2016 CMAQ User Survey

Q1 - Describe your primary role: (Choose the best answer)

	Answer	%	Count
1	Management or administration	0.91%	1
2	Technical support	4.55%	5
3	Student	21.82%	24
4	Academic research	32.73%	36
8	Federal/state/local government air quality management	10.91%	12
12	Federal/state/local/government air quality research	18.18%	20
7	Private Industry	10.91%	12
11	Other (optional):	0.00%	0
	Total	100%	110

Q2 - How long have you been associated with the CMAQ community? (Choose the best answer.)

	Answer	%	Count
1	<1 year	20.00%	22
2	1-3 years	14.55%	16
3	3-5 years	16.36%	18
4	5-10 years	20.91%	23
5	>10 years	28.18%	31
	Total	100%	110

Q3 - How do you interact with CMAQ? (Choose the best answer or your primary method of interaction)

	Answer	%	Count
1	I create highly customized versions of CMAQ that involve modifying large amounts of source code and/or inputs and outputs	14.55%	16
2	I run CMAQ with some moderate modification to the source code and/or inputs (meteorology, emissions, etc.)	43.64%	48
3	I run the CMAQ model with minimal (if any) modification to the source code and inputs	16.36%	18
4	I use CMAQ output in highly customized ways	3.64%	4
5	I use CMAQ output with fairly standard post processing methods	2.73%	3
6	I use CMAQ output that someone else created, and those data are input for my research/application	3.64%	4
7	I create input data for CMAQ (meteorology, emissions, etc.)	8.18%	9
10	I am interested in CMAQ, but do not use it	7.27%	8
	Total	100%	110

Q4 - For which types of applications do you use CMAQ? (Choose all that apply)

	Answer	%	Count
1	Retrospective (historical) general air quality	62.04%	67
2	Retrospective (historical) case studies/field campaigns	48.15%	52
3	Improving the representation of atmospheric chemistry	39.81%	43
13	General model development	25.00%	27
14	Emissions change scenarios	66.67%	72
15	Regulatory applications	41.67%	45
16	Model evaluation	66.67%	72
17	Air quality forecasting	34.26%	37
18	Examining effects of air quality on human health	39.81%	43
19	Examining effects of air quality on ecosystems and/or agriculture	13.89%	15
20	Understanding climate change and air quality interactions	26.85%	29
12	Other (optional):	0.00%	0
	Total	100%	108

Q5 - Why have you chosen to use CMAQ or CMAQ output? (Choose all that apply)

	Answer	%	Count
1	I did not consider any other models	13.89%	15
11	EPA involvement	51.85%	56
12	Scientific rigor	42.59%	46
4	Ease of use	16.67%	18
5	User community	45.37%	49
6	Availability of training	22.22%	24
13	Model performance compared to other models	23.15%	25
14	I was already familiar with CMAQ	27.78%	30
15	My colleagues are using it	45.37%	49
16	Previous group familiarity/historical reasons	33.33%	36
17	Availability of archived output data	11.11%	12
10	Other (optional):	0.93%	1
	Total	100%	108

Q6 - Please rank your experience with the following software programs:

	Question	I have run and modified it		I run it regularly		I run it occasionally		I do not run but use data from it		I do not use it		Total
1	SMOKE	15.84%	16	14.85%	15	9.90%	10	39.60%	40	19.80%	20	101
3	WRF	16.35%	17	21.15%	22	16.35%	17	39.42%	41	6.73%	7	104
4	MCIP	8.74%	9	29.13%	30	31.07%	32	18.45%	19	12.62%	13	103
5	ICON	11.54%	12	29.81%	31	27.88%	29	15.38%	16	15.38%	16	104
6	BCON	14.42%	15	26.92%	28	28.85%	30	14.42%	15	15.38%	16	104
7	JPROC	2.97%	3	27.72%	28	25.74%	26	18.81%	19	24.75%	25	101
8	AMET	6.86%	7	8.82%	9	24.51%	25	11.76%	12	48.04%	49	102

Q7 - Which of the following CMAQ or CMAQ-related components do you personally modify or create on a regular basis? (Choose all that apply)

	Answer	%	Count
1	Gridded emission inputs	54.81%	57
2	Land use input files	20.19%	21
3	Meteorology-related CMAQ routines and/or meteorology models	40.38%	42
4	Chemical mechanism(s)	27.88%	29
5	Aerosol treatment (organic or inorganic)	24.04%	25
6	Transport processes	14.42%	15
7	Land-surface processes	4.81%	5
8	Emission-related processes	33.65%	35
9	Photolysis	6.73%	7
10	Deposition	14.42%	15
11	I/O and/or utility routines	25.00%	26
12	Parallelization/optimization	9.62%	10
13	Publicly available post-processing software tools distributed by CMAS	23.08%	24
14	My own post-processing tools	56.73%	59
15	None of these	6.73%	7
	Total	100%	104

Q8 - Please rate the following aspects of CMAQ:
5: sufficient (available and easy to use/implemented well/facilitates easy model use)
1: insufficient (barrier to use/insufficient support or documentation for use/hindrance) Select NA if you feel unable to determine

	Question	5		4		3		2		1		Total
1	Availability of inputs (meteorology, emissions, etc)	29.21%	26	29.21%	26	22.47%	20	11.24%	10	7.87%	7	89
2	Availability of model outputs	33.33%	27	30.86%	25	19.75%	16	11.11%	9	4.94%	4	81
3	Availability of training	36.05%	31	34.88%	30	20.93%	18	3.49%	3	4.65%	4	86
4	Availability of test input data sets	37.08%	33	29.21%	26	21.35%	19	7.87%	7	4.49%	4	89
5	Ability to set up custom domains	31.46%	28	30.34%	27	21.35%	19	12.36%	11	4.49%	4	89
6	Ability to set up custom simulations	28.09%	25	39.33%	35	20.22%	18	6.74%	6	5.62%	5	89
8	Operational user documentation	25.81%	24	30.11%	28	23.66%	22	13.98%	13	6.45%	6	93
9	Scientific documentation (publications)	33.70%	31	35.87%	33	21.74%	20	5.43%	5	3.26%	3	92
10	Model performance on relevant metrics	24.71%	21	36.47%	31	29.41%	25	5.88%	5	3.53%	3	85
12	Representation of state of the science	35.23%	31	43.18%	38	15.91%	14	4.55%	4	1.14%	1	88
15	User support for CMAQ	42.71%	41	34.38%	33	17.71%	17	1.04%	1	4.17%	4	96
18	Overall ease of use of CMAQ	20.65%	19	29.35%	27	29.35%	27	16.30%	15	4.35%	4	92

Q9 - Are the number of configurable options (e.g. chemistry options, deposition schemes, aerosol modules) in CMAQ adequate?

	Answer	%	Count
1	No, I would like more options	23.81%	25
2	Yes, the number of options is adequate	66.67%	70
3	No, I think there are too many options	9.52%	10
	Total	100%	105

Q10 - How useful are the following software packages and utilities for working with CMAQ output?

	Question	Extremely useful		Very useful		Moderately useful		Slightly useful		Not at all useful		N/A: Never used/no basis to judge		Total
1	AMET	8.60%	8	22.58%	21	9.68%	9	5.38%	5	2.15%	2	51.61%	48	93
2	VERDI	26.04%	25	20.83%	20	23.96%	23	12.50%	12	1.04%	1	15.63%	15	96
3	PAVE	18.75%	18	26.04%	25	7.29%	7	8.33%	8	3.13%	3	36.46%	35	96
4	ncview	20.21%	19	13.83%	13	15.96%	15	10.64%	10	3.19%	3	36.17%	34	94
5	IDV	5.43%	5	3.26%	3	13.04%	12	6.52%	6	0.00%	0	71.74%	66	92
6	Excel	15.79%	15	9.47%	9	20.00%	19	18.95%	18	13.68%	13	22.11%	21	95
7	R packages (e.g.openair, M3)	20.21%	19	24.47%	23	15.96%	15	1.06%	1	0.00%	0	38.30%	36	94
8	appendwrf	4.44%	4	3.33%	3	4.44%	4	2.22%	2	0.00%	0	85.56%	77	90
9	bldoverlay	3.23%	3	4.30%	4	5.38%	5	3.23%	3	0.00%	0	83.87%	78	93
10	combine	29.03%	27	17.20%	16	8.60%	8	3.23%	3	1.08%	1	40.86%	38	93
11	hr2day	6.52%	6	6.52%	6	5.43%	5	1.09%	1	0.00%	0	80.43%	74	92
12	sitecmp	17.39%	16	16.30%	15	5.43%	5	2.17%	2	0.00%	0	58.70%	54	92
13	sitecmp_dailyo3	9.78%	9	11.96%	11	2.17%	2	2.17%	2	0.00%	0	73.91%	68	92
14	writesite	2.22%	2	4.44%	4	3.33%	3	2.22%	2	1.11%	1	86.67%	78	90
17	NCL (NCARGraphics Language)	23.66%	22	11.83%	11	11.83%	11	5.38%	5	2.15%	2	45.16%	42	93
18	NCO (netCDF operator)	16.30%	15	19.57%	18	8.70%	8	7.61%	7	0.00%	0	47.83%	44	92

Q11 - If you were collaborating with CMAQ developers via the GitHub repository, how important would the following features be to you?

	Question	Extremely important		Very important		Moderately important		Slightly important		Not at all important		N/A - I do not plan to use Git now or in the future		Total
1	Ability to issue code updates to the main version (e.g., Pull Requests)	28.57%	26	23.08%	21	17.58%	16	7.69%	7	4.40%	4	18.68%	17	91
2	Access to the full code history (Git commit history) for CMAQ	24.44%	22	30.00%	27	20.00%	18	5.56%	5	1.11%	1	18.89%	17	90
3	Ability to post/discuss issues related to bugs or desired features	37.36%	34	32.97%	30	6.59%	6	4.40%	4	1.10%	1	17.58%	16	91
4	Ability to see items in development	31.11%	28	22.22%	20	20.00%	18	8.89%	8	0.00%	0	17.78%	16	90
5	Access to previous CMAQ release versions	28.89%	26	28.89%	26	15.56%	14	4.44%	4	5.56%	5	16.67%	15	90

Q12 - We are considering updates to CMAQ web content. Which of the following would you like to see on a CMAQ website (Choose all that apply)?

	Answer	%	Count
1	High-level description of CMAQ	67.39%	62
2	Technical description of CMAQ	85.87%	79
3	List of relevant publications	70.65%	65
4	Instructions on how to run CMAQ	82.61%	76
5	Instructions on how to contribute new code to CMAQ	63.04%	58
6	CMAS conference/training information	65.22%	60
7	Blog	26.09%	24
8	Twitter feed	11.96%	11
9	List of upcoming changes to CMAQ	73.91%	68
10	Upcoming conferences/workshops of interest	63.04%	58
11	Photos	16.30%	15
12	Links to model output archives	70.65%	65
13	Links to model input (emissions, meteorology, etc.) archives	84.78%	78
14	Links to interactive archives (EnviroAtlas, RSIG, etc.) with visualization	56.52%	52
15	Tutorials on how to accomplish CMAQ-related tasks	73.91%	68
16	Tips	56.52%	52
17	Link to CMAQ source code	64.13%	59
18	Map of user locations	26.09%	24
19	Job listings	44.57%	41
24	Funding opportunities	43.48%	40
25	Example applications (what you can do with CMAQ)	59.78%	55
26	The results of this survey	38.04%	35
22	Other (optional):	4.35%	4
	Total	100%	92