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Measurement report: Hydrolyzed amino acids in fine and coarse atmospheric aerosol in Nanchang, China: concentrations, compositions, sources and possible bacterial degradation state

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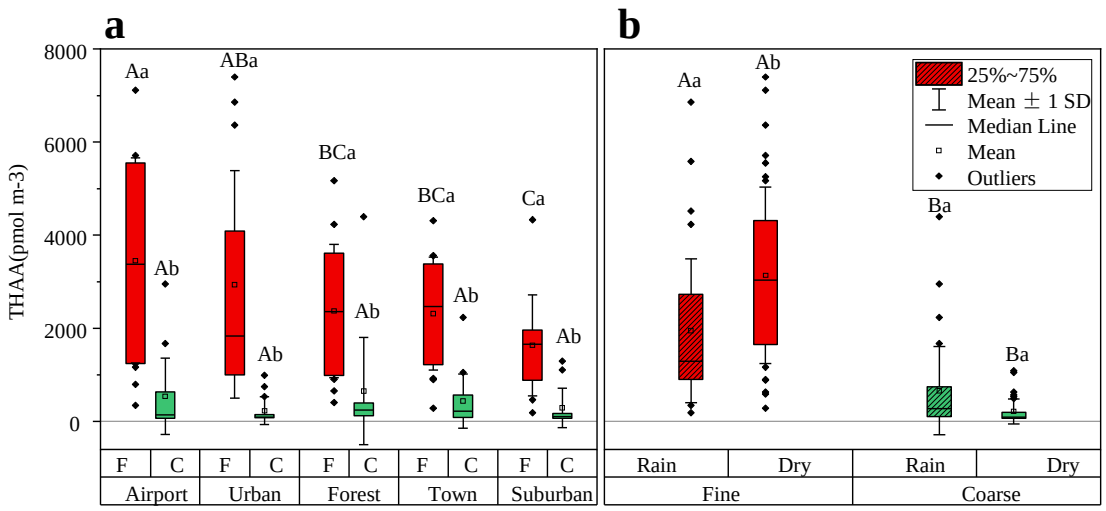

Figure S1. Concentrations of THAA for fine (F) and coarse (C) particles in airport, urban, forest, town and suburban sites (a) and Concentrations of THAA for fine and coarse particles on rainy and dry days(b). Red box indicates fine particles and green box indicates coarse particles. The box encloses 50% of the data, the whisker is standard deviation of the data, the horizontal bar is the median, solid circles are outliers. In a, different uppercase letters denote means found to be statistically different between sites and different lower case letters denote means found to be statistically different between fine and coarse particles (two-way ANOVA, $p < 0.05$). In b, different uppercase letters denote means found to be statistically different between fine and coarse particles and different lower case letters denote means found to be statistically different between rainy and dry days (two-way ANOVA, $p < 0.05$). In order to make graph more visual clarity, a zero-line were added.

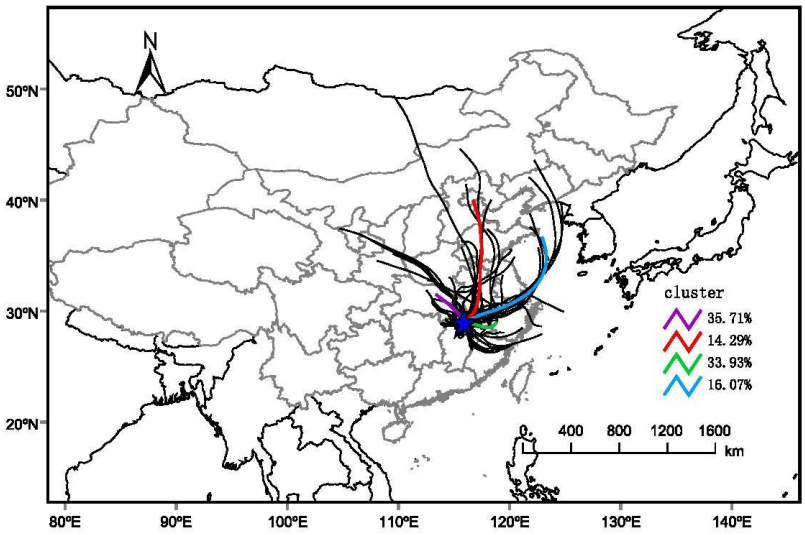

Figure S2. The 2-day (48 h) back trajectories at 500m height illustrating the typical air mass flows to the sampling site (28.85°N, 115.91°E) during the sampling periods. The map comes from the MeteoInfoMap (version 1.4.9R2) software (Chinese Academy of Meteorological Sciences, China).

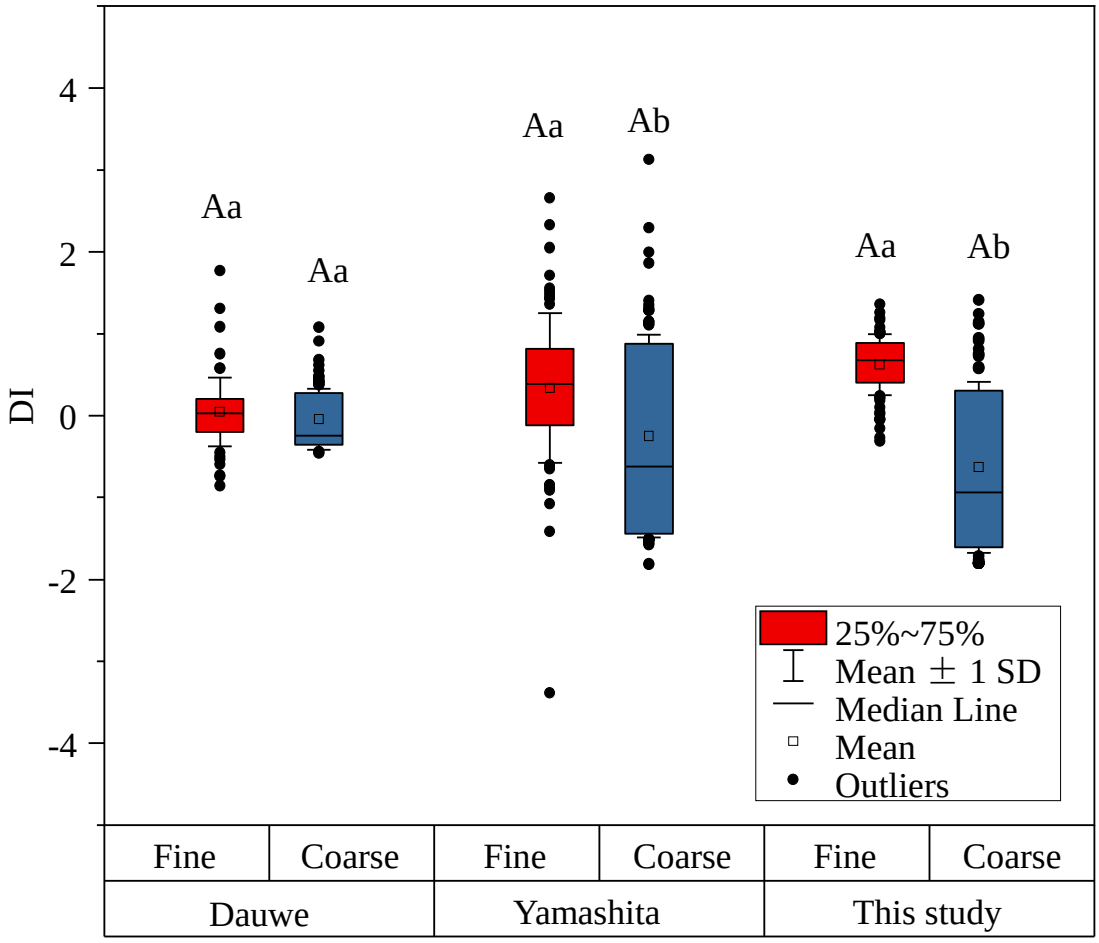

Figure S3. Comparison of DI values obtained by principal component analysis (this study) with those calculated by using the coefficients reported by Dauwe et al., 1999 and Yamashia and Tanoue, 2003. Red box indicates fine particles and blue box indicates coarse particles. The box encloses 50% of the data, the whisker is standard deviation of the data, the horizontal bar is the median, solid circles are outliers. Identical uppercase letters denote DI means found to be not statistically different between different calculating methods and different lower case letters denote means found to be statistically different between fine and coarse particles (two-way ANOVA, $p < 0.05$).

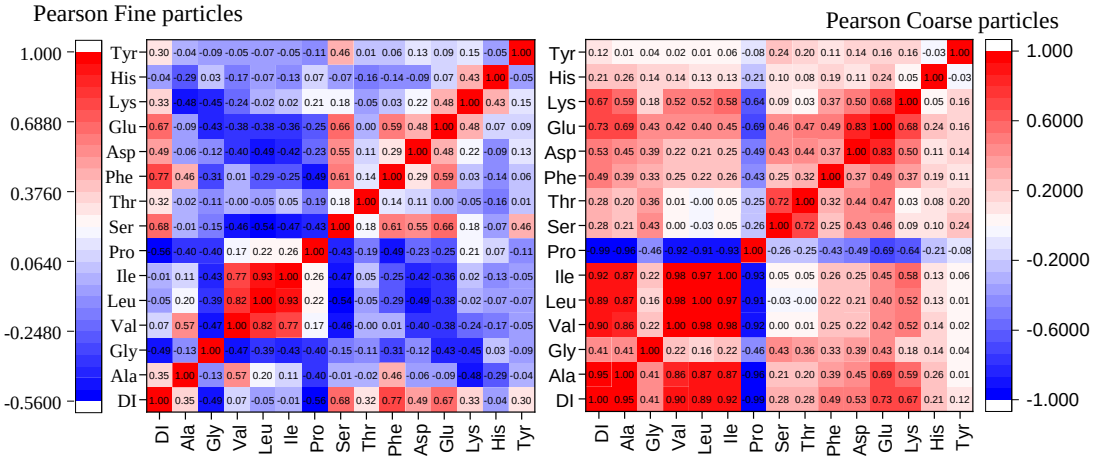

Figure S4. Correlation heatmap and associated significance of DI values with mol% percentage of hydrolyzed amino acid for fine and coarse particles. The color scale indicates negative/positive correlation.

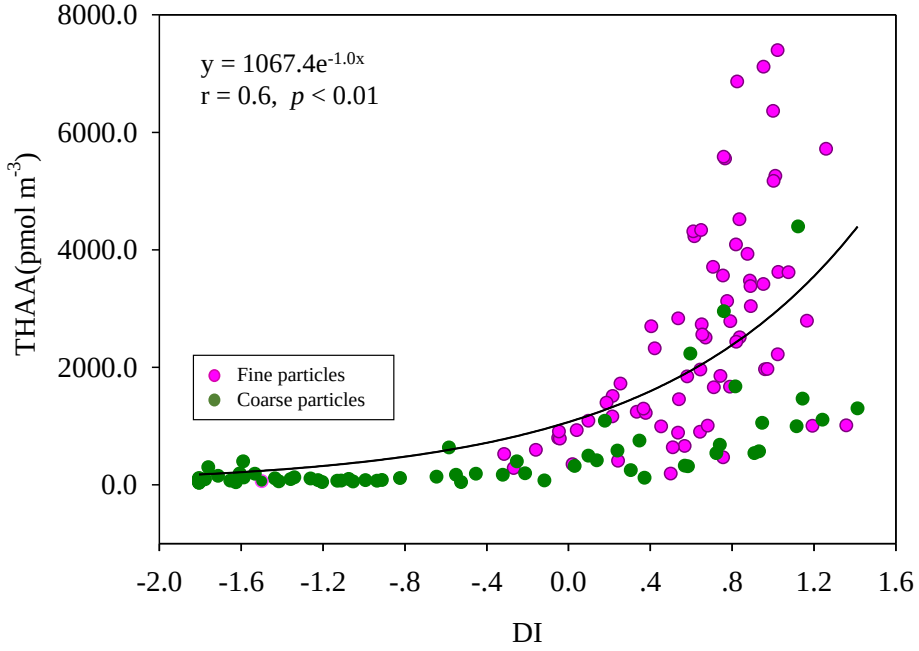

Figure S5. Correlations between concentrations of total hydrolyzed amino acid and DI values for fine and coarse particles.

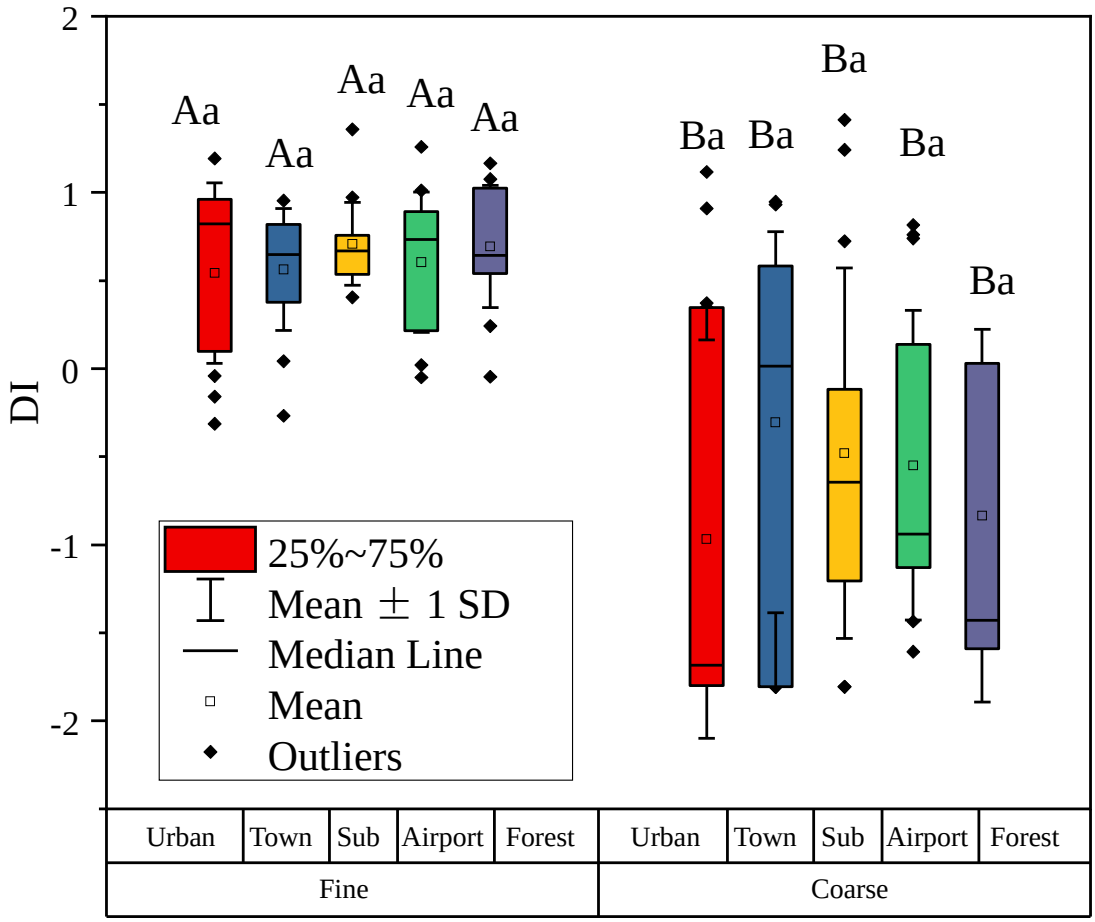

Figure S6. DI values for fine and coarse particles in urban, town, suburban airport and forest sites. The box encloses 50% of the data, the whisker is standard deviation of the data, the horizontal bar is the median, solid circles are outliers. Different uppercase letters denote means found to be statistically different between fine and coarse particles (two-way ANOVA, Tukey-HSD test, $p < 0.05$). Identical lower case letters denote means found to be not statistically different between sites.

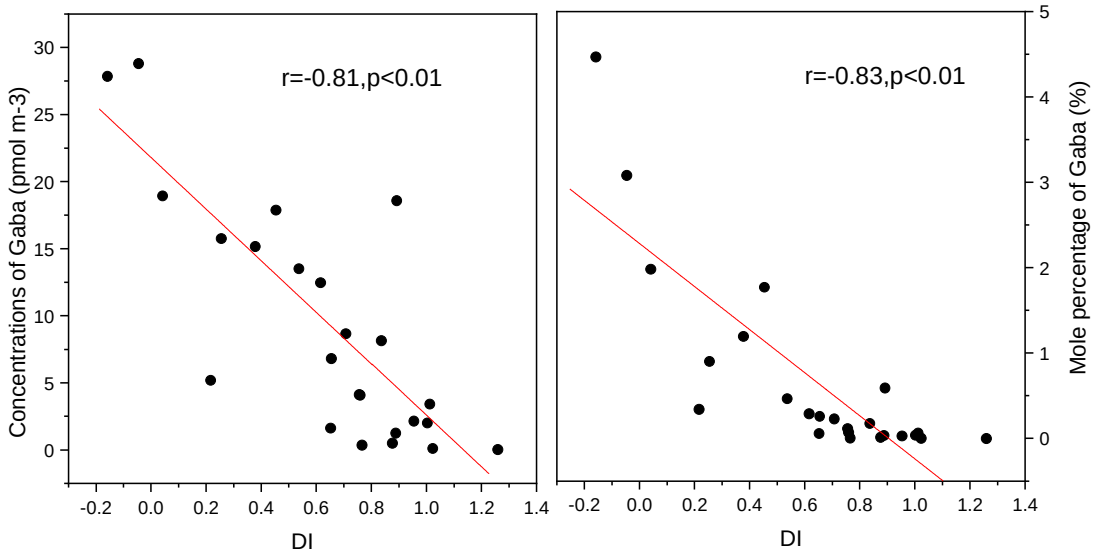

Figure S7. Changes in the concentration and mole percentage ofγ-aminobutyric acid (Gaba) vs. DI.

Table S1. The Characteristics and potential emission sources of atmospheric amino acids at 5 sampling area.

Sampling sites	Characteristics and potential emission sources of atmospheric amino acids at sampling area
Urban	an area with dense population and human activities, industrial emissions, biomass burning and road dust
Town	local people cook and heat using straw, charcoal and wood, an area is more influenced by biomass burning
Suburban	a convergence area between city and rural, influenced by mixture sources, including biomass burning, agricultural activities and natural sources
Agricultural area	open area, surrounded by paddy fields, affected by agricultural activities
Forest	more affected by natural source, including viruses, algae, fungi, bacteria, protozoa, spores and pollen, fragments of plants and insects

Table S2. Result of principal component analysis. For each PC with an eigenvalue >1, eigenvalues, percent of variation explained (%), cumulative variation explained (Cumulative%) are listed.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.360	38.286	38.286	5.360	38.286	38.286
2	2.926	20.899	59.185	2.926	20.899	59.185
3	1.335	9.534	68.719	1.335	9.534	68.719
4	1.074	7.670	76.388	1.074	7.670	76.388
5	.858	6.127	82.515			
6	.732	5.232	87.747			
7	.593	4.233	91.979			
8	.481	3.438	95.417			
9	.304	2.169	97.586			
10	.170	1.211	98.798			
11	.111	.791	99.588			
12	.031	.221	99.810			
13	.027	.190	100.000			
14	-4.620E-16	-3.300E-15	100.000			

Extraction Method: Principal Component Analysis.

Table S3. Result of principal component analysis (PCA). PC loadings (eigenvectors) for each AA are listed.

Component Score Coefficient Matrix

	Component			
	1	2	3	4
Ala	.143	-.138	-.159	-.067
Gly	.087	.105	.175	-.423
Val	.132	-.233	-.038	.072
Leu	.133	-.228	.031	.082
Ile	.138	-.212	.011	.092
Pro	-.180	.001	-.056	.134
Ser	.096	.229	-.185	.133
Thr	.071	.112	-.204	-.295
Phe	.120	.124	-.140	-.102
Asp	.094	.164	-.152	.070
Glu	.137	.180	.074	.016
Lys	.119	.108	.341	.220
His	.023	.053	.636	.160
Tyr	.026	.082	-.205	.718

Extraction Method: Principal Component Analysis.

Component Scores.

Table S4. Daily precipitation amount(mm) and hourly rainfall(mm) of sampling day.

Date	Daily precipitation amount(mm)	Rainfall duration(hour)	Hourly rainfall(mm)
April 30	27.2	15	1.8
May 1	-	-	-
May 2	-	-	-
May 3	-	-	-
May 4	-	-	-
May 5	1	3	0.3
May 6	1	6	0.2
May 7	0.6	9	0.1
May 8	0.2	6	0.03
May 9	-	-	-
May 10	-	-	-
May 11	-	-	-
May 12	0.1	3	0.03
May 13	31.4	12	2.6

-represent no precipitation.