



ASSOCIATION OF CHEMISTRY AND THE ENVIRONMENT NEWSLETTER N° 10

May, 2008

ACE WEBSITE

Dear Colleagues. The new ACE website is now up and running. It has taken a bit longer than anticipated but we were keen to ensure that the design and facilities were appropriate for the organisation's ongoing and future activities. The new website address is <http://www.europeanace.com> and there is a redirection from the old website. I would like to take this opportunity to sincerely thank my colleague, Dr Anthony Lewis, who redesigned the ACE website in 2003 and has maintained it since then.

I don't wish to explain the changes extensively but invite you to visit the website yourself to have a look. Nonetheless, a few features are worth mentioning:

ACE Homepage – this page will display announcements that members wish to publicise and I would very much like to see news coming in regularly from around the world for posting. **The success of this 'blog' is dependent on your participation so please send me anything of interest; you will be acknowledged next to the posting.**

Journal – This page is linked to the ECL site so that the abstract and author details for new 'online first' articles are published on this page. It also has an RSS feed.

Activities – This page contains a Powerpoint presentation summarising ACE activities. It is available for downloading.

Join ACE – Membership applications and renewals can now be performed on this page.

I hope that you are happy with the new site and I would very much like to have your feedback, and *plenty* of announcements for the homepage.

Mark FITZSIMONS

SOME STATISTICS ABOUT ECL

After five years of publishing *Environmental Chemistry Letters*, with three years being considered in SCI and the implementation of an electronic manuscript submission system last year, we can now have a more detailed look at our journal from a statistical point of view. Beside important characteristics like the impact factor, several other interesting aspects are deducible from these data. Some examples are presented below.

The journal profile can be illustrated by the geographical distribution of authors as given in Fig. 1. This composition clearly reflects the 'European' characteristic of ACE and also ECL.

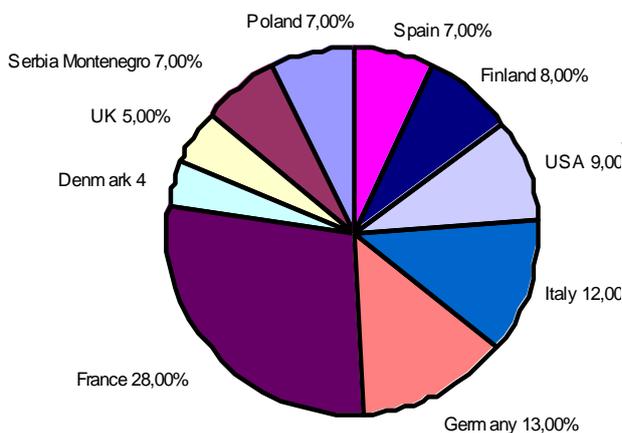


Fig. 1: Geographical distribution of ECL authors since 2004

Summarising the journals related to ECL by citations, the linkage of ECL with other journals can be followed. Obviously *Environ. Science and Technology*, published by the American Chemical Society, and *Chemosphere*, published by Elsevier, play the most important roles:

Furthermore, the development of ECL under economical aspects can be shown by recording the downloads of articles *via* Springer's web page:

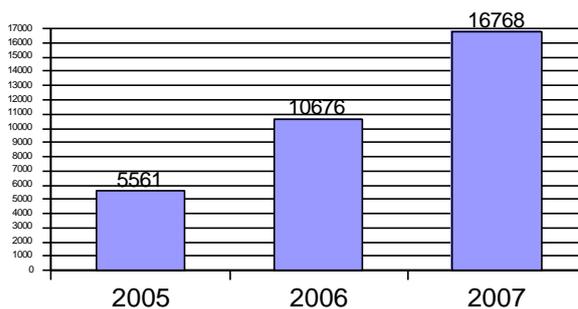


Fig. 2: Full-text downloads per year

Also the editorial work can be illustrated e.g. by the parameters given below:

And finally, a look into the future - let us have some pleasant perspectives: the number of online published papers is around 30, which is high compared to the total numbers of articles we are publishing within one year. Further on, the citations in 2008 (from January til March) have already reached the total citations of 2006 and will probably also be higher as compared to 2007. Therefore, an increased impact factor in 2008 can be assumed.

Tab 1a: Number of times articles published in the journals below, were cited in ECL 2006

| <i>Impact factor</i> | <i>Citing journals</i> | <i>citations</i> |
|----------------------|-------------------------|------------------|
| 4.0 | Environ Sci Technol | 78 |
| 2.5 | Water Res | 66 |
| 2.4 | Chemosphere | 41 |
| | Environ Chem Green Chem | 25 |
| 3.8 | Geochim Cosmochim Acta | 25 |
| 0.8 | Environ Chem Lett | 23 |

Tab. 1b: Number of times articles published in 2006 (in journals below) cited articles published in ECL

| <i>Impact factor</i> | <i>Citing journals</i> | <i>citations</i> |
|----------------------|----------------------------|------------------|
| 0.8 | Environ Chem Lett | 23 |
| 2.4 | Chemosphere | 8 |
| 1.9 | J Hazard Materials | 6 |
| 4.0 | Environ Sci Technol | 5 |
| 3.9 | Appl Catalysis B - Environ | 4 |
| | Environ Chem | 4 |

Tab. 2: Turnaround time of manuscripts at ECL

| <i>Time</i> | <i>Received to Acceptance</i> | <i>Acceptance to Pub Online</i> | <i>PubOnline to Print</i> |
|-----------------|-------------------------------|---------------------------------|---------------------------|
| Volume 3 - 2005 | 3.6 months | 2.4 months | 1.9 months |
| Volume 4 - 2006 | 2.1 months | 2.2 months | 2.7 months |
| Volume 5 - 2007 | 3.7 months | 2.2 months | 6.4 months |

Jan SCHWARZABUER

MEETINGS



8th European Meeting on Environmental Chemistry

Inverness, Scotland, UK

December 2007

In recent years, the annual European Meeting on Environmental Chemistry, EMEC has been hosted in central and southern Europe. In 2007, the meeting migrated across Europe to the north-western Atlantic margin and to the city of Inverness in the Highlands of Scotland.



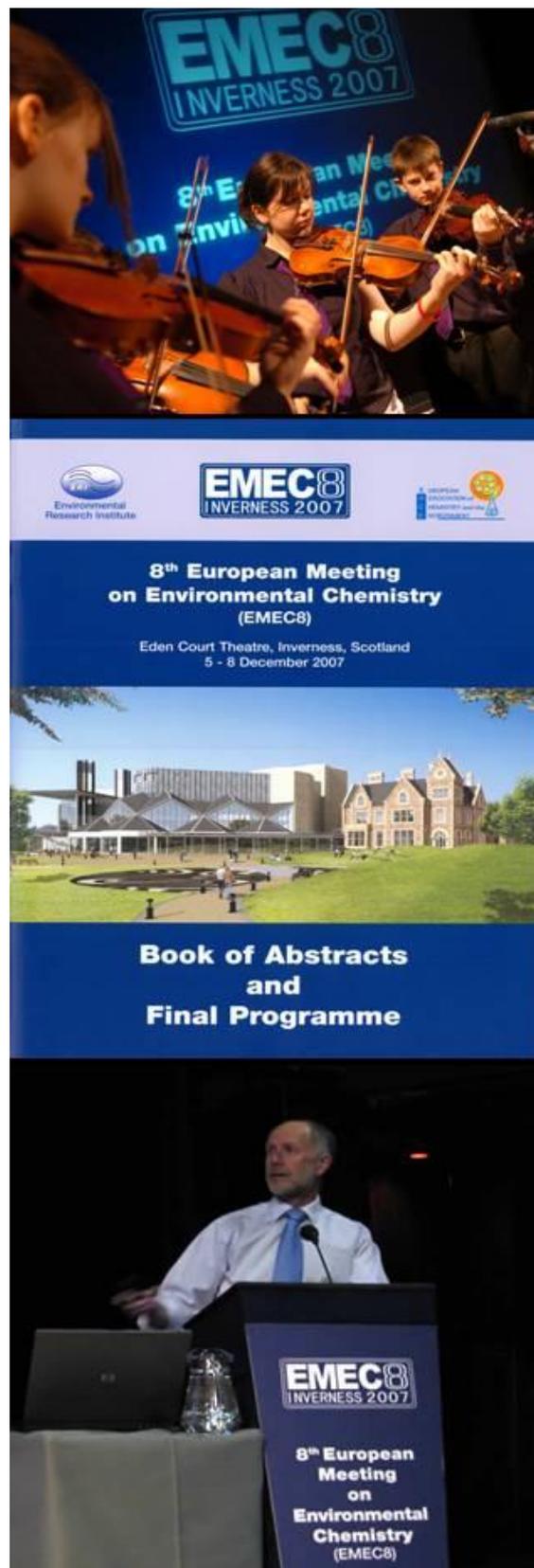
The challenge for the Organising Committee of EMEC8 was to build on the best of EMEC traditions established during EMEC7 in Brno and in earlier events in Serbia, Italy, Plymouth, Switzerland and France. We aimed to provide a combination of scientific programme and social events that would be highly rewarding and greatly enjoyable from both professional and personal perspectives.

Inverness is the self-proclaimed "Capital of the Highlands" and is Scotland's smallest and 'newest' city (being granted city status by the Queen in December 2000). Situated on the banks of the River Ness, it has been a focus for communication to, and through, the Highlands for the last two thousand years. As EMEC8 was hosted by the Environmental Research Institute of the UHI Millennium Institute, the emergent 'University of the Highlands and Islands', Inverness was a 'natural' choice for this event.

The scientific programme for EMEC8 was based at Eden Court Theatre in the centre of Inverness on the banks of the fast flowing waters of the River Ness. Eden Court had recently undergone a major programme of refurbishment and expansion. Indeed it had only re-opened a matter of days before and EMEC8 was the first conference to be held in the new setting. However, the combination of traditional and contemporary spaces provided a light and spacious conference venue for all to enjoy.

EMEC8 was held between the 5th and the 8th of December and attracted a truly international delegation of around 150 people from 28 countries. Delegates came from across Europe and from further afield including Brazil, Canada, South Korea, Japan and China. The meeting attracted

academics, researchers, private sector representatives, policy makers and regulators.



The conference programme opened with addresses from the Chair of the Organising

Committee, the Principal of the UHI Millennium Institute and the Theatre's Director. Following a musical welcome provided by a group of talented young, traditional musicians from nearby Culloden High School, the scientific programme was underway.

The scientific programme comprised a total of around 130 keynote, podium and poster presentations addressing a diverse array of issues in contemporary environmental chemistry. Sessions were dedicated to themes including Emerging Contaminants, Gas Exchange & Atmospheric Chemistry, Water Treatments & Waste Management, Analytical Methods for Environmental Science, Soil Chemistry, Pollutant Chemistry, Aquatic & Marine Chemistry, Biogeochemistry, Clean Technology & Green Chemistry.

The high quality of the presentations, both podium and poster, was evident throughout and widely commented upon. Given the interdisciplinary nature of the meeting, these presentations gave delegates much to consider, stimulating lively discussion and the exchange of ideas.

Accompanying the scientific programme was a full social programme. There was even time for Santa to stop by and deliver a little gift of 'highland hospitality' to all!

A welcome reception was followed by a civic reception at Inverness Town House hosted by Highland Council. Next, the Newton Hotel in the nearby seaside town of Nairn was the venue for the conference dinner and 'ceilidh'. Was it possible for delegates from so many nations to enjoy this traditional Scottish event? Absolutely! Following a short 'tutorial' in a few simple Scottish dance steps, the floor was filled with happy delegates from across the globe. Indeed the only 'problem' in the

end was getting people off the dance-floor and onto the buses home – a wonderful situation and testimony to a highly successful social evening!



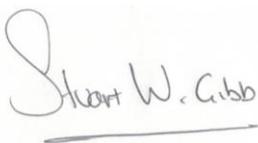
The programme concluded with a cruise along the world-famous Loch Ness and a short visit to the ruins of Urquhart Castle at sunset. While certain delegates claimed to have sighted 'Nessie' the legendary Loch Ness Monster during the trip, no-one is quite sure whether these 'visions' were aided by consumption of a little too much of the local *uisge beatha*,

'the water of life'.....the mystery goes on...

Now, some months after the event we can only hope that, if you participated in EMEC8 in Inverness, you returned home with positive impressions of a scientific conference that stimulated lively discussion and networking with colleagues from across Europe and further afield. We also hope that in the course of both scientific and social events that you were able to instigate some new collaborations and also perhaps re-energize some old ones. Lastly we hope that you felt rewarded from having spent a little time with us in the Highlands of Scotland. Certainly if the feedback is anything to go by, perhaps we achieved this!

To all who came to Inverness for EMEC8, a huge thank-you from all of the Organising Committee! Thank you for contributing to a far-reaching scientific programme of the highest quality; and thank you for engaging whole-heartedly with the social programme. The success of the event was down to you all!

It was a pleasure and a privilege to host you in all and hopefully your time and experience in Inverness will encourage you to join EMEC's journey round Europe and participate in EMEC9 in Girona in December 2008.



Stuart GIBB,

On behalf of the EMEC8 Organising Committee (Stuart.Gibb@thurso.uhi.ac.uk)

FORTHCOMING MEETINGS

9th EUROPEAN MEETING ON ENVIRONMENTAL CHEMISTRY

Dear colleagues,

It is my great pleasure to invite you to Catalonia to participate in the 9th European Meeting of Environmental Chemistry (EMEC9). The event will be held in Girona from 3-6th December, 2008 and will be hosted by the research group Metals and Environment at the Escola Politècnica Superior of the Universitat de Girona.



Girona is a small, quite, modern and accessible city, with a lot of places of interest that can be reached by walking from the city centre: The Cathedral is the result of various superimposed styles (c. XI-XVIII) and its single nave is the broadest of gothic architecture in the world. The call, the old Jewish quarter, is a maze of cobbled streets. The Jewish History Museum is a testimony to the

importance of the Jewish community that occupied this part of Girona until 1492.

The conference will be based at the Escola Politècnica Superior on the Campus Montilivi of the Universitat de Girona.

As with previous EMECs, EMEC9 will provide a forum for exchange of ideas on recent advances in research and development in environmental chemistry and technology and their links to other disciplines.

The web site for the conference is live at <http://www.udg.edu/deqata/mma/emec9> and will shortly display information on the scientific and social aspects of the meeting, as well as travel details.

Girona has a regional airport served mainly by Ryanair. You can also fly to Barcelona and drive to Girona (one hour drive) or take the train to Girona. Girona railway station is located in the City Centre.

I very much hope that you will join us for EMEC9 and I look forward to welcoming you to Girona to enjoy the scientific programme and social events as well as the cultural and architectural heritage of Girona.

Isabel Villaescusa

Chairman of 9th European Meeting on Environmental Chemistry (EMEC9)

(Isabel.Villaescusa@udg.edu)

ENVIRONMENTAL CHEMISTRY & TECHNOLOGY AT THE BRNO CONFERENCE "CHEMISTRY AND LIFE 2008" (CZECH REPUBLIC)

The 4th Meeting on Chemistry & Life will be held from September 9 to September 11, 2008, at the Faculty of

Chemistry, Brno University of Technology under the auspices of the rector of the Brno University of Technology, prof. Karel Rais, MBA. It draws upon the tradition of three annual meetings providing a forum for exchange of ideas on recent advances in research and development in chemistry, biotechnology, materials science and environmental technology for people from industry, research and academia. The town of Brno, in which is the conference organized, represents the educational and cultural centre of the South Moravian part of the Czech Republic.

The Conference topics, which reflect the specialization of various departments of the Faculty of Chemistry, are:

- Chemistry of inorganic materials
- Chemistry of organic materials
- Physical & Applied Chemistry
- Environmental Chemistry & Technology
- Polymers and polymer composites
- Food Chemistry & Biotechnology

The section of Environmental Chemistry and Technology is considered as very attractive; almost 100 contributions have been registered in this section till now, the total number of preliminary registered participants exceeded 300. The importance of the environmental section is also emphasized by the fact that 2 plenary lectures in the Conference scientific program were devoted to this field. These lectures will be delivered by ACE members – Jan Schwarzbauer will give a speech entitled "Organic anthropogenic contaminants in river systems - complementary environmental approaches", and the lecture of Branimir Jovancicevic will focus on pollutants of petroleum origin in the environment. Full

texts of accepted lectures and posters will be published in English in a special issue of the Chemické listy Journal (ISSN 0009 – 2770).

The social program of the conference includes the welcome drink organized at the Faculty of Chemistry on September 9, 2008, and the conference dinner on September 10, which will take place in the wine cellars in the village of Mutenice, which were established as early as in 1930s.

The registration is still open and all ACE members are cordially invited to visit the town of Brno and to attend the 4th **Meeting on Chemistry & Life**. Detailed information is available at the Conference web pages http://www.fch.vutbr.cz/chl_2008/.

Josef CASLAVSKY

ENVIRONMENTAL CHEMISTRY AS SENTINEL FOR CLIMATE CHANGE IN THE ARCTIC ATMOSPHERIC ENVIRONMENT

Climate scenarios in the Arctic

The currently released up-dated reports of the Arctic Climate Impact assessment (ACIA 2005) and the Intergovernmental panel of Climate change (IPCC 2007) confirmed that the strongest changes in ambient temperature are expected in the Arctic. Within the next generation an average ambient temperature increase of around 2.5 °C is expected. This will consequently lead to a total loss of the summer ice coverage in the central Arctic with dramatic consequences for the entire ecosystem including top predators like polar bears (*Ursus maritimus*), seals (*Phoca spec.*) and glaucous gulls (*Larus hyperboreus*). Already today, significant changes in the Arctic environment have

been observed, in 2007 for the first time, (the North-West passage along the Canadian–Greenland borders has been monitored ice-free for almost the whole year until October 2007).

Pollutant transport

Although still one of the most pristine regions on our globe, today the Arctic is today considered as polluted mainly through long-range transported pollution for industrial contaminant sources. It is well known today, that the Arctic (abiotic) environments generally exhibit lower levels of contamination than those found in regions closer to major sources, such as most of Europe, USA and Eastern Asia. However, certain characteristics of the Arctic (cold, ice and snow cover, extended periods of darkness) mean that the Arctic has the potential to accumulate globally transported environmental contaminants, including a number of Persistent Organic Pollutants (POPs). Processes that affect contaminant movement within and between different environmental compartments, and thereby determine to a large degree their transport pathways, are complicated and complex. These processes and pathways are influenced by a number of physical factors, such as temperature, precipitation, winds, ocean currents, and snow and ice cover, all of which are subject to climate-related perturbations. It is, thus, obvious, that also combined long-range transport processes are influenced by the global climate change processes. The potential changes of transport processes by ambient temperature change and associated changes in hydrology, oceanography and weather patterns are comprehensively described in a recently published review paper (Macdonald et al. 2005).

Atmospheric transport processes

Today long-term monitoring data on the distribution persistent organic pollutants (POPs) in the Arctic atmosphere exists for two atmospheric monitoring stations in the Arctic. The Canadian Alert station (Ellesmere Island) and the Norwegian Zeppelin monitoring station have collected POP atmospheric concentration data for selected POPs over a period of more than 15 years (AMAP 2004). The thorough inspection of this long-term data sets allow already an effective evaluation of climate influences on atmospheric pollutant transport with specific emphasis on POPs.

As a part of the ocean- atmosphere coupling in the Northern hemisphere, incl. atmospheric pressure driven changes in the ocean currents have been observed and described (ACIA 2005). The North Atlantic oscillation (NAO) is a climatic phenomenon in the North Atlantic Ocean of fluctuations in the difference of sea-level atmospheric pressure systems between the Icelandic Low and the Azores high. It, consequently, governs the strength and direction of westerly winds across the North Atlantic. NAO is strongly correlated with the Arctic oscillation (AO). These pressure driven changes are considered as long-term cycles and are described with a selection of meteorological and oceanographic parameters, summarized as NAO-index and AO index. Based upon these phenomena, during the past five years an increased inflow of warm Atlantic waters, up-welling in the Western Spitsbergen currents lead to complete ice-free open waters including the inner fjords along the western Spitsbergen coast. These changes in winter ice conditions are clearly climate related with consequences also for the levels and distribution of environmental pollutions in the local Spitsbergen Arctic environment and the Atmosphere.

For a selection of contaminants such as polychlorinated biphenyl congeners (PCB) and hexachlorobenzene (HCB) a distinct increase in atmospheric levels has been observed (Fig. 1) in atmospheric data from Zeppelin but not for Alert (which has no direct contaminant influence from potential marine ocean-related sources). The Zeppelin monitoring station is located 475 m above sea level at Ny-Ålesund on the west coast of the Spitsbergen Island (Svalbard Archipelago, 79 ° N).

The observed distinct decreases are considered as an increased influence of continuous contaminant evaporation (directly or through aerosol creation) from the ocean surface along the West Spitsbergen coast and those considered as a sentinel indicator process for changes ocean current systems and linkage between atmospheric and ocean currents interactions defined through indices like NAO and AO.

Perspectives

Based upon today's scientific knowledge, it is expected that atmospheric and ocean-borne long range transport processes for the distribution of pollutants into and throughout the Arctic will be influenced by climate change processes. Meteorological as well as ocean-related processes will change and, thus, also transport characteristic parameters like seasonality, evaporation from ocean surfaces (secondary sources), distance to primary sources, frequency of long-range transport (LRT) events etc. (Macdonald et al., 2005). Based upon already ongoing atmospheric and marine monitoring program, which are co-ordinated through the circum-Arctic Arctic monitoring and Assessment programme (AMAP, Oslo, Norway), potential changes can easily be detected and monitored through a combination of environmental chemical,

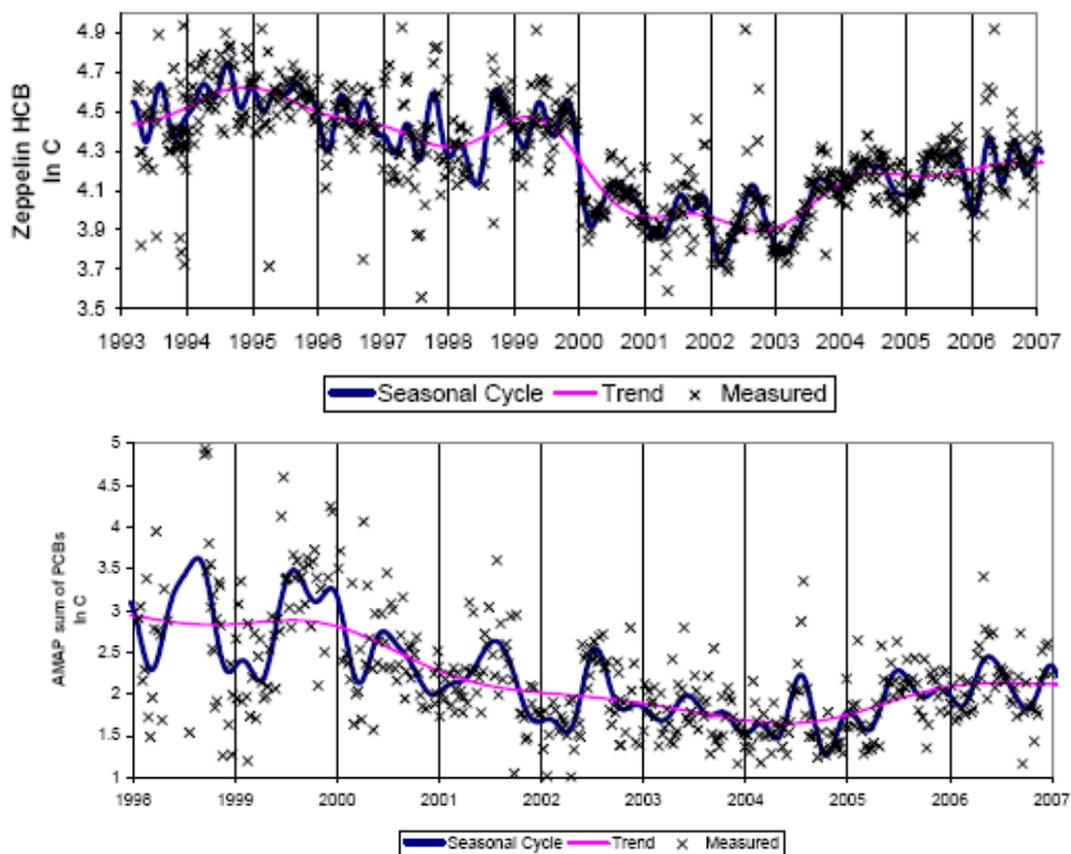


Figure 1: Digital filtration (DF) statistical trend analysis using DHR (Dynamic Harmonic Regression) according to Becker 2006. The evaluation was done for PCB (Sum 10 congeners) and HCB. Please note: Concentrations are given as $[\ln \text{pg/m}^3]$.

meteorological and oceanographic methods. The data collected so far is constantly fed into modern modeling tools for scenario assessment and model evaluations. Thus, environmental chemistry combined with other interdisciplinary scientific disciplines is expected today to play a significant role in identifying and scientifically evaluate the impact of climate change on the sensitive Arctic marine and terrestrial environment.

Aknowledgement

The here presented evaluation has been supported financially through the Nordic Council of Ministers (NMR)/ Arctic Monitoring and Assessment Programme

Project: *Influences of Climate change on long-range transport of pollutants.*

Dr. Hayley Hung (Environment Canada, Meteorological Services) helped with the DHR evaluation of the POP trends from the Zeppelin station (Svalbard, Norway).

References:

- ACIA, 2005. Arctic Climate Impact Assessment. Cambridge University Press. 1042 pp.
- AMAP, 2004. AMAP Assessment 2002: Persistent Organic Pollutants (POPs) in the Arctic. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. xvi+310 pp.

Becker, S., Halsall, C.J., Tych, W., Hung, H., Attewell, S., Blanchard P., Li, H., Fellin, P., Stern, G., Billeck, B., and Friesen, S., 2006. Resolving the long-term trends of polycyclic aromatic hydrocarbons in the Canadian Arctic Atmosphere. *Environ. Sci. Technol.* 40 (10), 3217-3222.

IPCC, 2007, *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp.

Macdonald, R.W., Harner, T., Fyfe, J. (2005) Recent climate change in the Arctic and its impact on contaminant pathways and interpretation of temporal trend data. *Sci. Total Environ.*, 342, 5-86.

Roland KALLENBORN

5TH SYMPOSIUM ON CHEMISTRY AND THE ENVIRONMENT, SERBIA (MOUNTAIN TARA)

The 5th Symposium on Chemistry and the Environment organized by the Serbian Chemical Society, Environmental Chemistry Section, is nearing, scheduled to be held on 27th to 30th May 2008 on Mt. Tara in Serbia. This is a national conference with international participation.

The president of Organizing Committee is Dr Bojan Radak. The president of Scientific Committee is Dr Branimir Jovancevic.

The keynote speakers invited to give talks at the symposium are both from Serbia and abroad. Serbian professionals in this field

will greatly benefit from information and insight the speakers will provide, as care was taken to cover most interesting areas and choice of competent professionals for the task. The list of the keynote speakers is the following (with respective titles of lectures in quotation marks):



1) Prof. Philippe Garrigues, Director of the Institute of Molecular Sciences, University of Bordeaux, France, Chairman of Division of Chemistry and the Environment, European Association for Chemical and Molecular Sciences, "What is new in environmental chemistry"

2) Prof. Albert Lebedev, Moscow State Lomonosov University, Chemistry, Russia, "Modern trends and perspectives of mass spectrometry"

3) Mr. Ilija Andjelković, Director General of the Pančevo Oil Refinery, Serbia, "Pančevo Oil Refinery and environmental protection".

4) Mr. Mihajlo Gavrić, Electric Power Industry of Serbia, Environmental Division, "Serbia in compliance with Kyoto protocol regulations".

5. Prof. Josef Caslavsky, Brno University of Technology, Faculty of Chemistry, Czech Republic, "Degradation products of synthetic polymers: Potential threat for the environment".

6. Prof. Trebše Polonca, University of Nova Gorica, Laboratory for Environmental Research, Slovenia, "Organophosphorus and neonicotinoid insecticides: degradation and toxicity monitoring".

7, Dr. Anatoly Golovko, Institute of Petroleum Chemistry, Russia, "Study of Activity Soil Microflora on to Liquidation of Oil Contaminations at Natural Reduced Temperatures".

8. Dr. Jiri Zima, Department of Analytical Chemistry, Charles University in Prague, Faculty of Science, Czech Republic, "Carbon Paste Electrodes in Analysis of Environmental Pollutants".

9. Prof. Ivan Gržetić, Faculty of Chemistry, University of Belgrade, Studentski trg 12-16, Belgrade, Serbia, "POP chemicals and Stockholm Convention".

10. Dr. Dragana Djordjević, Centre for Chemistry, IHTM, Belgrade, Serbia, "Models of chemical mass ballance applied in emission source identification, control of identified sources and effect of improving the ambient air quality in Pancevo".

11. Dr. Danijel Vrhovsek, Company for Applied Ecology, "Water Ecology".

12. Mr. Predrag Manojlović, Deputy Permanent Representative of the Republic of Serbia to the OPCW, "The role of the CWC and OPCW in the future - outcomes of the Second Review Conference of the States Parties to the OPCW"

13. Prof. Miroslav Vrvić, Faculty of Chemistry, University of Belgrade, Studentski trg 12-16, Belgrade, Serbia, "Biotechnology of the environment - the real green chemistry: some proofs".



Reception of the abstracts has now been closed, with 140 abstracts of the symposium contributions received. The organizers are happy to find that the expectations have been fulfilled by this number of contributions. The statistics of contributions vs. the topics/sections of the symposium is the following:

| | |
|--|----|
| Methods of determining and monitoring environmental pollution. | 32 |
| Transformation and dispersion of harmful substances. | 39 |
| Effects of harmful substances on biochemical processes. | 5 |
| Effects of pollutants on materials. | 0 |
| Mitigation of negative anthropogenic effects on the environment. | 7 |
| Scrubbing systems, novel clean technologies and equipment. | 23 |
| Radiochemical pollution. | 11 |
| Environmental protection and education. | 0 |
| Current problems and handling of environmental protection in industry. | 4 |
| Standards, legislation, and terminology in environmental protection. | 5 |
| Green chemistry | 2 |

All information on the symposium are available at:

<http://www.vin.bg.ac.yu/envirotara>.

Bojan RADAK

POSTDOCTORAL TRAINING COURSE AT RWTH UNIVERSITY IN AACHEN

From the beginning of October 2007, until the end of March 2008, we have attended postdoctoral training course in Laboratory for organic-geochemical analysis, at the Institute of Geology and Geochemistry of Petroleum and Coal in Aachen, Germany, under the supervision of Dr. Jan Schwarzbauer. Our stay was sponsored by the Ministry of Science of the Republic of Serbia. We enjoyed our stay very much and it was very good professional, as well as private experience, for both of us. Aachen is a delightful small town in the North-Rhine-Westphalia region of western Germany with a population of nearly 260000. It is the westernmost city of Germany, located along its borders with Belgium and the Netherlands, 65 km west of Cologne. It is much visited because of its associations with Charles the Great (Charlemagne). Aachen was chosen by Charlemagne as one of his preferred winter palace from the end of 8th century and after that was developed and extended more and more into his actual residence. Charlemagne has left his mark throughout the city. The cathedral - the first monument in Germany to be included in the UNESCO Cultural Heritage list - and the gothic City Hall in which 32 German kings celebrated their coronations still form the heart of Aachen's old city centre. Today, Aachen unites tradition with progress. It is a modern city, open to the world, with political, economic and cultural contacts that reach far beyond Germany's borders. Aachen has also much to offer in respect of quality of life. The city has a flair and atmosphere of its own. The attractive layout of the old city centre, the important historic monuments, the wells and baths over the hottest natural springs in Europe, the bustling activity in the streets and squares, the cultural

diversity and quality (Ludwig Forum for International Art, Suermondt-Ludwig Museum, Couven Museum, Burg Frankenberg Museum, International Newspaper Museum) and the many recreational and leisure activities make Aachen an exciting and pleasing whole. The Carolus-Therme is one of the most modern and attractive thermal bath in Europe.

We spent six months at Rhineland-Westphalian Technical University (RWTH) in Aachen, the largest university of technology in Germany and one of the most renowned in Europe, which currently has around 28000 enrolled students. Every year, numerous international students and scientists come to the University to benefit from its high quality courses and excellent facilities, both of which are recognized at an international level.



Vesna and Malisa Antić: view from the Lusberg, the hill beyond Aachen

Our investigation was related with development of the methods for identification and quantification of water soluble polymers in polluted environmental samples. Everyday growth of polymers production and their application leads to increasing pollution of the environment. It is the reason why development of new methods for identification and isolation of polymers, as well as following the fate of polymeric pollutants in the environment is necessary.

The idea for investigations related with chemistry of synthetic polymers and environmental chemistry was issued owing to the earlier successful cooperation of the group of Dr. Jan Schwarzbauer from the Institute of Geology and Geochemistry of Petroleum and Coal in Aachen with Dr. Branimir Jovančičević and colleagues from the Institute of Chemistry, Technology and Metallurgy and the Faculty of Chemistry in Belgrade.

The research during our postdoctoral training course involved the usage of powerful combination of pyrolysis with standard gas chromatography/mass spectrometry (GC/MS) technique for determination of poly(vinylpyrrolidone) (PVP). PVP is highly polar, amphoteric polymer which finds application in wide variety of industries, including production of cosmetic, detergent, pharmaceutical and personal care products. The fate of PVP in the environment, after very intensive usage in the industry as well as in households was very rarely investigated until now. From environmental chemistry point of view, PVP can be especially interesting, whereas its presence can contribute to arising different complexes and aggregations. Because of good solubility in water and high complexing ability, PVP can potentially influence to the fate of many other substances in environment. We developed efficient "off-line" pyrolytic method for quantitative determination of PVP in some commercial products, as well as in environmental samples. The samples containing PVP were heated to a high temperatures (above 400 °C) to cause rapid polymer fragmentation into volatile products – compounds capable of being analyzed using GC/MS. The fragmentation of PVP was reproducible and generated specific analytes which could help to quantify the amount of polymer in the original sample. Degradation products,

dissolved in appropriate solvent, were identified by GC/MS. The quantification was based on the main degradation product, *N*-vinylpyrrolidone.

We believe that our research in Aachen gave essential contribution to connection of synthetic polymer chemistry with environmental chemistry. During our stay, we acquired new experience related to isolation of polymeric pollutants from environmental samples and to their analysis by modern instrumental techniques. The great experience of Dr. Jan Schwarzbauer and his coworkers in the field of environmental chemistry was of invaluable essence for us, since they permanently improve existing methods and develop new ones for analysis of low and high molecular weight organic pollutants. We honestly believe that this research represents the beginning of much more intensive cooperation between the Institute of Geology and Geochemistry of Petroleum and Coal in Aachen with the Institute of Chemistry, Technology and Metallurgy in Belgrade and the Faculty of Chemistry in Belgrade, in the field of identification and determination of polymeric type pollutants.

Vesna and Malisa ANTIC

This Newsletter was edited by Branimir JOVANČIČEVIĆ