

Risks in a complex world: the effects of a structured environment on food web accumulation of contaminants.

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The environment in which organisms are exposed to contaminants is complex, with structures at different scales in space and time. For instance habitat configuration, contamination patterns and soil properties may vary in space, while prey availability may be seasonal and vary in time. Higher organisms therefore exploit their environment in a non-random way (e.g. optimal or central foraging). However, in models describing food web accumulation, such non-random accumulation is often ignored. Most of such models describe worst-case scenario's, and calculate uptake based on bioaccumulation factors. In recent years, models have become available that include spatial variation in for instance contaminant patterns and foraging behavior of higher organisms. Here we present a spatially explicit accumulation model, developed in the BERISP project (www.berisp.org), in which spatially explicit information on soil contamination and -properties can be combined with habitat structures and foraging behavior of organisms, to assess uptake of contaminants through a given food web. Based on this model we will illustrate the effect of structures in the environment on the exposure patterns of predators. The results show that structures in the environment affect the relationships between soil contaminant levels and exposure of predators to these contaminants. This depends for instance on the habitat type and structure, and the suitability of the habitat for predators to forage. Effects of other factors, like for instance soil properties affecting the bioavailability of the contaminants, or the foraging behavior of the species of concern will also be discussed. Based on the results it can be concluded that for a given contamination pattern in the soil, the risks for higher organisms may vary considerably, due to the characteristics and structure of the environment they live in. When assessing site specific risks in a realistic way this should be taken into account.