

Implications of rainfall variability for seasonality and climate-induced risks concerning surface water quality in East Asia

Abstract

Water resources in East Asia are considered particularly vulnerable to climate variability and extremes due to strong hydrologic variability inherent in the monsoon climate and rising water demand resulting from rapid economic growth. To obtain a better understanding of the current status and climate-induced risks concerning surface water quality in East Asia, seasonal and spatial variations in surface water quality were compared among 11 watersheds in eight countries during typical dry and wet periods from 2006 to 2008. While concentrations of dissolved ions tended to be higher during dry periods, concentrations of suspended sediments and dissolved organic matter were significantly higher during wet periods at most sampling locations. Metals with low solubility showed higher total concentrations during wet periods and had strong positive relationships with suspended sediment concentrations. Metals with high partitioning into the dissolved phase exhibited higher concentrations during dry periods at many sites. Seasonal and spatial patterns were distinct along the Lower Mekong River, including much higher monsoonal concentrations of sediment-associated metals and relatively high dry-season concentrations of dissolved As along upper reaches. The results suggest that rainfall variability is crucial in understanding seasonality and climate-induced risks concerning surface water quality in East Asia. © 2011 Elsevier B.V. All rights reserved.