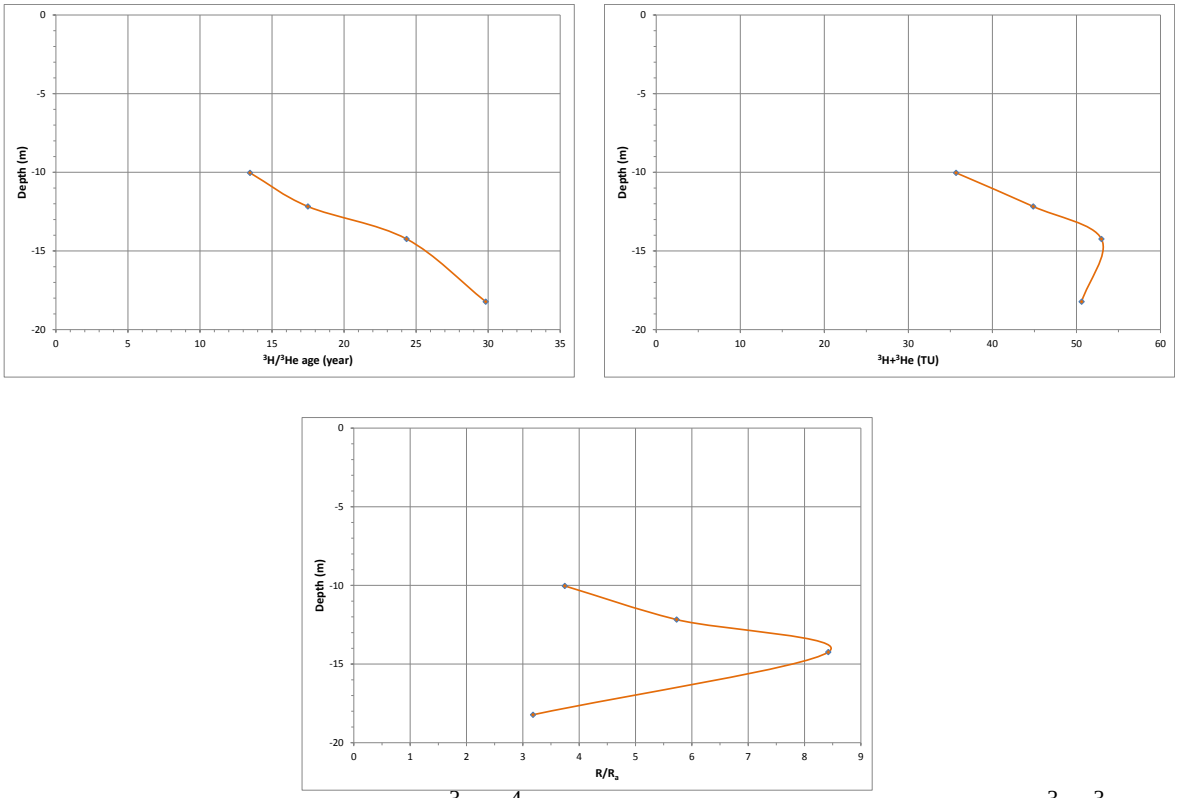

Fig. 7. R/Ra ratios (R and Ra: $^3He/^4He$ in the samples and air); minimum $^3H/^3He$ apparent water ages; the sum of ^3H and $^3He_{trit}$ in TU
(the authors own figure)

In the next, other tracers will be measured so that the age distribution can be estimated better. Concentrations of CFC's are less sensitive to degassing effects, hence CFC ages of the water samples will contribute to the more realistic age determination of these waters.

ACKNOWLEDGMENT

The research was carried out in the framework of the Sustainable Resource Management Center of Excellence at the University of Miskolc, as part of the TÁMOP-4.2.2/A-11/1-KONV-2012-0049 „WELL aHEAD" project in the framework of the New Széchenyi Plan, funded by the European Union, co-financed by the European Social Fund.

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