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Atmospheric deposition as an important nitrogen load to a typical agro-ecosystem in the Huang-Huai-Hai Plain. 2. Seasonal and inter-annual variations and their implications (2008-2012)

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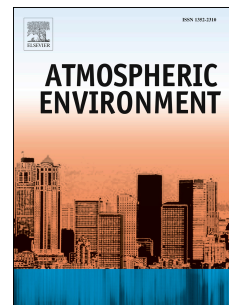
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1 **Atmospheric deposition as an important nitrogen load to a typical**
2 **agro-ecosystem in the Huang-Huai-Hai Plain. 2. Seasonal and inter-annual**
3 **variations and their implications (2008-2012)**

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13 **Abstract:** Atmospheric nitrogen (N) deposition, an important N source to
14 agro-ecosystems, has increased intensively in China during recent decades. However,
15 knowledge on temporal variations of total N deposition and their influencing factors is
16 limited due to lack of systematic monitoring data. In this study, total N deposition,
17 including dry and wet components, was monitored using the water surrogate surface
18 method for a typical agro-ecosystem with a winter wheat (*Triticum aestivum* L.) and
19 summer maize (*Zea mays* L.) rotation system in the Huang-Huai-Hai Plain from May
20 2008 to April 2012. The results indicated that annual total N deposition ranged from
21 23.8 kg N ha⁻¹ (2009-2010) to 40.3 kg N ha⁻¹ (2008-2009) and averaged 31.8 kg N
22 ha⁻¹. Great inter-annual variations were observed during the sampling period, due to
23 differences in annual rainfall and gaseous N losses from farmlands. Monthly total N
24 deposition varied greatly, from less than 0.6 kg N ha⁻¹ (January, 2010) to over 8.0 kg
25 N ha⁻¹ (August, 2008), with a mean value of 2.6 kg N ha⁻¹. In contrast to wet
26 deposition, dry portions generally contributed more to the total, except in the
27 precipitation-intensive months, accounting for 65% in average. NH₄⁺-N was the
28 dominant species in N deposition and its contribution to total deposition varied from

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