



PREPARE

Wolfgang Raskob, Thierry Schneider¹, Florian Gering², Sylvie Charron³,
Mark Zhelezniak⁴, Spyros Andronopoulos⁵, Gilles Heriard-Dubreuil⁶,
Johan Camps⁷

Karlsruher Institut für Technologie (KIT), Eggenstein-Leopoldshafen, Hermann-von-Helmholtz-Platz 1, Germany, wolfgang.raskob@kit.edu, Tel.: +4972160822480

¹Nuclear Protection Evaluation Centre (CEPN), Fontenay-aux-Roses, France

²Federal Office for Radiation Protection (BfS), Neuherberg, Germany

³Nuclear Radiation Protection and Safety Institute (IRSN), Paris, France

⁴Ukrainian Center of Environmental and Water Projects (UCEWP), Kiev, Ukraine

⁵National Center For Scientific Research "DEMOKRITOS", Aghia Paraskevi, Greece

⁶MUTADIS, Paris, France

⁷Belgian Nuclear Research Centre, SCK•CEN, Mol, Belgium



EC Project EURANOS (2004 – 2009)
Improvement of the coherence and effectiveness of nuclear and radiological emergency management including the rehabilitation of contaminated areas

NERIS-Platform

- Keep the momentum from EURANOS
- Improve the effectiveness of current European, national and local approaches
- Promoting more coherent approaches through the establishment of networking activities
- Maintaining and improving know-how and technical expertise among all interested stakeholders
- Identifying needs for further developments and addressing new and emerging challenges

EC Project NERIS-TP (2011-2014)

- Close gaps from EURANOS
- Promote the NERIS Platform

EC Project PREPARE (2013-2016)

- Close gaps based on Fukushima experience

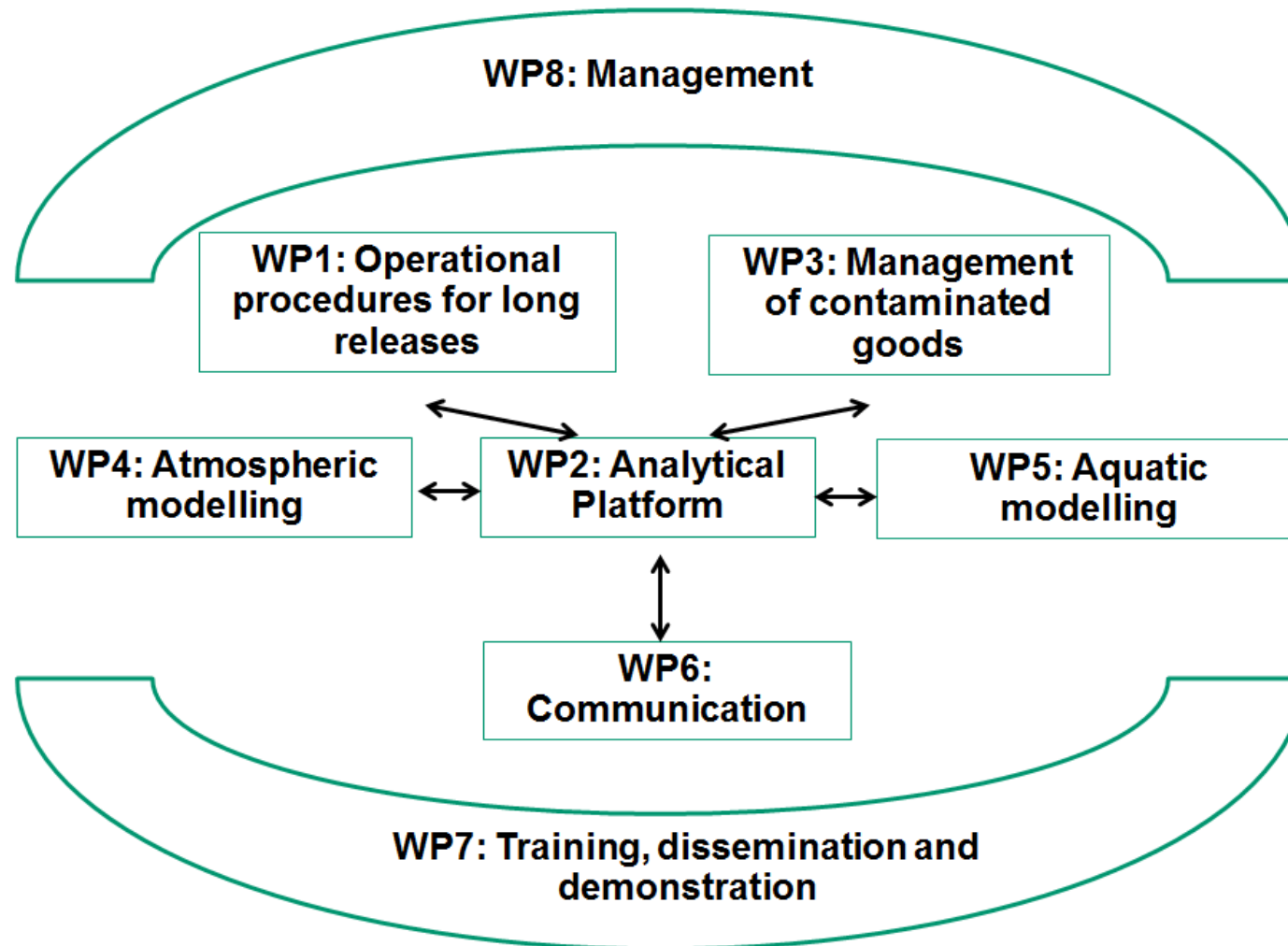


- PREPARE: Innovative integrated tools and platforms for radiological emergency preparedness and post-accident response in Europe
- Research project under the European Commission's 7th Framework Programme, EURATOM for Nuclear Research and Training Activities (work programme 2012), Fission-2012-3.3.1, Grand Agreement Number 323287
- Start first of February 2013, will last 3 years
- 45 partners
- 6 research work packages
- 1 work package on training and dissemination
- 1 work package on management





- This project aims to close gaps that have been identified in nuclear and radiological preparedness following the first evaluation of the Fukushima disaster.

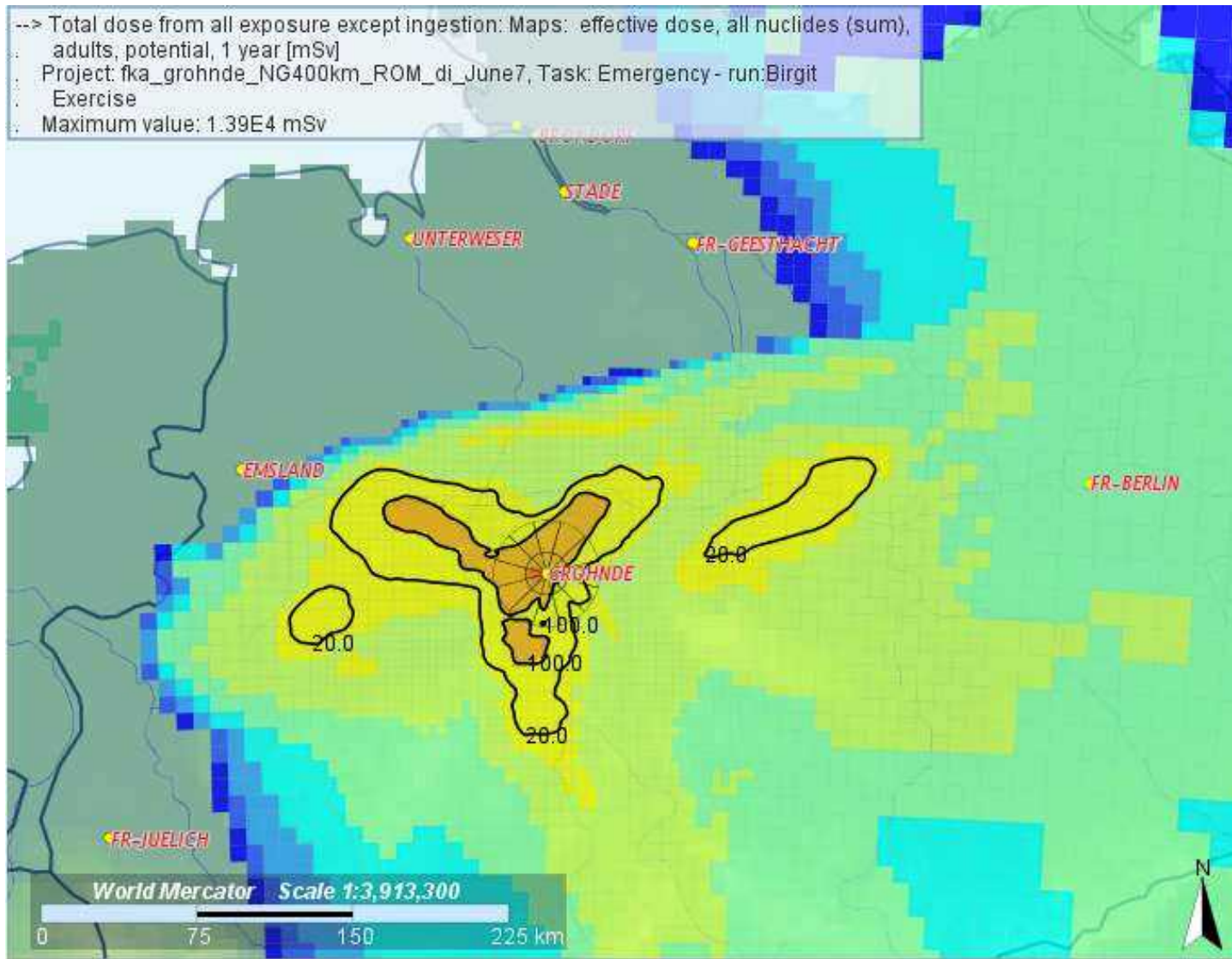




- **Development of operational procedures for long lasting releases:** Following the Fukushima Daiichi accident a review of existing procedures for long lasting releases and identification of possible needs for improvements by performing scenario calculations will be performed on a European level.
- **Potential source terms (FKA)**
 - Severe releases begin about 21 hours after reactor shutdown and continue for about 50 hours
 - The release occurs via the an open main steam valve at the roof in 30 m above ground; thermal rise is negligible
 - Release in terms of fractions of initial activity: Xe-133, Xe-135 \approx 24 %; I-131 and Cs-137 \approx 10 %
- **Investigations about emergency management options**
 - Where and when to perform actions
 - Weather statistics (e.g. from German Weather Service)



Example result: Effective dose in first year



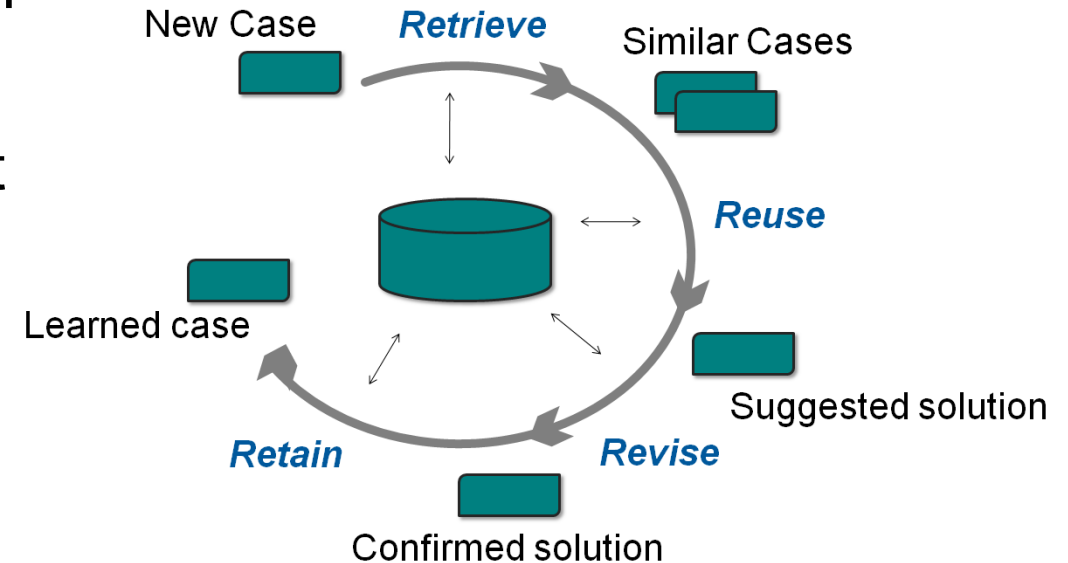
- JRodos screenshot with 20 mSv and 100 mSv isoline
- Near range ADM: DIPCOT



- **Platform for information collection and exchange:** The objective is to develop a so called Analytical Platform (AP) for information exchange in time of nuclear or radiological crisis events allowing discussion between experts on an expert-level and to widespread congruent information on the current situation to the public including mass media. The AP will cover all phases of an emergency and the functionalities will support uncertainty handling in the early beginning of the emergency in case information is sparse.



- Development of methods that allow to digest information even if the uncertainty is very high
- Use case-based reasoning that comprises machine learning algorithms to find solutions for events that are not part of the existing knowledge data base
- Provide working means for experts to facilitate discussion on hot topics
- Develop means to allow an expert working remotely as team for the Analytical Platform
- Communicate such an information to experts and the public





- Development of recommendations related to quality control and management of contaminated goods which are applicable to whole Europe, taking into account the viewpoint of all relevant stakeholders (e.g. producers, retailers, consumers and all the administrations involved at national and regional levels)
- **Progress made so far**
 - **Methodology for the involvement of stakeholder in national panels completed**
 - **10 national panels established in Belgium, Finland, France + Swiss, Greece, Ireland, Netherlands, Norway, Portugal, Spain and United Kingdom**
 - **DG-TREN, NEA and IAEA showed interest and will follow via WG3 of the NERIS-Platform**
 - **Regular contacts are organised with Japanese organisations to discuss this issue and to favour the exchange of experience**



- **Improvement to terrestrial aspects of decision support systems** such as ARGOS and RODOS including the estimation of a potential source term based on a combination of atmospheric dispersion calculations and monitoring information around a power plant and the physico-chemical properties of radionuclides emitted to the atmosphere
- **Progress made so far**
 - **Methodology and computational methods for simple estimate of source term using gamma dose rate measurements at the fence**
 - **Ideas about the complex methods for source term estimations are under discussion**
 - **Draft report on how to model particles in the ADM under preparation**

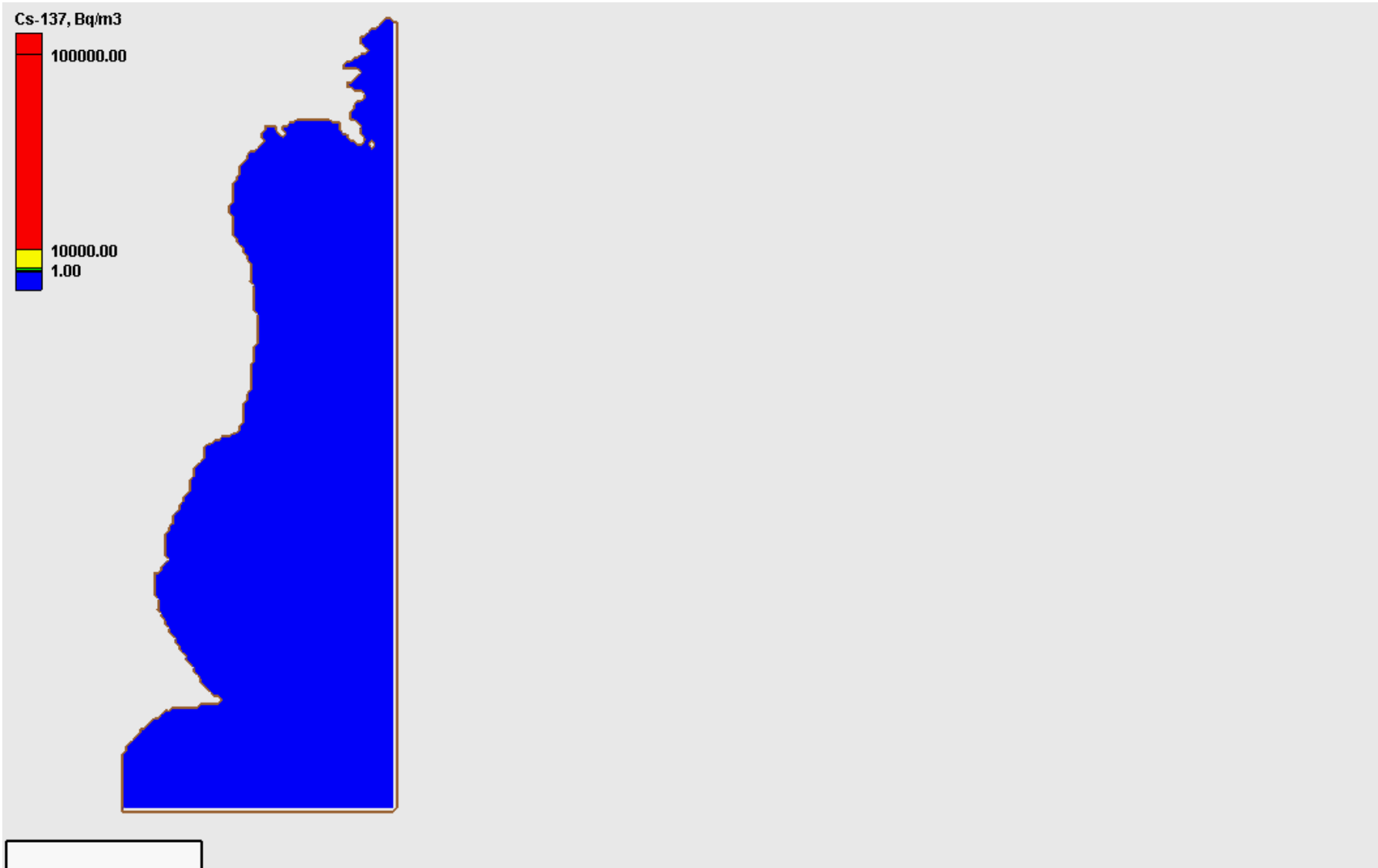


- **Improvement to aquatic aspects of decision support systems:**
The aquatic models in decision support systems are far less developed than those for terrestrial ecosystems. This was apparent for the Fukushima accident (ocean). In this respect we intend to integrate state of the art aquatic models into the RODOS DSS and couple them with countermeasure simulation models.
- **Progress made so far**
 - **Design Document for POSEIDON Model Integration**
 - **Design Document for THREETOX Model Integration**
 - **Design Document for MOIRA Model Integration**
 - **Work on integration of complex models started**
 - **WP5 leader professor at Fukushima University and will explore test cases for the hydrological models**



^{137}Cs (Bq/m^3) in water from direct deposition, dispersion for two weeks (coupled model)

PREPARE





General objectives:

- Investigate the conditions and means for **pertinent, reliable and trustworthy** information to be made available to the public in **due time and according to its needs** in the course of nuclear emergency and post-emergency contexts
- Taking into account **complexity and dynamic dimensions** of information flows
- Grounding on on the **empirical analysis** on the dynamic of information related to the Fukushima experience (in Japan and Europe) but also on other available experiences in the EU

3 areas of focus:

- Emergency & post-emergency **expertise networks interactions**
- Information & participation of **affected populations**
- Evaluation & improvement of **global communication (media)**



- Basic training of key players in the field of nuclear and radiological emergency and post-accident management by the organization of two basic courses:
 - Training Course on Preparedness and Response for Nuclear and Radiological Emergencies (**performed March 17-21, 2014**);
 - Training Course on Late Phase Nuclear Accident Preparedness and Management (**issued for September 16-18, 2014**).
- Training related to the use of specific tools developed or updated in this project – at the end of the project.
 - Exercises
 - Table-top exercise to evaluate the preparedness for monitoring in case of a large scale cross-border radioactive contamination in the aftermath of a nuclear accident – **one exercise performed in Ljubljana, end of 2013**.
 - Emergency exercise to evaluate the response during an accident involving an international transport of radioactive material – **preparation in progress**.



- Work in PREPARE is driven from the observations during and after the Fukushima incident
- PREPARE integrates 45 partners from universities, research organisations, operational emergency management centres, industry and NGOs
- Work comprises topics such as long lasting releases, source term estimation, model improvements, knowledge gathering and exchange of trustworthy information
- Work is part of the Strategic Research Agenda (SRA) of the NERIS Platform, but the SRA is much wider and contains more tasks
- PREPARE is a step forward in harmonisation of emergency management and rehabilitation preparedness in Europe
- Important to assure that the products are applied by end users and for new products (Analytical Platform) end users are identified



Thank you very much for
your attention

Questions?