EMRAS II:

Environmental Modelling for Radiation Safety Harmonization and Intercomparison

Overview on the current activities

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International Atomic Energy Agency

General aim of programme

To improve capabilities in the field of environmental radiation dose assessment

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Means for achieving improvement

- Acquisition of improved data for model testing
- Model testing and comparison
- Reaching consensus on modelling philosophies, approaches and parameter values
- Development of improved methods
- Exchange of information

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EMRAS process on Model testing

- Test scenario obtained and checked (by data providers)
- Modellers invited to make the predictions requested for the scenario (blind testing)
- Predictions compared with observations and discussed.
- Reasons for mis-prediction identified
- Conclusions drawn on how to improve

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Benefits of international model testing

- Opportunities to compare with other groups
- Wider selection of scenarios for testing
- Wider selection of transfer data
- Improve modelling capabilities globally

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History of international environmental model testing programmes

- 1985–1990 BIOMOVS – Swedish sponsored
- 1988–1994 – the IAEA VAMP programme (prompted by Chernobyl)
- 1996–2002 - the IAEA BIOMASS programme
- 2003–2007 - the IAEA EMRAS I programme
- 2009 – new programme IAEA EMRAS II

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EMRAS II

- IAEA has recognised the value of EMRAS and the previous programmes and has decided to sponsor another programme in this field

- The new programme is linked to:
  - issues in radiological risk assessment
  - the needs of countries
  - new international developments

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EMRAS II topics

- **Reference Approaches for Human Dose Assessment**
  - Reference Methodologies for "Controlling Discharges" of Routine Releases
  - Reference Approaches to Modelling for Management and Remediation at "NORM and Legacy Sites"
  - Reference Models for "Waste Disposal"
- **Reference Approaches for Biota Dose Assessment**
  - Biota Modelling
  - “Wildlife Transfer Coefficient" Handbook
  - Biota "Dose Effects Modelling
- **Approaches for Assessing Emergency Situations**
  - Tritium Accidents
  - Environmental Sensitivity
  - Urban Areas

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Reference Approaches for Human Dose Assessment

- Analysis and evaluation of assumptions, models and parameters to control routine to explore possibilities of harmonization
  - *Establishing reference principles and procedures for the prospective assessment of radioactive releases – standard models, parameters, assumptions.*
  - *Testing of model predictions based on harmonized principles and procedures*
- Effects of environmental change on assessment of long-term impact of waste repositories
  - *Extension of the BIOMASS reference biosphere work to consider influence of environmental change*

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Reference Approaches for Human Dose Assessment (cont.)

Models to assess radiological impact of NORM and legacy sites

- Almost all countries have NORM issues
  - A large demand for modelling the impact
- Model improvement and testing for NORM releases
- Exploration of reference approaches to NORM release assessment

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Reference Approaches for Biota Dose Assessment

- Comparing model results predicting radionuclide concentrations in biota with test data sets
- Develop handbook of transfer parameter values for application to biota
- Modelling to determine
  - dose effects on species,
  - derivation of species protection thresholds,
  - population effects, acquisition of relevant data

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Approaches for Assessing Emergency Situations

- Tritium:– testing in new situations but also
  - Specific interests in some countries
  - Transfer of knowledge and training
- Environmental sensitivity –
  - Impact of environment type on radionuclide transfer
  - Identification of areas where reference approaches are not applicable
- Urban
  - Dispersion and transfer modelling not yet reliable
  - Currently an important topic

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EMRAS process

- **Model comparison**
  - Similar to model testing but with hypothetical scenarios
  - Analysis based entirely on discussion between modellers
- **Establishing Reference Data Sets**
  - Bring together national experts on transfer data
  - Review literature
  - Summarise and recommend default values for use in modelling indicating associated uncertainties

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