

JRC Newsletter

News Events Open positions

MAY / JUNE 2010



Research and innovation are key to a competitive and dynamic economy

I very much welcome the Joint Research Centre's initiative for an exhibition hosted by the European Parliament. This exhibition provides an excellent opportunity to gain first-hand knowledge of JRC's activities and of the ways it provides technical support for European Union policies.

We are living in a world of global trade, global exchange and global competition. In such a world, the key is to remain competitive, and our challenge is to make Europe fit for the coming decades. One of the key roles of the Europe Union has to be the continuous promotion of research, innovation and education, because without this, Europe will not be a success story in the 21st century.

The statistics for education in Europe are very troubling. Less than one person in three aged 25-35 has a university degree in the EU, as compared to 40% in the United States, over 50% in Japan, and 61% in Canada. One in seven of our young people drop out of school and one in four have poor reading skills, not to mention their mathematic abilities. You can not build a world class economy if 25% of our children are functionally illiterate. Our statistics in spending for Research and Development are also not good enough. We spend half of what Japan does.

I am delighted that one of the three key priorities of the EU 2020 strategy is growth based on knowledge and innovation. This is the right step in the right direction and will help to change some of these statistics. But without a clear legislative programme it is unlikely that we will succeed. This new strategy has to be as concrete, as binding and as targeted as the 1992 Single Market project was 25 years ago.

To be able to make Europe a competitive and dynamic economy in ten years time, we need to create an "Innovation Union" - otherwise we will not continue to be a world leader. In order to achieve this, there are very concrete actions to take. We need to invest more in new technologies, and, at the same time, provide for an up-to-date infrastructure - both of the modern kind of high-speed data links and energy interconnection, and the traditional kind of bricks and mortar for our roads and bridges.

We need a new, third, green industrial revolution, since this is also where the jobs of the future will be in Europe.

"To be able to make Europe a competitive and dynamic economy in ten years time, we need to create an 'Innovation Union'"

We must face up to the challenges of energy shortages so that our businesses and our citizens have secure and affordable supplies.

Today we need to shift our priorities so that we can remain competitive. We need to treat innovation and research not as a tool, but rather as the "fifth freedom" our European Union is based upon - the free movement of knowledge. This freedom has to be just as important as the four freedoms we now have - the freedom of movement of goods, services, capital and people.

The intellectual backbone of this "Innovation Union" has to be the centres of excellence which the JRC represents. It is in your laboratories, and in the networks you work with, that the innovations which make Europe competitive will be discovered.

JERZY BUZEK
President of the European Parliament

COMPETITIVENESS

<http://www.eis.eu/>

Measuring European Innovation

The JRC Institute for the Protection and Security of the Citizen (IPSC) provided statistical support to the ninth edition of the European Innovation Scoreboard (EIS), published on 17 March by the European Commission. The EIS 2009 shows that the current economic crisis may be hampering the progress in innovation performances achieved by most EU Member States up until 2008. Member States with lower levels of innovation performance seem to be the worst hit, potentially reversing the convergence process witnessed over recent years. The latest statistics also show that the EU is no longer catching up with the US in innovation performance, although it maintains a clear lead over emerging economies.

The EIS 2009 includes 29 innovation related indicators with publicly available data from 2007/2008 and trend analyses for the EU27 Member States as well as for Croatia, Serbia, Turkey, Iceland, Norway and Switzerland. The 29 indicators are grouped around three categories, enablers (human resources, finance and support), firm activities (firm investments, linkages & entrepreneurship, throughputs) and outputs (innovators, economic effects).

Commissioned by the Directorate-General for Enterprise and Industry of the European Commission, the EIS is pre-

pared by the Maastricht University (MERIT) with a contribution from the JRC-IPSC on the evaluation of innovation performance at regional level across the 201 regions in the EU and Norway. Regional performances are quantified by using a set of dedicated composite indicators. Regional innovation performance complements the national level and emphasises the need for policies to reflect regional contexts.



INFORMATION SOCIETY

<http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=3159>

Prospects of mobile search

Mobile search is likely to become an attractive expansion market: by 2012, there will be an estimated five billion subscriptions to mobile telephony. By the end of 2013, broadband mobile connections will account for more than half of all connections and 40% of all subscribers will be using mobile internet. The report "Prospects of Mobile Search", established with input from the JRC Institute for Prospective Technological Studies (IPTS), aims to understand how mobile search will impact Europe's



Visual search is one promising field of upcoming mobile applications

economy and society. It also explores possible strategies for the EU to take a lead in upcoming technological developments and business opportunities. The report concludes by presenting some policy recommendations in view of the likely socio-economic implications of mobile search in Europe.

Mobile search is an evolving branch of information retrieval services centred on the convergence of mobile platforms and handsets. Applications on mobiles which make use of search technology can be grouped into two broad categories. First, there are those that adapt to or emulate existing web search services to the mobile environment. Second, there are search services that exploit the unique features of mobile devices or the environments in which they operate. The report assesses both of these categories to determine the potential of mobile search in Europe.

The report also describes the supply and demand side of mobile search in Europe and presents the emerging trends in technology and markets that could shape its development. Following a thorough study of the drivers, barriers and enablers for mobile search, the findings of this analysis lead to the formulation of recommendations for possible policy actions at an EU level.

ENERGY EFFICIENCY

<http://www.eu-greenlight.org/> - <http://www.eu-greenbuilding.org/>

2010 GreenLight and GreenBuilding awards

The winners of the 2010 GreenLight and GreenBuilding awards save up to 85% of their energy consumption. During the "Improving Energy Efficiency in Commercial Buildings" conference in Frankfurt (13 – 14 April), 24 participants from all over Europe received recognition for their results or their innovative projects. These initiatives count over 700 participants in total, who save approximately 545 GWh each year. This is equivalent to the energy used by two mid-size European cities over the same period.

One of the twelve award winners in the 2010 edition of the GreenLight programme is Dagda town council

in Latvia, which reduced its energy consumption in lighting by 85% after joining the initiative in 2007. In the GreenBuilding category, two of the best refurbishment projects, an office



The European Greenlight Programme is managed by the JRC Institute for Energy

building in Austria and a secondary school in Germany, have achieved over 80% of energy savings.

Managed by the JRC Institute for Energy (IE), the GreenLight and GreenBuilding programmes are voluntary schemes that invite private and public organisations to reduce their energy consumption in their premises. GreenLight encourages partners to install energy-efficient lighting, while the GreenBuilding initiative promotes improved energy efficiency in buildings through several measures such as thermal insulation, efficient heating and cooling, intelligent control systems, solar panels etc.

ENERGY

<http://www.nesshy.net>

Database on hydrogen solid-state storage material properties open

A database of hydrogen solid-state storage material properties, developed by scientists at the JRC Institute for Energy, was opened to the public in February.

The Novel Efficient Solid Storage for Hydrogen database (NESSHY_DB), is an archiving and comparison tool for these hydrogen solid-state storage material properties generated within various FP6 and FP7 R&D projects in the field. It includes experimental results such as hydrogen sorption kinetics curves and pressure-concentration-temperature equilibrium data, as well as thermo-physical properties. Opening the database to the public is strategically important for the consolidation of experimental data that have been generated in EC-cofinanced research projects and for making these data available for the wider R&D community for further development, for example in the frame of the Fuel Cells and Hydrogen Joint Undertaking.

The NESSHY project, which started in 2006, plays a key role for Europe in the field of hydrogen storage in solids. NESSHY aims to develop novel materials, storage methods and fabrication processes that provide the energy density and the charge/discharge, storage/restoration rates necessary for mobile applications with spin-offs in stationary systems. The final aim of the project is to identify the most promising solid storage solutions for such applications.

Progress in energy technologies has been identified as critical for the EU to reach the challenging objectives set in the Integrated Energy and Climate Change Action Plan. In this context, the importance of hydrogen technologies for the future EU energy system, in terms of their potential in addressing climate change, security of energy supply and competitiveness, has been explicitly recognised.

ENERGY

http://re.jrc.ec.europa.eu/esti/index_en.htm

European Solar Testing Installation results

JRC's European Solar Test Installation (ESTI) has released Europe's first calibration certificate for a "tandem" photovoltaic module. Tandem modules are thin-film devices which have a double-layer. This structure allows them to extend their solar absorption spectrum from ultraviolet to visible

and infrared wavelengths, assuring the generation of considerably more power than can be expected from conventional modules.

Although such modules are already in commercial production, as yet there is no international standard for calibrating

their power output. Based on its in-depth experience in this area, ESTI has used the flexibility afforded to it by its Type 2 ISO 17025 accreditation to issue the certificate and uncertainty estimate.

In other news, ESTI has updated its meteo tower facilities with an auto-

mated system, which allows continuous recording of the direct normal component of incident light. This value is important for detailed evaluation of the real-life performance of concentrator PV modules which can only exploit the "Direct Normal Irradiance (DNI)" component of total irradiance. The data are publicly available on the ESTI meteo tower website.

ESTI has also recently extended its capability to measure spectral response of PV devices from 1200 up to 1900 nm. This is important for characterising the behaviour of advanced multi junction cells, which also respond at these high wavelengths.



ESTI is a European reference laboratory for the verification of the power and energy generation of photovoltaic devices

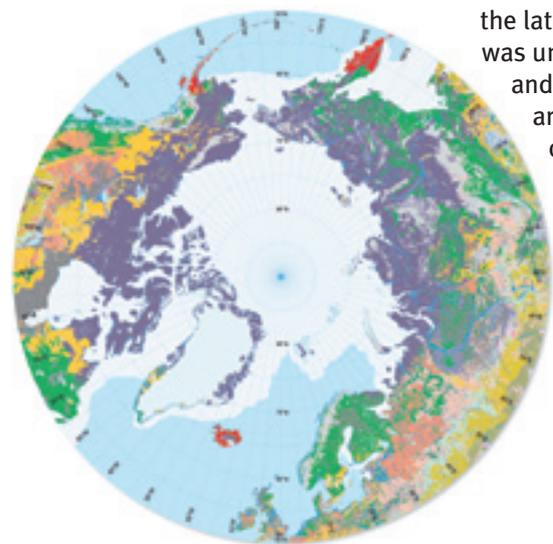
Sustainable management of natural resources

ENVIRONMENT

<http://eusoiils.jrc.ec.europa.eu/library/maps/Circumpolar/>

Soil Atlas of the Northern Circumpolar Region published

The JRC Institute for Environment and Sustainability (IES) has published



Soil Atlas of the Northern Circumpolar Region: soil data for all the land masses above the latitude of 50° North

the first Soil Atlas of the Northern Circumpolar Region bringing together soil data for all the land masses above the latitude of 50° North. This work was undertaken to better understand and protect soil resources in these areas. Produced in the frame of the International Polar Year Programme, the atlas showcases collaboration between the JRC and renowned soil scientists from northern countries within the EU, Norway, Iceland, Greenland, Canada, the USA and Russia and bridges the gap between soil science, policy makers, educators and the general public.

Soil in the northern latitudes has a global perspective and

importance, particularly, for global climate change and the carbon cycle. Special attention is given to the impact of cold climates on soil characteristics and on the relationship between climate change and soils' properties (notably CO₂ and methane emission).

The maps describe the major soil types found in northern latitudes, together with their principal properties and characteristics, their main forming processes and their use.

In addition, the maps illustrate how soil can be used as an indicator of past climate change and they present examples of local and regional perspectives and the importance of soil for society as a whole and particularly for indigenous northern cultures.

ENVIRONMENT

<http://ies.jrc.ec.europa.eu/index.php?page=65>

Global Forest Resources Assessment 2010: key findings

On 25 March, the Food and Agriculture Organization of the United Nations (FAO) published the key findings of the Global Forest Resources Assessment 2010 (FRA 2010), concluding that world deforestation, mainly the conversion of tropical forests to agricultural land, has decreased over the past ten years but continues at an alarmingly high rate in many countries. FRA 2010 is the most comprehensive

assessment of forests and forestry to date - not only in terms of the number of countries and people involved - but also in terms of scope. It examines the current status and recent trends for about 90 variables covering the extent, condition, uses and values of forests and other wooded land, with the aim of assessing all benefits from forest resources.

The JRC's work on tropical forest cover monitoring constitutes a major support to this undertaking. As main partners in FAO's FRA 2010 Remote Sensing Survey (RSS), JRC scientists collaborate with remote sensing and forestry experts from Tropical and European countries in order to estimate forest cover changes for the time period 1990-2000-2010. In this context, the JRC Institute for Environment and Sustainability (IES) organised several workshops for experts



Tropical forest in Bolivia (near Santa Cruz)

from Central and West Africa as well as from continental Southeast Asia. The output of the workshops will feed into the JRC's pan-tropical forest cover change assessment and will ultimately be used in the context of the FRA-2010 RSS global assessment.

Monitoring forest areas from continental to territorial levels

In related news, IES scientists H. Eva and F. Achard published the paper "Monitoring forest areas from continental to territorial levels using a sample of medium spatial resolution satellite imagery" in the *ISPRS Journal of Photogrammetry and Remote Sensing* (65 (2010): 191-197) in March. A global systematic sampling scheme was developed by the FAO and JRC-IES to estimate rates of deforestation at a global level. This global scheme can be intensified to produce results at a national level. The paper compares deforestation estimates derived from two levels of sampling intensities (the Brazilian Amazon from the global level and French Guiana from the national level) to those estimates derived from the official inventories. The results demonstrate that the intensification of the global sampling scheme can provide forest area change estimates close to those achieved by official forest inventories.

ENVIRONMENT

<http://ict.jrc.ec.europa.eu/>

Life Cycle Thinking and Assessment: reducing the environmental impacts of products

On 12 March, the European Commission launched a series of guidance documents for policy-makers and business on how to assess the environmental impacts of products. The guidance is part of the Commission's drive to promote more sustainable consumption and production patterns and reduce Europe's environmental footprint.

The products we buy and use everyday contribute to our comfort and well-being. However, they also contribute to environmental problems such as climate change, air and water pollution and the depletion of natural resources.

Businesses are increasingly turning to Life Cycle Thinking and Life Cycle Assessment (LCA) in order to improve the environmental profile of their products and supply chains, thus gaining competitive advantages. Public bodies are also using LCA to help assess policy options and support measures for promoting greener products such as ecolabels, ecodesign, green public procurement and better waste management.

This approach considers a wide range of impacts throughout the life of a product, starting with the extraction of natural resources, through to manufacture, distribution and use, and ending with re-use, recycling, and the disposal of remaining waste.

The International Reference Life Cycle Data System (ILCD) Handbook provides detailed guidance on how to conduct a Life Cycle Assessment to quantify the emissions, resources consumed and the pressures on the environment and human health that can be attributed to a product. Developed by the JRC Institute for Environment and Sustainability (IES) in cooperation with the Commission's Directorate-General for Environment, the ILCD Handbook is in line with international standards, has

been established through a series of public and stakeholder consultations, and provides guidance for consistency and quality assurance.

Life Cycle Thinking and Life Cycle Assessment are already playing a key role in EU policies in areas such as Integrated Product Policy, the Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan and waste legislation and will continue to be an essential factor in policy-making in the future.



Taking a life cycle perspective is vital to initiate and drive forward environmental improvements and economic gains

ENVIRONMENT

<http://dx.doi.org/10.1016/j.atmosenv.2009.12.011>

3rd European aerosol phenomenology published

The 3rd European aerosol phenomenology has been published in *Atmospheric Environment*. This paper presents the chemical composition of particulate matter (PM) of the size classes PM₁₀ and PM_{2.5} and ultra-fine particle

number concentrations from 60 rural, suburban, urban and traffic sites in North-western, Southern and Central Europe, showing regional variations in PM characteristics under different local conditions. The paper is the result

of a European-wide effort lead by J.P. Putaud of the JRC Institute for Environment and Sustainability (IES), together with 36 co-authors from 24 research institutes over Europe, and is a follow-up of two earlier papers published in 2004.

ENVIRONMENT

http://eusoils.jrc.ec.europa.eu/ESDB_Archive/eusoils_docs/other/EUR24258.pdf

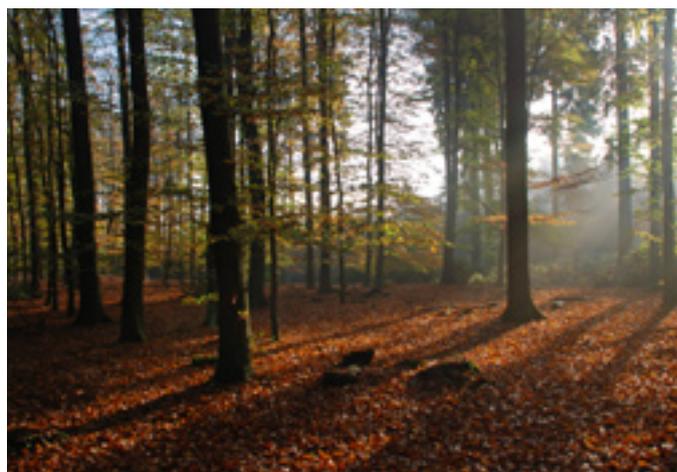
The BioSoil Demonstration Project: first findings

Due to the success of the BioSoil Demonstration Project, JRC scientists have concluded that large scale monitoring of soil conditions and biodiversity in forests is achievable. This goes part way towards fulfilling the main aims of the project: to provide harmonised soil and biodiversity data EU-wide, to evaluate the methodology of European soil and forest biodiversity monitoring programmes, and to provide a baseline to assess future trends in the soil condition and biodiversity of forests in the EU.

Soil characterisation data are essential to discover how an ecosystem works. In light of this, initial ideas for the BioSoil project emerged in 2004 in the context of the Forest Focus Regulation; a Community scheme for harmonised, comprehensive and long-term monitoring of European forest ecosystems. Within the Forest Focus BioSoil project, participant countries have increased the range of forest monitoring activities (on atmospheric pollution and forest fires) by intensifying surveys on soil characteristics and forest biodiversity indicators.

The implementation of the BioSoil Demonstration project has been a joint effort of the European Commission (Environment Directorate-General and JRC) and EU Member States. This is the single largest soil and biodiversity monitoring exercise implemented on an EU scale so far, with

data collected from twenty-one participating countries. In February, the JRC Institute for Environment and Sustainability (IES) published a preliminary Scientific and Technical Report presenting initial analysis and results. Subsequent to this preliminary data analysis, a more comprehensive evaluation of the final project data will be published jointly by the Commission's Environment Directorate-General and the JRC in 2010.



Soil characterisation data are essential to discover how an ecosystem works

ENVIRONMENT

<http://publications.jrc.ec.europa.eu/repository/handle/11111111/13562>

Multimedia Assessment of Pollutant Pathways

In February 2010, scientists from the JRC Institute for Environment and Sustainability (IES) published a report entitled "Multimedia Assessment of Pollutant Pathways in the Environment, European Scale Model (MAPPE-EUROPE)". The report documents the structure, functions and algorithms used for the modelling of pollutant pathways in air, soil

sediments and surface and sea water in Europe.

MAPPE is a pan-European Geographic Information System (GIS) based software model of the fate and transport of contaminants. It was designed in the context of the JRC FATE initiative for the assessment of the fate and impacts of pollutants in

terrestrial and aquatic ecosystems. MAPPE provides spatially explicit assessment of the continental-scale trends in the environmental distribution of contaminants, taking advantage of the increasing wealth of geographic information on landscape and climate parameters available, which are drivers of the fate of chemicals.

The intended use is for organic contaminants such as pesticides, pharmaceuticals, Volatile Organic Compounds (VOCs), and other industrial chemicals. The output of the model, i.e. maps of concentration and chemical fluxes, can be used for the

screening of hot spots at continental scale, the assessment of risk for human health and ecosystems and the evaluation of policies and scenarios.

In conjunction with more detailed, site-specific assessment procedures

for single problems, MAPPE provides a tool for decision support by making available a geographic representation of the consequences of emissions to air, soil and water compartments.

Safety of food and consumer products

FOOD SAFETY

<http://www.efsa.europa.eu/en/news.htm>

Computational assessment of pesticides residues

The JRC Institute for Health and Consumer Protection (IHCP) has finalised a report on the computational assessment of pesticides and their residues in support of the European Food Safety Authority (EFSA). The final report of the PESTISAR project evaluates the potential applicability of computational methods in the evaluation of the toxicological relevance of metabolites and degradates of pesticide active substances.

The safety and quality of food and consumer products is of high concern not only for the consumers but also for producers and regulators. In the risk assessment of pesticides, the provisions of the EU Plant Protection Products Directive ensure that active substances in applied pesticide formulations are extensively characterised in terms of their toxicological effects and environmental fate.

There is, however, limited information currently available on the toxico-

logical properties of the metabolites and degradates of pesticides active substances, and requests for further toxicological testing are restricted to minimise the use of animals. Thus, alternative (non-animal) assessment methods are needed to support the evaluation of the toxicological profile of these substances.



Currently there is only limited information available on the toxicological properties of the metabolites and degradates of pesticides

The overall purpose of the PESTISAR project between EFSA and the JRC was to evaluate the possible contribution

of Quantitative Structure-Activity Relationship (QSAR) analysis to the evaluation of the toxicological relevance of metabolites and degradates of active substances of pesticides for dietary risk assessment. The report provides a framework for assessing the usefulness of QSARs including a checklist of questions which focuses on issues that could be reasonably considered by a risk assessor.

The document also gives an in-depth review of the state-of-the-art in the availability and potential of computational methods to predict human health effects relevant to dietary risk assessment, and a number of case studies are presented that evaluate selected models and their applicability. The final report provides an input to the further work of an EFSA working group that is developing a scientific opinion and guidance on the establishment of the residue definition for pesticides, an activity which is also of considerable interest at the OECD level.

Nuclear safety and security

RADIATION PROTECTION

<http://irmm.jrc.ec.europa.eu/>

Hiroshima steel sample measurements help understanding exposure effects

Scientists at JRC Institute for Reference Materials and Measurements (IRMM) in Geel, Belgium, have performed extremely low-level measurements of radioactivity in old steel samples from Hiroshima. These latest measurements provide robust support

to Hiroshima dosimetry calculations, which are crucial for our knowledge about the effects of radiation on the human body.

The measurements were successful in resolving a pending discrepancy

between computer models and previous measurements (which were almost a factor of 100 too high). The new results support the computer models, and thus provide greater confidence in the existing dosimetry system for radiation protection.

The steel samples date from 1945, and were all in the direct line of sight of the Hiroshima atomic bomb blast. The 15 carefully selected samples include a piece of the Yokogawa bridge and thick rods from the Kanayamacho bank building.



Sample (steel tube) from Kyu-Fuzoku elementary school, Hiroshima

Scientists were particularly interested in measuring the level of the radioisotope cobalt-60 in the samples, due to discrepancies between older measurements and computer models. However, as the half-life of cobalt-60 is only 5.2 years, the level of radioactivity is nowadays extremely low,

particularly at the locations of interest up to 2 km away from the epicentre.

This low level of activity meant that the samples had to be transported from Japan to Belgium by boat to avoid activation from cosmic rays during flying. It was necessary to measure the cobalt-60 levels using specialised equipment in the JRC's underground laboratory. At 223 metres underground, the lab is shielded from background radiation and a lower detection limit could therefore be reached. Carrying out such accurate measurements is a race against time because the activity levels are so low. In fact, scientists have determined that it is no longer possible to assess the activity induced by neutrons from the atomic bomb at ground distances greater than 1000 metres from the blast, because environmental activation starts to dominate.

Legislation on radiation protection has changed a great deal since the initial discovery of radioactivity. In the past 100 years it has changed almost every 15 years and this is, to a large extent, based on follow-ups of Hiroshima victims. About 84,000 victims have been followed and both their health and the dosage they received have been recorded. The regular re-assessment of the Hiroshima dosimetry in 1986 still found significant discrepancies between measurements of Co-60 in steel and computer simulations. These discrepancies remained after the most recent reassessment in 2002. It is not until now that the Co-60 issue has been settled.

NUCLEAR SAFETY AND SECURITY

<http://www.rsc.org/publishing/journals/JA/article.asp?doi=b925918j>

Determining the source of plutonium contamination

A paper published in February by scientists from the JRC Institute for Reference Materials and Measurements (IRMM) represents a significant advance in the 'fingerprinting' of plutonium contamination, giving nuclear safety and safeguards authorities more information on how nuclear material was produced and helping to identify sources of environmental contamination.

Using a technique known as Thermal Ionization Mass Spectrometry (TIMS), the researchers measured the ratio of plutonium isotopes with unprecedented accuracy in reference samples obtained from the International Atomic Energy Agency (IAEA) and the U.S. National Institute of Standards and Technology, and also on soil and moss samples collected from the site of the Chernobyl accident.

Plutonium (Pu) isotope ratios vary depending on the source of the

contamination. For example, weapons-grade plutonium is characterised by a low content of the ^{240}Pu isotope ($\leq 7\%$)



Filament carburisation device for environmental nuclear mass spectrometry

with $^{240}\text{Pu}/^{239}\text{Pu}$ ratios between 0.03-0.07, whereas plutonium from nuclear reactors typically has a ratio of 0.4 or higher. This is because the nuclear fuel in a reactor is irradiated by neutrons for a longer time. The average $^{240}\text{Pu}/^{239}\text{Pu}$ ratio for global fallout, originating from nuclear weapons tests in the past, is 0.176 ± 0.014 .

By measuring these isotope ratios of samples collected in the field, nuclear safeguards and safety authorities can determine whether any plutonium contamination originates from power plant accidents, nuclear weapons testing or discharges from reprocessing facilities.

The researchers published data with considerably low uncertainties not only for the 'major' isotope ratio of $^{240}\text{Pu}/^{239}\text{Pu}$, but also – for the first time – for the minor ratios of $^{241}\text{Pu}/^{239}\text{Pu}$ and $^{242}\text{Pu}/^{239}\text{Pu}$. The results on the reference materials and the samples from

Chernobyl confirmed the suitability of the measurement technique, and the researchers could identify with confidence whether the environmental contamination originated from reactor-grade or weapons-grade plutonium.

The development of a technique for isotopic measurements of plutonium with TIMS has led to more precise isotope measurements of environment samples containing low amounts of plutonium.

The published work represents a further advance in environmental sample analysis to strengthen the effectiveness and improve the efficiency of nuclear safeguards in line with global nuclear non-proliferation objectives.

Security and crisis management

DISASTER RISK MITIGATION AND RESPONSE

<http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=36>

JRC work makes cover of "Geoscience and Remote Sensing"

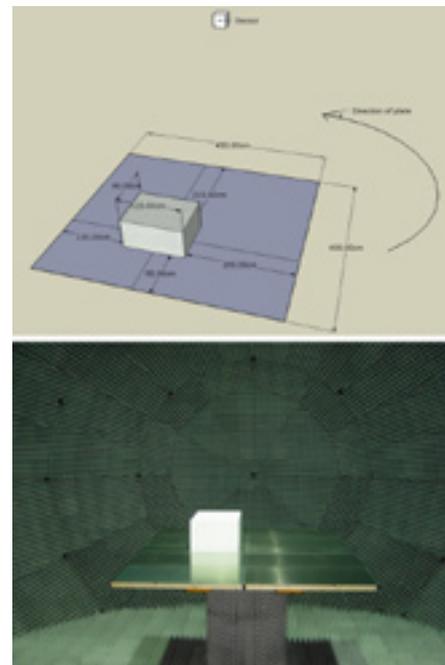
The March 2010 issue of *IEEE Transactions on Geoscience and Remote Sensing*, the top ranked journal in this discipline, features on its cover four images illustrating the work done by scientists at the JRC's Institute for the Protection and Security of the Citizen (IPSC). The paper titled "Building Height Retrieval From VHR SAR Imagery Based on an Iterative Simulation and Matching Technique" describes the development of a new method for estimating building height in detected very high resolution synthetic aperture radar (SAR) imagery.

The method is based on a building signature simulation approach which is matched locally with the detected scene, iterating for different heights. The best match yields the estimate for the building height. The paper describes an extensive testing experiment in which both airborne and space

borne Very High Resolution SAR are used.

The methodology presented in this paper was applied in the 2008 Sichuan (China) earthquake to estimate damage impact from satellite SAR images. The results of that work will be published in the May 2010 issue of *IEEE Transactions on Geoscience and Remote Sensing*. This method is particularly valuable in situations where optical data are not available.

Brunner, D. Lemoine, G. Bruzzone, L. Greidanus, H., "Building Height Retrieval From VHR SAR Imagery Based on an Iterative Simulation and Matching Technique", *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 48, No. 3, March 2010, 1487 - 1504, Digital Object Identifier: 10.1109/TGRS.2009.2031910.



Setup of scaled building model measurements in the European Microwave Signature Laboratory

DISASTER RISK MITIGATION AND RESPONSE

<http://www.jrc.ec.europa.eu/haiti>

Haiti: new atlas shows building damage ten times higher than first thought



Collapsed building in Port-au-Prince, Haiti

A comprehensive atlas of all damage caused in Haiti by the magnitude 7.0 earthquake on 12 January 2010 is now available to help planning recovery and reconstruction measures. The atlas, based on the comparison between pre-disaster satellite imagery and post-disaster aerial photos, provides an overview of building damage in the main affected cities in Haiti showing that almost 60,000 buildings were either destroyed or very heavily damaged.

Residential buildings and improvised settlements bore the worst damage, particularly in Port-Au-Prince, Carrefour, Delmas and Leogane communes. The damage is now assessed to be ten times higher than first estimates given immediately after the event, which can be attributed to the availability of higher resolution airborne data.

The Haiti Building Damage Atlas was produced by the United Nations'

Institute for Training and Research (UNITAR) / Operational Satellite Applications Programme (UNOSAT), the JRC Institute for the Protection and Security of the Citizen (IPSC), and the World Bank in support to the post disaster needs assessment process led by the government of Haiti.

The atlas provides a homogenous evidence base for the identification of recovery needs and the mobilisation of resources to finance the recovery and reconstruction. For each main city a separate atlas is produced, including an overview map of the atlas sheets, as well as individual sheets at a scale of

1:2,500 for A3 size hardcopy printouts. The damage to individual buildings is categorised according to the European Macroseismic Scale (EMS-98) Five-level grading system, which includes a substantial to heavy damage state (Level 3), very heavy damage state (Level 4), and destruction damage state (Level 5).

Reference materials and measurements

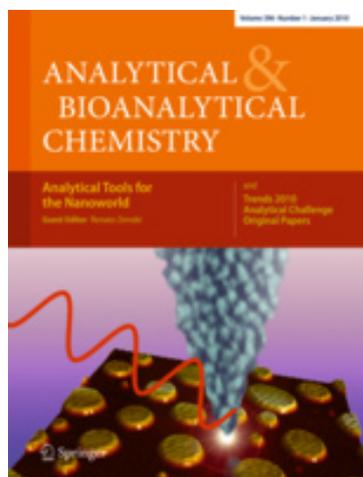
GMO ANALYSIS

<http://www.springerlink.com/content/q15152467281/>

Guest editorship of Analytical and Bioanalytical Chemistry

The JRC Institute for Reference Materials and Measurements (IRMM) edited a special issue of the scientific journal *Analytical and Bioanalytical Chemistry* (ABC). With Henrik Emons as the guest editor, the authors were asked to contribute to the topic of reliable quantification of genetically modified organisms (GMO) in food and feed.

This special edition of ABC reflects the increased level of international harmonisation efforts and reviews the whole analytical process starting from sampling up to data evaluation. The articles of this



issue tackle new approaches for efficient screening for an increasing number of DNA inserts whereas another group of papers highlights challenges and progress in the GMO quantification.

Analytical and Bioanalytical Chemistry is an international journal dealing with all aspects of analytical and bioanalytical sciences. The journal covers all fields of pure and applied analytical chemistry and bioanalysis, including topics at the interfaces with life and health sciences, engineering and materials sciences, environmental science, Earth sciences and others.

Other news

ECONOMETRICS

<http://www.ifad.org/mpat/>

New tool to measure rural poverty: robustness assessment by the JRC

Scientists at the JRC Institute for the Protection and Security of the Citizen (IPSC) provided recommendations for additional improvements to the United Nations' International Fund for Agricultural Development (IFAD) Multidimensional Poverty Assessment Tool (MPAT) framework and surveys. The analysis by IPSC also statistically confirmed the suitability of using a thematic indicator, as opposed to a composite indicator, and verified the overall robustness of MPAT's architecture.

MPAT is a multi-purpose tool that can be used to assess and support rural poverty alleviation efforts in developing countries. This survey-based (household and village level) thematic indicator is primarily designed to support monitoring and evaluation, targeting, and prioritisation efforts at the local level.

MPAT takes a step back from assessment methods that are focused on economic- and consumption-oriented indicators and strives to provide an

overview of fundamental and relatively universal dimensions of rural livelihoods and rural life, and thus of rural poverty. It is designed to be universal enough to be relevant to most rural contexts around the world, yet specific enough to provide project managers and others with a detailed overview of key dimensions relevant to rural poverty reduction efforts. MPAT provides an assessment of ten dimensions central to rural livelihoods, highlighting where additional support or interventions are likely to be most needed.

TECHNOLOGY TRANSFER

<http://ec.europa.eu/dgs/jrc/index.cfm?id=4210>

Improved mobility of the visually impaired

The Italian association for the visually impaired (Unione Italiana Ciechi ed Ipovedenti ONLUS – UIC) recently signed an option agreement on the JRC's Sesamonet technology. The aim of this agreement is to allow the UIC to properly assess the technology, in order to decide whether to enter into a licence agreement.

As foreseen by the option agreement, an electronic path based on Radio Frequency Identification (RFID) technology for visually impaired persons was built in the Gemelli Hospital in Rome for testing and demonstration purposes. This path integrates the Sesamonet technology developed at the JRC-IPSC with the tactile tiles ("Vettore") produced by the UIC's technological partner Antonplast Srl. The JRC will provide its scientific and technical assistance to install and test the technology in the Rome site, and will support the UIC in the installation of the technology in two other sites.

SESAMONET (Secure and Safe Mobility Network) is an innovative navigation system for blind persons, based on the use of low frequency RFID, patented by the JRC. The system uses RFID micro-chips embedded in the ground



The JRC developed an innovative navigation system for blind persons, based on the use of low frequency RFID

to guide a visually impaired person through a predefined area. Each microchip sends position signals via a dedicated walking stick to a smart phone containing information about the location and a recorded voice – via a Bluetooth headset - guides the visually impaired person along the route.

The main objective is the development of an integrated system, to increase the mobility of people with a disability and their personal safety and security, by identifying a secure path to walk through selected areas. If correctly implemented, this system could be of great help for all users adding independence to their lives.

The agreement with the UIC falls within the initiatives carried out by the JRC in aiming to promote the commercialisation of its technologies through the creation of new enterprises and via the transfer of technology to existing companies in the Member States.

COLLABORATION

<http://www.enea.it/com/ingl/default.htm>

JRC and ENEA strengthen science & technology collaboration

The JRC and the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) have signed a Memorandum of Understanding (MoU) on 17 March. This agreement promotes collaboration in scientific and technology areas such as energy, environment, security, high performance scientific computing and nuclear security.

Building on a longstanding scientific relationship and the shared objective of research, both organisations have identified in particular the following areas of common interest:

- energy: end-use electricity efficiency, photovoltaic solar electricity, bioenergy, energy technologies, energy systemic modelling, hydrogen and fuel cells;
- nuclear security;

- environment: air quality and pollution, water pollution, climate change, earth observation technologies, environmental issues in the Mediterranean, life cycle analysis, environmental evaluation and certification;

- security of critical infrastructures: in particular the systems used for supervision, control and data acquisition;

- high performance scientific computing: grid computing (i.e. the combination of computer resources applied to a common task).

This collaboration will promote the sharing of scientific information, tools and data, the es-

establishment of new joint initiatives and projects, as well as the exploitation of the generated research results. Training for scientists through the exchange of personnel or the set-up of joint research facilities are other actions proposed to achieve the goals set by the agreement.



Roland Schenkel, JRC Director General and Giovanni Lelli, ENEA Commissioner, signing the MoU between the two organisations

PUBLICATIONS

<http://ec.europa.eu/dgs/jrc/index.cfm?id=1420>

JRC Annual Report 2009 now available



The JRC Annual Report 2009, published at the end of April, provides an overview of the activities, accomplishments and resources related to the JRC's work carried out in 2009.

In 2009, the JRC took on the challenge of reinvigorating its organisation by the creation of a new vision and strategy for 2010-2020, expected to be approved by mid-2010.

In this year's Annual Report, various examples from the JRC's policy support work are presented, including actions in the field of crisis response as well as input to the various stages of the policy cycle, from anticipation and formulation to policy adoption, implementation and evaluation. The report also presents particular highlights of the JRC Institutes' work in 2009.

JRC MANAGEMENT

<http://ec.europa.eu/dgs/jrc/index.cfm?id=2790>

New Director of Institute for Prospective Technological Studies



As from 1 May, **John Bensted-Smith** has been appointed Director of the JRC Institute for Prospective Technological Studies (IPTS) in Seville, Spain.

He has been working within the European Commission since 1983, most recently as Director responsible for International Affairs II, in particular enlargement, at the Directorate-General for Agriculture and Rural Development.

John Bensted-Smith succeeds Peter Kind, who is leaving the services of the Commission to enter into retirement.

AWARDS & PRIZES

Natural radiation

Valeria Gruber from the JRC Institute for Environment and Sustainability (IES) has received the Klaus Fischer Innovation Award for Technology and Environment for her Ph.D. thesis "Radiation Exposure by Natural Radionuclides in Drinking Water in Upper Austria - A Radioanalytical and Hydrogeological Research and Evaluation in an International Context". The "Klaus Fischer Innovation Award for Technology and Environment" is conferred to the authors of outstanding and innovative diploma, Ph.D. or post-doctoral theses carried out at the University of Natural Resources and Applied Life Sciences (BOKU) Vienna.

Accident management

The Master thesis "Analisi dell'effetto di eventi Natech in impianti di processo" by **Elisabetta Renni** was awarded the title of best engineering thesis 2008 by the Order of Engineers in Bologna. This thesis was prepared in 2008 during a period of traineeship at the JRC Institute for the Protection and Security of the Citizen (IPSC). The topic of the paper, analysing the potential effects of natural disasters, and in particular lightning strikes, on processing plants, was considered of high relevance for the chemical industry and civil-engineering application, and the thesis' high scientific content received particular mentioning.

NOMINATIONS

<http://www.ilsil.org/Europe/>



Anne-Mette Jensen from the JRC Institute for Reference Materials and Measurements (IRMM) has been appointed

member of the Scientific Advisory Committee for the International Life Science Institute, Europe. With this nomination, the JRC is reinforcing its collaboration with external international research organisations.

The International Life Sciences Institute (ILSI) is a non-profit, worldwide foundation seeking to advance the understanding of scientific issues relating to nutrition, food safety, toxicology, risk assessment, and the environment. By bringing together scientists from academia, government, industry, and the public sector, ILSI seeks a balanced approach to solving problems of common concern for the well-being of the general public.

Anne-Mette Jensen joined the JRC-IRMM in 2004 and is Action Leader for Food Safety and Quality. Her previous work experience includes research in the agro-food industry, and scientific and regulatory work as a lobbyist in Brussels.

FIRST SCIENTIFIC FORUM FOR THE EU REFERENCE LABORATORIES

GEEL, 9 – 10 FEB 2010

BE

<http://ec.europa.eu/dgs/jrc/index.cfm?id=4070>

The JRC Institute for Reference Materials and Measurements (IRMM) organised the first ever Scientific Forum for the 28 EU Reference Laboratories, which, together with national reference laboratories, lead the harmonisation efforts across the EU for analytical methodology, each for a given topic within the food/feed area.

EU Reference Laboratories are appointed by the European Commission's Directorate General for Health and

Consumers, and the JRC itself hosts six such Laboratories, namely the ones for Heavy Metals, GMO's, Mycotoxins, Food Contact Materials, Polycyclic Aromatic Hydrocarbons and Feed Additives.

The purpose of the Forum was to give leaders of EU Reference Laboratories the opportunity to share experiences from their first five years of operation, to identify and address topics of common interest, and to discuss upcoming challenges and priority areas, with each

other as well as with representatives of the Commission. Special focus was given to the learning experiences related to the organisation of proficiency tests.

The Forum was very well received by the participants who voiced a strong interest for it to be repeated on an annual basis. They identified a number of priority topics to be addressed in future, including alternative ways to evaluate the performance of National Reference Laboratories.

JRC-ISPRA SCHOOLS DAY

IT

<http://ec.europa.eu/dgs/jrc/index.cfm?id=5690> ISPRA, 1 MARCH 2010

On Monday 1 March, the JRC's Ispra site in Northern Italy hosted almost a thousand pupils and students as well as 85 teachers from 23 different schools. The day's programme, tailored according to the needs of each school and age category, included 18 laboratory visits, from vehicle emissions to the European Laboratory for Structural Assessment and 11 seminars, on topics such as the traceability of animals, radioactivity in the environment and biodiversity. Questioned after the event, some 75% of the participating pupils aged 10 to 18 felt more attracted to the world of science and technology which is an impact benchmark that speaks for itself.

The JRC's work for promoting science in schools has gained increased momentum year by year - in fact, this year no announcement or advertising was required - all 23 participating schools independently approached the JRC-Ispra site.



JRC scientists present their work to young pupils

GALILEO APPLICATION DAYS

BE

<http://www.gsa.europa.eu/>

BRUSSELS, 3 – 5 MARCH



The JRC Institute for the Protection and Security of the Citizen (IPSC) contributed to this event with a keynote address during the session on Precision Agriculture. The presentation addressed the increasing demand for accuracy from the Common Agricultural Policy's requirements and challenged the role of Galileo services herein.

Another topic addressed by research at JRC-IPSC is the vulnerabilities of GNSS systems (GPS/EGNOS/Galileo), which were discussed in a number of sessions. As the use of localisation and precise timing becomes widespread in a number of civilian application domains, including public safety and transportation, such vulnerabilities will have a serious impact from a security and reliability point of view on services relying on GNSS systems.

EU AND US DISCUSS CRITICAL INFRASTRUCTURE PROTECTION

ISPRA, 2 – 3 MARCH
MADRID, 4 – 5 MARCH

IT - ES

<http://infrastructure-protection.net/>

On 2-3 March, the JRC Institute for the Protection and Security of the Citizen (IPSC) hosted the first EU-US workshop on Commercial Satellite Critical Infrastructure Protection. The event was attended by some 60 experts from both sides of the Atlantic and addressed a range of issues in this area of global importance, such as satellite dependencies and vulnerabilities, physical, cyber and network security threats to satellite infrastructure

Another important event in this field was the first EU-US expert meeting on the general issue of Critical Infrastructure Protection organised by the European Commission and the EU Presidency in Madrid on 4-5 March.

The meeting brought together almost 100 experts from the EU Member States, the US and the European Economic Area countries, and constituted the opening event for the future EU – US cooperation process in this field.

At the event, the JRC Institute for the Protection and Security of the Citizen (IPSC) presented the principles behind the identification of European critical infrastructures. The JRC-IPSC carries out research work in support to European policies in this field by providing policy makers and stakeholders with information, instruments and methods for the identification of critical infrastructures, for a better understanding of the risks,



Utility networks are one example of critical infrastructures

for the qualitative and quantitative evaluation of the security issues as well as for the determination of the security condition of systems.

UPCOMING

INFORMATION EXCHANGE DAY IN SPAIN

ES

MADRID, 2 JUNE

<http://www.jrc.ec.europa.eu>

The JRC will host an Information Exchange Day in Madrid on Wednesday, 2 June at the EU Representation. The European Union Satellite Centre (Torréjon) will also participate. The Spanish Government have confirmed that Secretary of State Dr. Felipe Pétiz Calvo will attend. The proposed programme includes insights into the JRC's new ten-year strategy and work done by JRC Institute for Prospective Technological Studies (IPTs) in Seville.

Emphasis will be put on the application of technology to address grand challenges facing society today. This will include presentations by JRC speakers and partners on climate change, nanotechnology, remote sensing and applications for the European Forest Fire and Drought Information Systems, agriculture and fisheries.

10TH ANNIVERSARY OF THE JRC ON-SITE LABORATORIES

DE

<http://itu.jrc.ec.europa.eu/>

KARLSRUHE, 15 JUNE

The 10th anniversary of the JRC On-Site Laboratories will be celebrated on 15 June at the Schloss Karlsruhe, and a programme for the media is organised on the day before at the JRC Institute for Transuranium Elements (ITU). This event will allow informing the public about the safety and reliability of the nuclear fuel cycle



and the latest developments in the field of nuclear safeguards. Experts from JRC-ITU and the Commission's Energy Directorate-General will show examples of this important work, to demonstrate how, for example, environmental sampling techniques work in practice and how inspectors are trained.



Partial views of the Euratom On-Site Laboratories in Sellafield (left) and La Hague (right)

JOBS AT THE JRC

<http://www.jrc.ec.europa.eu/jobs>

RECENTLY PUBLISHED

(Applicants must submit their application no later than the indicated deadline.)

Ispra, Italy**Trainee**

- Safeguards simulation tools – 5 May
- IHCP: traineeships in several areas related to health aspects – 10 Oct

Seconded National Expert

- Contribution to development of a functional understanding of how drivers of change affect aquatic ecosystem ecological processes – 15 May
- Scientific / Technical project officer in support to the CAP implementation – 15 May

Grantholder (Ph.D Student)

- Metrological improvements in sensors for nuclear/radiological detection – 6 May

Grantholder (Post-Doc researcher)

- Expert in radiation detection equipment for nuclear security – 6 May
- CID (Community Image Data portal) – 10 May
- Chemical risk assessment for biocides – 15 May
- GNSS Interference / spoofing mitigation techniques – 15 May
- Remote Sensing Expert for Crop Monitoring – 17 May
- Satellite vessel detection software – 17 May
- Evaluation of Education and Training systems – 19 May
- Statistical analysis and composite indicators – 19 May
- Statistical analysis of education and training datasets – 19 May
- European Reference Network for Critical Infrastructure Protection – 27 May
- Human Computer Interaction for Crisis Management Systems – 30 May
- Rural, Water and Ecosystem Resources Unit - Assessing adaptive capacities of Mediterranean aquatic ecosystems – 8 Jun
- Rural, Water and Ecosystem Resources Unit - Modelling tipping points and ecological thresholds – 8 Jun
- Systems toxicology / Health and environment – 31 Oct
- Molecular biology and genomics / GMOs – 19 Oct
- Nanobiosciences / Nanotechnology – 31 Oct
- Chemical assessment and testing / Consumer products and nutrition – 31 Oct
- In vitro methods / Alternative methods and ECVAM – 31 Oct

Grantholder (Senior scientist)

- European Reference Network for Critical Infrastructure Protection – 27 May

Geel, Belgium**Grantholder (Ph.D Student)**

- Neutron induced fission cross sections of 240-242Pu – 15 Jun

Grantholder (Post-doc researcher)

- Development of liquid scintillation counting techniques and measurement of nuclear decay data – 15 Jun
- Food analysis by modern chromatographic and spectroscopic methods – 15 Jun
- Food metabolomics – 15 Jun
- Food proteomics – 15 Jun
- Nanotechnologies applied to food and feed safety and quality – 15 Jun
- Development and characterisation of new Reference Materials for fissile material control – 30 Jun

Seville, Spain**Grantholder (Post-doc researcher)**

- Economic evaluation and modelling for personal health system – 9 May

Seconded National Expert

- Economics of Industrial Research and Innovation – 15 May
- Best Available Techniques BREF Author - (IPPC Directive) – 15 Jun

Karlsruhe, Germany**Traineeship**

- Testing of chelates for application in targeted alpha therapy – 10 May
- The low temperature heat capacity of the Li₃ThF₇ and Li₇Th₆F₃₁ compounds – 10 May
- DNA extraction from radioactively contaminated forensic evidence – 15 May
- Source Term Evaluation Experiments for Radiological Dispersion Events (RDE) using laser heating – 15 May
- Universal nuclide chart – 15 May
- Assessing the structural behaviour of nuclear fuel rods during ramps by means of the TRANSURANUS code – 1 Jun
- Separation of lead, strontium and neodymium from uranium ore concentrates – 1 Jun
- Synthesis and physical properties of doped Y_{1-x}U_xPd₂Sn – 1 Jun

Research fellowship

- CERMET Fuels - FUTURIX - Closing the fuel cycle – 1 Jun

Senior scientist

- Local geometric and magnetic structure in actinide compounds – 5 May
- Atomistic calculations – 21 Jun

Petten, The Netherlands**Seconded National Expert**

- Hydrogen safety sensor testing – 15 May



The JRC Newsletter is a bi-monthly publication intended to provide JRC customers, stakeholders and other interested parties with an overview of recent highlights from the JRC's scientific achievements, policy support, contributions to events and other news.

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