EVALUATION DES IMPACTS A LONG TERME DES STOCKAGES DE DECHETS RADIOACTIFS

ACQUIS ET PERSPECTIVE DU PROGRAMME BIOPROTA

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« La gestion des matières et des déchets radioactifs »

Journées SFRP / Section Environnement – 01 et 02 octobre 2013

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www.bioprota.org

What is BIOPROTA?

An international forum for exchange of information to support resolution of key issues in biosphere aspects of assessments of the long-term impact of contaminant releases associated with solid radioactive waste disposal and contaminated land management.

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BIOPROTA Membership

- **Andra, France**
- ARAO, Slovenia
- **Areva, France**
- BfS, Germany
- CIEMAT, Spain
- **EdF, France**
- ENSI, Switzerland
- EPRI, USA
- FANC, Belgium
- **IRSN, France**
- JGC Corporation, Japan
- KAERI, Korea
- SCK-CEN, Belgium
- SSM, Sweden
- Univ. Life Sciences, Oslo

Operators
Regulators
Technical support organisations
Academic institutions

All supported by their own experts

Focus on science , not lobbying!

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Why study the biosphere?

- **National and international radiological protection objectives are defined in terms of radiation doses occurring in the biosphere.**
- **It is where people live and because people have access to the area, *unlike the geosphere*, they know what it looks like and can therefore relate to information being presented.**
- **Demonstrating knowledge of the biosphere helps gain trust from the public, e.g. though the: Observatoire Pérenne de l'Environnement**

BIOPROTA members visit
Observatoire Pérenne de l'Environnement, 2012

The Biosphere Assessment Problem

- Assessment period extends thousands of years into future!!!
- En
  often for t
  long enough time series, so not a complete solution
- Prognostic assessment with models is difficult:
  - environmental change
  - human behaviour not easily assumed, but affects:
    - modes of exposure, and
    - modifies environmental change

Assumptions will appear arbitrary, for example about human behaviour!

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A little history …

To separate the arbitrary from the scientific, a **REFERENCE BIOSPHERE METHODOLOGY**

was developed though international cooperation:

- BIOMOVS II
- IAEA-BIOMASS-6

Hard discussion! Each participant wanted the arbitrariness to correspond to their situation!

Eventually a step by step process was developed and documented with examples, completed 2001

Use of IAEA-BIOMASS-6

Prov… …s for de…

Exa… …rocess – …ments

Has… …e as…

Alre… …e under wa…

More locally detailed assessment usually needed for site specific studies!

BIOPROTA set up in 2002 to support continued international cooperation in the area, first meeting hosted in Paris by ANDRA☺

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BIOPROTA: Key Objectives:

- Help make available and share the best sources of information to justify modelling assumptions
- Focus on key uncertainties for important radionuclides
- Develop a scientific basis for removing {potentially} unnecessary conservatism

BIOPROTA: Method of Work

- Annual meetings to share latest progress and raise new and key (special) issues
- Topica[illegible]es
- Mechanism for developing projects among organisations with shared interest in further focussed research on the special issues

Not an exercise in random filling of data gaps…

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BIOPROTA: Special Workshops

- Evaluation of Primary Features, Events and Processes Occurring in the Geosphere-Biosphere Interface Zone
- C-14 m
- Cl-36 in the Biosphere
- Se-79 in the Biosphere
- Environmental behaviour of Radium
- Methodologies for Assessing Radiation Impacts on Non-Human Biota from Radioactive Waste Disposal Facilities

Fully documented and published after participant approval

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BIOPROTA: Initial Special Projects

- Model Review and Comparison for the Spray
- **Investigated implications of different treatment of features, events and processes (FEPs), and exploration of alternative interpretation of environmental data in model development and selection of parameter values. All in long term context… thousands of years!!**
- e

Fully documented and published after participant approval

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Focus Shift to Key radionuclides

Detailed documentation on enhanced assessments:

- **NB C-14 and Cl-36 in graphite and reactor operating wastes…**
  U series waste… various FAVL
- Modelling the Behaviour of Se-79 in Soils and Plants
- **Fully documented and published after participant approval**
  ls and Uptake
- Long-term Dose Assessments for U-238 Series Radionuclides.

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Other Special Projects on:

- Non-human Biota Dose Assessment: Sensitivity Analysis and Knowledge Quality Assessment
- Demonstrating Compliance with Protection Objectives for Non-Human Biota within Post-closure Safety Cases for Radioactive Waste Repositories
- Human Intruder Dose Assessment for Deep Geological Disposal.

On-going activities:

- Modelling Approaches to C-14 in Soil-Plant Systems
- [redacted] for Validation

Reports in preparation!!!

- Methodology for addressing Transfer across the Geosphere-Biosphere Interface, ***allowing coherently for environmental change in the geosphere and biosphere***
- Scales for Assessment of Doses to Non-Human Biota
- Workshop on the Scientific Basis for Long-term Radiological and Hazardous Waste Disposal Assessments (Slovenia, May 2013)

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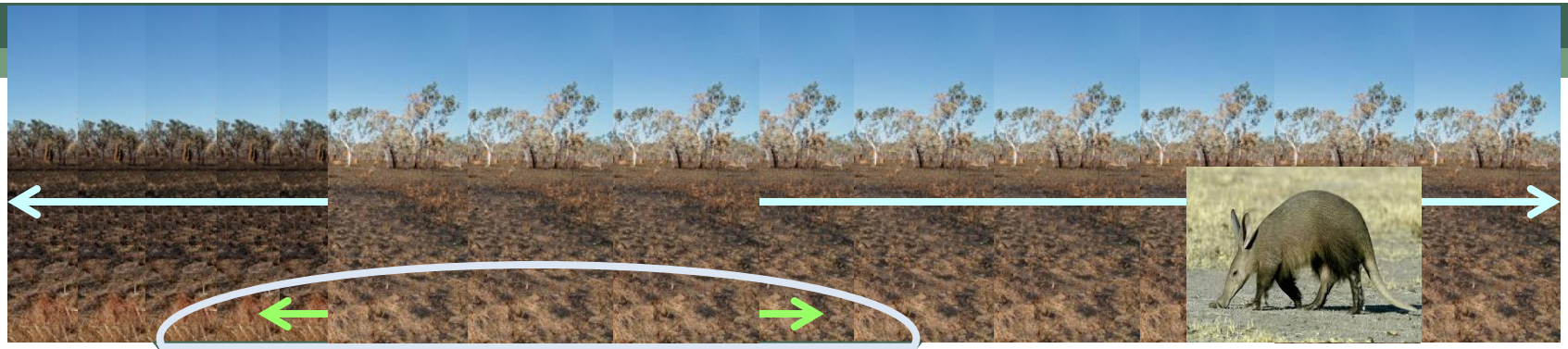
Why Consider Spatial Scales?



Model spatial scale

Transfer through Geosphere-Biosphere Interface

Assessment Criteria (µGy/h)

	Invertebrate	Vertebrate
ICRP DCRLs (Planned Activity)	400	4
PROTECT (taxa specific)	200	2

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Overview Comments (1)

- All is done in spirit of collaborative scientific investigation
- Results are presented as potentially helpful information, *not* as recommendations or as a collective opinion
- A substantial body of results has been produced, all available at www.bioprota.org
- It is hoped that BIOPROTA is an effective model for sharing resources to address commonly identified problems

Overview Comments (2)

- Results could benefit the long-term assessment of legacy sites (e.g. NORM and U mining sites, and sites contaminated with hazardous chemicals
- At the same time, long-term monitoring data from such sites could support prognostic assessment of waste repositories.

Information and 2014

- 2014 annual meeting will be hosted by the Radioactive Waste Management Directive of the Nuclear Decommissioning Authority (UK), under the chairmanship of Ray Kowe, who is the current chair of the BIOPROTA Sponsoring Committee
- All reports available free of charge after registration of interest at www.bioprota.org
- Further information from the BIOPROTA technical Secretariat at gmsabingdon@btinternet.com and karen@radecol.co.uk

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