Foreword

The second ECORAD congress held in Aix-En-Provence in 2004 and organized by the Nuclear Safety and Radioprotection Institute was devoted to the scientific basis for environment protection against radioactivity. Considering its results, it is clear that radioecology is now changing rapidly. This science, derived from ecology and ecotoxicology was born out of the needs of civilian and military nuclear applications. Although initially, the main science involved was clearly biology, operational management needs have rapidly moved its main concerns towards transfer studies and associated metrology. It is only over the last few years that a clear return to biology has taken place in the research teams. A convergence is now emerging with more and more biologically-oriented human radioprotection and with environmental protection including more and more true ecology. The issue nowadays is not only to understand where radionuclides are going but what their real effects are.

I hope that you will enjoy getting a sense of the new trends in radioecology, in these papers. It would be unfair to focus only on a few but to encourage you, I will highlight one or two personal impressions.

There was, of course, cellular biology, with some studies showing that the impact of radiation cannot be reduced to some small scale DNA damage and a few mutations. as real ecologists are well aware, the cell is not only a stand alone complex system, but it is also a system exchanging information with other cells; this may be the fundamental reason for the high resilience of organisms but also, from time to time, the cause of overreactions leading to damage. It was stressed that that the complexity of organization levels, from the DNA to the whole biosphere is such that the ambition to explain one end by the other is unrealistic. It is hence necessary to keep up the research effort in all areas and not only in molecular biology.

The new age of radioecology may also be seen from some interesting attempts to go further than a "cataloguing" science. Even if it is clearly out of reach to know how each species manages its stressors, some grouping is possible, since countermeasures are also a genetic inheritance that may be shared by genetically close species.

I must also stress the enormous potential offered by modern analytical techniques. If they are used to support imaginative experimental activities, more breakthroughs may be hoped for. These techniques will certainly benefit our knowledge of biogeochemical cycles of radioactive and stable elements in a big way in the coming years. Some such results were presented, notably about ^{129}I that may be found very far from known sources. Even very classical cases, like ^{137}Cs from Chernobyl, may benefit from precise measurements of isotopic ration (including stable Cs).

In conclusion, it is clear that there is an emerging residual problem of environmental impact in cases of chronic exposure to very low levels of radiological stress. Many presentations were given about this topic, which is still an open question but which is more and more focused on internal contamination. Some recent data are, indeed, clearly in favor of a very high level of "no effect dose" in the case of low dose rate gamma radiation coming from an external source.

I hope that this congress has helped to identify and fill some knowledge gaps. Many thanks to the organizing team, many thanks to our scientific committee that helped us to build the program of oral and poster presentations. And many thanks to the reviewers who have enabled this book to be published.

J.C. Barescut