

## NOTES AND CORRESPONDENCE

### A Three End-Member Mixing Model Based on Isotopic Composition and Elemental Ratio

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#### ABSTRACT

A three end-member mixing model based on nitrogen isotopic composition and organic carbon to nitrogen ratio of suspended particulate matter in an aquatic environment has been developed. Mathematical expressions have been derived for the calculation of the fractions of nitrogen or organic carbon originating from three different sources of distinct isotopic and elemental compositions. The model was successfully applied to determine the contributions from anthropogenic wastes, soils and bedrock-derived sediments to particulate nitrogen and particulate organic carbon in the Danshuei River during the flood caused by Typhoon Bilis in August 2000. The model solutions have been expressed in a general form that allows applications to mixtures with other types of isotopic compositions and elemental ratios or in forms other than suspended particulate matter.

(Key words: Carbon isotope, Particulate organic matter, Typhoon flood, Danshuei River, Taiwan)

#### 1. INTRODUCTION

Geochemical properties, such as isotopic compositions and elemental concentrations, are often used to determine contributions of materials from different sources. Two end-member mixing models based on one geochemical variable, such as carbon or nitrogen isotopic composition, are most widely used (e.g., Shultz and Calder 1976; Kao et al. 2006). Three end-

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