

1 Session

2 Integrated Environmental Assessment and Management

3 Integrated Environmental Assessment and Management, poster only

4 Poster Presentation

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6 Title: Regional distribution of ecological risks of pesticides in Japan - Integrated

7 analysis of environmental model and species sensitivity distribution.

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12 Keywords: Pesticide, Ecological risk assessment

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15 Abstract

16 We analyzed regional distribution of ecological risks of 67 pesticides (commonly used  
17 in Japanese paddy fields) in 350 sites of Japanese river water. Region-specific  
18 environmental models and species sensitivity distribution (SSD) were integrated to  
19 quantify ecological risks in each site. Environmental model used in this study consists  
20 of environmental scenario (property of river basin) and environmental dynamics from  
21 paddy field to river. The predicted environmental concentrations (PEC) in river water  
22 was calculated considering pesticide mass discharge through surface runoff and seepage  
23 using physico-chemical parameters (soil adsorption constant and half-life in water) and  
24 paddy field lysimeter test data. To predict region-specific PEC, the important  
25 region-specific parameters of environmental scenario, which are river flow, paddy rice  
26 cropped area, and pesticide usage ratio in the basin, were organized at 350 river sites in  
27 Japan. The calculated region-specific PECs were validated by comparing with measured  
28 concentrations in a river. Differences between measured and predicted concentrations  
29 were within 10-folds for all but one pesticide. The SSDs of the 67 pesticides were also  
30 analyzed based on acute toxicity data. To do so, ecotoxicity database was constructed by  
31 collecting acute toxicity data for freshwater organisms. The magnitude of ecological  
32 risk was quantified as the index of potentially affected fraction (PAF) by jointing SSD  
33 and the regional distribution of PEC. Finally, we developed the database of PECs and  
34 PAFs and the Google map based visualization tool of the data at the 350 sites in Japan.  
35 Several techniques for filling the gaps of fate and effect data were also developed.

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