

## **INTEGRATION RAMA & DIMAS**

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### **Introduction**

This cluster brought together two projects, *i.e.* EV/36: Risk Analysis of Marine Activities in the Belgian part of the North Sea (RAMA) and EV/41: Development of an Integrated Database for the Management of Accidental Spills (DIMAS). Both projects focused on different aspects of marine accidents. The first project dealt with the analysis of the risks and hazards related to shipping, the potential impact of spills and the development of recommendations for improvement of existing contingency plans. The second project aimed at developing a database of priority contaminants relevant in case of marine accidents and spills, amendable for interpretation, providing reliable, easy to interpret and up-to-date information on marine specific issues. The most important parts of this database are the quality-assured direct and indirect effects on marine biota.

### **Objectives**

The objectives of the cluster were:

- to create a structure which will increase and optimize the already existing communication and interaction between the different partners in both projects;
- to avoid duplication and overlap of efforts and data generation and integrate the results and data of both projects;
- to increase the visibility, dissemination and exploitation of the results by international networking, improving participation of potential end-users and integrating recommendations to policy makers;
- to create added value both for the researchers as well as for the end-users of both projects;
- to minimize gaps in the knowledge by mutual exchange of specific information and data relevant for each others project;
- to explore opportunities to combine the expertise of both project teams in further research projects.

### **Results**

#### ***More structured co-operation (objective 1, 3, 4)***

A structured co-operation was attained through the organization of official and informal partner meetings. In these meetings focus lied on harmonization of data, methods and results as well as on the joint identification of knowledge gaps. This in its turn has led to more efficient data gathering and increase in the width and relevance of both projects.

Overall, the official as well as the informal meetings were considered very useful by the different partners within the cluster:

- Both projects were clearly optimized in terms of avoiding overlap (e.g. sending out questions to the port authorities, environmental fate and distribution modelling, gathering effects data...).
- The interaction led to a number of new multi-disciplinary concepts for knowledge gaps in the DIMAS and RAMA projects as well as for future project proposals (mainly in terms of database structure, fate and distribution modelling; see also 'Further research').
- An active exchange of data between Ecolas and Euras has taken place. As indicated in Fig. 5 below, data on transported cargo and the resulting list of relevant dangerous goods were needed by both projects.
- Based on the shipping and cargo data gathered in the RAMA project, Euras was able to make up a dangerous goods cargo list of relevant products transported in the Belgian Part of the North Sea. In the DIMAS project, an extended list of compounds was drawn based on physico-chemical properties, intrinsic (eco)toxicity, occurrence on priority lists. From this extended list, the final list with compounds to be fully evaluated in the DIMAS project was made, based on for instance intrinsic properties and – more importantly – on transported quantities. The frequency and quantity of transportation over the North Sea was obtained from the RAMA project and checked with data from the harbour of Ghent.
- Ecolas on its turn, used the ecotoxicological knowledge of Euras for its effect analysis. Three incident scenarios were selected for the effect analysis and the ecotoxicological data of the dangerous cargo used in these scenarios were delivered by Euras. In this way, the quality assurance of the ecotoxicological data will be integrated in the impact analysis of potential spills. Further, the scenario development and choice of marine distribution model parameters in the RAMA project was performed after an informal meeting of Euras, Ecolas and MUMM where possible options and realistic scenarios were thoroughly discussed.

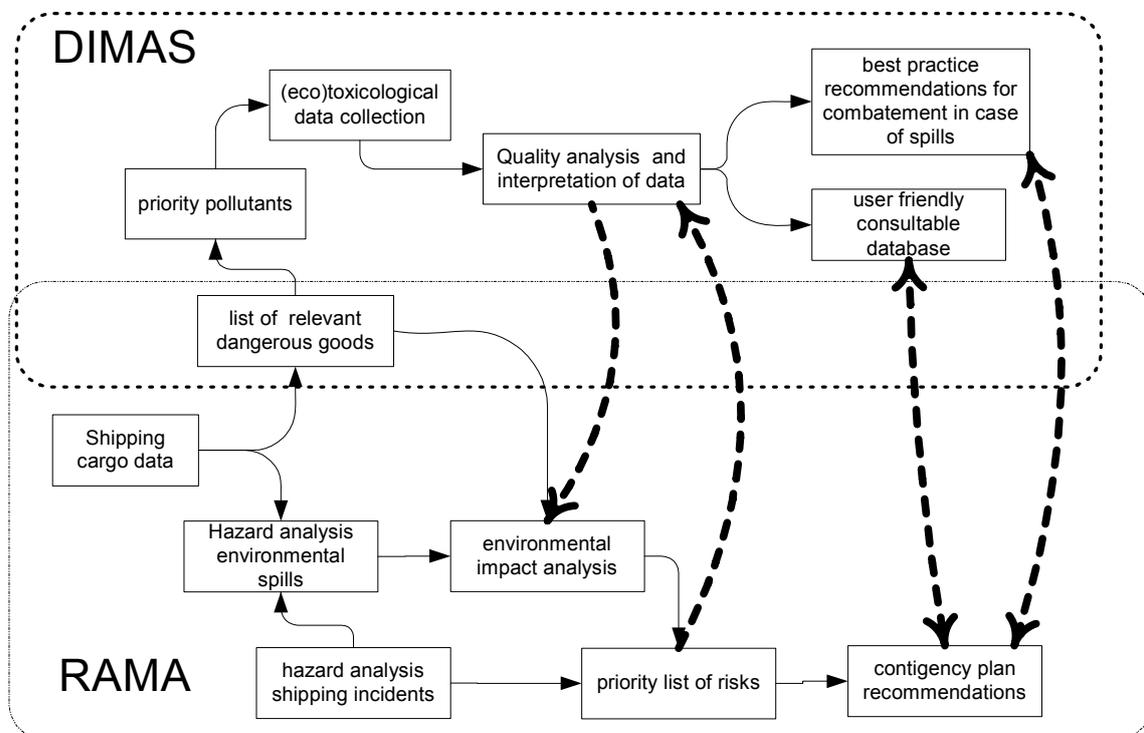


Fig. 5. Overview of the clustered project with mutual relationships.

## **Integration of results (objective 2)**

The integration of results of both projects resulted in the present policy oriented integrated report. This report combines the relevant results and reports in an understandable language. The cluster also aimed at improving the visibility, dissemination and exploitation of the results of both projects by organizing a joint end-user meeting, the creation of a cluster website and the organization of an international symposium. During the partner meetings, it became apparent that a clear communication on terminology between RAMA and DIMAS was also necessary to optimize the integration of the two projects. Therefore, the terminology was made uniform and easy to interpret (e.g. on the website).

Important with respect to policy, is that both the results of RAMA and DIMAS as well as the outcome of the MIMAC symposium are ready to be used in contingency planning. Currently there are some new developments regarding preparedness and response planning related to spills at sea (organizational, operational, administrative). This provides an excellent opportunity to pick up and integrate some of the results and recommendations put forth by both RAMA and DIMAS. The risk analysis of RAMA forms a basis for the evaluation of the degree of preparedness (products, equipment, response) while the database developed within the DIMAS project forms an operational tool that can be used during pollution combating operations at sea.

## **Knowledge gaps (objective 5)**

A number of knowledge gaps were identified and filled in both projects:

- RAMA:
  - data on ecotoxicity for the selected substances in RAMA were not readily available;
  - data on fate of chemicals were not available.
- DIMAS:
  - data on transport were very limited;
  - data on distribution of chemicals were not available.
- MIMAC: even after clustering the DIMAS and RAMA projects, some data gaps remained:
  - more information (modelling) is needed concerning fate and distribution of chemical spills on the North Sea; current modelling efforts are solely focussed on oil spills (see also 'Further research');
  - for a number of substances, marine-specific ecotoxicity data are lacking so that extrapolations from freshwater data were needed.

Data gaps for the RAMA and DIMAS projects were filled as much as possible. Through the clustering this could be done without duplication of efforts. Data gaps that are still present are further discussed in 'Further research'.

## **Further research (objective 6)**

A number of research options are suggested below.

- Ecotoxicological research to obtain ecotoxicity data based on marine species for the transported chemical compounds at the North Sea.
- Development of a new approach to assess environmental impact caused by oil and chemical spills. The methodologies for assessing environmental fate and distribution within DIMAS and RAMA are conservative and can supplement each other. A first attempt within RAMA (using the sediment transportation model) for estimating the spatial distribution of a 'Hazardous and Noxious Substance' (HNS) in water over time is novel, but somewhat limited as it assumes no breakdown of the chemical compound in the environment and does not take environmental distribution in the different compartments (air, water, soil, etc.) into account. The approach followed within DIMAS is also limited as only environmental distribution in a steady state

environment, without breakdown, is taken into account. Therefore following suggestions can be made:

- Development of adequate models for calculating the fate and distribution of chemical spills in the marine environment (ideally also taking into account biotic and abiotic breakdown of the product). Currently such models are not available or routinely used in Belgium (and neighbouring countries). This is in contrast to oil spills, where good models are used to evaluate marine pollution.
- The integration of the approaches of both the RAMA and DIMAS project can form the basis of this new model (Fig. 6):
  - a Mackay-like distribution of the compound in the environment (DIMAS) followed by
  - a spatial distribution in time (RAMA approach).
- Refinement of both of these approaches is however necessary to come to an operational and policy relevant tool.

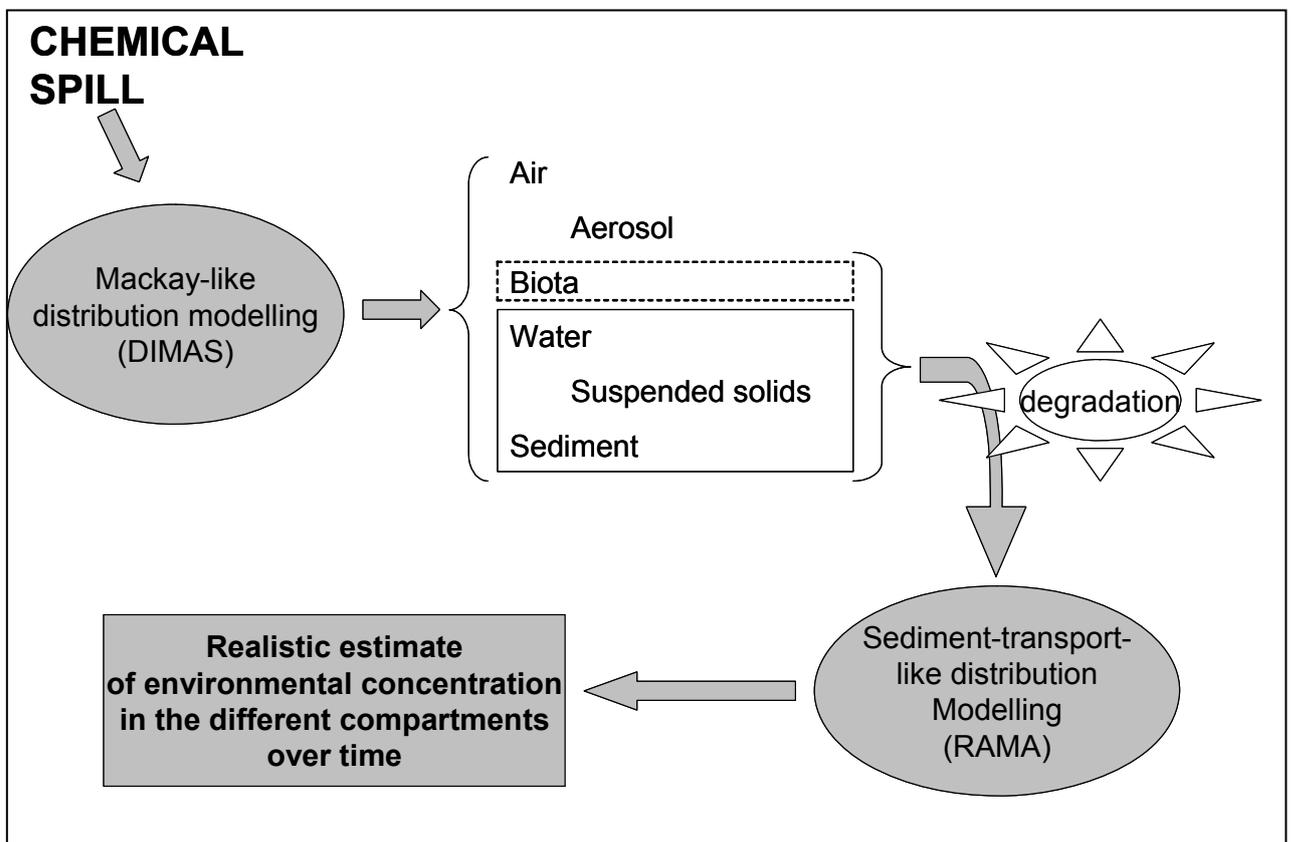


Fig. 6. Schematized approach for a realistic environmental fate and distribution modeling in the case of an accidental spill.

## Conclusion

Clustering RAMA and DIMAS was considered to be very successful:

- The integration and bilateral adjustment of methods and data led to more efficient data gathering and increased the width and relevance of both projects by integrating each others experience.
- End-users of one project got acquainted with the results of the other project. They also gave valuable advice for the exploitation of the results by other potential end-users (e.g. data from

Ghent harbour that was obtained in the DIMAS project was cross-checked with transport data from the RAMA project; distribution modelling from the RAMA project was used as a starting point for developing an environmental fate and distribution model in DIMAS).

- Expertise in both projects was complimentary and this cluster brought together experts in environmental law (RAMA), environmental policy (RAMA), impact assessment (RAMA/DIMAS), risk analysis (RAMA & DIMAS), ecotoxicology and toxicology (DIMAS & RAMA), contingency planning (RAMA), database management (DIMAS). This has led amongst other to a number of future research options that are considered crucial in spill management/contingency planning, as discussed in '*Further research*'.

## **References**

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