

1 **Supporting information for:**

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3 **Amino acids, carbohydrates and lipids in the tropical oligotrophic Atlantic**
4 **Ocean: Sea-to-air transfer and atmospheric in situ formation**

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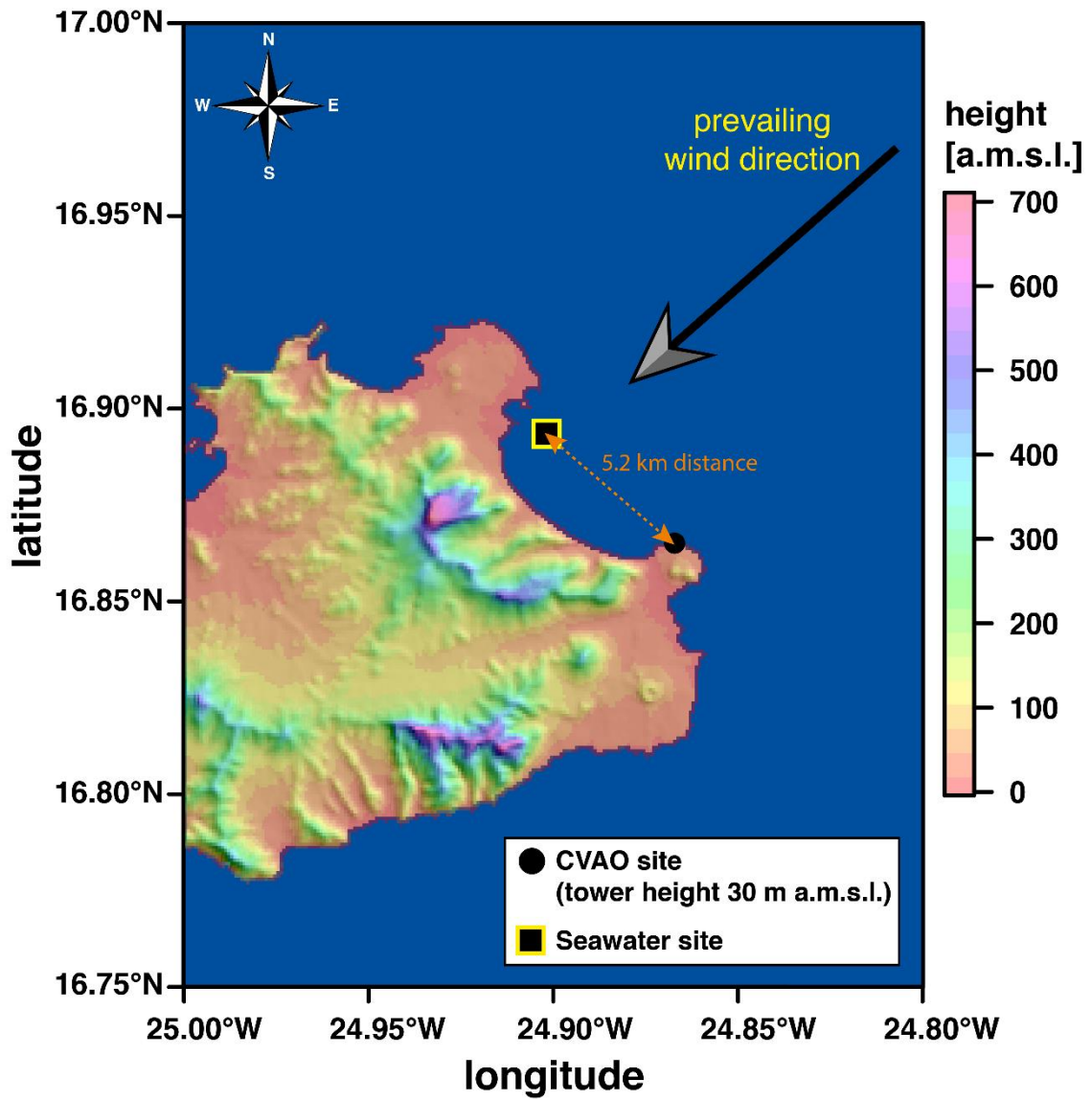
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31 Figure S1: Sampling stations of the MarParCloud: Cape Verde Atmospheric Observatory
 32 (CVAO) and seawater sampling site (adopted from Triesch et al. 2021)

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42 Table S1: Concentration of individual monosaccharides, after hydrolysis step, ($\mu\text{g L}^{-1}$) in the
 43 SML and bulk water samples.

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Sample ID	Sampling date	Fuc	GalN	Rha	Ara	GlcN	Gal	Glc	Xyl+Man	MurAc	GalAc	GlcAc
SML 7	27.09. 2017	9.9	3.9	8.7	7.6	5.2	18.1	35.0	10.3	2.1	7.2	1.0
SML 7 (2)	27.09. 2017	10.5	4.4	9.1	7.5	5.2	19.2	30.6	9.4	2.4	7.4	1.0
SML 10	03.10. 2017	8.2	3.0	6.7	6.9	4.2	17.5	17.6	10.0	2.1	8.3	1.9
SML 10 (2)	03.10. 2017	9.1	3.5	7.4	7.5	4.8	18.6	23.5	10.5	2.5	7.3	3.3
SML 14	07.10. 2017	5.3	2.1	5.0	4.0	2.6	8.8	14.3	4.9	3.2	1.7	1.5
SML 14 (2)	07.10. 2017	6.1	2.4	5.0	4.1	2.6	8.4	13.0	4.6	3.9	1.8	1.9
ULW 7	27.09. 2017	4.6	1.6	4.1	3.8	2.4	9.0	24.9	5.4	1.0	8.9	2.7
ULW 7 (2)	27.09. 2017	4.6	1.4	4.3	3.6	2.3	8.7	30.1	4.5	1.0	7.3	1.8
ULW 10	03.10. 2017	7.2	2.8	7.1	5.8	3.5	14.3	16.0	4.8	1.0	7.5	4.2
ULW 10 (2)	03.10. 2017	6.9	3.0	7.5	6.5	3.8	13.9	13.9	5.3	1.0	8.2	0.4
ULW 14	07.10. 2017	7.9	3.0	7.3	7.7	3.9	14.4	30.5	7.3	2.0	6.9	3.5
ULW 14 (2)	07.10. 2017	7.5	3.4	8.1	6.7	4.5	13.1	28.2	7.4	1.8	5.5	3.9

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46 Table S2: Concentration of individual amino acids, after hydrolysis step, ($\mu\text{g L}^{-1}$) in the SML
 47 and bulk water samples.

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Sample ID	Sampling date	Gly	Ala	Ser	Glu	Thr	Pro	Tyr	Val	Phe	Asp	Iso	Leu
SML 8	28.09. 2017	50.8	39.9	70.4	0.2	17.1	12.2	2.9	15.6	2.2	19.3	7.5	11.1
SML 10	03.10. 2017	22.6	7.4	16.3	0.2	1.3	2.5	0.1	2.5	0.4	0.2	0.3	0.9
ULW 11	04.10. 2017	5.7	0.2	0.2	0.2	38.2	0.2	0.1	25.8	4.0	38.3	0.2	0.2
ULW 12	05.10. 2017	33.6	12.9	38.9	0.2	4.7	3.5	0.1	5.1	1.0	3.9	0.2	3.7
SML 13	06.10. 2017	24.3	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1
SML 14	07.10. 2017	38.1	14.1	30.0	0.2	3.1	3.9	0.1	5.6	1.7	9.1	1.9	9.9
SML 16	10.10. 2017	36.5	1.2	5.0	0.2	0.8	1.5	0.1	2.4	0.2	0.2	0.2	0.2
ULW 16	10.10. 2017	17.4	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2
SML 3	20.09. 2017	163.2	93.4	156.9	54.9	28.1	25.4	0.7	28.5	5.4	54.9	9.7	25.7

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50 Table S3: Concentration of individual monosaccharides, after hydrolysis step, (pg m⁻³) in the
 51 PM₁ (detection limit = 5 pg m⁻³).

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Sample ID	Start sampling (UTC)	Stop sampling (UTC)	Fuc	GalN	Rha	Ara	GlcN	Gal	Glc	Xyl+Man	MurAc	GalAc	GlcAc
PM1 924	19.09.2017 20:00	20.09.2017 20:00	44	21	5	113	5	112	422	95	187	193	5
PM1 926	22.09.2017 15:00	23.09.2017 15:00	22	13	5	5	5	28	128	138	5	103	5
PM1 927	23.09.2017 15:00	24.09.2017 15:00	27	5	5	5	5	66	917	18	5	454	5
PM1 928	24.09.2017 15:00	25.09.2017 15:00	49	31	5	345	504	107	553	82	5	1147	5
PM1 934	30.09.2017 15:00	01.10.2017 15:00	27	5	5	5	32	35	5	18	5	84	5
PM1 937	02.10.2017 15:00	03.10.2017 15:00	5	5	5	54	5	131	141	71	112	66	5
PM1 945	08.10.2017 15:00	09.10.2017 15:00	5	5	5	5	5	5	50	5	5	5	5
PM1 946	09.10.2017 15:00	10.10.2017 15:00	22	5	5	5	5	5	77	45	5	5	5

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56 Table S4: Concentration of individual amino acids, after hydrolysis step, (pg m⁻³) in the PM₁
 57 (detection limit = 2 pg m⁻³).

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Sample ID	Start sampling (UTC)	Stop sampling (UTC)	Gly	Ala	Ser	Glu	Thr	Pro	Tyr	Val	Phe	Asp	Iso	Leu
PM1 920	15.09.2017 15:00	16.09.2017 15:00	1208	794	136	236	562	118	144	51	5	32	30	1208
PM1 923	18.09.2017 20:00	19.09.2017 20:00	318	528	7	84	148	58	46	3	1143	6	4	318
PM1 927	23.09.2017 15:00	24.09.2017 15:00	571	811	1039	302	462	420	325	45	5	61	172	571
PM1 930	26.09.2017 15:00	27.09.2017 15:00	82	387	5	24	45	7	17	5	388	5	5	82
PM1 932	28.09.2017 15:00	29.09.2017 15:00	668	604	108	149	204	119	111	37	5	22	29	668
PM1 940	05.10.2017 15:00	06.10.2017 15:00	124	458	199	45	128	69	70	12	5	20	38	124
PM1 942	07.10.2017 15:00	08.10.2017 15:00	275	805	5	38	170	26	3	-	1168	5	5	275

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64 Table S5: Relative composition (mol%) of the individual compounds in the bulk water, the SML and
 65 the aerosol particles. Classification of the lipids after (Parrish, 1988;Parrish and Wells, 2021).

	bulk water	SML	aerosol	classification
amino acids				
Phe	2.15	0.88	0.66	neutral/polar
Gly	23.68	29.37	35.33	neutral/polar
Ser	16.39	24.42	18.68	neutral/polar
Tyr	0.14	0.36	0.23	neutral/polar
Thr	17.94	4.43	4.45	neutral/non-polar
Ala	5.56	13.67	11.67	neutral/non-polar
Pro	1.59	3.98	4.79	neutral/non-polar
Val	12.87	4.77	3.70	neutral/non-polar
Leu	1.65	4.19	1.33	neutral/non-polar
Iso	0.19	1.73	0.63	neutral/non-polar
Asp	17.66	7.33	12.35	acidic
Glu	0.19	4.87	6.16	acidic
carbohydrates				
GlcN	4.29	4.77	7.99	basic
GalN	3.23	3.76	1.84	basic
Fuc	8.88	10.46	3.08	neutral
Rha	8.82	8.91	1.76	neutral
Ara	8.56	8.73	8.75	neutral
Gal	15.39	17.56	6.04	neutral
Glc	30.07	25.96	28.98	neutral
Xyl+Man	7.24	9.63	5.52	neutral
MurAc	1.73	2.25	19.03	acidic (bacterial tracer)
GalAc	8.59	6.06	7.15	acidic
GlcAc	3.21	1.91	9.87	acidic
lipids				
HC	44.07	30.89	39.00	hydrocarbon
sterols (ST)	0.28	0.53	0.94	sterol
PIC	2.09	1.28	0.50	pigments
ME	0.36	1.34	no data	methyl ester
WE	0.61	0.80	no data	membrane component
TG	0.91	1.17	8.03	metbolic reserve
FFA	13.65	17.32	21.27	degradation lipids
ALC	1.22	2.26	8.49	degradation lipids
1,3DG	no data	0.29	0.17	degradation lipids
1,2 DG	0.07	0.42	0.46	degradation lipids
MG	0.19	0.19	0.43	degradation lipids
MGDG	16.77	18.44	3.42	glycolipids

DGDG	0.35	3.49	2.84	glycolipids
SQDG	2.11	2.01	5.55	glycolipids
PE	6.17	8.40	4.74	polar lipids
PG	11.12	11.04	4.17	polar lipids
PC	0.03	0.15	no data	polar lipids

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68 Table S6: Concentration of organic carbon (OC) and elemental carbon (EC) in $\mu\text{g m}^{-3}$ in the
69 $\text{PM}_{1.0}$.

Sample ID	Start sampling (UTC)	Stop sampling (UTC)	OC	EC
PM1 922	17.09.2017 20:00	18.09.2017 20:00	0.310	0.127
PM1 923	18.09.2017 20:00	19.09.2017 20:00	0.274	0.131
PM1 924	19.09.2017 20:00	20.09.2017 20:00	0.201	0.136
PM1 927	23.09.2017 15:00	24.09.2017 15:00	0.169	0.053
PM1 929	25.09.2017 15:00	26.09.2017 15:00	0.202	0.115
PM1 932	28.09.2017 15:00	29.09.2017 15:00	0.130	0.091
PM1 933	30.09.2017 15:00	29.09.2017 15:00	0.13	0.054
PM1 934	30.09.2017 15:00	01.10.2017 15:00	0.150	0.069

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Tab. S7: Average concentration and respective carbon contribution of the OC groups

OC group	ng m^{-3}	ng C m^{-3}	% OC	Reference
carbohydrates				
DCHO	1.5	0.6	0.30	this work
amino acids				
DAA	2.4	0.8	0.41	this work
Lipids (DL)				
HC	32.1	27.25	13.56	(Triesch et al., 2021)
TG	21.9	16.83	8.38	(Triesch et al., 2021)
FFA	18.5	14.08	7.00	(Triesch et al., 2021)
ALC	6.3	5.00	2.49	(Triesch et al., 2021)
1,3DG	0.2	0.19	0.09	(Triesch et al., 2021)
ST	2.6	1.74	0.87	(Triesch et al., 2021)
1,2DG	0.5	0.41	0.20	(Triesch et al., 2021)
PIG	0.9	0.55	0.27	(Triesch et al., 2021)
MG	0.8	0.61	0.30	(Triesch et al., 2021)
MGDG	3.4	1.51	0.75	(Triesch et al., 2021)
DGDG	4.0	1.88	0.94	(Triesch et al., 2021)
SQDG	14.2	8.77	4.36	(Triesch et al., 2021)
PG	3.8	1.38	0.69	(Triesch et al., 2021)
PE	10.5	6.62	3.29	(Triesch et al., 2021)
others				

oxalic acid	2.0	0.55	0.27	(van Pinxteren et al., 2015)
amine	17.0	8.84	4.40	(van Pinxteren et al., 2015)
MSA	14.0	1.76	0.88	(van Pinxteren et al., 2015)
carbonyls	0.1	0.02	0.01	(van Pinxteren et al., 2015)

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