



“Gheorghe Asachi” Technical University of Iasi, Romania



COMPARISON OF THREE MODELS SIMULATING THE DYNAMIC CHANGES OF NO₃⁻-N AND NH₄⁺-N IN SOIL UNDER THE INFLUENCE OF CLIMATE CHANGE

Can Chen^{1,2*}, Kexin Wang¹, Hongxia Zhu²

¹*School of Ecology and Applied Meteorology, Nanjing University of Information Science
and Technology, Nanjing 210044, The People's Republic of China*

²*Wuxi University, Wuxi 214105, The People's Republic of China*

Abstract

In this paper, three models (CENTRY, DAISY and DNDC) were used to simulate the dynamic changes of nitrate nitrogen (NO₃⁻-N) and ammonium nitrogen (NH₄⁺-N) in soil in the Taihu Lake region of China when CO₂ concentration and temperature rise under climate change conditions. Three models were compared for their simulation of NO₃⁻-N and NH₄⁺-N content in soil, and the most suitable model for the study area was determined. Winter wheat (*Triticum aestivum* L.) was cultivated during the study period at two CO₂ concentration levels (350 ppm ambient and elevated to 500 ppm) and two temperatures (ambient and 2 °C above the ambient). The results showed that precipitation, soil pH, amount of N fertilizer and mean annual temperature had most substantial effects on soil NO₃⁻-N content. Although all three models provided satisfactory results, there are certain differences in the simulated values of the three models. NO₃⁻-N content always displayed a greater difference in all three models than NH₄⁺-N content. DAISY model shows the most significant corresponding relationship (with the highest R²) with the observed values in the whole growth period of winter wheat. Therefore, this model may be more suitable for studying climate change scenarios in the region, as it is generally consistent with observed field data.

Key words: ammonium nitrogen, climate change scenarios, comparison of three models, nitrate nitrogen

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* Author to whom all correspondence should be addressed: e-mail: chencan2010203@sohu.com