

## **Process characterization at the continent-ocean interface using natural isotopes**

**Luiz D. Lacerda**

INCT de Transferência de Materiais Continente-Oceano  
Instituto de Ciências do Mar  
Universidade Federal do Ceará  
Av. Abolição 3207  
60.165-081 Fortaleza, CE  
[ldrude@pq.cnpq.br](mailto:ldrude@pq.cnpq.br)

### **ABSTRACT**

Along the transport through the continent-ocean continuum, different physical, chemical and biological processes, affected both by natural forcing and anthropogenic drivers, alter the quantity and quality of the transported materials. The compounded operation of these processes results in extremely high complexity, making difficult the understanding of the ecosystems' functioning and consequently the possibility of sustainable management and use of the coastal zone. Some advanced applications of natural isotopes are discussed here to help understand this complex scenario. The quantification of natural radionuclides from the U/Th series (in particular of  $^{222}\text{Rn}$ ,  $^{226}\text{Ra}$  e  $^{228}\text{Ra}$ ) and element ratios makes possible to deduce the exchange rates between different water sources to the coastal zone, to establish water residence time in estuarine systems and its influence on the water mass on the continental shelf. Simultaneous quantification of nutrient, trace metal and/or organic micro-pollutant distribution, either in surface and ground water also allows to trace complex mixture of water and materials from different sources discharged to the coastal zone, both from continental and oceanic sources. Changing rates of different radionuclides may also be used to understand under what environmental conditions substances had been formed and/or accumulated. By combining these analyses on recent and palaeoenvironments, a historical evolution of the different biogeochemical processes as well as the relative importance of the anthropogenic drivers will be possible. Eventually, scenarios of future response of the coastal zone to regional and global changes can be assessed.