

Importance of advective zone in longitudinal mixing experiments

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Abstract

One-dimensional Fickian dispersion models such as the advection diffusion equation (ADE) are commonly used to analyse and predict concentration distributions downstream of contamination events in watercourses. Such models are only valid once the tracer had entered the equilibrium zone. This paper compares previous theoretical, experimental and numerical estimates of the distance to reach the equilibrium zone with new experimental values, obtained by examining the change of skewness in a tracer profile, downstream of a cross-sectionally well mixed source. Closer agreement was found with Fischers' theoretical estimate than prior experimental and numerical studies.

Key words: environmental hydraulics, longitudinal mixing experiment, advection diffusion equation, advective zone.