

1 **Paper# 2012GLXXXXXX**

2
3 **Noble Gas Composition in Rainwater and Associated Weather Patterns**

4
5 **Supplementary Text 2: Area Forecast Discussion for southeast Michigan**

6
7 **1. Introduction**

8 Area forecast discussions (AFDs) provide information on synoptic and mesoscale
9 weather features at the local region where the issuing weather station is located. This
10 supplementary text collates unedited AFDs for southeast Michigan region issued by the
11 National Weather Service in Detroit/Pontiac, MI (archived at
12 <http://mesonet.agron.iastate.edu/wx/afos/list.phtml>). Because multiple AFDs are issued
13 every day, only the most recent and up-to-date AFD prior to the date and time of
14 rainwater sample collection are included here. For example, on May 15 2011 nr1 was
15 sampled at 15:40 UTC (Coordinated Universal Time). AFDs were issued by the National
16 Weather Service in Detroit/Pontiac at 1:34, 4:50, 7:30, 10:59, 17:24, 18:47 and 23:00
17 UTC. AFD included in this Supplementary Text corresponds to 10:59 UTC (6:59 AM,
18 EDT) since it is the most up-to-date AFD prior to the occurrence of precipitation event
19 nr1 sampled in this study. Below, we only include AFDs for a few samples (nr1, 2, 6 and
20 12) for demonstrative purposes. AFDs for all remaining samples are available at the
21 National Weather Service archive listed above.

22
23 **2. Sample Area Forecast Discussions**

24
25 **2.1 Sample nr1**

26
27 480 FXUS63 KDTX 151059 AFDDTX AREA FORECAST DISCUSSION NATIONAL
28 WEATHER SERVICE DETROIT/PONTIAC MI 659 AM EDT SUN MAY 15 2011

29
30 .AVIATION...

31
32 WIDESPREAD IFR BASED STRATUS WILL START THE TAF PERIOD AT MANY OF THE
33 TAF SITES. HOWEVER...DRIER AIR BELOW 3K FEET WILL SLOWLY BE ADVANCING
34 IN FROM THE NORTH WHICH HAS ALREADY ADVECTED IN AT MBS. THIS WILL LEAD
35 TO A SLOW BUT STEADY INCREASE IN CEILING HEIGHTS FROM NORTH TO SOUTH
36 DURING THE COURSE OF THE MORNING AND AFTERNOON. THIS WILL OCCUR DESPITE
37 THE INCREASING COVERAGE OF RAINFALL. A STRONG NORTHEASTERLY PRESSURE
38 GRADIENT WILL CONTINUE TO LEAD TO GUSTY WINDS...ESPECIALLY AT MBS WHERE
39 FUNNELING DOWN SAGINAW BAY IS LEADING TO SOME LOCALLY STRONGER WINDS UP
40 TO 40 KNOTS. THE RAIN SHOULD END AT ALL OF THE TAF SITES DURING THE
41 EVENING HOURS WITH VFR CONDITIONS EXPECTED AS LOW PRESSURE PUSHES EAST
42 TOWARDS THE ATLANTIC SEABOARD.

43
44 &&

45
46 .PREV DISCUSSION...ISSUED 332 AM EDT SUN MAY 15 2011

47
48 SHORT TERM...TODAY

49
50 A LOW PRESSURE SYSTEM OVER THE EASTERN OHIO VALLEY WILL BEGIN ITS TRACK
51 EASTWARD TOWARDS THE ATLANTIC SEABOARD TODAY. BEFORE IT MOVES OFF TO
52 THE EAST SHOWERS ARE EXPECTED TO CONTINUE ACROSS MUCH OF THE AREA TODAY
53 UNDER AN 850-500MB DEFORMATION ZONE ON THE COLD SIDE OF THIS LOW. DRY

54 AIR IN PLACE ACROSS THE NORTHERN GREAT LAKES WILL BEGIN TO SINK
55 SOUTHWARD AS THE LOW DEPARTS...SLOWLY SHUTTING OFF THE SHOWERS FROM
56 NORTH TO SOUTH. WHILE THE SOUTHERN CWA WILL REMAIN VERY MOIST WITH
57 CONTINUED SHOWER ACTIVITY ALL OF TODAY...THE SAGINAW VALLEY AND
58 NORTHERN THUMB SHOULD SEE AN END TO THE RAIN BY THE AFTERNOON HOURS AS
59 THIS DRY AIR ADVECTS IN. THE VERY TIGHT PRESSURE GRADIENT ON THE NORTH
60 SIDE OF THIS LOW HAS CREATED VERY GUSTY WINDS ACROSS LAKE HURON EARLY
61 THIS MORNING. THESE WINDS HAVE FUNNELED DOWN SAGINAW BAY AND CHanneLED
62 THESE STRONG WINDS INTO THE SAGINAW VALLEY WITH WIND GUSTS REACHING 50
63 MPH AT TIMES. WITH THIS FLOW EXPECTED TO LAST FOR MUCH OF TODAY HAVE
64 ISSUED A WIND ADVISORY FOR BAY AND MIDLAND COUNTIES WITH FREQUENT GUSTS
65 OF 40 TO 50 MPH EXPECTED MUCH OF TODAY. WINDS WILL DIE DOWN LATER THIS
66 AFTERNOON AS THE LOW DEPARTS AND WINDS SHIFT TO THE NORTH WITH A LOOSER
67 PRESSURE GRADIENT. WILL TAKE THE ADVISORY THROUGH 4 PM AND CANCEL
68 EARLIER IF WINDS DROP BELOW ADVISORY CRITERIA SOONER. WITH THE REGION
69 ON THE COLD SIDE OF THE LOW PRESSURE SYSTEM AND CLOUDY RAINY CONDITIONS
70 EXPECTED FOR MUCH OF THE DAY WITH MIXING HEIGHTS ONLY TO 925MB THE
71 DIURNAL TEMPERATURE RANGE SHOULD NOT BE VERY LARGE AS HIGHS WILL ONLY
72 BE A FEW DEGREES WARMER THAN MORNING LOWS.
73
74 LONG TERM...
75 COOL AND BRISK START TO THE WORK WEEK. EXPANSIVE UPPER LEVEL RIDGE AND
76 SURFACE HIGH PRESSURE OVER CENTRAL CANADA WILL DRIFT TO THE SOUTH OVER
77 THE NEXT 48 HOURS AND ENOUGH DRY AIR IS EXPECTED TO FILTER INTO
78 SOUTHEAST MICHIGAN TO ALLOW FOR A DRY MONDAY...AS WEAKENING 500 MB LOW
79 LIFTS NORTH FROM THE EASTERN OHIO VALLEY. SHOWERS WILL LIKELY BE CLOSE
80 BY HOWEVER...ALONG THE US/CANADIAN BORDER. 850 MB TEMPS NOW PROGGED TO
81 FALL SLIGHTLY BELOW ZERO DURING MONDAY...SETTING UP A COLD NIGHT MONDAY
82 NIGHT...IN ADDITION TO TONIGHT. IT APPEARS PRESSURE GRADIENT WILL BE TOO
83 STRONG TO ALLOW WINDS TO DECOUPLE (ESPECIALLY WITH NORTHEAST FLOW OFF
84 LAKE HURON)...AND ALTHOUGH WE ARE LIKELY LOOKING AT MINS IN THE MID 30S
85 ACROSS A PORTION OF SOUTHEAST MICHIGAN...NOT PLANNING ON MENTIONING ANY
86 FROST WITH THE WIND STAYING UP. PLUS...THIS IS NO GUARANTEE CLOUDS ARE
87 GOING TO FULLY CLEAR OUT TONIGHT...AND CLOUDS WILL LIKELY BE RETURNING
88 FOR MONDAY NIGHT. LATEST TRENDS FOR THE SHEARED OUT ENERGY OVER THE
89 DAKOTAS/IOWA IS TO DIVE SOUTHEAST...MUCH FARTHER SOUTH...WITH THE
90 CENTER OF THIS SHORTWAVE HOVERING AROUND FAR EASTERN TENNESSEE OR EVEN
91 NORTHERN GEORGIA MONDAY/TUESDAY. NONE-THE-LESS...THE LARGE SCALE UPPER
92 LEVEL LOW/TROUGH IS QUITE EXTENSIVE...AND GOOD TAP OF ATLANTIC MOISTURE
93 IS STILL PROGGED TO ADVANCE WESTWARD INTO THE CENTRAL GREAT LAKES ON
94 TUESDAY...WITH LEAD SURGE OF LOW LEVEL WARM ADVECTION...AS 850 MB TEMPS
95 FORECASTED TO CLIMB INTO THE MID SINGLE NUMBERS. BETTER UPPER LEVEL
96 FORCING AS WE HEAD INTO THE MID WEEK PERIOD...AS THE MID/UPPER LEVEL
97 CIRCULATION ADVANCES NORTH INTO THE WESTERN MID ATLANTIC STATES. THE
98 GOOD NEWS IS AN UPPER LEVEL RIDGE IS FORECASTED (PER 00Z GFS/EUROPEAN)
99 TO BUILD INTO THE GREAT LAKES REGION AS WE HEAD INTO THE
100 WEEKEND...SUPPORTING A QUICK WARM UP...WITH TEMPERATURES POTENTIALLY
101 BACK TO 80 DEGREES BY SATURDAY. \$\$ MARINE... THE PRESSURE GRADIENT
102 WILL CONTINUE TO TIGHTEN AS LOW PRESSURE LIFTS THROUGH THE OHIO VALLEY
103 TO WESTERN PENNSYLVANIA BY MORNING AND HIGH PRESSURE SHIFTS SLOWLY
104 SOUTHEAST TOWARDS THE REGION. THIS SETUP WILL PROVIDE A PROLONGED
105 PERIOD OF NORTHEASTERLY FLOW...WHICH WILL PEAK EARLY THIS MORNING...BUT
106 PERSIST TO SOME DEGREE INTO EARLY NEXT WEEK AS THIS LOW PRESSURE SYSTEM
107 STALLS NEAR THE APPALACHIAN RANGE. NORTHEAST WINDS ARE STILL GUSTING TO
108 GALE FORCE DUE TO THE FUNNELING EFFECT UP SAGINAW BAY AND EXPECT WINDS
109 SPEEDS TO REMAIN AT THESE LEVELS THROUGH THE AFTERNOON
110 HOURS...THEREFORE WILL RETAIN THE GALE WARNING THROUGH ITS CURRENT
111 EXPIRATION. WILL ALSO MAINTAIN THE SMALL CRAFT ADVISORIES FOR THE
112 REMAINDER OF THE LAKE HURON NEAR SHORE WATERS AS WIND SPEEDS SHOULD
113 GENERALLY PEAK CLOSER TO 30 KNOTS WITHOUT THE HELP OF FUNNELING. FOR
114 THE SAME REASON...WILL CONTINUE TO FORGO A GALE WARNING FOR THE OPEN
115 WATERS AS WINDS GENERALLY REMAIN IN THE LOWER 30 KNOT RANGE. WILL
116 KEEP THE SMALL CRAFT ADVISORIES FOR LAKE ST CLAIR AND FAR WESTERN LAKE
117 ERIE TODAY AS STRONGER NORTHEAST FLOW PENETRATES INTO THESE AREAS AS

118 THE AFOREMENTIONED LOW PRESSURE MOVES EAST OF THE CENTRAL LAKES REGION.
119 WITH THIS LONG PERIOD OF NORTHEAST/NORTH WINDS...WAVES WILL BUILD TO 10
120 FEET OR MORE OVER PORTIONS OF LAKE HURON TONIGHT INTO SUNDAY AND THEN
121 REMAIN HIGH FOR SEVERAL DAYS THEREAFTER && .DTX
122 WATCHES/WARNINGS/ADVISORIES... MI...WIND ADVISORY...MIZ048-
123 MIZ053...UNTIL 4 PM SUNDAY. LAKE HURON... GALE WARNING...SAGINAW
124 BAY AND THE NEARSHORE WATERS FROM PORT AUSTIN TO HARBOR
125 BEACH...UNTIL 4 PM SUNDAY. SMALL CRAFT ADVISORY...NEARSHORE WATERS
126 FROM HARBOR BEACH TO PORT HURON...UNTIL 8 AM MONDAY. LAKE ST
127 CLAIR... SMALL CRAFT ADVISORY...UNTIL 10 PM SUNDAY. MI WATERS OF
128 LAKE ERIE... SMALL CRAFT ADVISORY...UNTIL 10 PM SUNDAY. && \$\$
129 AVIATION.....KURIMSKI SHORT TERM...KURIMSKI LONG TERM....SF
130 MARINE.....KURIMSKI YOU CAN OBTAIN YOUR LATEST NATIONAL WEATHER
131 SERVICE FORECASTS ONLINE AT WWW.WEATHER.GOV/DETROIT (ALL LOWER CASE).
132

133 2.2 Sample nr2a, nr2b

134 540
135 FXUS63 KDTX 032319
136 AFDDTX
137
138 AREA FORECAST DISCUSSION
139 NATIONAL WEATHER SERVICE DETROIT/PONTIAC MI
140 719 PM EDT SUN JUL 3 2011
141

142
143 .AVIATION...

144
145 //DISCUSSION...

146
147 JUST EXPECT A FEW SHOWERS TO DOT THE AREA FROM DET/DTW SOUTH AS LAKE
148 BREEZES INTERACT AND HELP RELEASE MINOR LOW LEVEL INSTABILITY FROM
149 DAYTIME HEATING TODAY. OTHERWISE...VFR CONDITIONS ARE EXPECTED WITH
150 LIGHT WINDS AS HIGH PRESSURE REMAINS IN PLACE OVER FROM THE CENTRAL
151 GREAT LAKES TO UPPER MIDWEST.
152

153 FOR DTW...MAY SEE AN ISOLATED SHOWER OR TWO EARLY IN THE FORECAST
154 PERIOD AS LAKE BREEZE INTERACTIONS CONTINUE TO PRODUCE LOCALLY
155 ENHANCE LOW LEVEL CONVERGENCE OVER THE REGION.
156

157 //DTW THRESHOLD THREATS...

158
159 * LOW CONFIDENCE OF CEILINGS AROUND 5000 FEET EARLY IN THE FORECAST
160 FROM ISOLATED SHOWERS.
161

162 &&

163
164 .PREV DISCUSSION...ISSUED 336 PM EDT SUN JUL 3 2011
165

166 SHORT TERM...TONIGHT
167

168 MUCH NICER DAY TODAY WITH HIGHS SOLIDLY IN THE 80S ALONG WITH LOWER
169 HUMIDITY. 24 HR CHANGE IN TEMP/DEW PT AVERAGING 10 DEGREES LOWER.
170

171 AGITATED BUT DISORGANIZED AND HIGH BASED CU FIELD OVER THE SOUTH
172 HALF OF THIS AFTERNOON AND CANT TOTALLY RULE OUT ISOLATED
173 SHOWER/THUNDERSTORM OVER THE NEXT COUPLE OF HOURS WITH MLCAPES OF
174 400 TO 800 J/KG...BUT WITH MEAGER SURFACE/LOW LEVEL CONVERGENCE
175 AROUND AND SURFACE DEW PTS EXPECTED TO DROP WITH FURTHER
176 MIXING/ADVECTION PROCESSES...WILL LEAVE THE MENTION OUT. SKIES WILL
177 THEN TREND TO MOSTLY CLEAR/CLEAR OVERNIGHT AS HIGH PRESSURE
178 CONTINUES TO WORK ITS WAY IN FROM THE WEST. FAVORABLE RADIATING
179 NIGHT SHOULD ALLOW FOR A GOOD PORTION OF THE CWA TO SNEAK INTO THE
180 50S...WITH WARMER URBAN AREAS IN THE LOWER 60S.
181

182 LONG TERM...MONDAY THROUGH NEXT SUNDAY
183
184 HIGH PRESSURE WILL BE IN CONTROL OF THE WEATHER FOR THE 4TH OF JULY
185 HOLIDAY. THE HIGH WILL PROVIDE MOSTLY CLEAR SKIES AND LIGHT WINDS AS
186 HIGH TEMPERATURES CLIMB INTO THE 80S. THIS HIGH PRESSURE SYSTEM WILL
187 SLOWLY SINK SOUTH MONDAY NIGHT...AS A LOW PRESSURE SYSTEM TRACKS
188 THROUGH THE GREAT LAKES REGION TUESDAY AND WEDNESDAY. ALTHOUGH RAIN
189 IS NOT EXPECTED ON TUESDAY...THE EFFECTS OF THE APPROACHING LOW WILL
190 STILL BE APPARENT WITH WARMER TEMPERATURES AS WINDS TURN TO THE
191 SOUTHWEST AND INCREASING CLOUDS FROM THE APPROACHING COLD FRONT FROM
192 THE NORTH.
193
194 THE FRONT ITSELF IS A RATHER WEAK FEATURE...HOWEVER THE SHORTWAVE
195 COINCIDENT WITH THE FRONT WILL BE THE MAIN DRIVING FORCE BEHIND THE
196 SHOWER AND THUNDERSTORM ACTIVITY TUESDAY NIGHT AND WEDNESDAY.
197 CURRENT MODEL RUNS ARE IN FAIRLY GOOD AGREEMENT ON THE TIMING OF THE
198 ACTIVITY...WITH VERY LITTLE ADJUSTMENT FROM THE PREVIOUS FORECAST.
199 THE BEST CHANCE FOR RAIN WILL BE ON WEDNESDAY AS THE SHORTWAVE TAKES
200 ADVANTAGE OF MLCAPE VALUES AROUND 1 J/G. DESPITE THE CAPE
201 VALUES...THE WIND FIELD IS EXPECTED TO BE RATHER WEAK WITH NOT MUCH
202 SHEAR TO SPEAK OF AND FREEZING LEVELS ARE FORECAST TO BE AROUND 13K
203 FT SO SEVERE WEATHER DOES NOT LOOK TO BE A BIG ISSUE AT THIS POINT.
204
205 THE MODEL DATA CONTINUES TO LINGER A WEAKER SHORTWAVE ACROSS THE
206 EXTREME SOUTHEASTERN CWA WEDNESDAY EVENING...WARRANTING THE
207 CONTINUATION OF POPS DURING THIS PERIOD. HOWEVER HIGH PRESSURE WILL
208 QUICKLY BUILD IN BEHIND THE DEPARTING FRONT LATER WEDNESDAY
209 NIGHT...PROVIDING DRY AND SLIGHTLY COOLER WEATHER ON THURSDAY.
210
211 A SURFACE HIGH OF 1019MB WILL BE CENTERED OVER THE GREAT LAKES FOR
212 FRIDAY AND SATURDAY LEADING TO DRY WEATHER AND TEMPERATURES VERY
213 CLOSE TO THE CLIMO NORMS. NWP GUIDANCE IS MOSTLY WITHIN 3
214 DEGREES...SO WENT WITH AN OVERALL BLEND OF MOS GUIDANCE. MID RUN GFS
215 DOES SHOW A WEAK SHORTWAVE MOVING THROUGH MICHIGAN ON SATURDAY THAT
216 COULD SPARK SOME CONVECTIVE SHOWERS...BUT 12Z HAS SINCE SQUASHED
217 THAT NOTION AND WILL PROBABLY JUST GET BY WITH SOME AFTERNOON CU.
218
219 MARINE...
220 TRANQUIL CONDITIONS WILL PERSIST ACROSS AREA WATERS FOR THE
221 REMAINDER OF THE HOLIDAY WEEKEND WITH WINDS EXPECTED TO RANGE FROM 5
222 TO 10 KNOTS FOR MOST AREAS THROUGH AT LEAST WEDNESDAY WHEN THE A
223 FRONT WILL BRING A BRIEF INCREASE IN WINDS AND THE NEXT CHANCE FOR
224 THUNDERSTORMS LATE TUESDAY INTO WEDNESDAY.
225
226 &&
227
228 .DTX WATCHES/WARNINGS/ADVISORIES...
229 MI...NONE.
230 LAKE HURON...NONE.
231 LAKE ST CLAIR...NONE.
232 MI WATERS OF LAKE ERIE...NONE.
233
234
235 AVIATION.....DG
236 SHORT TERM...SF
237 LONG TERM....KURIMSKI/MM
238 MARINE.....SF
239
240
241 **2.3 Sample nr6**
242 043
243 FXUS63 KDTX 290734
244 AFDDTX
245

246 AREA FORECAST DISCUSSION
247 NATIONAL WEATHER SERVICE DETROIT/PONTIAC MI
248 334 AM EDT FRI JUL 29 2011
249
250 .SHORT TERM...TODAY
251
252 AREAS OF CONVECTION CONTINUE TO FLARE UP ALONG A STALLED FRONTAL
253 BOUNDARY STRETCHING ACROSS THE WESTERN AND CENTRAL GREAT LAKES THIS
254 MORNING. THIS IS BEING ENHANCED BY A COMBINATION OF A MID-LEVEL MCV
255 AND BY A NOCTURNAL LOW-LEVEL JET WHICH IS NOSING UP INTO MICHIGAN.
256 NUMEROUS THUNDERSTORMS ARE EXPECTED SOUTH OF I-69 EARLY THIS
257 MORNING...WITH ACTIVITY STRETCHING FROM SOUTHEAST MICHIGAN BACK
258 TOWARDS THE CHICAGO AREA (THE LATTER OF WHICH WILL AFFECT SOUTHERN
259 LOWER MICHIGAN LATER THIS MORNING). GOOD ELEVATED INSTABILITY LOOKS
260 PRESENT ACROSS THIS AREA PER MODEL CROSS-SECTIONS AND FORECAST
261 SOUNDINGS...POTENTIALLY SUPPORTING UPDRAFTS STRONG ENOUGH FOR STORMS
262 TO BECOME SEVERE. OTHER BIG CONCERN IS THE POTENTIAL FOR FLASH
263 FLOODING AS STRONGER STORMS MAY PRODUCE RAINFALL RATES BETWEEN 1 AND
264 2 INCHES PER HOUR. MUCH OF THIS RAIN WILL FALL OVER GROUND THAT
265 REMAINS SATURATED FROM RAIN LAST NIGHT.
266
267 COLD FRONT WILL DROP ACROSS LOWER MICHIGAN LATER THIS MORNING AS A
268 MID-LEVEL TROUGH PUSHES ACROSS ONTARIO. THIS WILL PUSH SHOWERS AND
269 THUNDERSTORMS OUT OF THE AREA BY LATE AFTERNOON AND ALLOW DEWPOINTS
270 TO FALL SLIGHTLY. THIS FRONT WILL HOWEVER DO LITTLE TO COOL
271 TEMPERATURES.
272
273 &&
274
275 .LONG TERM...FRIDAY NIGHT THROUGH NEXT WEEK
276
277 THE LOW TO MID LEVEL FLOW IS FORECAST TO BE MORE NORTHWESTERLY BY
278 TONIGHT IN THE WAKE OF THE DEPARTING MID LEVEL SHORT WAVE. THIS WILL
279 HELP ADVECT THE MUCH DRIER AIRMASS NOW OBSERVED OVER NORTHERN
280 MINNESOTA INTO SOUTHERN MICHIGAN DURING THE COURSE OF THE
281 NIGHT...ENDING THE RISK FOR ANY ADDITIONAL RAINFALL. WEAK HIGH
282 PRESSURE AND MUCH DRIER AIR WILL BECOME ESTABLISHED OVER SE MI BY
283 SATURDAY...WHICH WILL LEAD TO SUNNY SKIES WITH MORE COMFORTABLE
284 HUMIDITY LEVELS. DESPITE SOME WEAK LOW LEVEL COLD AIR ADVECTION
285 TONIGHT...MODEL SOUNDINGS SUGGEST AMPLE DAYTIME INSOLATION WILL
286 SUPPORT DEEP MIXING HEIGHTS SAT AFTERNOON. THIS SUPPORTS LEANING
287 TOWARD THE HIGH END OF GUIDANCE MAX TEMPS...UPPER 80S TO NEAR 90
288 WITH SOME MARINE MODIFICATION KEEPING THE THUMB REGION A TOUCH
289 COOLER.
290
291 THE ELONGATED UPPER RIDGE NOW OVER THE SOUTHERN US IS FORECAST TO
292 RETROGRADE BACK INTO THE SOUTH-CENTRAL PLAINS DURING THE COURSE OF
293 THE WEEKEND...WHILE A FAIRLY DEEP MID LEVEL TROUGH SLIDES INTO
294 EASTERN CANADA. THIS WILL LEAD TO SUBSTANTIAL HEIGHT FALLS ACROSS
295 EASTERN CANADA AND NRN NEW ENGLAND BY EARLY NEXT WEEK. ASSOCIATED
296 WITH THIS TROUGH WILL BE A SURFACE FRONT...FORECAST TO DROP INTO
297 SOUTHERN MICHIGAN LATE SUN INTO SUN NIGHT. THERE WILL BE A NARROW
298 RIBBON OF DEEP LAYER MOISTURE ALONG THIS FRONT. INSTABILITY IS
299 FORECAST TO BE SOMEWHAT MARGINAL AT THIS POINT. THE 00Z MODEL SUITE
300 DO HOWEVER SHOW SOME EXIT REGION JET SUPPORT AND FAIRLY DIFFLUENT
301 FLOW ALOFT...WHICH SUPPORTS THE A CHANCE OF CONVECTION LATE SUNDAY
302 THROUGH SUNDAY NIGHT.
303
304 THE MEDIUM RANGE SOLUTIONS ALL INDICATE A STRENGTHENING MID LEVEL
305 RIDGE OVER THE SOUTHERN/CENTRAL PLAINS NEXT WEEK...WHICH HAS BEEN
306 THE DOMINATE PATTERN OVER MUCH OF THE SUMMER. THERE WILL BE THE
307 POTENTIAL FOR CONVECTIVE SYSTEM ORIGINATING OVER THE NRN
308 PLAINS/UPPER MIDWEST TO SLIDE INTO LOWER MI UNDER THE NORTHWEST
309 FLOW. TIMING AND PROBABILITY OF THESE SYSTEMS IS QUITE LOW THIS FAR

310 OUT. THE CURRENT FORECAST HAS THE NEXT CHANCE OF THUNDERSTORMS ON
311 TUES...WHICH IS IN LINE WITH THE RECENT MODEL CONSENSUS. DEPENDING
312 ON TIMING OF ANY CONVECTIVE COMPLEXES...TEMPS ARE EXPECTED TO REMAIN
313 ABOVE SEASONAL NORMS WITH THE GREAT LAKES REGION BEING ON THE FRINGE
314 OF THE STRONG SUBTROPICAL RIDGE.

315
316 &&

317
318 .MARINE...

319
320 SHOWER AND THUNDERSTORM ACTIVITY SHOULD DIMINISH BY MID-AFTERNOON AS
321 A WEAK COLD FRONT DROPS THROUGH THE AREA. HIGH PRESSURE BUILDING
322 INTO THE REGION WILL PROVIDE DRY WEATHER AND LIGHT WINDS FROM THIS
323 EVENING INTO SUNDAY. A COLD FRONT WILL THEN DROP THROUGH THE AREA AS
324 LOW PRESSURE TRACKS ACROSS HUDSON BAY. THIS WILL BRING CHANCES FOR
325 SHOWERS AND THUNDERSTORMS LATE SUNDAY AND SUNDAY NIGHT. WESTERLY
326 WINDS ASSOCIATED WITH THE FRONTAL PASSAGE ARE EXPECTED TO REMAIN
327 BELOW 15 KNOTS.

328
329 &&

330
331 .AVIATION...ISSUED 1252 AM EDT FRI JUL 29 2011

332
333 //DISCUSSION...

334
335 A CONVECTIVE COMPLEX WILL CONTINUE TO EVOLVE DURING THE EARLY
336 MORNING HOURS IMPACTING THE FLINT AND PONTIAC TERMINALS MOST
337 DIRECTLY. TRENDS LOOK PRETTY SOLID WITH THE STRONGEST ACTIVITY
338 CONFINED NEAR THE INTERSTATE 69 CORRIDOR EARLY IN THE OVERNIGHT WITH
339 THE PATTERN THEN DEVELOPING TO THE SOUTH AND EAST TOWARD SUNRISE
340 BEFORE EXITING THE AREA BY MID MORNING. FOG WILL TEND TO FORM IN THE
341 TRAILING BOUNDARY LAYER MOISTURE WITH ANY LINGERING SHOWERS AND
342 THUNDERSTORMS MINGLED WITH A PERIOD OF MVFR CEILING ASSOCIATED WITH
343 PASSAGE OF THE SURFACE TROUGH/Front. STEADY IMPROVEMENT TO VFR BY
344 AFTERNOON IS THEN EXPECTED AS WEAK HIGH PRESSURE BUILDS INTO THE
345 REGION TOWARD EVENING.

346
347 FOR DTW...THUNDERSTORM ACTIVITY WILL TRACK NEARBY TO THE NORTH AND
348 WEST OF THE AIRPORT FOR MUCH OF THE NIGHT BEFORE ACTIVITY TRAILING
349 WESTWARD TOWARD CHICAGO MOVES INTO THE REGION. RELYING ON THE
350 TRAILING ACTIVITY TENDS TO LOWER CONFIDENCE THAT THE AIRPORT WILL BE
351 IMPACTED BUT TRENDS WILL BE MONITORED AND TIMING REFINED DURING THE
352 EARLY MORNING HOURS. WHILE THERE IS SOME UNCERTAINTY ON THUNDERSTORM
353 IMPACTS, CONFIDENCE IS HIGHER ON CEILING TRENDS WITH LESS THAN 5000
354 FT EXPECTED WITH THE RAIN ALONG WITH A PERIOD OF MVFR CEILING
355 ASSOCIATED WITH THE FRONTAL PASSAGE THROUGH MID MORNING. STEADY
356 IMPROVEMENT BACK INTO VFR IS THEN EXPECTED FOR THIS AFTERNOON.

357
358 //DTW THRESHOLD THREATS...

359
360 * MODERATE CONFIDENCE THUNDERSTORMS WILL AFFECT DTW 08Z TO 11Z.

361
362 * HIGH CONFIDENCE CEILING BELOW 5000 FT DURING THE MORNING.

363
364 &&

365
366 .PREV DISCUSSION...ISSUED 1043 PM EDT THU JUL 28 2011

367
368 CONVECTIVE TRENDS HAVE SHOWN UP STRONGLY ENOUGH SINCE THE LAST
369 UPDATE TO SUPPORT THE CONTINUATION OF THE FLASH FLOOD WATCH, EVEN
370 FOR METRO DETROIT. THE MCV CROSSING NORTHERN LOWER MICHIGAN WILL
371 CONTINUE TO SUPPORT BACKED FLOW OVER SOUTHERN LOWER MICHIGAN IN
372 THE MIDST OF THE LOW LEVEL MOISTURE AXIS WITH PRECIPITABLE WATER
373 IN THE RANGE OF 2 TO 2.5 INCHES ACCORDING TO HOURLY MESOANALYSIS.

374 IF ANYTHING, COVERAGE SHOULD INCREASE AS THE MCV SUPPORTS A RAMPED
375 UP LOW LEVEL JET AND ACCELERATED MOISTURE TRANSPORT TO THE SOUTH
376 OF ITS TRACK AND OVER SE MICHIGAN. THIS WILL FUEL CONVECTION
377 STRONGLY ENOUGH FOR A FEW STORMS TO POSSIBLY APPROACH SEVERE
378 LIMITS, AND THIS WILL BE MONITORED, BUT HEAVY RAINFALL CLEARLY
379 REMAINS THE PRIMARY CONCERN THROUGH THE NIGHT. THE TRACK OF THE
380 MCV AND THE POSITION OF THE LOW LEVEL THETA-E RIDGE STILL FAVOR
381 THE SAGINAW VALLEY AND NORTHERN THUMB, AND THE NORTHERN PORTION OF
382 THE WATCH AREA, FOR THE HEAVIEST RAINFALL BUT COVERAGE WILL BE
383 GREAT ENOUGH TOWARD THE DETROIT AREA TO MAINTAIN THE HEADLINE.
384
385 &&
386
387 .DTX WATCHES/WARNINGS/ADVISORIES...
388 MI...FLASH FLOOD WATCH...MIZ053-MIZ060-MIZ061-MIZ062-MIZ063-MIZ068-
389 MIZ069-MIZ070-MIZ075-MIZ076-MIZ082-MIZ083...UNTIL 11 AM FRIDAY.
390
391 LAKE HURON...NONE.
392
393 LAKE ST CLAIR...NONE.
394 MI WATERS OF LAKE ERIE...NONE.
395
396 &&
397
398 \$\$
399
400 SHORT TERM...HLO
401 LONG TERM....SC
402 MARINE.....HLO
403 AVIATION.....BT
404
405
406 YOU CAN OBTAIN YOUR LATEST NATIONAL WEATHER SERVICE FORECASTS ONLINE
407 AT WWW.WEATHER.GOV/DETROIT (ALL LOWER CASE).
408
409
410 **2.4 Sample nr12**
411
412 433
413 FXUS63 KDTX 240510
414 AFDDTX
415
416 AREA FORECAST DISCUSSION
417 NATIONAL WEATHER SERVICE DETROIT/PONTIAC MI
418 110 AM EDT WED AUG 24 2011
419
420
421 .AVIATION...
422
423 //DISCUSSION...
424
425 SHOWERS WITH SOME EMBEDDED THUNDERSTORMS WILL PERSIST THROUGH
426 ROUGHLY DAYBREAK...ASSOCIATED WITH AN UPPER LEVEL LOW PRESSURE
427 SYSTEM WHICH WILL BE ROTATING ACROSS LOWER MI EARLY THIS MORNING.
428 RECENT VAD WIND PROFILE DATA ALONG WITH 00Z MODEL SOUNDINGS INDICATE
429 STRENGTHENING WINDS ABOVE THE NOCTURNAL INVERSION THIS
430 MORNING...PROMPTING A MENTION OF LOW LEVEL WIND SHEAR THROUGH 13Z.
431 WITH THE EXPECTATION THAT AMPLE LOW LEVEL MOISTURE WILL BE IN PLACE
432 BELOW THIS INVERSION SHORTLY AFTER DAYBREAK...WILL CONTINUE TO CARRY
433 A BRIEF PERIOD OF MVFR BASED STRATUS LATER THIS MORNING. THERE IS A
434 CHANCE OF STRONG THUNDERSTORMS ALONG A COLD FRONT FORECAST TO MOVE
435 ACROSS THE REGION LATE THIS AFTERNOON/EVENING.
436
437 FOR DTW...A LITTLE MORE ROBUST INSTABILITY IS NOW FORECAST TO MOVE

438 INTO METRO DETROIT IN THE 08Z TO 12Z TIME PERIOD...WHICH LOOKS TO
439 GIVE DTW A GOOD SHOT AT SOME THUNDERSTORMS EARLY THIS MORNING. GUSTY
440 SOUTH-SOUTHWEST WINDS WILL THEN DEVELOP BY AFTERNOON IN ADVANCE OF A
441 COLD FRONT. WIND GUSTS MAY APPROACH OR EXCEED 30 KNOTS MID TO LATE
442 WED AFTERNOON.

443
444 //DTW THRESHOLD THREATS...

445
446 * HIGH CONFIDENCE IN THUNDERSTORM CHANCES PRIOR TO 12Z.

447
448 * MEDIUM CONFIDENCE IN CLOUD BASES BELOW 5000 FT LATE THIS MORNING.

449
450 * HIGH CONFIDENCE SOUTHWEST WIND GUSTS WILL EXCEED 25 KNOTS
451 THIS AFTERNOON.

452
453 * MEDIUM CONFIDENCE IN STRONG THUNDERSTORM DEVELOPMENT THIS
454 EVENING.

455
456 &&

457
458 .PREV DISCUSSION...ISSUED 946 PM EDT TUE AUG 23 2011

459
460 UPDATE...

461
462 A CLUSTER OF SHOWERS AND SCATTERED THUNDERSTORMS HAVE DEVELOPED
463 OVER SW LOWER MI OVER THE LAST COUPLE OF HOURS. THIS CONVECTION IS
464 A RESULT OF WARM AIR ADVECTION ON THE NOSE OF STRENGTHENING LOW
465 LEVEL INFLOW. THIS IS ALL IN ADVANCE OF A POTENT MID LEVEL TROUGH
466 OVER NE WISCONSIN. THIS SYSTEM WILL INVOKE PRETTY DECENT MID LEVEL
467 HEIGHT FALLS ACROSS LOWER MI TONIGHT AS IT TRACKS EAST. CONTINUED
468 LOW-MID LEVEL THETA E ADVECTION IN THE PRESENCE OF THIS FORCING
469 SHOULD ALLOW DECENT COVERAGE OF SHOWERS TO CONTINUE TO PUSH EAST
470 INTO THE FORECAST AREA DURING THE REMAINDER OF THE NIGHT. THE 00Z
471 DTX SOUNDING SHOWED NO INSTABILITY OVER SE MI...WHICH EXPLAINS WHY
472 THE THUNDERSTORMS HAVE THUS FAR BEEN UNABLE TO MAKE THE TRIP INTO
473 SE MI. MID LEVEL COOLING WILL HOWEVER STEEPEN THE LAPSE RATES
474 DURING THE COURSE OF THE NIGHT...WHICH WILL ALLOW ENOUGH ELEVATED
475 INSTABILITY TO POSE THE RISK OF SOME THUNDERSTORM
476 DEVELOPMENT...ESPECIALLY LATE. OVERALL...THE GOING FORECAST LOOKS
477 IN GOOD SHAPE. THUS AN UPDATE WILL BE ISSUED STRICTLY TO REMOVE
478 THE TIMING OF SHOWERS AS THEY ARE VIRTUALLY ON THE DOORSTEP.

479
480 PREV DISCUSSION...ISSUED 400 PM EDT TUE AUG 23 2011

481
482 SHORT TERM... TONIGHT

483
484 A BATCH OF SHOWERS AND THUNDERSTORMS HAVE BEEN IMPACTING NORTHERN
485 ILLINOIS THROUGH MUCH OF THE DAY...SLIGHTLY IMPACTING/DELAYING
486 MOISTURE SURGE INTO LOWER MICHIGAN...AS SURFACE DEW PTS REMAIN IN
487 THE COMFORTABLE MID 50S TO AROUND 60 RANGE ACROSS MOST OF SOUTHEAST
488 MICHIGAN THROUGH 2 PM. HOWEVER...AS THUNDERSTORM COMPLEX CONTINUES
489 TO HEAD SOUTH...SOME OF THAT DEEPER MOISTURE OVER THE MIDWEST (IOWA)
490 WILL WORK INTO SOUTHERN LOWER MICHIGAN. MOISTURE TRANSPORT
491 VECTORS/THETA-E FIELDS SHOW MID LEVEL MOISTURE (700 MB) ARRIVING
492 AROUND 00Z...WITH LOW LEVEL MOISTURE (850 MB) AROUND 6Z.
493 EXPECTATIONS ARE CONVECTION WILL RE-ORGANIZE OVER WISCONSIN LATER
494 TODAY...CLOSE/UNDERNEATH THE MID LEVEL CIRCULATION. THIS MID LEVEL
495 WAVE WILL BE BOOTED TO THE EAST TONIGHT...AS DYNAMIC...CLIPPER LIKE
496 SYSTEM COMES OUT OF SOUTHERN SASKATCHEWAN. THE 850-700 MB THETA-E
497 RIDGE AXIS LOOKS TO BE GETTING PINCHED OFF AS IT MOVES INTO OUR
498 AREA...WITH CORRESPONDING INSTABILITY WEAKENING (SEE SHOWALTER
499 INDICES). NONE-THE-LESS...WITH MID LEVEL CIRCULATION TRACKING
500 OVER/CLOSE TO THE STRAIGHTS OVERNIGHT AND SUBSEQUENT MODEST HEIGHT
501 FALLS EXTENDING SOUTH...ALONG WITH THE 850 THETA-E

502 MOISTURE/CONVERGENCE...EXPECTING NUMEROUS SHOWERS AND EMBEDDED
503 THUNDERSTORMS...JUST NOT AS CONCERNED WITH THE HEAVY RAIN DUE TO THE
504 PROGRESSIVE NATURE AND LESS INSTABILITY. LEFT INHERITED MINS
505 INTACT...MID 60S WITH THE WARM ADVECTION PATTERN AND HIGHER DEW PTS
506 MOVING IN...IN LINE WITH LATEST MAV GUIDANCE.

507
508 LONG TERM... WEDNESDAY THROUGH NEXT TUESDAY

509
510 THANKS TO THE ACCOMPANYING SHORT WAVE, NOCTURNAL CONVECTION AND
511 ASSOCIATED CLOUD COVER WILL BE TO OUR EAST BY MID WEDNESDAY MORNING.
512 THIS WILL OPEN THE DOOR ON SURFACE HEATING FOR THE NEXT ROUND OF
513 STORMS AS THE PREFRONTAL TROUGH/COLD FRONT MOVES THROUGH SE
514 MICHIGAN. THERE IS SOME RESIDUAL BOUNDARY LAYER MOISTURE INDICATED
515 THAT COULD TRANSLATE INTO SOME STRATUS FOR A WHILE BUT THIS APPEARS
516 OVERDONE IN THE MODEL DATA BASED ON SATELLITE IMAGERY OVER THE
517 MIDWEST DURING THE MORNING. SHOULD LOW CLOUD COVER BE ABLE TO
518 MATERIALIZE, IT WILL MIX OUT QUICKLY AS SURFACE HEATING AND
519 SOUTHWEST WINDS RAMP UP BY AFTERNOON. SEVERE WEATHER POTENTIAL AND
520 TIMING THEN BECOME THE MAIN PROBLEM IN THE FORECAST FOR WEDNESDAY
521 AFTERNOON AND EVENING.

522
523 THE BIG THING, WHICH WAS DOCUMENTED THOROUGHLY IN THE EARLY MORNING
524 FORECAST PACKAGE, IS THE INCREASE IN THE MODEL WIND FIELD AND
525 INSTABILITY PARAMETERS FOR WEDNESDAY AFTERNOON AND EVENING. THIS HAS
526 CARRIED OVER INTO THE 12Z FORECAST CYCLE ADDING CONFIDENCE TO THE
527 POTENTIAL FOR SEVERE CONVECTION. THE LATEST FORECAST SOUNDINGS FROM
528 THE NAM AND GFS SPORT 0-1KM MLCAPE OF 2000-2500 J/KG BY LATE
529 AFTERNOON VS 1500 COMPARED TO YESTERDAYS DATA. THIS APPEARS TO BE
530 THE RESULT OF A BETTER HANDLE ON THE EML MIGRATING INTO THE
531 MIDWEST FROM THE PLAINS. THERE IS ALSO CONSIDERABLY GREATER SHEAR
532 IN THE LOW LEVELS OF THE WIND PROFILE, DUE TO EXTRA DEEPENING OF
533 THE SURFACE LOW IN NORTHERN ONTARIO, WITH 0-3KM HELICITY RANGING
534 FROM 250-300 M2/S2 COMPARED TO VALUES CLOSER TO 150 YESTERDAY. THE
535 DATA IN YESTERDAY'S MODEL RUNS DEPICTED A SCENARIO SUFFICIENT FOR
536 SEVERE WEATHER, ESPECIALLY WITH REGARD TO LINEAR CONVECTIVE MODES,
537 BUT THE NUMBERS THAT HAVE PERSISTED INTO TODAY'S MODEL DATA
538 INTRODUCE AN EXTRA LAYER OF POTENTIAL THAT INCLUDES SUPERCELL
539 MODES CAPABLE OF LARGE HAIL AND TORNADO DEVELOPMENT. THE MOST
540 CHALLENGING ASPECT OF THE FORECAST WILL BE IDENTIFYING THE TIMING
541 AND LOCATION FOR STORM INITIATION. THIS IS COMPLICATED BY THE LOW
542 TO MID LEVEL CAPPING INVERSION THAT DEVELOPS ON THE HEELS OF THE
543 EARLY MORNING ACTIVITY AND STRENGTHENED BY THE INCREASING
544 SOUTHWEST LOW LEVEL FLOW DURING THE EARLY AFTERNOON. AT THIS
545 POINT, PREFER TO EXPECT THE CAP TO HOLD INTO THE LATE
546 AFTERNOON/AROUND 21Z. AFTER THAT, SURFACE CONVERGENCE ALONG THE
547 PREFRONTAL TROUGH WILL COMBINE WITH MAX TEMPS NEAR 90 AND THE
548 APPROACH OF THE UPPER TROUGH TO INITIATE STORMS. BY THEN, HOWEVER,
549 THE ACTIVITY WILL LIKELY DEVELOP RIGHT OVER SE MICHIGAN BEFORE
550 MOVING OFF TO THE EAST BY MID EVENING. THIS WOULD RESULT IN VERY
551 LITTLE ADJUSTMENT TO EARLIER EXPECTATIONS FOR SEVERE WEATHER OTHER
552 THAN POSSIBLY SPARING US THE MORE MATURE ASPECTS OF SQUALL LINE
553 DEVELOPMENT IN OUR AREA.

554
555 A BROAD EXPANSE OF HIGH PRESSURE WILL THEN SETTLE OVER THE GREAT
556 LAKES FOR THE END OF THE WEEK. THIS WILL BRING COOLER AND LESS
557 HUMID CONDITIONS BACK INTO SE MICHIGAN FOR THURSDAY AND FRIDAY.
558 DRY CONDITIONS WILL BE PUNCTUATED BY LOW TEMPERATURES MAKING A RUN
559 BACK DOWN INTO THE UPPER 40S IN THE TYPICALLY COOLER LOCATIONS IN
560 OUR AREA. THE BROAD HIGH PRESSURE SYSTEM IS ALSO SHOWN TO CONTINUE
561 GUARDING US AGAINST MUCH MOISTURE RETURN AHEAD OF THE NEXT COLD
562 FRONT DUE BY SATURDAY AFTERNOON.

563
564 THE LARGE SCALE PATTERN IN THE WESTERLIES IS SHOWN IN THE LATEST
565 GLOBAL MODELS TO PRESERVE SOME TROUGHINESS IN THE UPPER LEVEL

566 PATTERN OVER EASTERN NORTH AMERICA BY THE BEGINNING OF NEXT WEEK.
567 THERE IS VERY LITTLE AMPLIFICATION UPSTREAM, HOWEVER, SO WE CONTINUE
568 TO EXPECTED A SUPPLY OF SHORT WAVES FROM THE EASTERN PACIFIC AND
569 WESTERN CANADA INTO THE GREAT LAKES. A FAIRLY LARGE SHORT WAVE IS
570 INDICATED IN THE GREAT LAKES AROUND MONDAY BUT WITH TIMING AND TRACK
571 COMPLICATIONS EXPECTED BY THE PRESENCE OF "IRENE", EVEN THOUGH IT
572 WILL REMAIN LARGELY TO OUR EAST THROUGH TUESDAY.
573
574 MARINE...
575
576 SOUTHWEST WINDS WILL BE RAMPING UP TONIGHT...BUT ESPECIALLY TOMORROW
577 AHEAD OF A COLD FRONT...WITH FREQUENT GUSTS OF 20 TO 30 KNOTS
578 EXPECTED ACROSS THE MARINE AREAS. A SMALL CRAFT ADVISORY HAS BEEN
579 ISSUED FOR ALL NEARSHORE WATERS. SCATTERED THUNDERSTORMS ARE
580 EXPECTED TO BE AROUND TONIGHT AS WARM FRONT MOVES THROUGH. THESE
581 STORMS ARE NOT EXPECTED TO BE SEVERE. OF MORE CONCERN ARE THE
582 THUNDERSTORMS WHICH DEVELOP ALONG THE COLD FRONT LATE
583 TOMORROW...WHICH WILL HAVE THE POTENTIAL TO PRODUCE WINDS OF 50
584 KNOTS OR GREATER. WINDS BEHIND THE COLD FRONT WILL SHIFT TO THE
585 NORTHWEST...AND WILL REMAIN STRONG OVER THE NORTH HALF OF THE LAKE
586 HURON WEDNESDAY NIGHT INTO THURSDAY. WINDS WILL DIMINISH ON FRIDAY
587 AS HIGH PRESSURE RETURNS.
588
589 &&
590
591 .DTX WATCHES/WARNINGS/ADVISORIES...
592 MI...NONE.
593
594 LAKE HURON...
595 SMALL CRAFT ADVISORY...NEARSHORE WATERS FROM PORT AUSTIN TO PORT
596 HURON INCLUDING SAGINAW BAY...FROM 8 AM WEDNESDAY TO 8 PM
597 WEDNESDAY.
598
599 LAKE ST CLAIR...
600 SMALL CRAFT ADVISORY...FROM 8 AM WEDNESDAY TO 8 PM WEDNESDAY.
601
602 MI WATERS OF LAKE ERIE...
603 SMALL CRAFT ADVISORY...FROM 8 AM WEDNESDAY TO 8 PM WEDNESDAY.
604
605 &&
606
607 \$\$
608
609 AVIATION.....SC
610 UPDATE.....SC
611 SHORT TERM...SF
612 LONG TERM....BT
613 MARINE.....SF
614
615
616 YOU CAN OBTAIN YOUR LATEST NATIONAL WEATHER SERVICE FORECASTS ONLINE
617 AT WWW.WEATHER.GOV/DETROIT (ALL LOWER CASE).
618
619