

# Test Case TO8-2002

## Revision History

Rev. No.	Date	By	Description of Changes
1	4/20	Mike Churma (NWS/MDL)	Created

### 1. TEST CASE IDENTIFIER : TO8-2002

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### 2. NARRATIVE

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The "Test Case Plot\_Model\_Maintenance\_1.0" procedures verify that station plots for METAR reports can be displayed in CAVE (requirement CAVE\_TO8\_018.2). These test procedures will perform similar verification for fixed buoys (CAVE\_TO8\_018.22), moving buoys and ships (CAVE\_TO8\_018.23), and MAROBs (CAVE\_TO8\_018.24). Synoptic station data and other pending plot types can be added to this test case as they are completed.

In addition, the individual parameters in the station plots will be checked to verify that they are being decoded properly, and that all plot elements that D-2D's plot would display are also available in CAVE (the station plot models are highly configurable in CAVE, but the expectation would be that CAVE's plot models by default would match D-2D's in terms of which parameters are displayed and where).

Note that not every parameter (e.g., wind gusts, pressure change, present weather) will be reported in every station observation, and therefore will not be present in every station plot. In determining whether a particular parameter is available, users can sample the raw station report (using FMH-1 and FMH-2 references), or load a D-2D to compare station plots. If the tester chooses to compare a CAVE station plot against a D-2D plot, the raw station report must still be sampled to ensure that the report in question are identical between the two displays. The tester should not expect the whole field of CAVE and D-2D station plots to match; rather, individual CAVE station plots should represent a specific report accurately and with at least as much detail as is seen in the D-2D.

### 3. REFERENCES (Optional)

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- Federal Meteorological Handbook # 1 (online: <http://www.ofcm.gov/fmh-1/pdf/FMH1.pdf> )
- Federal Meteorological Handbook # 2 (online: <http://www.ofcm.gov/fmh2/pdf/FCM-H2-1988.pdf> )
- Test Case Plot\_Model\_Maintenance\_1.0 (AWP.TE.SWCTR/TO8-0022)
- Online interactive METAR station plot information (source of included figures): <http://www.hpc.ncep.noaa.gov/dailywxmap/wxsymbols.html>

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### 4. FEATURES TO BE TESTED

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Plot Model displays for METARs, Fixed Buoys, Moving Maritime Stations, and MAROBS

### 5. SETUP INSTRUCTIONS

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Step	Setup Procedure	Result
1	Start EDEX	EDEX is running
2	Start CAVE	CAVE loads
3	Ingest point obs data	Station plot data appears in CAVE.

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### 6. ACCEPTANCE CRITERIA

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Each of the test steps is largely independent, provided that the station plots load. The recommendation is that the test be judged “incomplete” if there is no data or it cannot load. The test case only fails if, in the judgment of the tester, the plotted data for a station, as a whole, bears no resemblance to the station observation it is supposed to represent.

Step(s)	Criteria	Result
2, 14, 29, 43	These steps load the four station types. <b>The test case is incomplete if one of them fails to load the station data.</b>	
4-13	These steps describe how various parameters of a METAR report should appear in the plot model. <b>The test case fails if the station plot is totally inconsistent with the sampled METAR text (i.e., it seems like a different observation).</b>	
16-28	These steps describe how various parameters of a fixed buoy report should appear in the plot model. <b>The test case fails if the station plot is totally inconsistent with the sampled buoy report text (i.e., it seems like a different observation).</b>	
21-42	These steps describe how various parameters of a moving maritime report should appear in the plot model. <b>The test case fails if the station plot is totally inconsistent with the sampled moving maritime report text (i.e., it seems like a different observation).</b>	
45-56	These steps describe how various parameters of a MAROBS report should appear in the plot model. <b>The test case fails if the station plot is totally inconsistent with the sampled buoy text (i.e., it seems like a different observation).</b>	

### 7. TESTING PROCEDURE

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#### PART A – METARS

**Note:** Steps 4-11 require the ability to read a METAR report in its encoded form. Reference FMH-1 as needed. *If the value is unavailable in the METAR observation, skip to the next step.*

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Step	Action	Result	Pass/Fail
1	Load CAVE	CAVE loads	
2	Under the Obs menu, load the Surface plot	METAR station plots appear on the display map	
3	Choose a plot from an individual station. Move the cursor over the circle at the center of the plot.	Encoded report text appears in the cursor sampling.	
4	Find the value for temperature (degrees C) in the sampled report.	In the station plot, temperature will be displayed in degrees F, above and to the left of the central station point.	
5	Check for dewpoint (degrees C) in the sampled report.	In the station plot, dewpoint will be displayed in degrees F, below and to the left of central station point.	
6	Find the value for wind direction in the sampled report.	A staff will extend from the central station point, pointing toward the wind direction.	
7	Find the value for wind speed in the sampled report.	Barbs will be present at the end of the wind direction staff, to represent wind speed to the closest 5 knots (See Fig. 1)	
8	Find the value for wind gust in the sampled report.	An arrow will be drawn from the station point, opposite the wind direction staff; the gust speed in knots will be displayed near the arrow tip.	
9	Find the value for present weather in the sampled report.	A corresponding present weather symbol should be plotted to the left of the central station point (see Fig. 2a and 2b.)	
10	Find the value for sea level pressure in the sampled report.	The sea level pressure will appear above and to the right of the central station point, in tenths of a millibar, with the leading "9" or "10" omitted.	
11	Find the value for 3-hour pressure change in the sampled report	The 3-hour pressure change will appear to the right of the central	

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	(this will only be reported in hours divisible by 3, e.g, 00Z, 03Z, 06Z, etc.)	station point.	
12	Find the pressure tendency value in the sampled report.	A line will appear to the right of the 3-hour pressure change value. Its appearance will correspond to the pressure tendency encoded in the sampled report (see Fig. 3).	
13	Find the sky cover value(s) in the sampled report.	The shading of the center station circle should correspond to the amount of sky cover indicated by the text in the sampled report (see Fig. 4)	
<p><b>Repeat steps 3-13 with multiple station plots, until you are reasonably satisfied that the METAR data is being plotted correctly. Then proceed to step 14.</b></p>			
13	Select CAVE's Clear button	The METAR station plots will be removed from the screen.	
<p><b>PART B – Fixed Buoys</b></p> <p><b>The fixed buoy plots are similar to the METAR plots, with some added data. Reference FMH-2 as needed to decode the raw report. <i>If the parameter is unavailable in the report, skip to the next step.</i></b></p>			
15	Under the Obs menu, load the Fixed Buoys plot	Fixed buoy station plots appear on the display map	
16	Choose a plot from an individual station. Move the cursor over the circle at the center of the plot.	Encoded report text appears in the cursor sampling.	
17	Find the value for temperature in the sampled report.	In the station plot, temperature will be displayed in degrees F, above and to the left of the central station point.	
18	Check for dewpoint in the sampled report.	In the station plot, dewpoint will be displayed in degrees F, below and to the left of central station point.	

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<b>19</b>	Find the value for wind direction in the sampled report.	A staff will extend from the central station point, pointing toward the wind direction.	
<b>20</b>	Find the value for wind speed in the sampled report.	Barbs will be present at the end of the wind direction staff, to represent wind speed to the closest 5 knots (See Fig. 1)	
<b>21</b>	Find the value for wind gust in the sampled report.	An arrow will be drawn from the station point, opposite the wind direction staff; the gust speed in knots will be displayed near the arrow tip.	
<b>22</b>	Find the value for present weather in the sampled report.	A corresponding present weather symbol should be plotted on the left side of the station plot (see Fig. 2a and 2b.)	
<b>23</b>	Find the value for sea level pressure in the sampled report.	The sea level pressure will appear on the top right of the station plot, in tenths of a millibar, with the leading "9" or "10" omitted.	
<b>24</b>	Find the value for 3-hour pressure change in the sampled report (this will only be reported in hours divisible by 3, e.g, 00Z, 03Z, 06Z, etc.)	The 3-hour pressure change will appear immediately on the right side right of the station plot.	
<b>25</b>	Find the pressure tendency value in the sampled report.	A line will appear to the right of the 3-hour pressure change value. Its appearance will correspond to the pressure tendency encoded in the sampled report (see Fig. 3).	
<b>26</b>	Find the sky cover value(s) in the sampled report.	The shading of the circle around the station point should correspond to the amount of sky cover indicated by the text in the sampled report (see Fig. 4)	
<b>27</b>	Find the peak wind value in the sampled report.	The "PK" prefix will appear with the peak wind, in knots, at the extreme lower left of the station	

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		plot (beneath the dewpoint).	
28	Find the value for sea surface temperature in the sampled report.	The sea surface temperature (degrees F) will appear, on the lower right of the station plot.	
<p><b>Repeat steps 16-28 with multiple station plots, until you are reasonably satisfied that the fixed buoy data is being plotted correctly. Then proceed to step 29.</b></p>			
29	Select CAVE's Clear button.	The fixed buoy station plots will be removed from the screen.	
<p><b>PART C – Moving Maritime</b></p> <p><b>The moving maritime plots – ships and unmoored buoys -- are very similar to the buoy plots (the D-2D does not display peak winds, so that parameter will not be accounted for in this test plan.) Reference FMH-2 as needed to decode the raw report. <i>If the parameter is unavailable in the report, skip to the next step.</i></b></p>			
30	Under the Obs menu, load the Moving Maritime plot	Moving maritime station plots appear on the display map	
31	Choose a plot from an individual station. Move the cursor over the circle at the center of the plot.	Encoded report text appears in the cursor sampling.	
32	Find the value for temperature in the sampled report.	In the station plot, temperature will be displayed in degrees F, above and to the left of the central station point.	
33	Check for dewpoint in the sampled report.	In the station plot, dewpoint will be displayed in degrees F, below and to the left of central station point.	
34	Find the value for wind direction in the sampled report.	A staff will extend from the central station point, pointing toward the wind direction.	
35	Find the value for wind speed in the sampled report.	Barbs will be present at the end of the wind direction staff, to represent wind speed to the closest 5 knots (See Fig. 1)	
36	Find the value for wind gust in the sampled report.	An arrow will be drawn from the station point, opposite the wind	

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		direction staff; the gust speed in knots will be displayed near the arrow tip.	
37	Find the value for present weather in the sampled report.	A corresponding present weather symbol should be plotted on the left side of the station plot (see Fig. 2a and 2b.)	
38	Find the value for sea level pressure in the sampled report.	The sea level pressure will appear on the top right of the station plot, in tenths of a millibar, with the leading "9" or "10" omitted.	
39	Find the value for 3-hour pressure change in the sampled report (this will only be reported in hours divisible by 3, e.g, 00Z, 03Z, 06Z, etc.)	The 3-hour pressure change will appear immediately on the right side right of the station plot.	
40	Find the pressure tendency value in the sampled report.	A line will appear to the right of the 3-hour pressure change value. Its appearance will correspond to the pressure tendency encoded in the sampled report (see Fig. 3).	
41	Find the sky cover value(s) in the sampled report.	The shading of the circle around the station point should correspond to the amount of sky cover indicated by the text in the sampled report (see Fig. 4)	
42	Find the value for sea surface temperature in the sampled report.	The sea surface temperature (degrees F) will appear, on the lower right of the station plot.	
<p><b>Repeat steps 31-42 with multiple station plots, until you are reasonably satisfied that the moving maritime data is being plotted correctly. Then proceed to step 43.</b></p>			
43	Select CAVE's Clear button.	The moving maritime station plots will be removed from the screen.	
<p><b>PART D – MAROBS</b></p>			

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<p><b>The MAROBS plots have the same format as the moving maritime plots. Reference FMH-2 as needed to decode the raw report. <i>If the parameter is unavailable in the report, skip to the next step.</i></b></p>			
44	Under the Obs menu, load the Moving Maritime plot	MAROBS plots appear on the display map	
45	Choose a plot from an individual station. Move the cursor over the circle at the center of the plot.	Encoded report text appears in the cursor sampling.	
46	Find the value for temperature in the sampled report.	In the station plot, temperature will be displayed in degrees F, above and to the left of the central station point.	
47	Check for dewpoint in the sampled report.	In the station plot, dewpoint will be displayed in degrees F, below and to the left of central station point.	
48	Find the value for wind direction in the sampled report.	A staff will extend from the central station point, pointing toward the wind direction.	
49	Find the value for wind speed in the sampled report.	Barbs will be present at the end of the wind direction staff, to represent wind speed to the closest 5 knots (See Fig. 1)	
50	Find the value for wind gust in the sampled report.	An arrow will be drawn from the station point, opposite the wind direction staff; the gust speed in knots will be displayed near the arrow tip.	
51	Find the value for present weather in the sampled report.	A corresponding present weather symbol should be plotted on the left side of the station plot (see Fig. 2a and 2b.)	
52	Find the value for sea level pressure in the sampled report.	The sea level pressure will appear on the top right of the station plot, in tenths of a millibar, with the leading "9" or "10" omitted.	

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<b>53</b>	Find the value for 3-hour pressure change in the sampled report (this will only be reported in hours divisible by 3, e.g, 00Z, 03Z, 06Z, etc.)	The 3-hour pressure change will appear immediately on the right side right of the station plot.	
<b>54</b>	Find the pressure tendency value in the sampled report.	A line will appear to the right of the 3-hour pressure change value. Its appearance will correspond to the pressure tendency encoded in the sampled report (see Fig. 3).	
<b>55</b>	Find the sky cover value(s) in the sampled report.	The shading of the circle around the station point should correspond to the amount of sky cover indicated by the text in the sampled report (see Fig. 4)	
<b>56</b>	Find the value for sea surface temperature in the sampled report.	The sea surface temperature (degrees F) will appear, on the lower right of the station plot.	
<b>Repeat steps 45-56 with multiple station plots, until you are reasonably satisfied that the moving maritime data is being plotted correctly. Then proceed to step 57.</b>			
<b>57</b>	Select CAVE's Clear button.	The MAROBS plots will be removed from the screen.	
<b>End of test case.</b>			

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ff WIND SPEED		
	Knots	miles per hour
☉	Calm	Calm
—	1-2	1-2
└─	3-7	3-8
└─└─	8-12	9-14
└─└─└─	13-17	15-20
└─└─└─└─	18-22	21-25
└─└─└─└─└─	23-27	26-31
└─└─└─└─└─└─	28-32	32-37
└─└─└─└─└─└─└─	33-37	38-43
└─└─└─└─└─└─└─└─	38-42	44-49
└─└─└─└─└─└─└─└─└─	43-47	50-54
└─└─└─└─└─└─└─└─└─└─	48-52	55-60
└─└─└─└─└─└─└─└─└─└─└─	53-57	61-66
└─└─└─└─└─└─└─└─└─└─└─└─	58-62	67-71
└─└─└─└─└─└─└─└─└─└─└─└─└─	63-67	72-77
└─└─└─└─└─└─└─└─└─└─└─└─└─└─	68-72	78-83
└─└─└─└─└─└─└─└─└─└─└─└─└─└─└─	73-77	84-89
└─└─└─└─└─└─└─└─└─└─└─└─└─└─└─└─	103-107	119-123

Figure 1. Wind speed plot format.

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WW PRESENT WEATHER (Descriptions abridged from International Code)				
0	1	2	3	4
<b>00</b>  Cloud development NOT observed or NOT observable during past hour	 Clouds generally dissolving or becoming less developed during past hour	 State of sky on the whole unchanged during past hour	 Clouds generally forming or developing during past hour	 Visibility reduced by smoke
<b>10</b>  Light fog (mist)	 Patches of shallow fog at station, NOT deeper than 6 feet on land	 More or less continuous shallow fog at station, NOT deeper than 6 feet on land	 Lightning visible, no thunder heard	 Precipitation within sight, but NOT reaching the ground
<b>20</b>  Drizzle (NOT freezing) or snow grains (NOT falling as showers) during past hour, but NOT at time of observation	 Rain (NOT freezing and NOT falling as showers) during past hour, but NOT at time of observation	 Snow (NOT falling as showers) during past hour, but NOT at time of observation	 Rain and snow or ice pellets (NOT falling as showers) during past hour, but NOT at time of observation	 Freezing drizzle or freezing rain (NOT falling as showers) during past hour, but NOT at time of observation
<b>30</b>  Slight or moderate dust storm or sandstorm, has decreased during past hour	 Slight or moderate dust storm or sandstorm, no appreciable change during past hour	 Slight or moderate dust storm or sandstorm has begun or increased during past hour	 Severe dust storm or sandstorm, has decreased during past hour	 Severe dust storm or sandstorm, no appreciable change during past hour
<b>40</b>  Fog or ice fog at distance at time of observation, but NOT at station during past hour	 Fog or ice fog in patches	 Fog or ice fog, sky discernible, has become thinner during past hour	 Fog or ice fog, sky NOT discernible, has become thinner during past hour	 Fog or ice fog, sky discernible, no appreciable change during past hour
<b>50</b>  Intermittent drizzle (NOT freezing), slight at time of observation	 Continuous drizzle (NOT freezing), slight at time of observation	 Intermittent drizzle (NOT freezing), moderate at time of observation	 Continuous drizzle (NOT freezing), moderate at time of observation	 Intermittent drizzle (NOT freezing), heavy at time of observation
<b>60</b>  Intermittent rain (NOT freezing), slight at time of observation	 Continuous rain (NOT freezing), slight at time of observation	 Intermittent rain (NOT freezing), moderate at time of observation	 Continuous rain (NOT freezing), moderate at time of observation	 Intermittent rain (NOT freezing), heavy at time of observation
<b>70</b>  Intermittent fall of snowflakes, slight at time of observation	 Continuous fall of snowflakes, slight at time of observation	 Intermittent fall of snowflakes, moderate at time of observation.	 Continuous fall of snowflakes, moderate at time of observation	 Intermittent fall of snowflakes, heavy at time of observation
<b>80</b>  Slight rain shower(s)	 Moderate or heavy rain shower(s)	 Violent rain shower(s)	 Slight shower(s) of rain and snow mixed	 Moderate or heavy shower(s) of rain and snow mixed
<b>90</b>  Moderate or heavy shower(s) of hail, with or without rain, or rain and snow mixed, not associated with thunder	 Slight rain at time of observation; thunderstorm during past hour, but NOT at time of observation	 Moderate or heavy rain at time of observation; thunderstorm during past hour, but NOT at time of observation	 Slight snow, or rain and snow mixed, or hail at time of observation; thunderstorm during past hour, but NOT at time of observation	 Moderate or heavy snow, or rain and snow mixed, or hail at time of observation; thunderstorm during past hour, but NOT at time of observation

Figure 2a. Present Weather symbols (1<sup>st</sup> of 2 diagrams; see 2b.)

<b>10</b>				
5	6	7	8	9
Haze	Widespread dust in suspension in the air, NOT raised by wind, at time of observation	Dust or sand raised by wind at time of observation	Well-developed dust whirl(s) within past hour	Dust storm or sandstorm within sight of or at station during past hour
Precipitation within sight, reaching the ground but distant from station	Precipitation within sight, reaching the ground, near to but NOT at station	Thunder storm, but no precipitation at the station	Squall(s) within sight during past hour or at time of observation	Funnel cloud(s) within sight of station at time of observation
Showers of rain during past hour, but NOT at time of observation	Showers of snow, or of rain and snow, during past hour, but NOT at time of observation	Showers of hail, or of hail and rain, during past hour, but NOT at time of observation	Fog during past hour, but NOT at time of observation	Thunderstorm (with or without precipitation) during past hour, but NOT at time of observation
Severe dust storm or sandstorm has begun or increased during past hour	Slight or moderate drifting snow, generally low (less than 6 ft)	Heavy drifting snow, generally low	Slight or moderate blowing snow, generally high (more than 6 ft)	Heavy blowing snow, generally high
Fog or ice fog, sky NOT discernible, no appreciable change during past hour	Fog or ice fog, sky discernible, has begun or become thicker during past hour	Fog or ice fog, sky NOT discernible, has begun or become thicker during past hour	Fog depositing rime, sky discernible	Fog depositing rime, sky NOT discernible
Continuous drizzle (NOT freezing), heavy at time of observation	Slight freezing drizzle	Moderate or heavy freezing drizzle	Drizzle and rain, slight	Drizzle and rain, moderate or heavy
Continuous rain (NOT freezing), heavy at time of observation	Slight freezing rain	Moderate or heavy freezing rain	Rain or drizzle and snow, slight	Rain or drizzle and snow, moderate or heavy
Continuous fall of snowflakes, heavy at time of observation	Ice prisms (with or without fog)	Snow grains (with or without fog)	Isolated starlike snow crystals (with or without fog)	Ice pellets or snow pellets
Slight snow shower(s)	Moderate or heavy snow shower(s)	Slight shower(s) of snow pellets, or ice pellets with or without rain, or rain and snow mixed	Moderate or heavy shower(s) of snow pellets, or ice pellets with or without rain or rain and snow mixed	Slight shower(s) of hail, with or without rain or rain and snow mixed, not associated with thunder
Slight or moderate thunderstorm without hail, but with rain and/or snow at time of observation	Slight or moderate thunderstorm, with hail at time of observation	Heavy thunderstorm, without hail, but with rain and/or snow at time of observation	Thunderstorm combined with dust storm or sandstorm at time of observation	Heavy thunderstorm with hail at time of observation

**Figure 2b. Present Weather symbols (2<sup>nd</sup> of 2 diagrams)**

Code No.	a	PRESSURE TENDENCY	Code No.	a	8
0		Rising, then falling; same as or higher than 3 hours ago	4		Steady; same as 3 hours ago
1		Rising, then steady; or rising, then rising more slowly	5		Falling, then rising; same as or lower than 3 hours ago
2		Rising steadily, or unsteadily	6		Falling, then steady; or falling, then falling more slowly
3		Falling or steady, then rising; or rising, then rising more rapidly	7		Falling steadily, or unsteadily
		} Barometric pressure now higher than 3 hours ago	8		Steady or rising, then falling; or falling, then falling more rapidly
					} Barometric pressure now lower than 3 hours ago

Figure 3. Pressure tendency plot format.

Code No.	N	SKY COVER	5
0		No clouds	
1		One tenth or less, but not zero	
2		Two-tenths to three-tenths	
3		Four-tenths	
4		Five-tenths	
5		Six-tenths	
6		Seven-tenths to eight-tenths	
7		Nine-tenths or over cast with openings	
8		Completely overcast (ten-tenths)	
9		Sky obscured	

Figure 4. Sky cover plot format.