Key Messages from EURADOS

STAR Final Dissemination Event

June 9th, 2015

Aix-en-Provence, France

J. Tschiersch on behalf of EURADOS
Institute of Radiation Protection
Helmholtz Zentrum München, German Research Center for Environmental Health

EURADOS

History of EURADOS (European Radiation Dosimetry Group)

- Founded in 1981 by scientists involved in contracts with the EC
- Aim: To promote European research, development and cooperation in dosimetry
- Financial support from EC
  - General support in the first years
  - Later (only) dedicated support for projects
- In 2001 registered in the Netherlands, constitution set up
- 2004 – 2008: Last EC project
- In 2008 registered in Germany as “e.V.” (registered society)
- Since 2008: self-sustained network with regular income

Activities of EURADOS (European Radiation Dosimetry Group)

EURADOS maintains a network which includes experts, reference and research laboratories, industry and dosimetry services.

- **Goal:**
  - To promote research and development and European cooperation in the field of the dosimetry of ionizing radiation

- **Activities:**
  - Coordination of working groups
    - which promote technical development and its implementation in routine work
    - which contribute to compatibility within Europe and conformance with international practices
  - Organization of scientific meetings and training activities
  - Organization of intercomparisons and bench mark studies

- **Financial resources:**
  - from sponsoring institutions, from levies raised for activities organized by EURADOS (annual meetings, training courses and intercomparison exercises), and from projects funded by the European Communities.

EURADOS (as of January 2015)

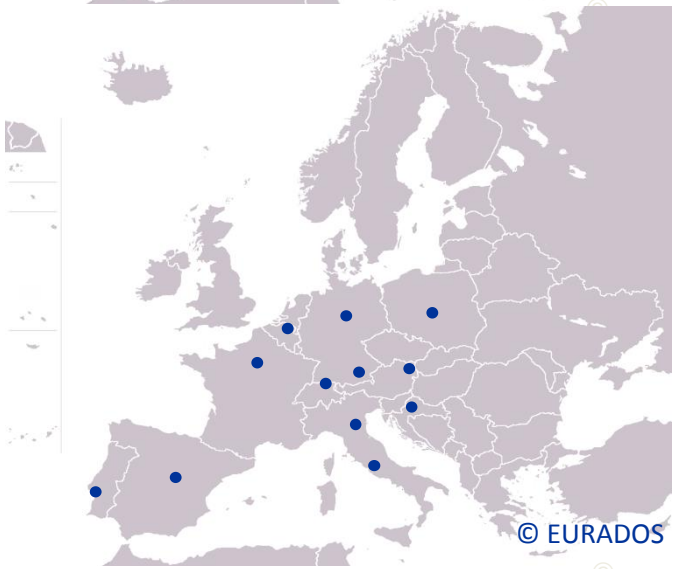
- **Voting Member Status (January 2015)**
  61 Voting Members from 29 countries

- **EURADOS Board of Officers**

Chair:	W. Rühm (Helmholtz Munich, Germany)
Vice-Chair:	F. Vanhavere (SCK-CEN, Belgium)
Secretary:	JF. Bottollier (IRSN, France)
Treasurer:	H. Schumacher (PTB, Germany)

- **EURADOS Office**
  operated by PTB (H. Schuhmacher, H. Harms)

- **EURADOS Council**
  J. Alves, J.F. Bottollier, E. Fantuzzi, P. Fattibene, M.A. Lopez, S. Mayer, S. Miljanic, P. Olko, W. Rühm, H. Schuhmacher, H. Stadtmann, F. Vanhavere



EURADOS Working Groups

Eight EURADOS Working Groups

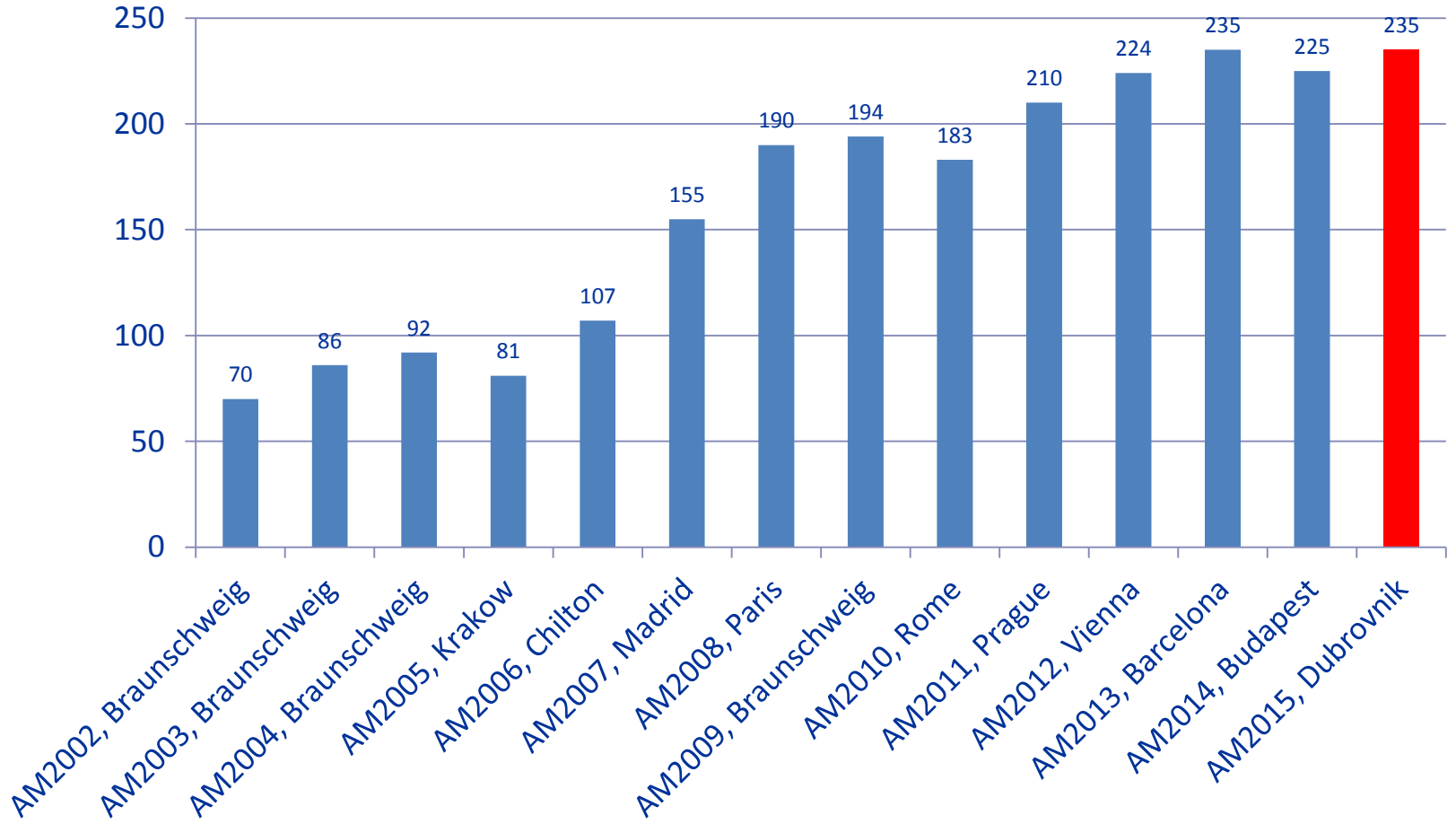
- Harmonization of Individual Monitoring (J. Alves, Portugal)
- Environmental Dosimetry (A. Vargas, Spain)
- Computational Dosimetry (R. Tanner, UK)
- Internal Dosimetry (M.A. Lopez, Spain)
- Radiation Protection Dosimetry in Medicine (R. Harrison, UK)
- Retrospective Dosimetry (C. Woda, Germany)
- High-Energy Radiation Fields (J.F. Bottollier, Franc
- Dosimetry in Medical Imaging (Z. Knezevic, Croatia)

Associate Members

Almost 500 scientists contributing to the overall EURADOS objectives

EURADOS Annual Meetings

Number of participants - history



EURADOS Visibility – Website, Newsletter, Reports

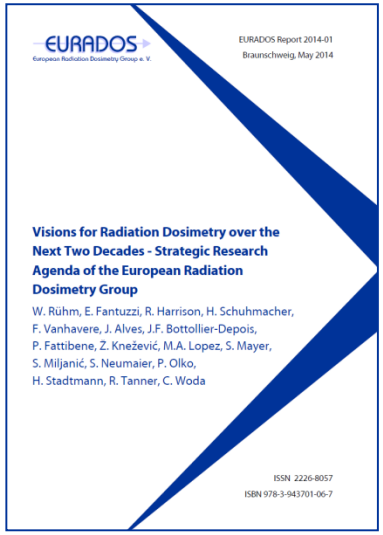
Website and newsletter (S Miljanic, P Fattibene): almost 900 subscribers

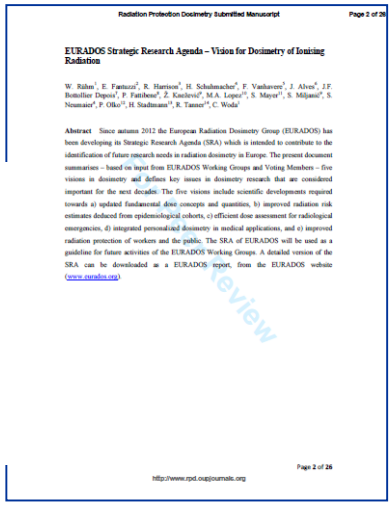
Feel free to subscribe if not yet done!

Two EURADOS Reports in 2014

Recent Achievements – Strategic Research Agenda

- **SRA Task Group** established in 2013
  (E Fantuzzi, R Harrison, W Rühm, H Schuhmacher, F Vanhavere)
- Draft prepared with input from all EURADOS WGs
- **EURADOS Report 2014/01 finished** and published
- **SRA presented at**
  - OPERRA, January, Rome (W Rühm)
  - German Radiation Protection Association, April, Munich (W Rühm)
  - IRPA 2015, June, Geneva (F Vanhavere)
  - MELODI 2014 E&T (J Alves)
  - MELODI 2014, October, Barcelona (W Rühm)
- **Publication for RPD prepared (accepted February 6, 2015)**
  - Ref. 1: "… could serve as a reference for possible research topics … which could potentially bear academic and practical significance."
  - Ref. 2: "… the paper identifies all relevant research needs in radiation dosimetry …good reference to justify future research projects. "





WG3 Environmental Dosimetry

Environmental Dosimetry = Environmental Radiation Monitoring for the protection of the public and the environment (Vargas et al.)

Radiation protection measurements and interpretations of

- dose and dose rate values
- radioactivity concentrations in environmental media

Environmental Radiation Monitoring for different scenarios:

- Monitoring of nuclear, industrial, medical and research installations
- Nuclear emergencies with local impact
- Nuclear disasters with transboundary implications

Objectives of WG3, examples

- Metrological support (harmonisation) of European early warning dosimetry networks
- Organisation of intercomparison programmes
- Development of (passive) methods for environmental dosimetry
- Use of gamma spectrometry systems for environmental radiation monitoring

Intercomparisons for Environmental Radiation Monitoring

-430 m: „radiation free“ environment

Monitoring of cosmic- & terrestrial radiation

cosmic radiation

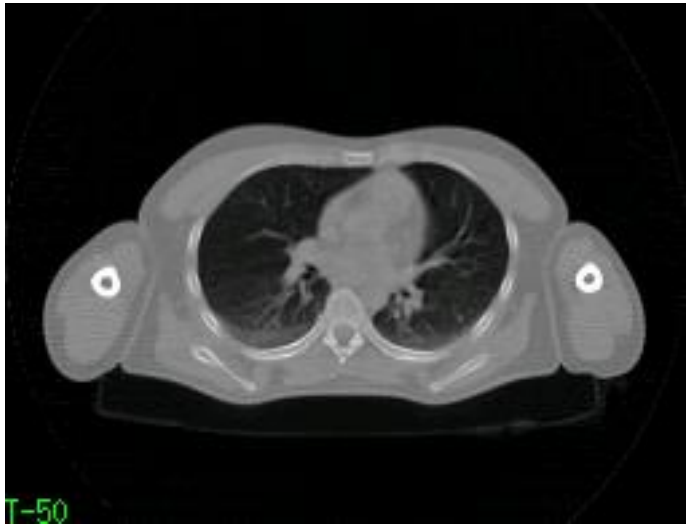
„radioactive plume“ simulation

Facilities available at PTB, Germany

WG6 Computational Dosimetry

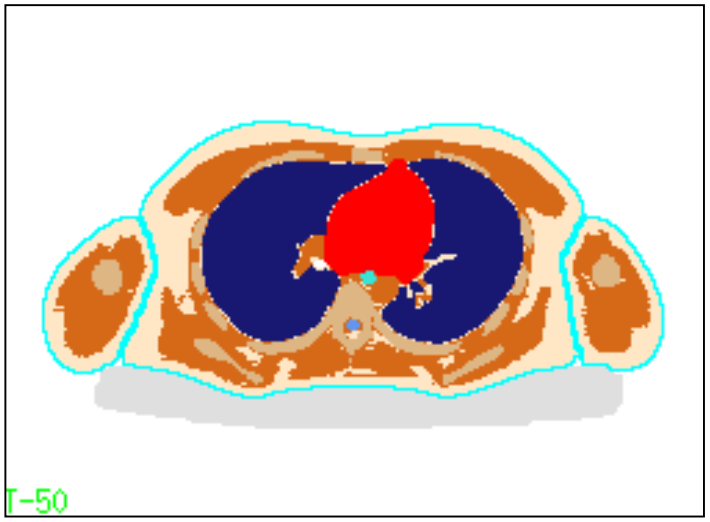
Example: Construction of voxel models from 3D medical image data

(M. Zankl et al.)



Original CT slice

Grey values: absorption properties



Segmented slice

Colours: assigned to individual organs

Method can be used for humans and animals

WG7 Internal Dosimetry

Example: Biokinetic models (Nosske et al.)

Early ICRP biokinetic models

- Based on fractions reaching whole body and organs of reference for ingestion and inhalation and biological half times; simple organ models
- Dosimetric models based on sphere geometries

Most recent ICRP biokinetic models

- Detailed alimentary tract model, respiratory tract model; systemic models with independent daughter kinetics.
- Dosimetric models based on voxel phantoms

New developments e.g. dosimetric models based on microdosimetry

What to do for wildlife dosimetry?

- Early biokinetic models might be enough environmental protection purposes?
- Most recent biokinetic models useful for bioassay interpretation (needed for wildlife?)

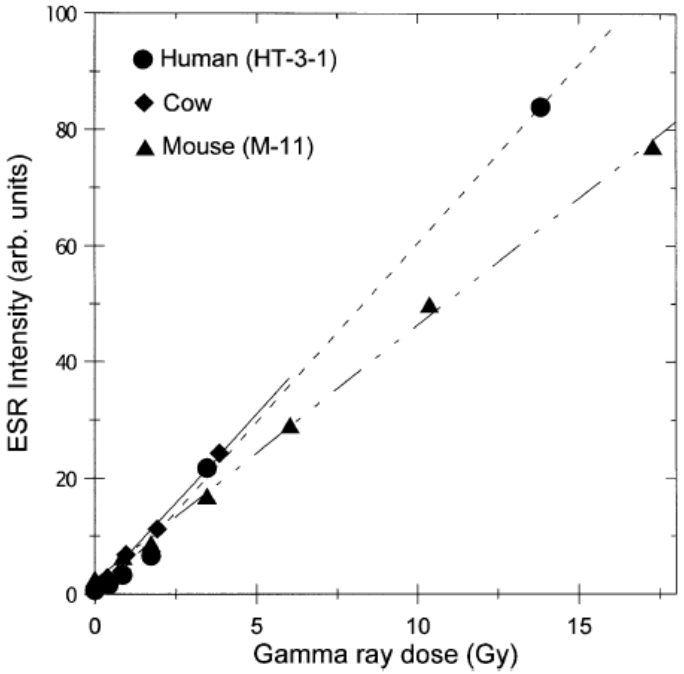
WG10 Retrospective Dosimetry

Example: Application of retrospective dosimetry to wildlife dosimetry

(Trompier et al.)

EPR dosimetry can be applied to animal teeth (cows, mice, dogs and walrus)

- EPR signal in animal and human teeth is simila
- Linear responses of the EPR signals to laboratory doses observed above 0.5 Gy
- X-band EPR depends on extracted teeth: > limited to dead animals (hunted, cadavers,…)
- Q-band EPR needs less material (mg)
- Could make the collection from living animals possible



Toyoda et al., 2003

Summary

- EURADOS has a long history of promoting methods for measurement for human exposure that can be of use for radioecological studies
- In particular, intercomparisons act as a vital component of QA providing checks on accuracy
- Training initiatives provide an important method of promoting good practice
- Wildlife dosimetry is not (yet) part of the remit of EURADOS
- Methods are being developed within EURADOS working groups and at home laboratories that might have benefits for wildlife dosimetry

THANK YOU!