

Comparison of EPA's RGGs CALPUFF modeling and variants to WRAP BART modeling results

sjb 2011-03-26

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All simulations used ENSR meteorology (WRAP AZ domain, CALMET 5.8, with upper air data), except the WRAP results per se.

All simulations used visibility method 6, with annual average natural background concentrations.

Impacts listed are 98th percentile delta deciviews (ddv).

"avg" = average of 2001-2003 individual year results; "mult" = all three years' data considered together for 98th percentile

Conclusions

PM speciation change made little difference;

using WRAP CALPUFF puff parameters increased Grand Canyon impacts by 50%;

using WRAP CALMET meteorology increased impacts by another 20-100% increase, including 60% at Grand Canyon.

WRAP Comparison Simulations

Name	versions of executables				emissions	Sequence of changes
	CALMET	CALPUFF	POSTUTIL	CALPOST		
c00 / rgset2	5.8	5.8	1.56	5.6394	EPA	(PM10 modeled as PMC, PMF, SO4, EC, SOA)
cwe / rgset2_wrapem	5.8	5.8	1.56	5.6394	WRAP	Small emission change ; total PM modeled as PMF
WRAP0_cf5.8_ct5.6	5.8	5.8	1.56	5.6394	WRAP	Some puff parameters
WRAP0_cf5.8_ct6.1	5.8	5.8	1.56	6.131	WRAP	CALPOST version
WRAP0_cf6.1_ct6.1	5.8	6.112	1.52	6.131	WRAP	CALPUFF & POSTUTIL versions
WRAP per se	6.211	6.112	< 1.5?	6.1?	WRAP	Meteorology, bigger computational grid, TimeZone=8

c00 / rgset2 (used by EPA for proposal)

						Absolute Differences		Relative Differences	
						vs. prev.	vs. rgset2	vs. prev.	vs. rgset2
						vs. WRAP		vs. WRAP	
area	2001	2002	2003 avg	mult		2001		2001	
brca	0.181	0.204	0.295	0.227	0.203	-0.109		-37.6%	
grca	0.725	0.589	0.508	0.607	0.585	-0.995		-57.8%	
jotr	0.663	0.583	0.446	0.564	0.508	-0.217		-24.7%	
syca	0.127	0.177	0.134	0.146	0.135	-0.063		-33.2%	
zion	0.307	0.382	0.601	0.430	0.390	-0.523		-63.0%	

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cwe / rgset2_wrapem; change from c00 rgset2

		Absolute Differences			Relative Differences		
		vs. prev.	vs. rgset2	vs. WRAP	vs. prev.	vs. rgset2	vs. WRAP
		2001	2001	2001	2001	2001	2001
brca	0.180	-0.001	-0.001	-0.110	-0.6%	-0.6%	-37.9%
grca	0.699	-0.026	-0.026	-1.021	-3.6%	-3.6%	-59.4%
jotr	0.653	-0.010	-0.010	-0.227	-1.5%	-1.5%	-25.8%
syca	0.123	-0.004	-0.004	-0.067	-3.1%	-3.1%	-35.3%
zion	0.304	-0.003	-0.003	-0.526	-1.0%	-1.0%	-63.4%

Coarser PM speciation: Small decreases

WRAP0_cf5.8_ct5.6; change from cwe

		Absolute Differences			Relative Differences		
		vs. prev.	vs. rgset2	vs. WRAP	vs. prev.	vs. rgset2	vs. WRAP
		2001	2001	2001	2001	2001	2001
brca	0.186	0.006	0.005	-0.104	3.3%	2.8%	-35.9%
grca	1.075	0.376	0.350	-0.645	53.8%	48.3%	-37.5%
jotr	0.717	0.064	0.054	-0.163	9.8%	8.1%	-18.5%
syca	0.121	-0.002	-0.006	-0.069	-1.6%	-4.7%	-36.3%
zion	0.402	0.098	0.095	-0.428	32.2%	30.9%	-51.6%

Change puff parameters: Increase at Grand Canyon big, Zion moderate, Bryce & Joshua Tree small , slight decrease at Sycamore Canyon

WRAP0_cf5.8_ct6.1; change from WRAP0_cf5.8_ct5.6

		Absolute Differences			Relative Differences		
		vs. prev.	vs. rgset2	vs. WRAP	vs. prev.	vs. rgset2	vs. WRAP
		2001	2001	2001	2001	2001	2001
brca	0.186	0.000	0.005	-0.104	0.0%	2.8%	-35.9%
grca	1.075	0.000	0.350	-0.645	0.0%	48.3%	-37.5%
jotr	0.717	0.000	0.054	-0.163	0.0%	8.1%	-18.5%
syca	0.121	0.000	-0.006	-0.069	0.0%	-4.7%	-36.3%
zion	0.402	0.000	0.095	-0.428	0.0%	30.9%	-51.6%

Change CALPOST version from 5.6394 to 6.131: No effect.

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WRAP0_cf6.1_ct6.1; change from WRAP0_cf5.8_ct6.1

		Absolute Differences			Relative Differences		
		vs. prev.	vs. rgset2	vs. WRAP	vs. prev.	vs. rgset2	vs. WRAP
	2001	2001	2001	2001	2001	2001	2001
brca	0.186	0.000	0.005	-0.104	0.0%	2.8%	-35.9%
grca	1.075	0.000	0.350	-0.645	0.0%	48.3%	-37.5%
jotr	0.717	0.000	0.054	-0.163	0.0%	8.1%	-18.5%
syca	0.121	0.000	-0.006	-0.069	0.0%	-4.7%	-36.3%
zion	0.402	0.000	0.095	-0.428	0.0%	30.9%	-51.6%

Change CALPUFF version from 5.8 to 6.112: No effect (but results stated in terms of end of preceding day, rather than start of current day)

WRAP report; change from WRAP0_cf6.1_ct6.1

					Absolute Differences		Relative Differences	
					vs. prev.	vs. rgset2	vs. prev.	vs. rgset2
	2001	2002	2003	avg	2001	2001	2001	2001
brca	0.29	0.21	0.37	0.29	0.104	0.109	55.9%	60.2%
grca	1.72	1.03	1.00	1.25	0.645	0.995	60.0%	137.2%
jotr	0.88	0.56	0.55	0.67	0.163	0.217	22.7%	32.7%
syca	0.19	0.17	0.14	0.17	0.069	0.063	57.0%	49.6%
zion	0.83	0.46	0.74	0.68	0.428	0.523	106.5%	170.4%

Change meteorology ENSR 2008 to WRAP 2007: Big increase at most areas , moderate incr. at Joshua Tree