Overview of RF01-RF10 TOGA VOC data

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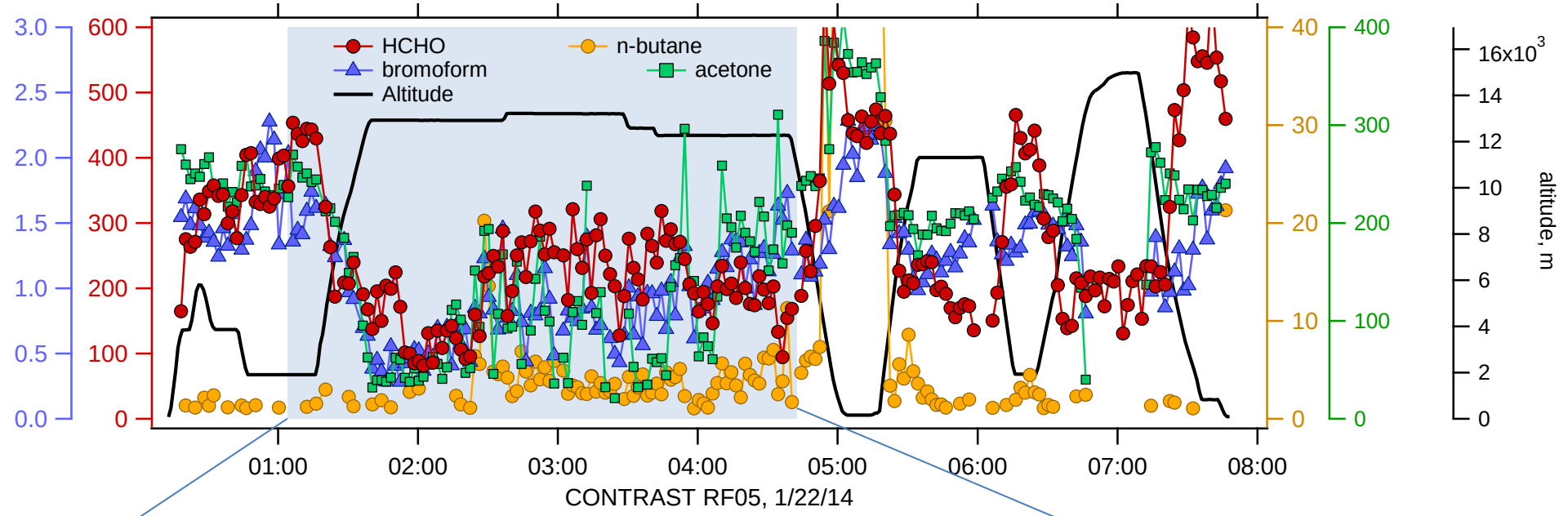
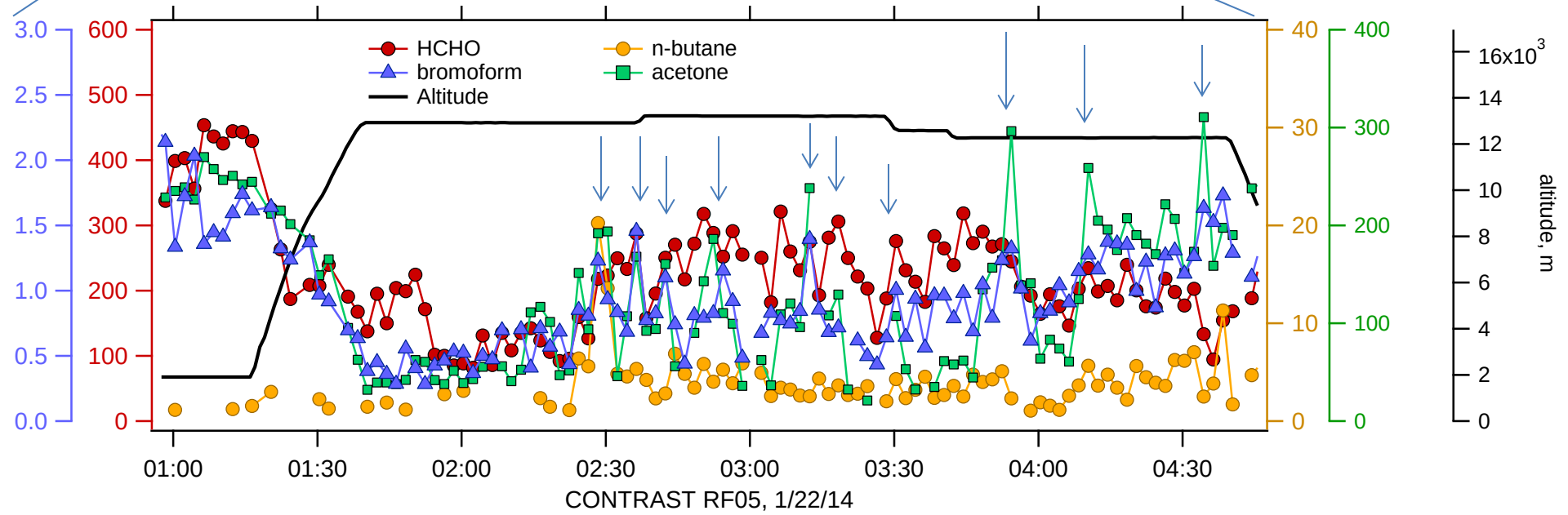
Dan Riemer (U. Miami)
Nicola Blake, Stacey Hughes (UC Irvine)

12-Feb-14 science meeting

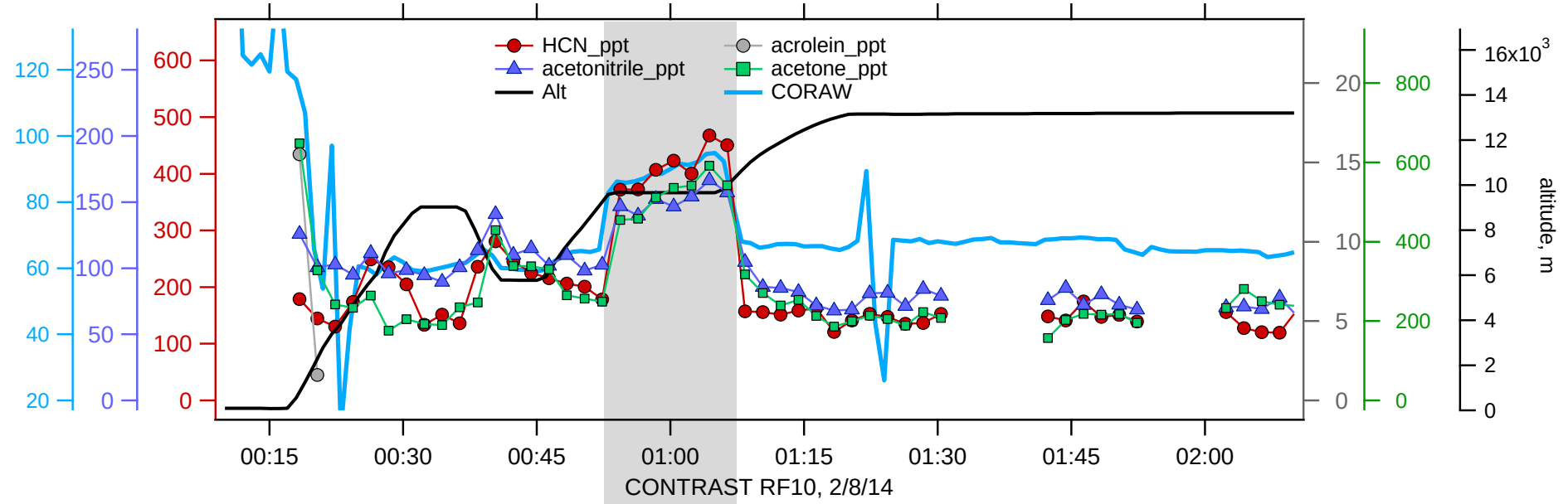
ITCZ convection during RF10

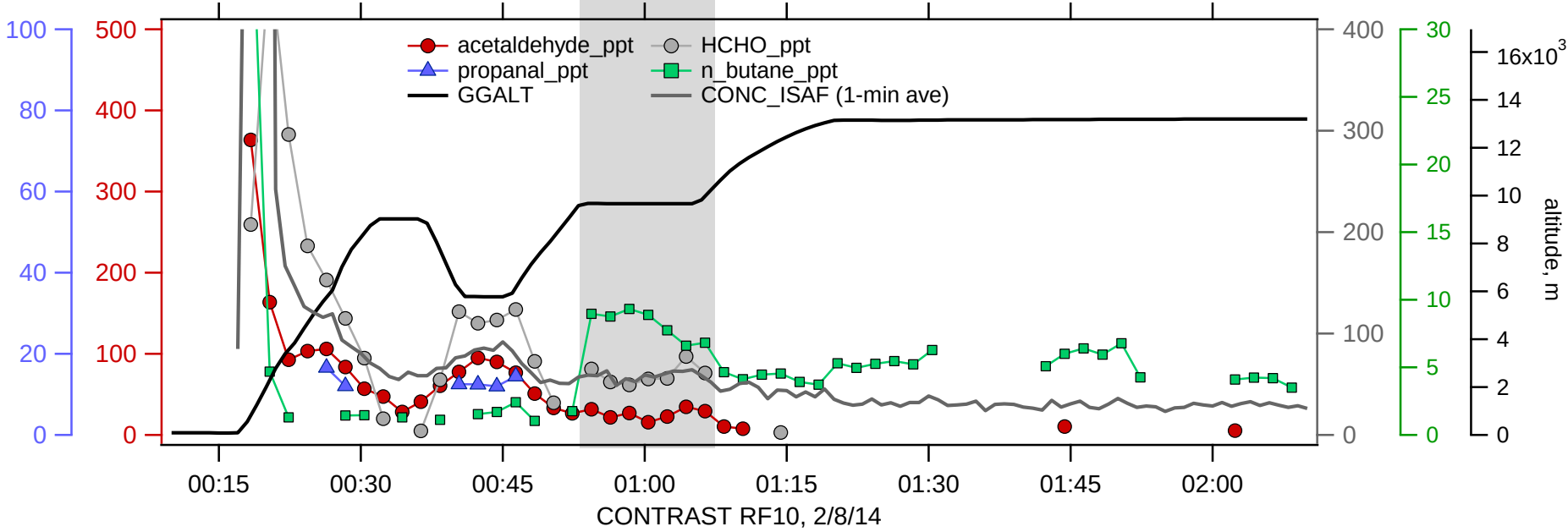
Evidence of Convection during RF05

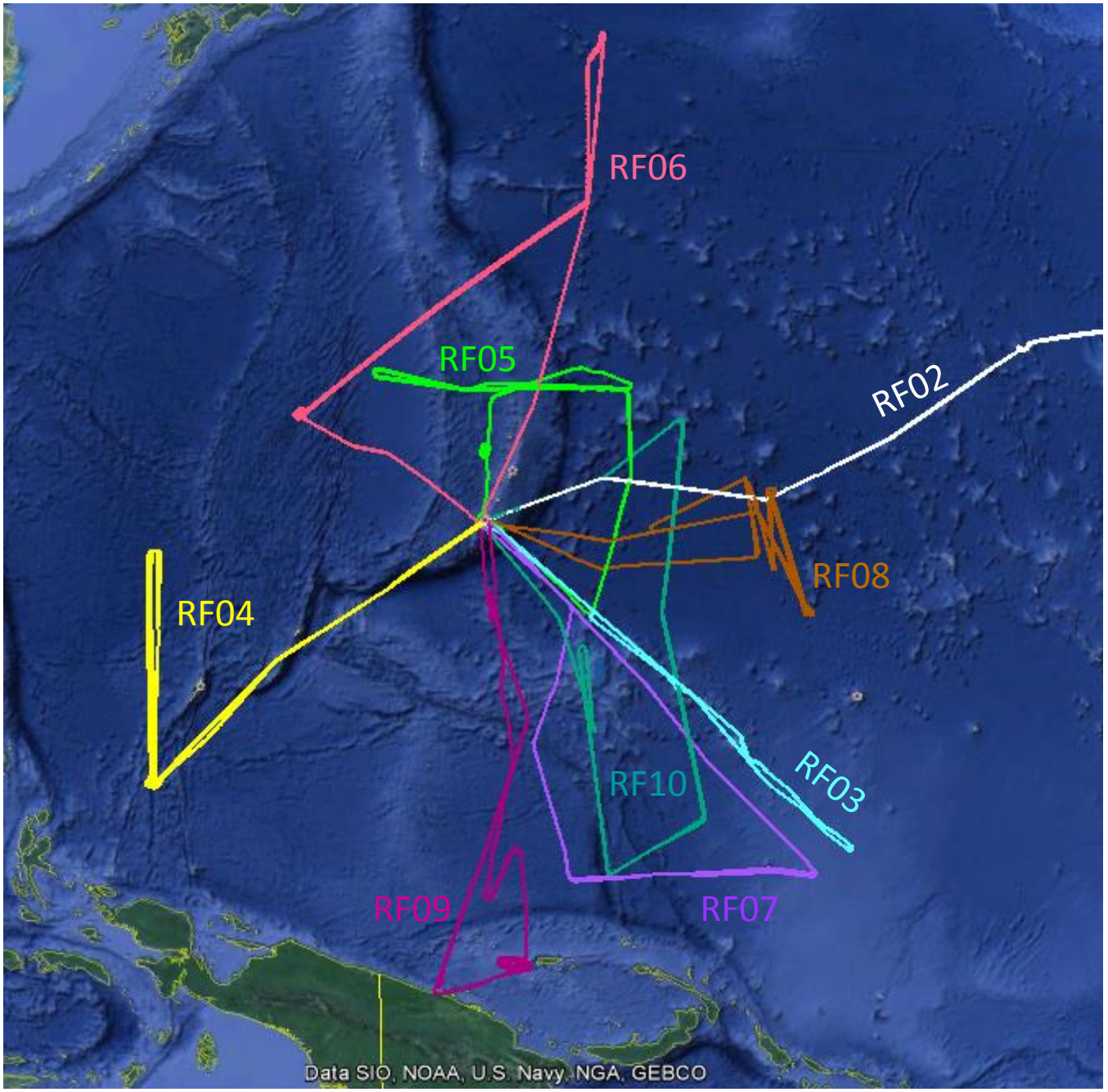


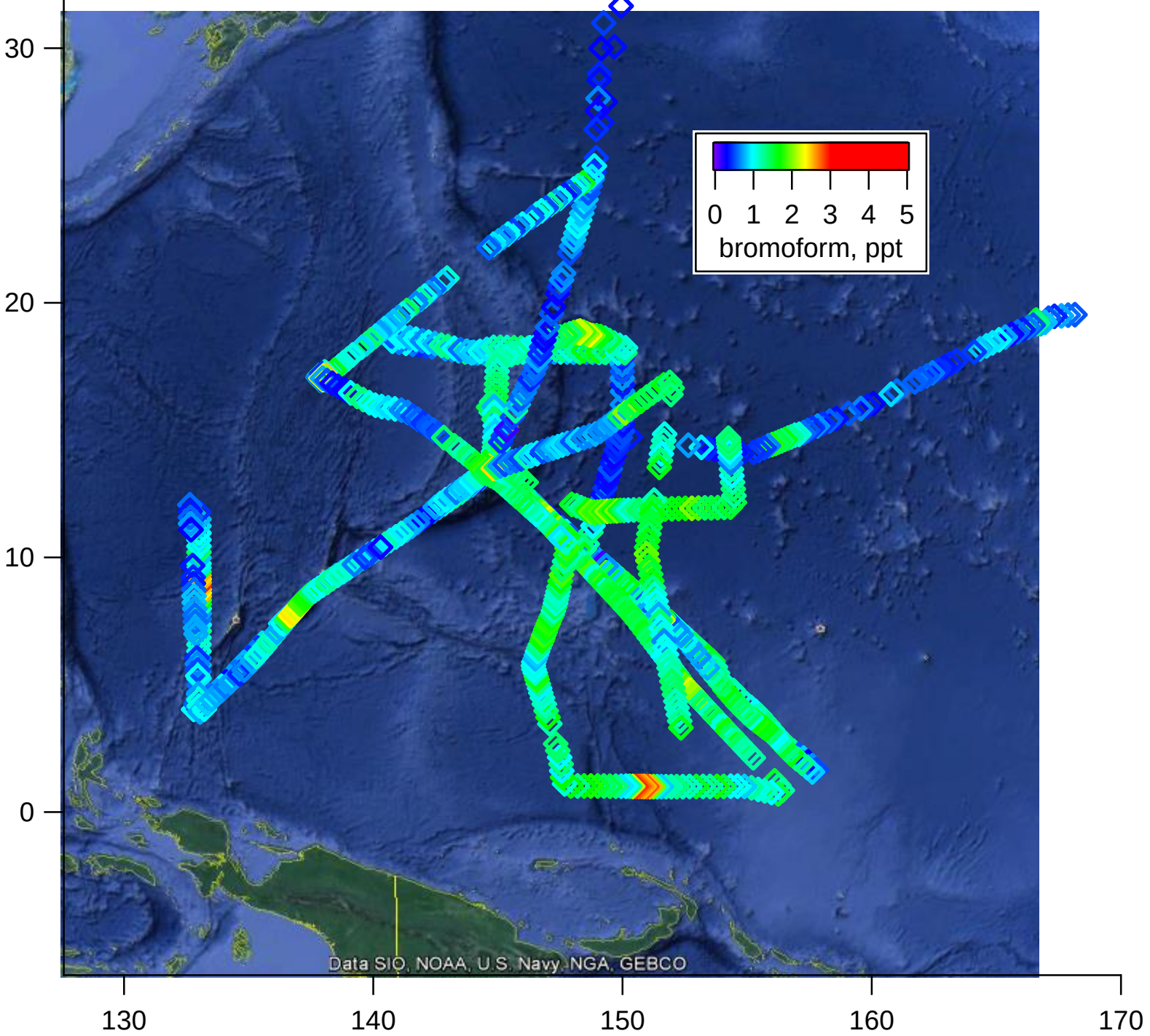


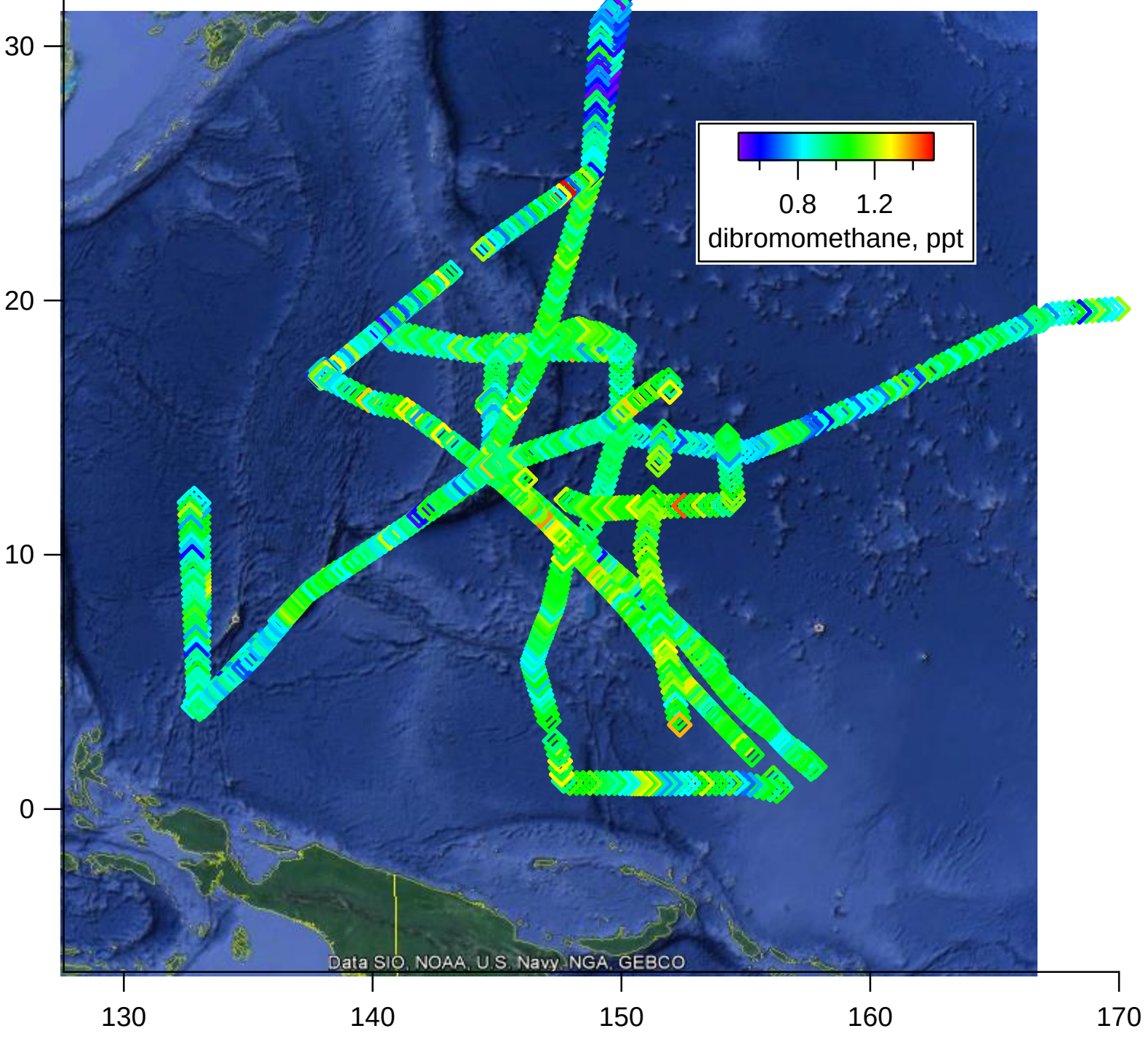
RF10 “CO River” – AKA Indonesian Biomass Burning plume






RF06
RF05
RF02
RF08
RF04
RF10
RF03
RF09
RF07
Data SIO, NOAA, U.S. Navy, NGA, GEBCO


0 1 2 3 4 5
bromoform, ppt
30
20
10
0
130
140
150
160
170
Data SIO, NOAA, U.S. Navy, NGA, GEBCO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1.2
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20
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130
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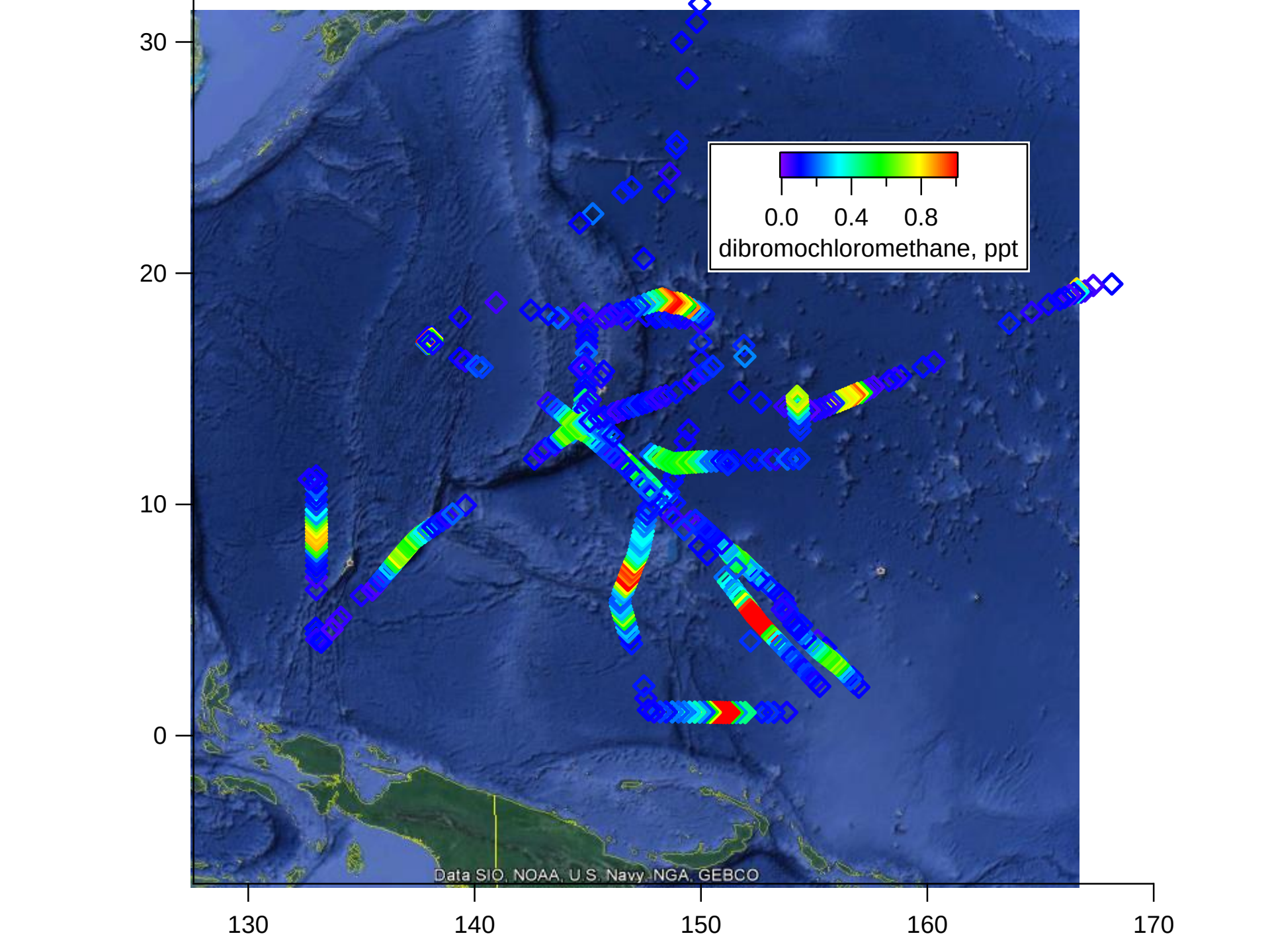
150
160
170
Data SIO, NOAA, U.S. Navy, NGA, GEBCO


0.0
0.4
0.8
dibromochloromethane, ppt
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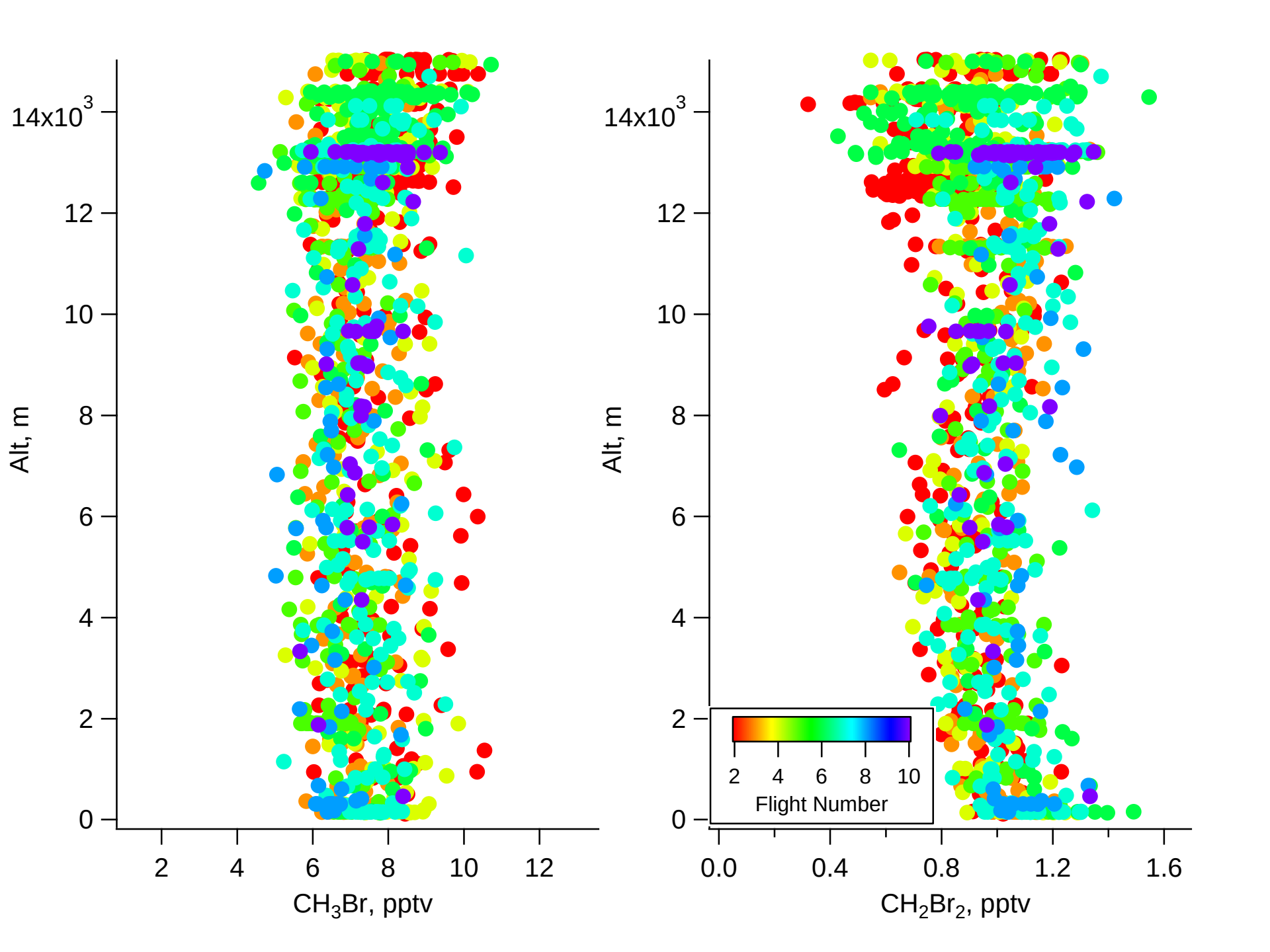
Data SIO, NOAA, U.S. Navy, NGA, GEBCO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10
8
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Alt, m
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4
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12
CH3Br, pptv
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12
10
8
6
4
2
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6
8
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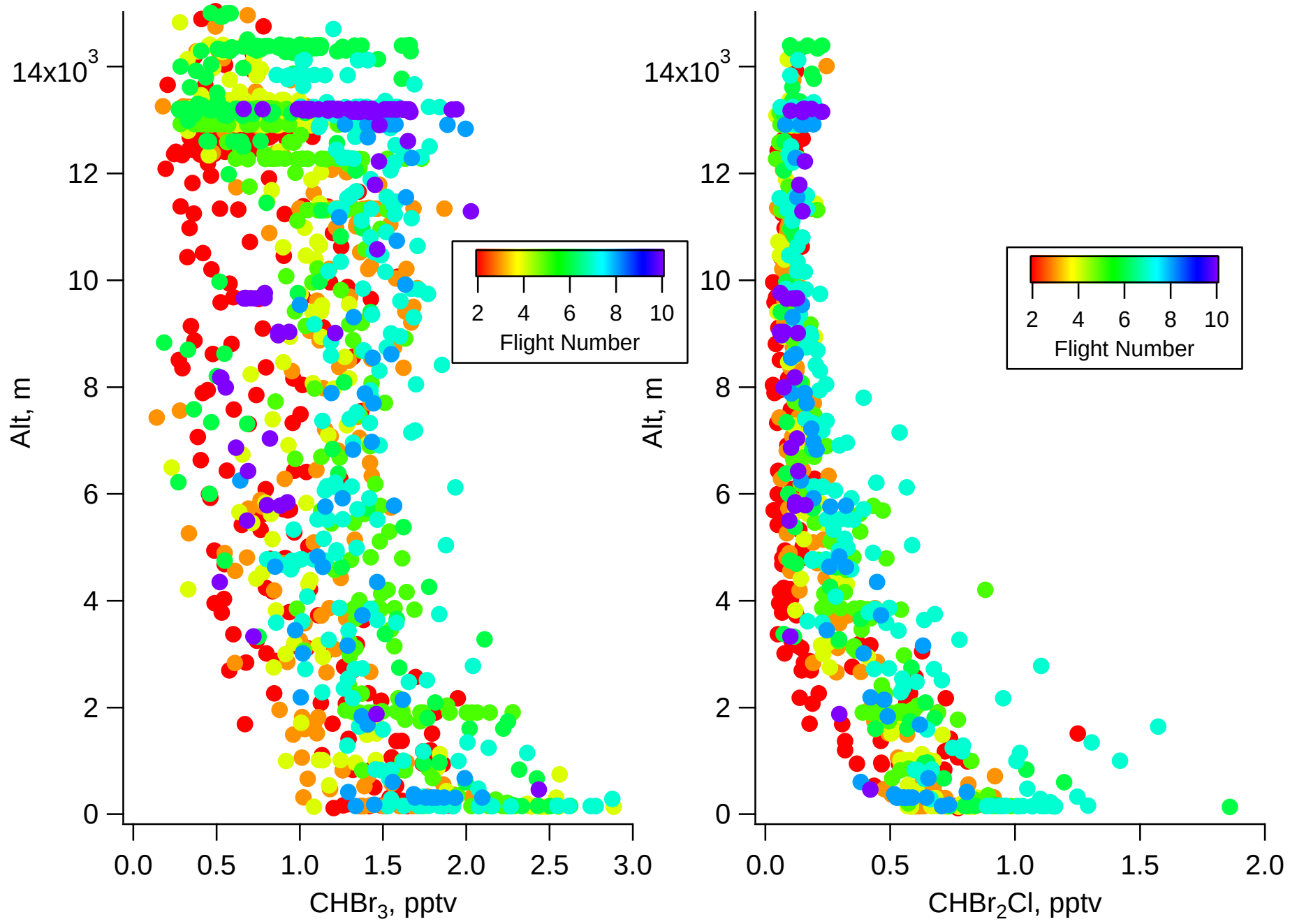
1.6
CH2Br2, pptv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1.5
2.0
2.5
3.0
CHBr3, pptv
2
4
6
8
10
Flight Number
14x10^3
12
10
8
6
4
2
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1.0
1.5
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CHBr2Cl, pptv
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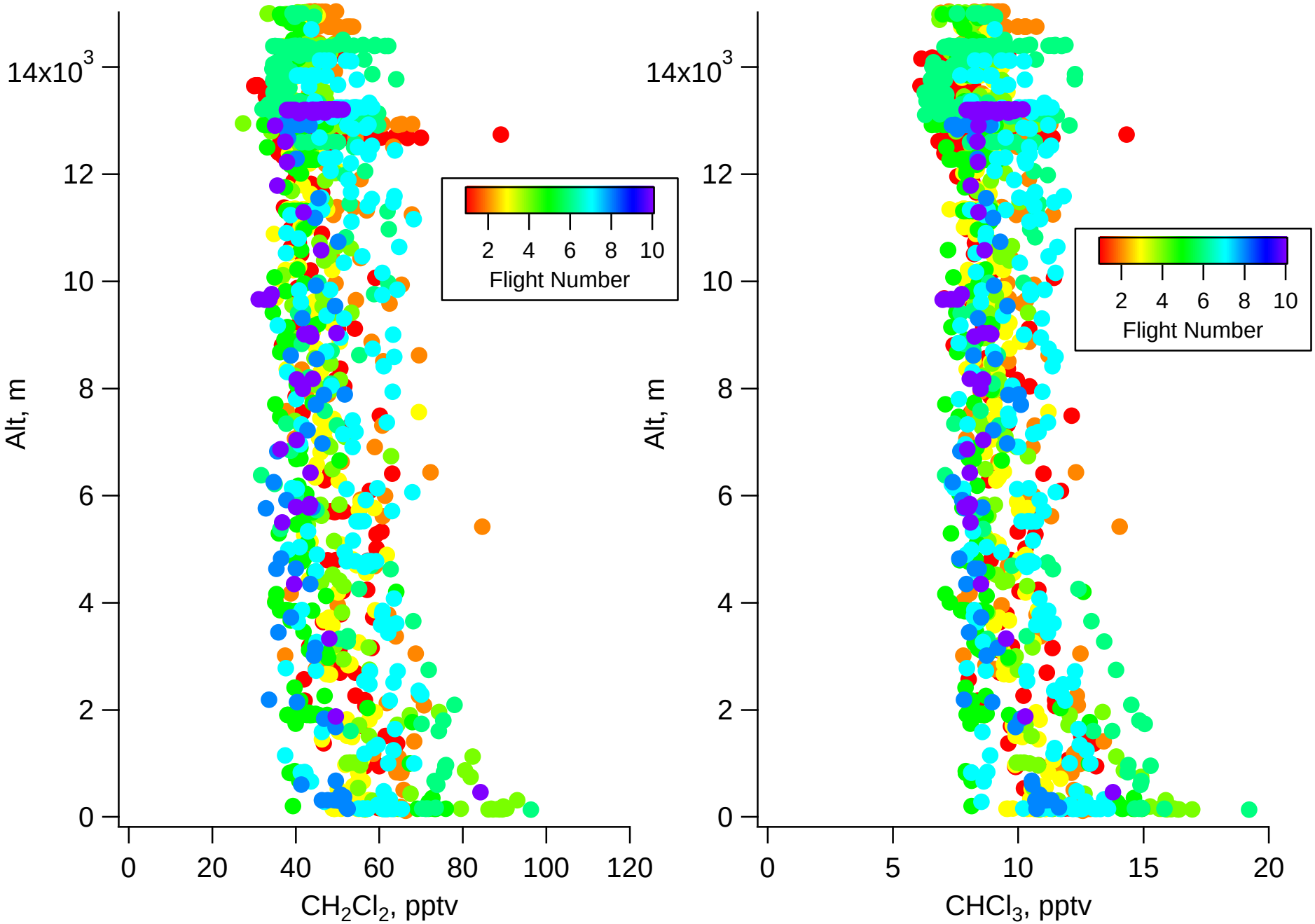
4
6
8
10
Flight Number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20
40
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80
100
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CH2Cl2, pptv
2
4
6
8
10
Flight Number
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12
10
8
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Alt, m
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10
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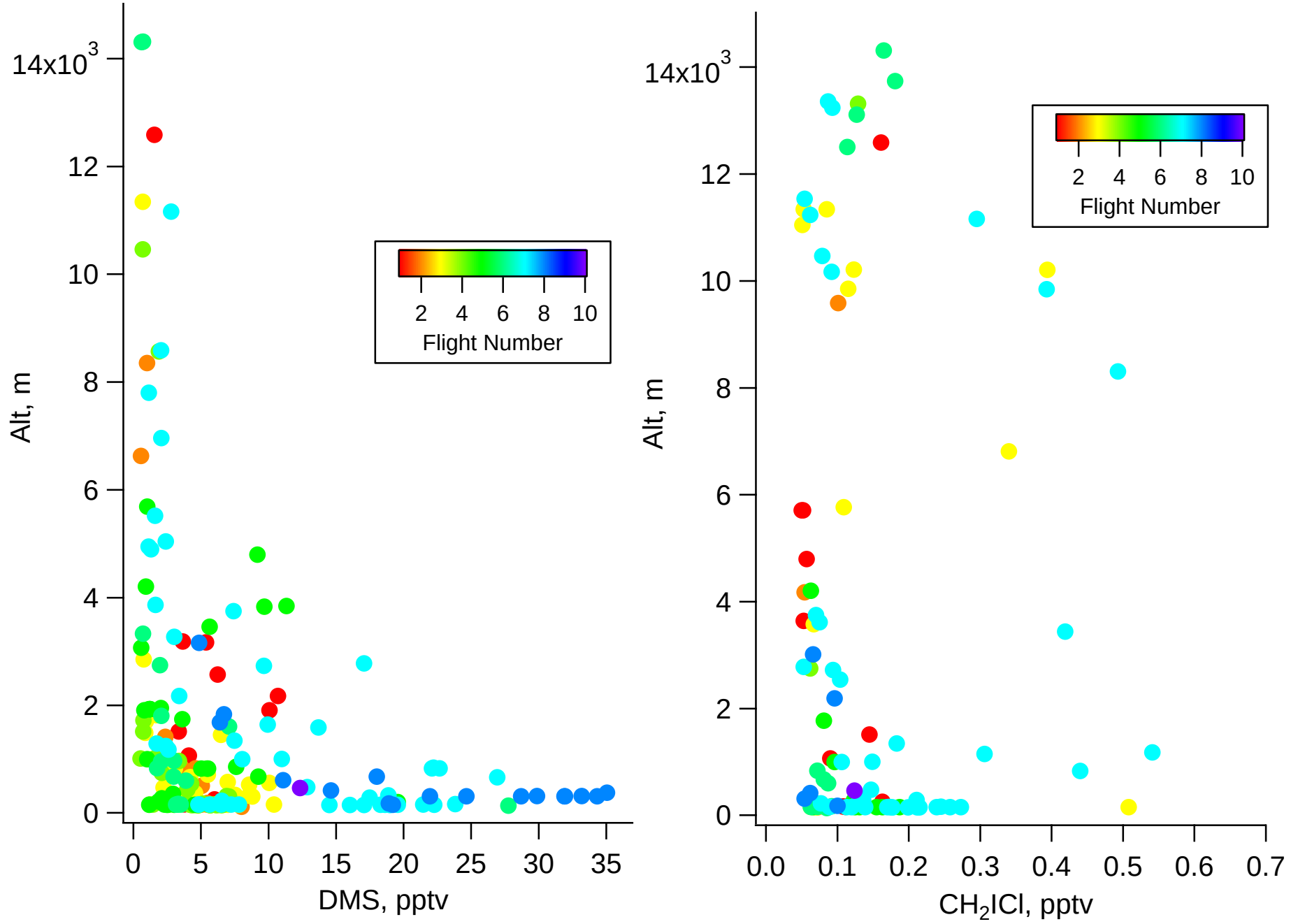
20
CHCl3, pptv
2
4
6
8
10
Flight Number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8
6
4
2
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Alt, m
0
5
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15
20
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30
35
DMS, pptv
2
4
6
8
10
Flight Number
14x10^3
12
10
8
6
4
2
0
Alt, m
0.0
0.1
0.2
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0.5
0.6
0.7
CH2ICl, pptv
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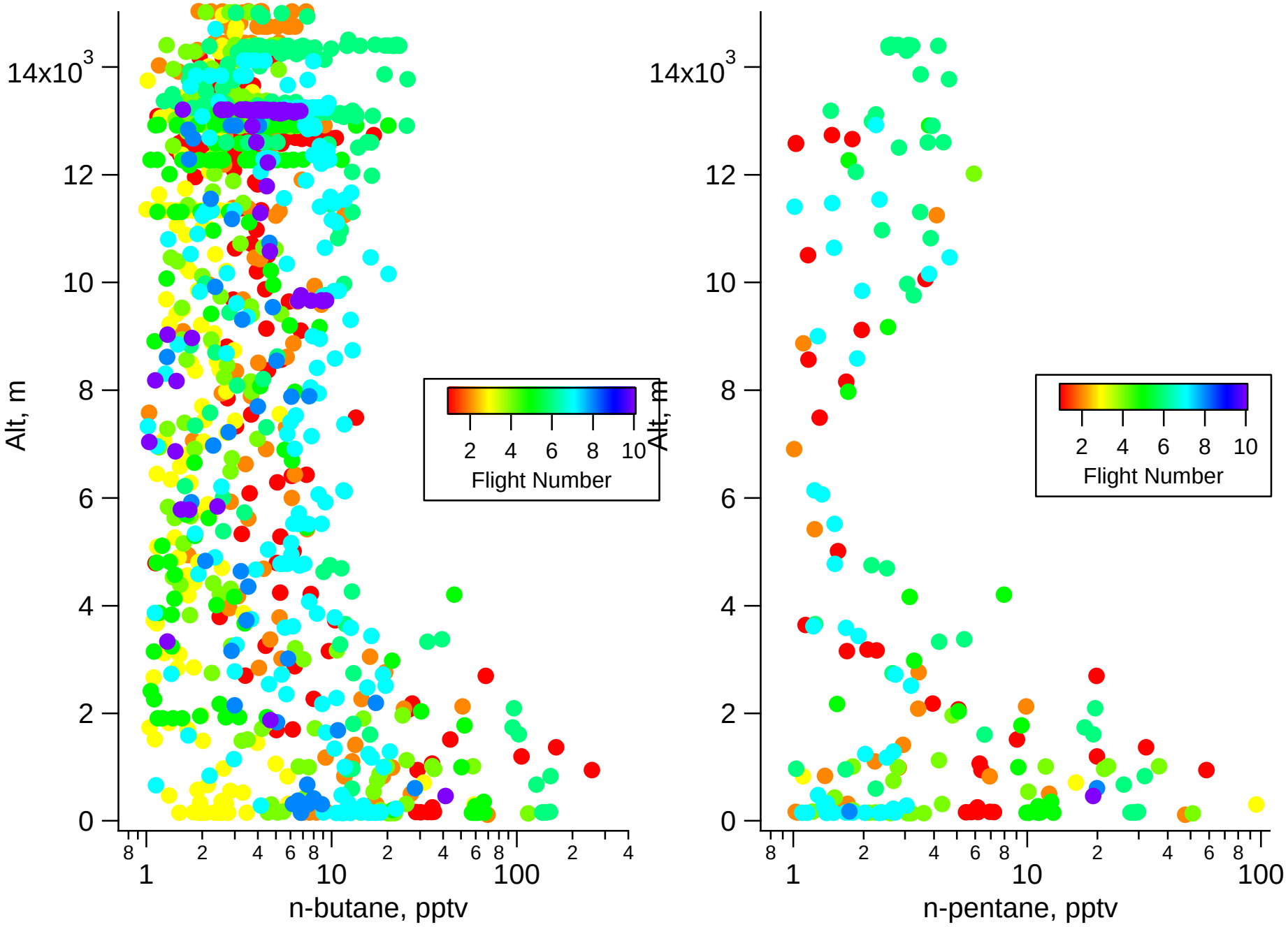
6
8
10
Flight Number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8
6
4
2
0
Alt, m
2 4 6 8 10
Flight Number
1 10 100
n-butane, pptv
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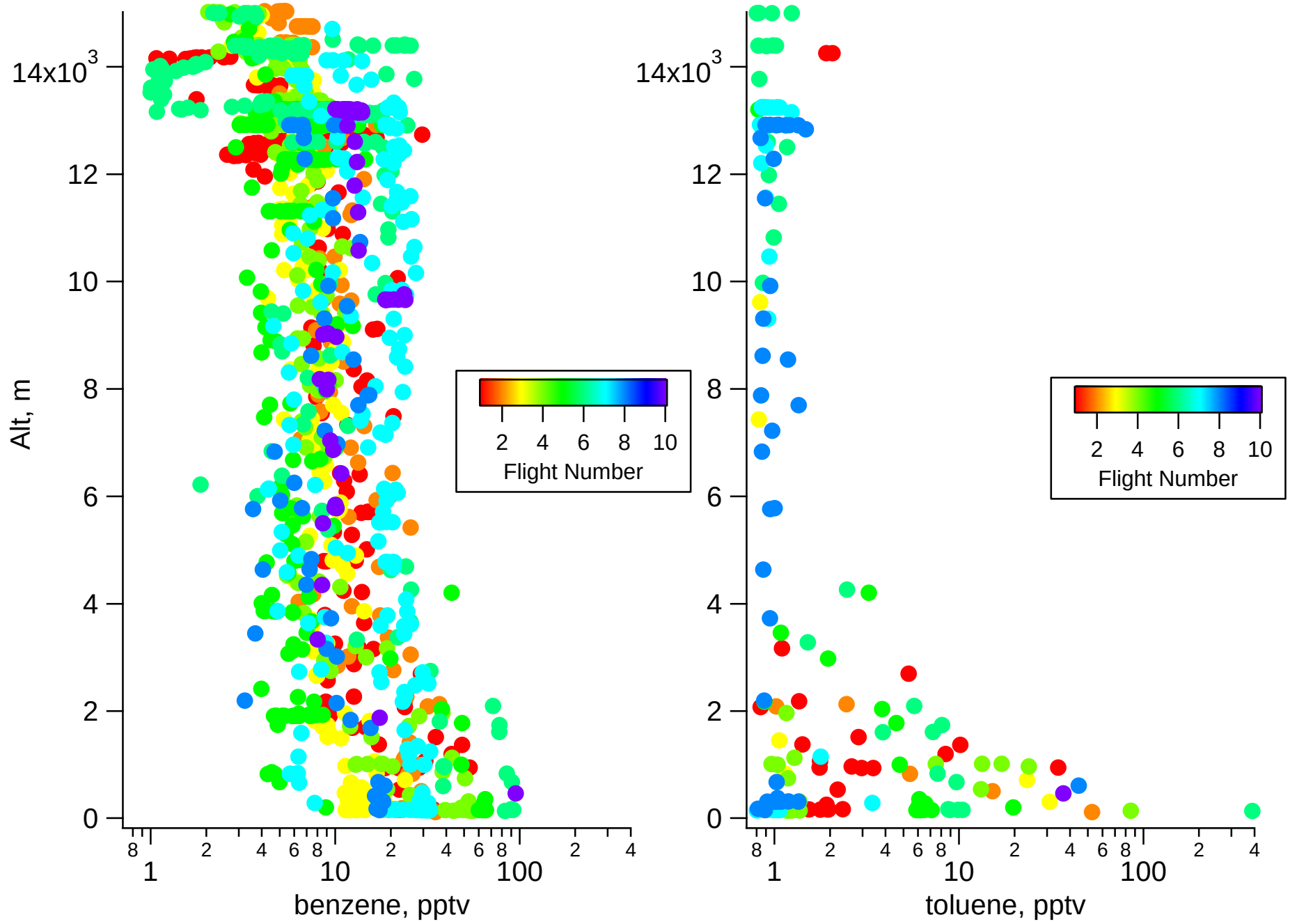
10
8
6
4
2
0
Alt, m
2 4 6 8 10
Flight Number
1 10 100
n-pentane, pptv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8
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2
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Alt, m
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4
6
8
10
Flight Number
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2
4
6
8
10
2
4
6
8
100
2
4
benzene, pptv
14x10^3
12
10
8
6
4
2
0
2
4
6
8
10
Flight Number
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2
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8
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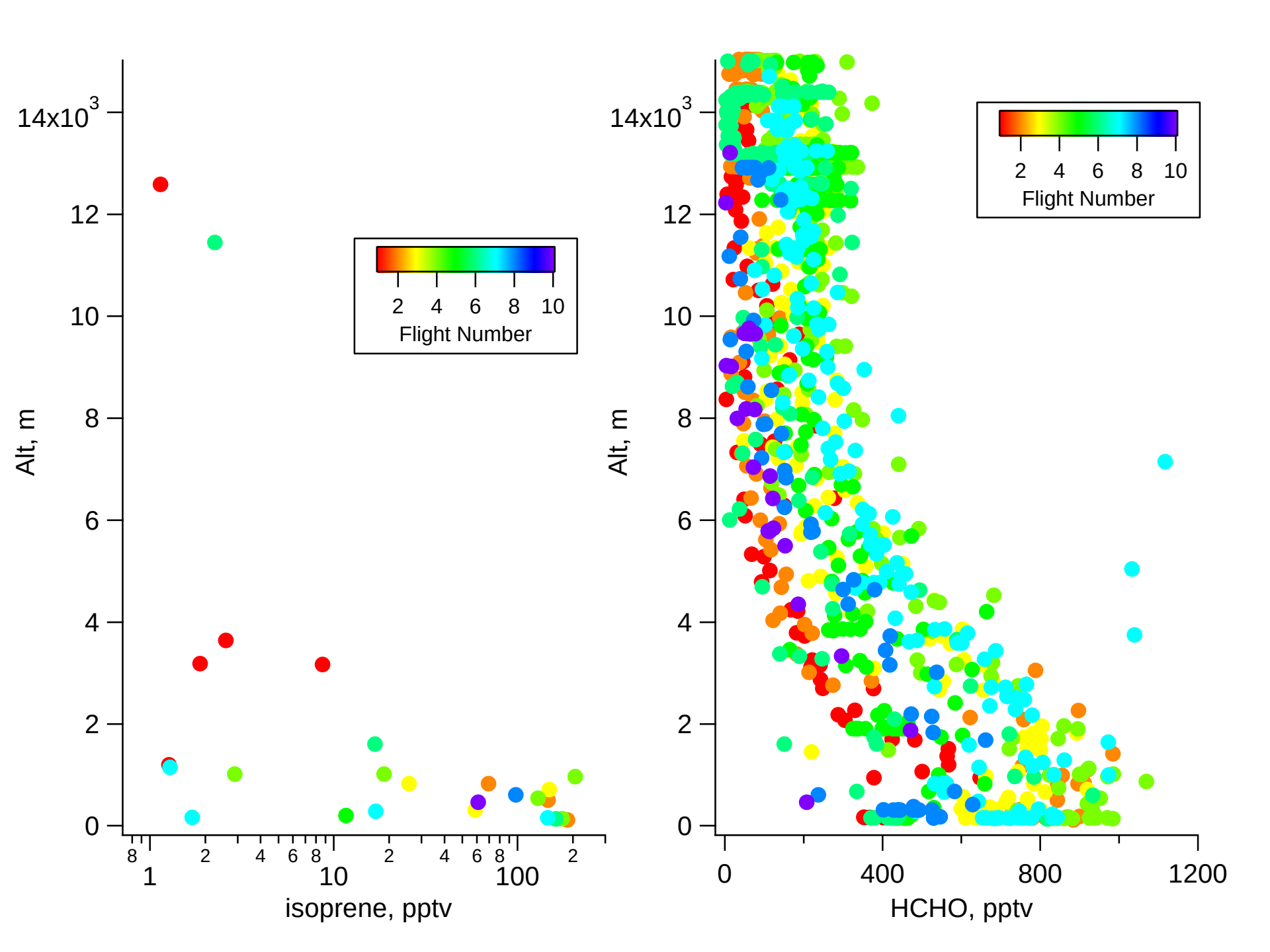
4
toluene, pptv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Alt, m
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4
6
8
10
Flight Number
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2
4
6
8
10
2
4
6
8
100
2
isoprene, pptv
14x10^3
12
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0
Alt, m
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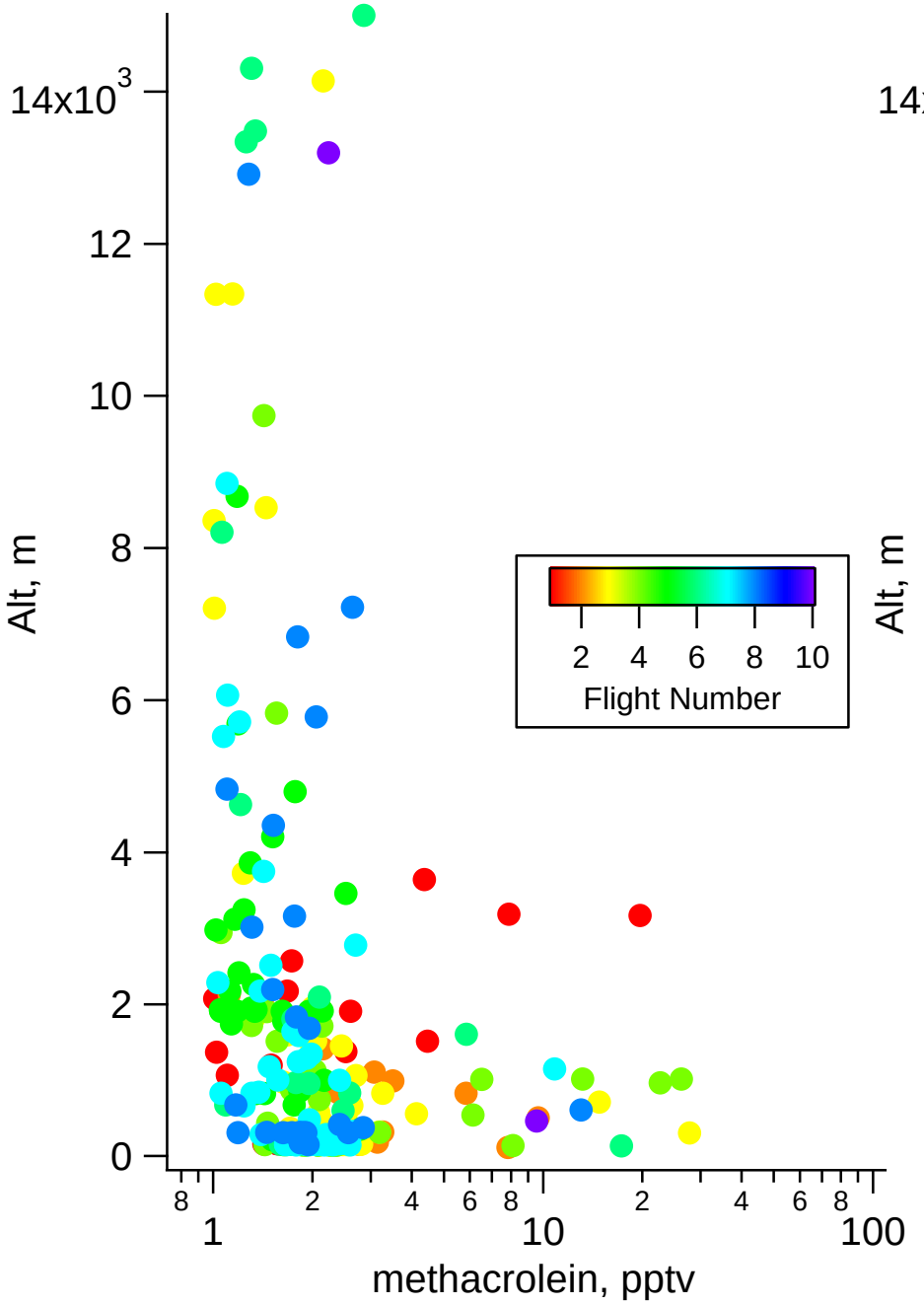
4
6
8
10
Flight Number
0
400
800
1200
HCHO, pptv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Alt, m
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Flight Number
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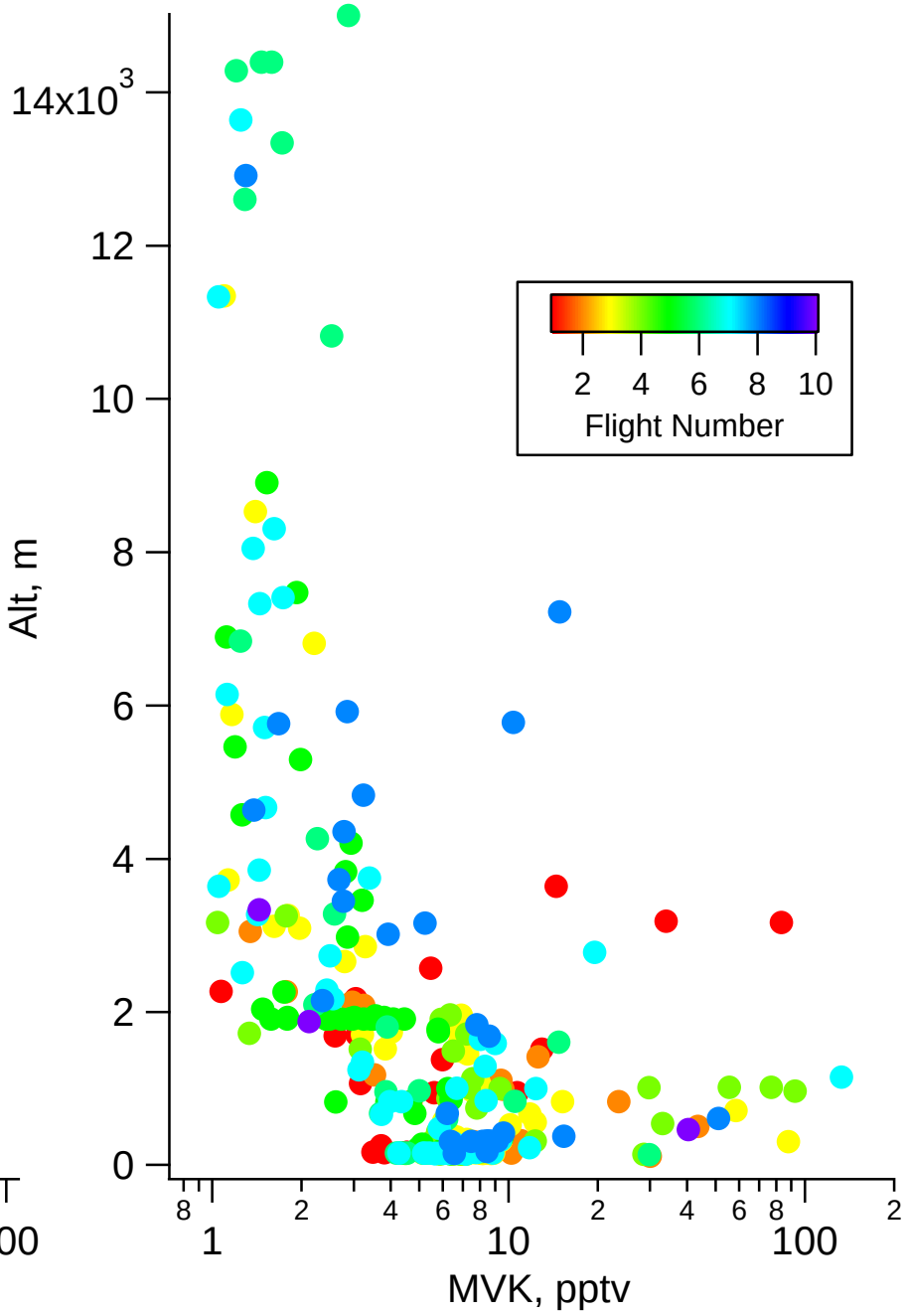
methacrolein, pptv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Alt, m
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Flight Number
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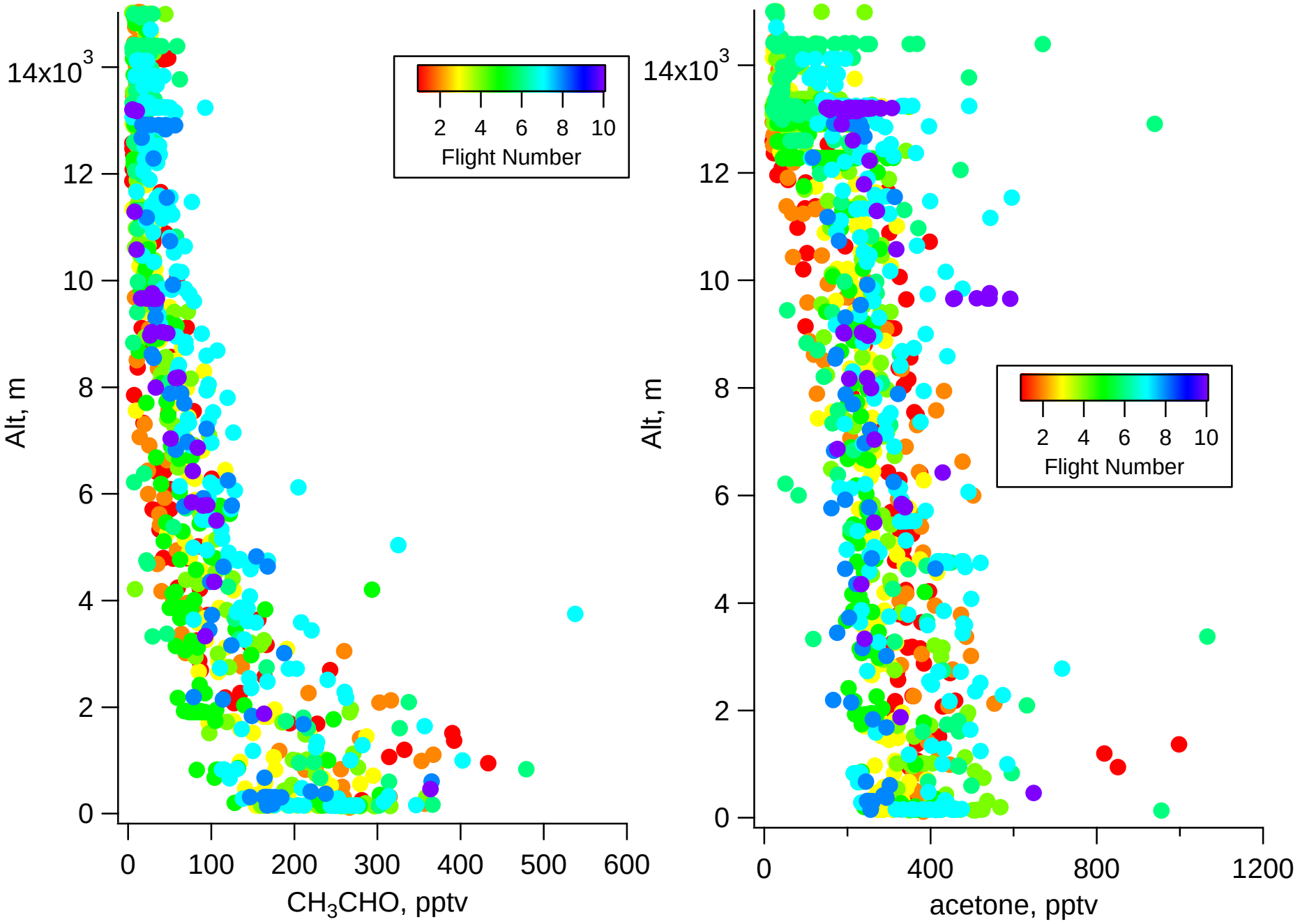
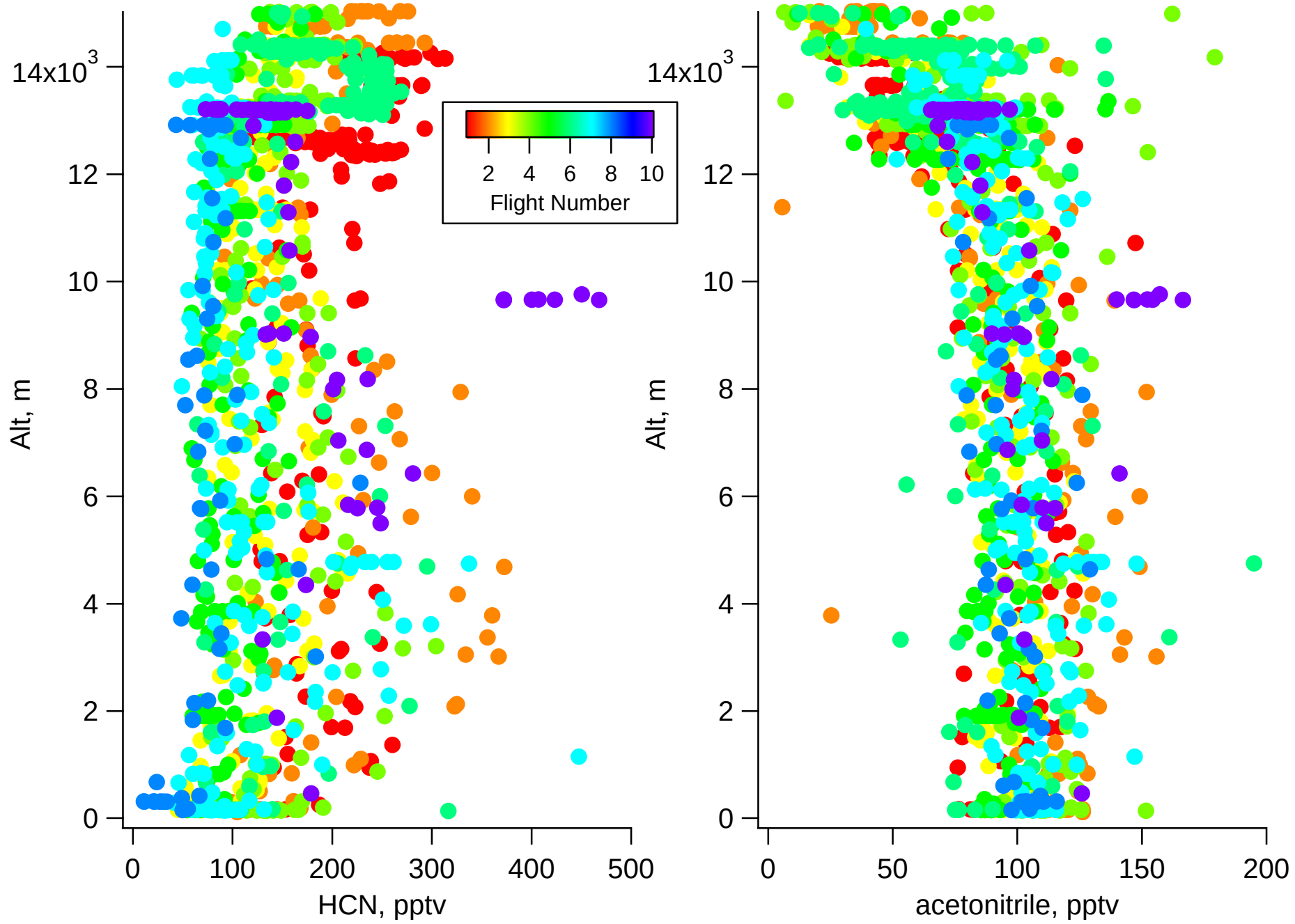
MVK, pptv


14x10^3
12
10
8
6
4
2
0
Alt, m
2
4
6
8
10
Flight Number
0
100
200
300
400
500
600
CH3CHO, pptv
14x10^3
12
10
8
6
4
2
0
Alt, m
2
4
6
8
10
Flight Number
0
400
800
1200
acetone, pptv


14x10^3
12
10
8
6
4
2
0
Alt, m
2
4
6
8
10
Flight Number
0
100
200
300
400
500
HCN, pptv
14x10^3
12
10
8
6
4
2
0
Alt, m
0
50
100
150
200
acetonitrile, pptv

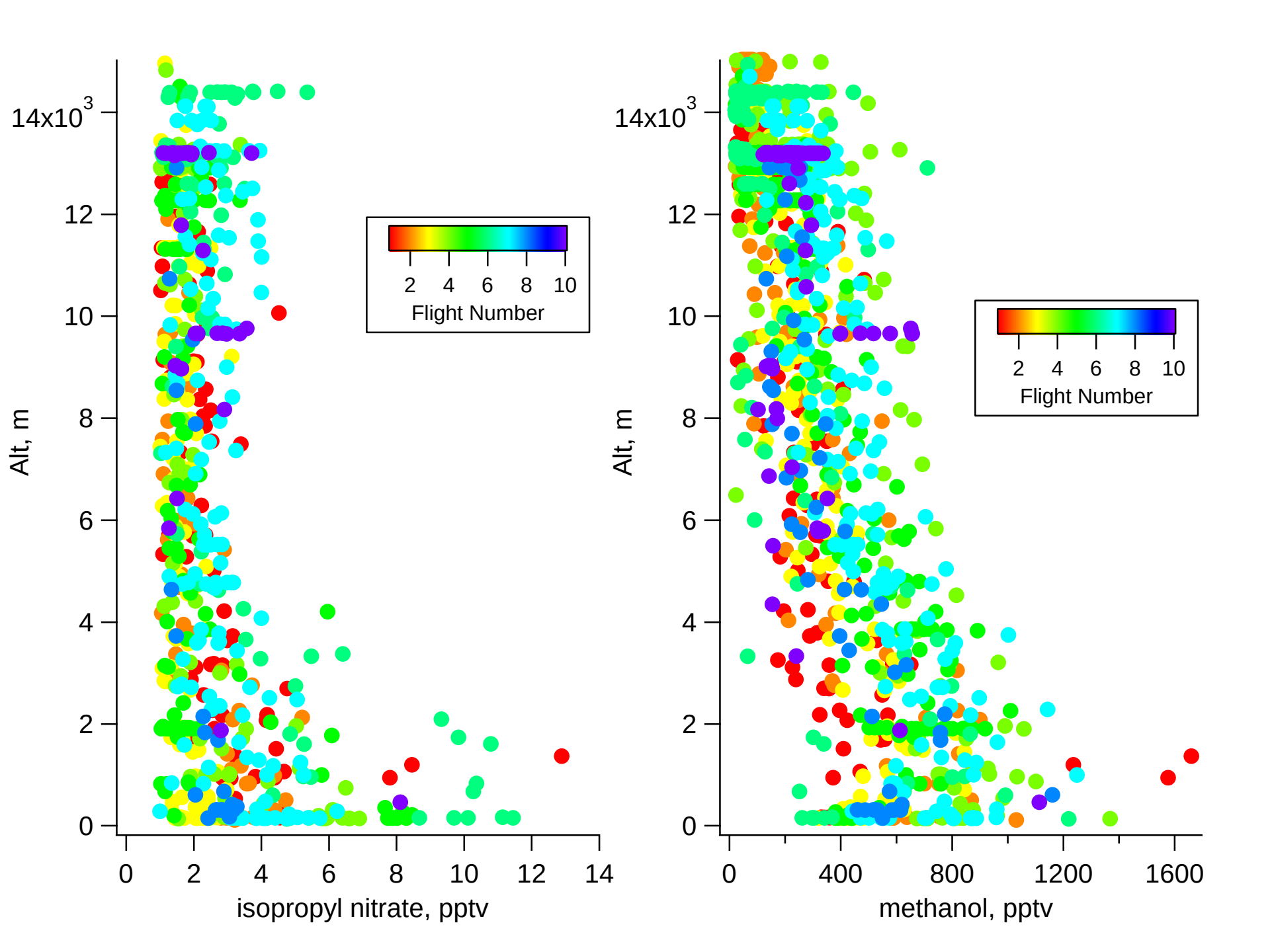
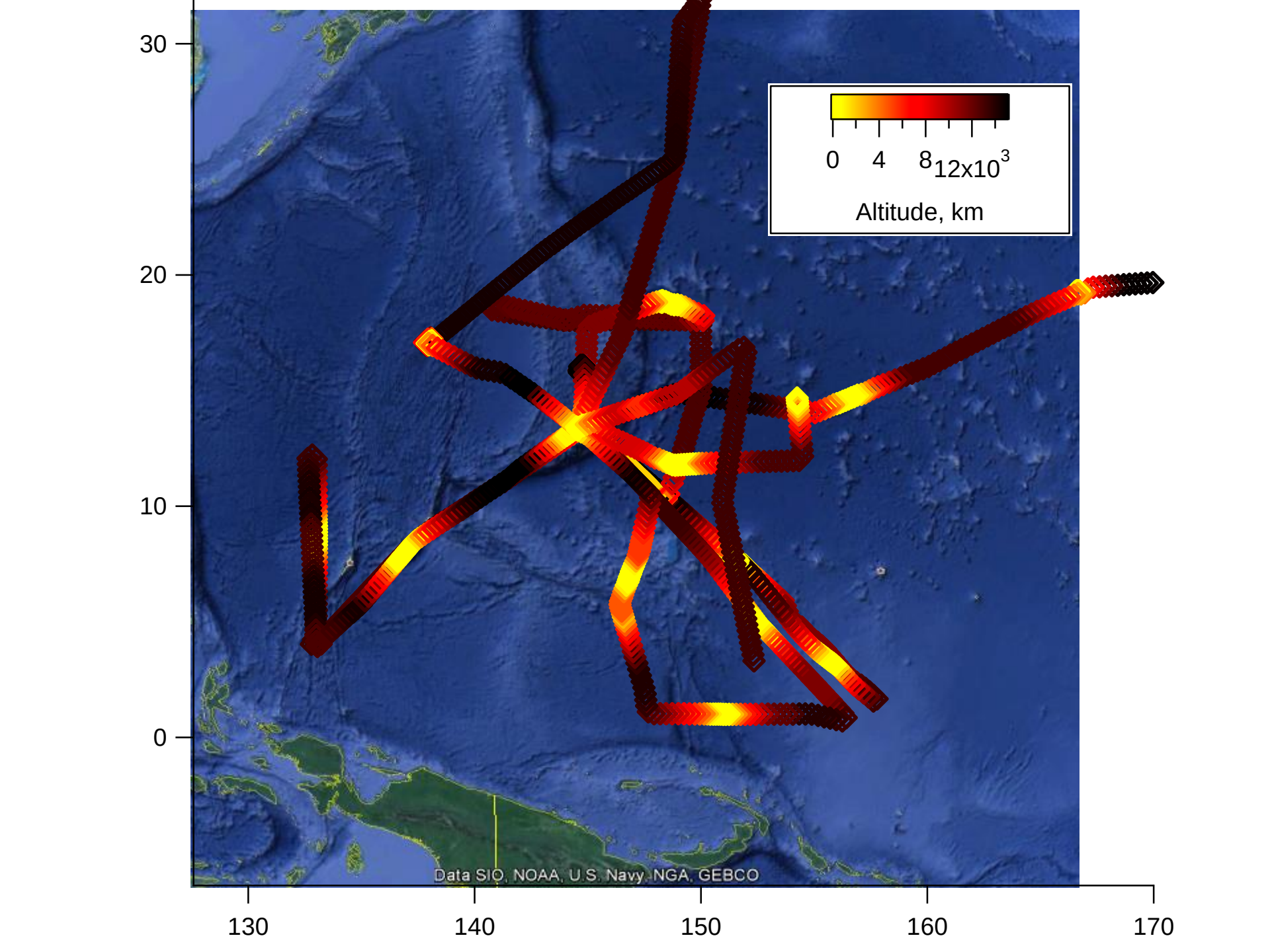

14x10^3
12
10
8
6
4
2
0
Alt, m
2
4
6
8
10
Flight Number
0
2
4
6
8
10
12
14
isopropyl nitrate, pptv
14x10^3
12
10
8
6
4
2
0
Alt, m
2
4
6
8
10
Flight Number
0
400
800
1200
1600
methanol, pptv

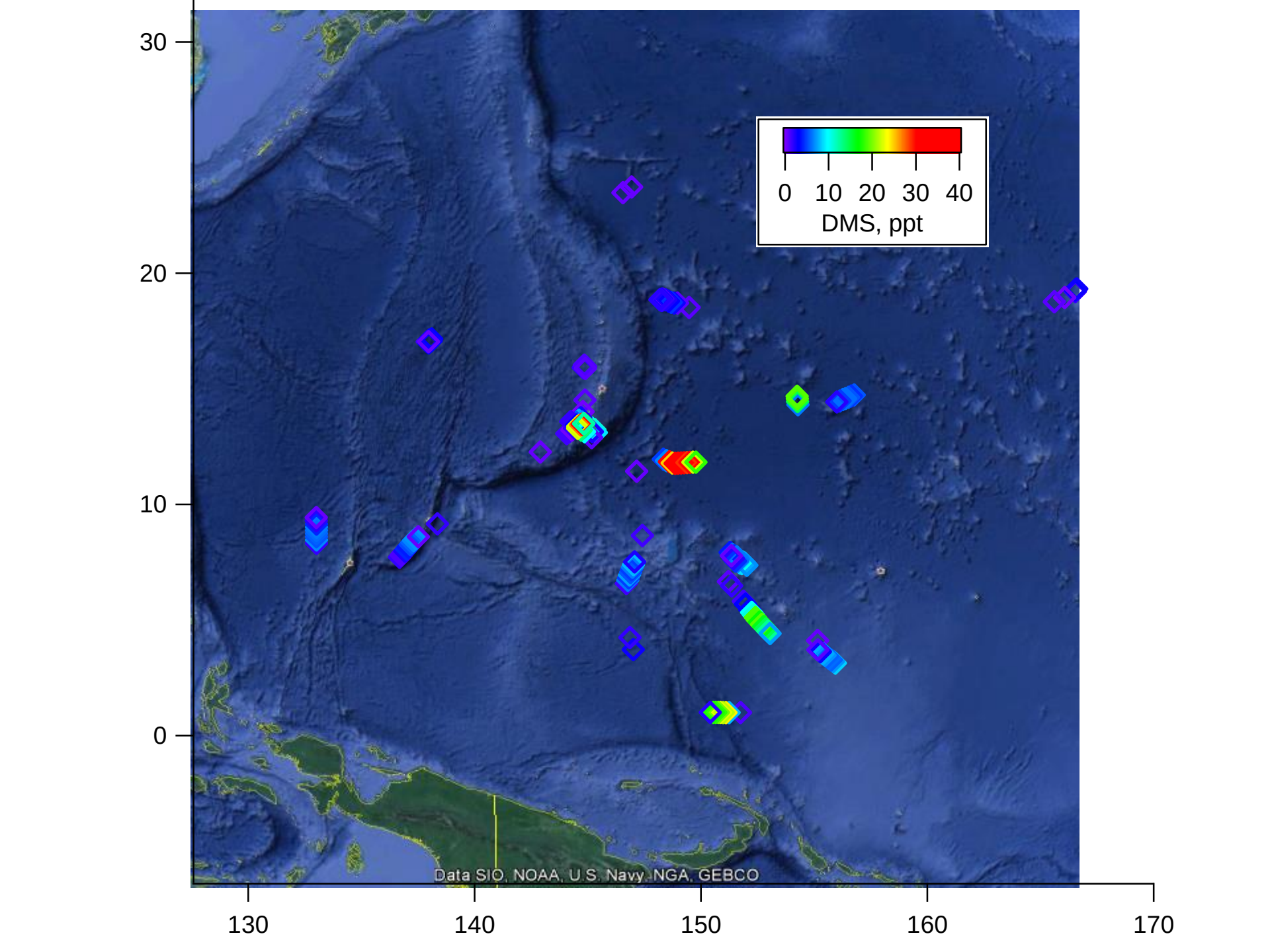
Table 1-4. Lifetimes for very short-lived halogenated source gases. Montzka, Reimann, et al.

Compound	Local Lifetime from Previous Assessments (τ_{local}), days	OH Lifetime[1] (τ_{OH}), days	Photolysis Lifetime from Previous Assessments (τ_{local}), days	New Local Lifetime, (τ_{local}), days	Notes
Chlorocarbons					
CH_2Cl_2	140	144	>15000	144	2, 8
$CHCl_3$	150	149	>15000	149	2, 8
CH_3CH_2Cl	30	39		39	2
CH_2ClCH_2Cl	70	65		65	4
$CH_3CH_2CH_2Cl$		14		14	5
$CHClCCl_2$		4.9	>15000	4.9	3, 8
CCl_2CCl_2	99	90		90	3
$CH_3CHClCH_3$		18		18	5
Bromocarbons					
CH_2Br_2	120	123	5000	123	2, 8
$CHBr_3$	26	76	36	24	2, 8
CH_2BrCl	150	137	15000	137	2, 8
$CHBrCl_2$	78	121	222	78	6, 8
$CHBr_2Cl$	69	94	161	59	7, 8
CH_3CH_2Br	34	41		41	2
CH_2BrCH_2Br	55	70		70	4
n-C_3H_7Br	13	12.8	>1200	12.8	3, 8
iso-C_3H_7Br		16.7		16.7	3
Iodocarbons					
CH_3I	7	158	7 (4–12)	7	4, 8
CF_3I	4	860	not determined	4	2
CH_2ClI	0.1		0.1	0.1	8
CH_2BrI	0.04		0.04	0.04	8
CH_2I_2	0.003		0.003	0.003	8

2 hrs

5 min


0
4
8
12x10^3
Altitude, km
30
20
10
0
130
140
150
160
170
Data SIO, NOAA, U.S. Navy, NGA, GEBCO


0 10 20 30 40
DMS, ppt
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
30
20
10
0
130
140
150
160
170