Supplement of

Role of sea spray aerosol at the air-sea interface in transporting aromatic acids to the atmosphere

Yaru Song et al.

Correspondence to: Lin Du (lindu@sdu.edu.cn)

(6 Pages, 4 Table, 2 Figures)

Table S1. Summary of experimental conditions.

Exp. No.	Experiment type	pH	Salinity (psu)	Sampling time (h)	RH (%)
1	SW	7.92	34.2	5	35
2	SW+benzoic acid	7.72	34.3	5	34
3	SW+*o*-hydroxybenzoic acid	7.60	34.5	5	36
4	SW+*m*-hydroxybenzoic acid	7.68	34.1	5	40
5	SW+*p*-hydroxybenzoic acid	7.84	34.3	5	38
6	SW+*o*-phthalic acid	7.58	34.2	5	36
7	SW+*m*-phthalic acid	7.80	34.5	5	37
8	SW+*p*-phthalic acid	7.85	34.4	5	42
9	SW+vanillic acid	7.81	34.2	5	43
10	SW+syringic acid	7.84	34.3	5	39

Table S2. Octanol−water partitioning coefficients log(*K*ow) and octanol−air partitioning coefficients log(*K*oa) of aromatic carboxylic acids.

aromatic carboxylic acids	**log(*K*ow)**	**log(*K*oa)**
benzoic acid	1.87	5.91
o-hydroxybenzoic acid	2.26	7.44
m-hydroxybenzoic acid	1.5	8.08
p-hydroxybenzoic acid	1.58	8.08
o-phthalic acid	0.73	7.84
m-phthalic acid	1.66	7.84
p-phthalic acid	2	7.84
vanillic acid	1.43	7.84
syringic acid	1.04	7.95

Table S3. Aromatic acid concentration in seawater and estimated value K_{SSA}.

	Aromatic acid concentration in seawater (ng L^{-1})			K_{SSA} (pg μg^{-1})		
	low	medium	high	low	medium	high
benzoic acid	34	205	491	0.0235	0.142	0.304
o-hydroxybenzoic acid	0.4	-	53.3	0.0002	-	0.026
m-hydroxybenzoic acid	-	-	-	-	-	-
p-hydroxybenzoic acid	4.58	8.66	49.9	0.004	0.008	0.044
o-phthalic acid	-	-	-	-	-	-
m-phthalic acid	-	-	-	-	-	-
p-phthalic acid	-	-	-	-	-	-
vanillic acid	3	-	47	0.04	-	0.623
syringic acid	0.3	-	0.6	0.007	-	0.015

Table S4. Estimated annual global aromatic acids emission (tons yr^{-1}) via SSA.

		SSA emission based on Textor et al. (2006) (10^{12} kg yr^{-1})			SSA emission based on Jonas et al. (2021) (10^{12} kg yr^{-1})		
		3.65	6.25	9.7	3.65	4.98	6.62
		Global aromatic acids emission (tons yr^{-1})					
benzoic acid	low	27	45	71	27	36	48
benzoic acid	medium	161	275	427	161	219	291
benzoic acid	high	344	589	914	344	496	624
o-hydroxybenzoic acid	low	0.2	0.4	0.6	0.2	0.3	0.4
o-hydroxybenzoic acid	medium	-	-	-	-	-	-
o-hydroxybenzoic acid	high	29	50	78	29	40	53
p-hydroxybenzoic acid	low	4	8	12	4	6	8
p-hydroxybenzoic acid	medium	9	15	24	9	12	16
p-hydroxybenzoic acid	high	50	85	132	50	68	90
vanillic acid	low	45	77	120	45	62	82
vanillic acid	medium	-	-	-	-	-	-
vanillic acid	high	705	1207	1873	705	962	1278
syringic acid	low	8	14	21	8	11	14
syringic acid	medium	-	-	-	-	-	-
syringic acid	high	17	29	45	17	23	31

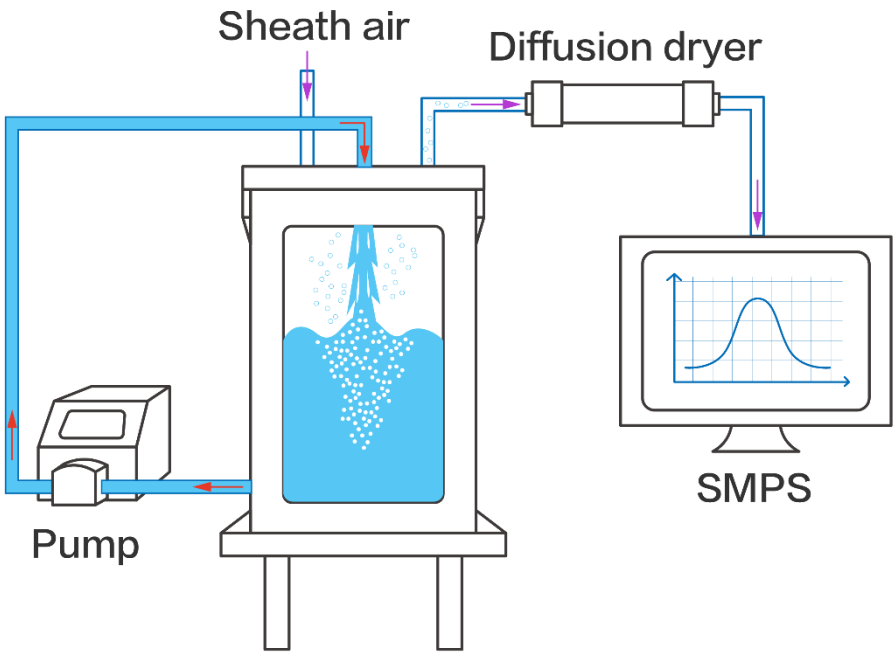

Fig. S1. Schematic picture of the plunging jet-sea spray aerosol generator. The red arrows represent the flow direction of seawater, and the purple arrows represent the flow of gases and aerosols.

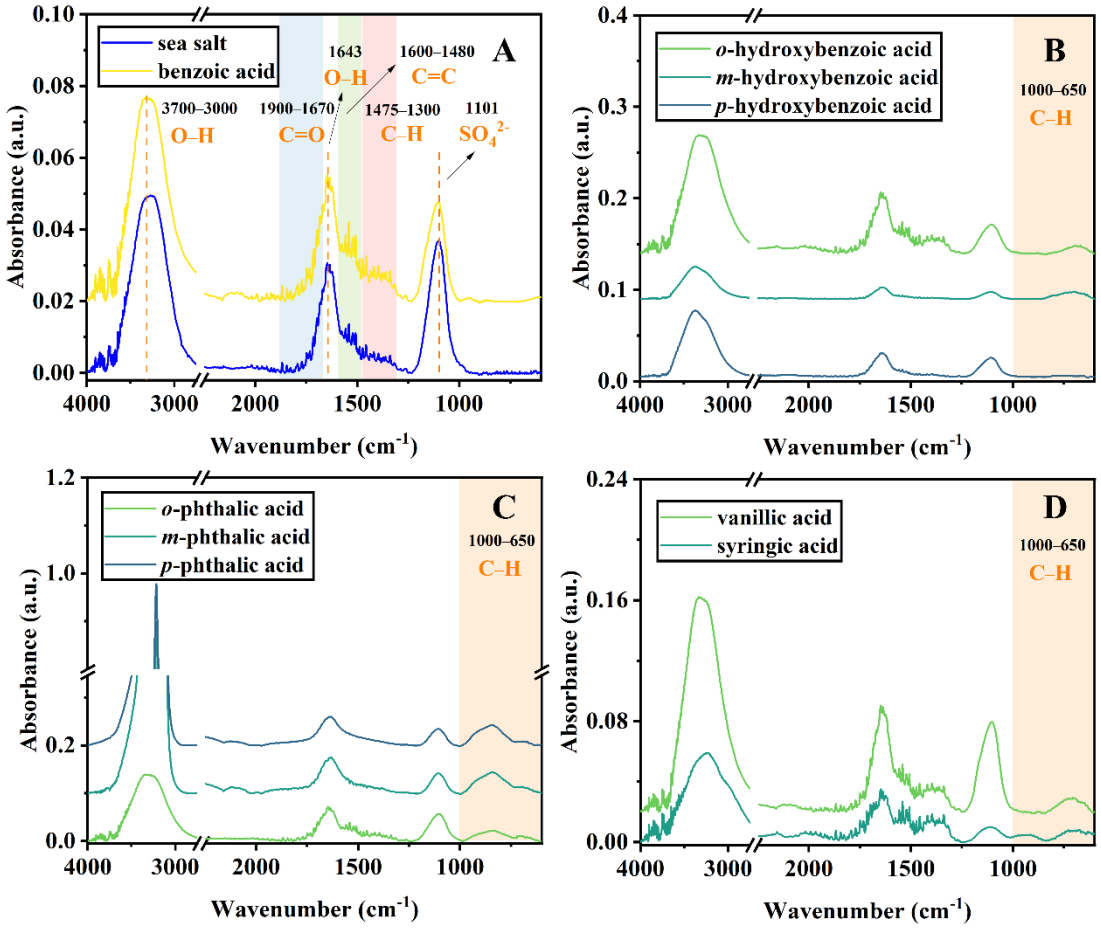

Fig. S2. Infrared spectra of aromatic acids-containing sea spray aerosol particles generated from SSA generation chamber. The ATR-FTIR data from the 2750–2250 cm^{-1} region, where CO_2 peaks are present, were not shown for clarity.