

## EDITORIAL

On December 12, 1999, the tanker “*Erika*”, laden with 31 000 t of heavy fuel oil, sank about thirty nautical miles south of Penmarc’h Pointe (Brittany, France) This wreck caused a huge 19 000 t oil spill along 400 km of the French Atlantic coast.

On February 28, 2000, the French government decided to implement programmes which would focus on the ecological and ecotoxicological consequences of the “*Erika*” oil spill including (i) monitoring of abiotic compartments of the environment and relevant biological species (approximately € 4.6 million over 3 years), overseen by the regional Directorates for the Environment, (ii) the monitoring of the ecological and ecotoxicological consequences (approximately € 4.6 million over 5 years), as well as two programmes for the development of new monitoring tools (*LITEAU*)<sup>1</sup> and for the provision of sea and land based anti-pollution resources (*RITMER*)<sup>2</sup>.

Within the monitoring programme investigating the ecological and ecotoxicological consequences of the “*Erika*” oil spill, thirty research projects were selected and funded after an open call for proposals. They include (i) detailed determinations of polycyclic aromatic hydrocarbons (PAH) and their metabolites in water, sediments and biota; (ii) monitoring of ecotoxicological biomarkers (BPH, AchE, MXR, GST, metallothionein, etc.) in mussels; (iii) estimation of the ecological, toxicological and physiological impact on sole; (iv) restoration of intertidal and supratidal fauna and flora; (v) evaluation of the effects on marine and coastal bird populations; (vi) assessment of the impact of cleaning activities on cliffs and beaches ([www.suivi-erika.info](http://www.suivi-erika.info)). Many French scientific institutes are involved in this programme: the French Research Institute for Exploitation of the Sea (IFREMER), the Centre for Documentation, Research and Experimentation on Accidental Pollution of Waters (CEDRE), the Biological Station in Concarneau, the Research Centre for Marine Mammals (CRMM), the League for the Protection of Birds (LPO), the Society for the Study and Protection of Nature in Brittany (SEPNB), the Brest Botany School, and several laboratories of the Universities of Brest, Nantes, Angers, La Rochelle and Bordeaux.

This special issue of *Aquatic Living Resources*, Vol. 17, N° 3, is devoted to the results of this monitoring programme, which were presented during a conference held on November 20-21, 2003, in the campus of the IFREMER Centre in Nantes. The results of *LITEAU-Erika* were also integrated into the presentations when the set of themes allowed it. The results of *RITMER* projects were presented on posters. Two hundred scientists, members of associations and environmental managers took part in this meeting, which also provided an opportunity to look back on other incidents compared to the “particular case” of “*Erika*”.

During the symposium, the “*Prestige*” disaster of 19 November 2002 off the Cape of Finisterre (Spain) was discussed. This oil tanker was flying a Bahamas flag and was carrying 77 000 t of heavy fuel when it broke into two pieces

<sup>1</sup> The program *LITEAU* was launched in 1999 by the Ministry of Ecology and Sustainable Development. It is devoted to the sustainable management of the littoral zone. Its studies are founded on the needs of the managers of the littoral zone. One of its aims is to provide validated models which will help to improve the management of nutrient inputs and pollution, including pollution by hydrocarbons. Following the shipwreck of the tanker *Erika*, this programme launched eight research projects relating to the bacterial degradation of hydrocarbons, the impact on the ecophysiology and the pathology of bivalves, the evaluation of the “non-commercial” damage resulting from the spill and the prediction of the movement of spilled oil. This part of the programme is called *LITEAU-Erika*.

<sup>2</sup> The network of technological research and innovation on accidental marine pollution and their ecological consequences (*RITMER*) was set up on April 19, 2001 by the Minister in charge of Research. Twenty projects are in hand and address the location of pollutants under the sea, the heat treatment of waste and the acceleration of biological breakdown of oil.

and sank to a depth of 3800 m. Several thousand tons of hydrocarbons were discharged into the sea. Less than two years after the “*Erika*” shipwreck, the Atlantic coasts in Europe were again plunged into a struggle against an oil slick. The weather conditions and currents in the vicinity of the spill unfortunately caused the pollution to spread throughout the Bay of Biscay. Dr J. Albaiges (CSIC, Spain) described the circumstances surrounding the shipwreck and the preliminary results of the spatial and temporal distribution of PAH following the incident. A programme monitoring the impact of this oil slick on the marine environment is currently being conducted (<http://otvm.uvigo.es/>). Other colleagues who had been faced with such accidental pollution caused by hydrocarbons also addressed the meeting. Within this scope, Mr R. Law (CEFAS, UK) provided a synthesis of the “*Sea Empress*” disaster which occurred at the entrance to Milford Haven on February 15 1996, losing 72 000 t of light crude oil and 480 t of heavy fuel oil. Dr. E. Amato (ICRAM, Italy) described the explosion in the Gulf of Genoa of the oil tanker “*Haven*” loaded with 144 000 t of crude oil and described the monitoring programme which remains operational today. On March 23, 2001, Denmark had to tackle a spillage of 2700 t of heavy fuel. Mr J.L. Sorenson described the findings in relation to the environmental impact and these are available on the web: <http://www.stam.dk/get/7918037.html>. Finally, Pr S. Jewett from the Institute of Marine Sciences of Alaska University described the effects of the oil slick from the “*Exxon Valdez*” and the clear ecotoxicological and demographic impact upon sea birds and certain mammals more than 10 years after the spillage. Some results were published in *Marine Ecology Progress Series*, Vol. 241, 2002, “Nearshore vertebrates predators: constraints to recovery from oil pollution”.

This broader experience regarding the impact of oil spills enabled the conference participants to consider the particular case of the “*Erika*” whilst recognising the substantial analogies regarding the management of this type of crisis, as well as the scientific monitoring programmes that were subsequently set up following specific incidents. In addition, these various case studies demonstrated that even in the presence of the same type of fuel, as was the case for the “*Erika*”, the “*Prestige*” and the “*Baltic Carrier*”, each oil accident is unique in itself, and unlike any other. The place of the shipwreck, e.g., the Northern or Southern hemisphere, the proximity to the coast, or the weather and sea conditions, all contribute the behaviour of spilled oil in the marine environment, and to determine both what response strategies can be used and which ecosystems will be affected.

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