

APPENDIX C

SYMBOLS, LINES, and MARKERS

SYMBOLS

The World Meteorological Organization (WMO) has established a standard set of symbols depicting descriptive reports of certain types of weather observations. The observation is reported as an integer value which corresponds to an appropriate symbol in a table. In GEMPAK applications programs, these symbols are plotted by specifying the four-character name associated with a particular set of symbols. These names are given below:

GEMPAK NAME	TYPE OF SYMBOL
WSYM	Weather
CSYT, CSYL, CSYM, CSYH	Clouds
PWTH	Past Weather
PTND	Pressure tendency with change
PTSY	Pressure tendency
SKYC	Sky cover

The symbols with the WMO code numbers are plotted on the following pages.

GEMPAK Symbols, Lines, and Markers

WEATHER SYMBOLS

- 0 - Cloud Development NOT observed or NOT observable during past hour
- 1 - Clouds generally dissolving or becoming less developed during past hour
- 2 - State of sky on the whole unchanged during past hour
- 3 - Clouds generally forming or developing during past hour
- 4 - Visibility reduced by smoke
- 5 - Haze
- 6 - Widespread dust in suspension in the air, NOT raised by wind, at time of observation
- 7 - Dust or sand raised by wind, at time of observation
- 8 - Well developed dust devil(s) within past hour
- 9 - Dust storm or sand storm within sight of or at station during past hour
- 10 - Light fog
- 11 - Patches of shallow fog at station, NOT deeper than 6 feet on land
- 12 - More or less continuous shallow fog at station, NOT deeper than 6 feet on land
- 13 - Lightning visible, no thunder heard
- 14 - Precipitation within sight, but NOT reaching the ground
- 15 - Precipitation within sight, reaching the ground, but distant from station
- 16 - Precipitation within sight, reaching the ground, near to but NOT at station
- 17 - Thunder heard, but no precipitation at the station
- 18 - Squall(s) within sight during past hour
- 19 - Funnel cloud(s) within sight during past hour
- 20 - Drizzle (NOT freezing and NOT falling as showers) during past hour, but NOT at time of observations
- 21 - Rain (NOT freezing and NOT falling as showers) during past hour, but NOT at time of observations
- 22 - Snow (NOT falling as showers) during past hour, but NOT at time of observation
- 23 - Rain and snow (NOT falling as showers) during past hour, but NOT at time of observation
- 24 - Freezing drizzle or freezing rain (NOT falling as showers) during past hour, but NOT at time of observation
- 25 - Showers of rain during past hour, but NOT at time of observation
- 26 - Showers of snow, or of rain and snow, during past hour, but NOT at time of observation
- 27 - Showers of hail, or of hail and rain, during past hour, but NOT at time of observation
- 28 - Fog during past hour, but NOT at time of observation
- 29 - Thunderstorm (with or without precipitation) during past hour, but NOT at time of observation
- 30 - Slight or moderate dust storm or sand storm, has decreased during past hour
- 31 - Slight or moderate dust storm or sand storm, no appreciable change during past hour
- 32 - Slight or moderate dust storm or sand storm, has increased during past hour
- 33 - Severe dust storm or sand storm, has decreased during past hour

GEMPAK Symbols, Lines, and Markers

- 34 - Severe dust storm or sand storm, no appreciable change during past hour
- 35 - Severe dust storm or sand storm, has increased during past hour
- 36 - Slight or moderate drifting snow, generally low
- 37 - Heavy drifting snow, generally low
- 38 - Slight or moderate drifting snow, generally high
- 38 - Heavy drifting snow, generally high
- 40 - Fog at distance at time of observation, but NOT at station during past hour
- 41 - Fog in patches
- 42 - Fog, sky discernible, has become thinner during past hour
- 43 - Fog, sky NOT discernible, has become thinner during the past hour
- 44 - Fog, sky discernible, no appreciable change during past hour
- 45 - Fog, sky NOT discernible, no appreciable change during past hour'
- 46 - Fog, sky discernible, has begun or become thicker during past hour
- 47 - Fog, sky NOT discernible, has begun or become thicker during past hour
- 48 - Fog, depositing rime, sky discernible
- 49 - Fog, depositing rime, sky NOT discernible
- 50 - Intermittent drizzle (NOT freezing) slight at time of observation
- 51 - Continuous drizzle (NOT freezing) slight at time of observation
- 52 - Intermittent drizzle (NOT freezing) moderate at time of observation
- 53 - Continuous drizzle (NOT freezing), moderate at time of observation
- 54 - Intermittent drizzle (NOT freezing), thick at time of observation
- 55 - Continuous drizzle (NOT freezing), thick at time of observation
- 56 - Slight freezing drizzle
- 57 - Moderate or thick freezing drizzle
- 58 - Drizzle and rain, slight
- 59 - Drizzle and rain, moderate or heavy
- 60 - Intermittent rain (NOT freezing), slight at time of observation
- 61 - Continuous rain (NOT freezing), slight at time of observation
- 62 - Intermittent rain (NOT freezing) moderate at time of observation
- 63 - Continuous drizzle (NOT freezing), moderate at time of observation
- 64 - Intermittent rain (NOT freezing), heavy at time of observation
- 65 - Continuous rain (NOT freezing), heavy at time of observation
- 66 - Slight freezing rain
- 67 - Moderate or heavy freezing rain
- 68 - Rain or drizzle and snow, slight
- 69 - Rain or drizzle and snow, moderate or heavy
- 70 - Intermittent fall of snowflakes, moderate at time of observation
- 71 - Continuous fall of snowflakes, slight at time of observation
- 72 - Intermittent fall of snowflakes, moderate at time of observation
- 73 - Continuous fall of snowflakes, moderate at time of observation
- 74 - Intermittent fall of snowflakes, heavy at time of observation
- 75 - Continuous fall of snowflakes, heavy at time of observation
- 76 - Ice needles (with or without fog)
- 77 - Granular snow (with or without fog)
- 78 - Isolated star like snow crystals (with or without fog)
- 79 - Ice pellets (sleet, U. S. definition)

GEMPAK Symbols, Lines, and Markers

- 80 - Slight rain shower(s)
- 81 - Moderate or heavy rain showers(s)
- 82 - Violent rain shower(s)
- 83 - Slight shower(s) of rain and snow mixed
- 84 - Moderate or heavy shower(s) of rain and snow mixed
- 85 - Slight snow shower(s)
- 86 - Moderate or heavy snow shower(s)
- 87 - Slight shower(s) of soft or small hail with or without rain, or rain and snow mixed
- 88 - Moderate or heavy shower(s) of soft or small hail with or without rain, or rain and snow mixed
- 89 - Slight shower(s) of hail, with or without rain or rain and snow mixed, not associated with thunder
- 90 - Moderate or heavy shower(s) of hail, with or without rain or rain and snow mixed, not associated with thunder
- 91 - Slight rain at time of observation; thunderstorm during past hour, but NOT at time of observation
- 92 - Moderate or heavy rain at time of observation; thunderstorm during past hour, but NOT at time of observation
- 93 - Slight snow or rain and snow mixed or hail at time of observation; thunderstorm during past hour, but not at time observation
- 94 - 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
- 95 - Slight or moderate thunderstorm without hail, but with rain and/or snow at time of observation
- 96 - Slight or moderate thunderstorm, with hail at time of observation
- 97 - Heavy thunderstorm., without hail, but with rain and/or snow at time of observation
- 98 - Thunderstorm combined with dust storm or sand storm at time of observation
- 99 - Heavy thunderstorm with hail at time of observation

- 201 - Volcanic ash
- 202 - Blowing spray
- 203 - Unknown precipitation from an automatic station

GEMPAK Symbols, Lines, and Markers

WEATHER SYMBOLS

	0	1	2	3	4	5	6	7	8	9
0										
10										
20										
30										
40										
50										
60										
70										
80										
90										
200										

GEMPAK Symbols, Lines, and Markers

CLOUD TYPE SYMBOLS

C_L

- 1 - Cu of fair weather, little vertical development and seemingly flattened
- 2 - Cu of considerable development, generally towering, with or without other Cu or Sc bases all at same level
- 3 - Cb with tops lacking clear-cut outlines, but distinctly not cirriform or anvil-shaped; with or without Cu, Sc, or St
- 4 - Sc formed by spreading out of Cu; Cu often present also
- 5 - Sc not formed by spreading out of Cu
- 6 - St or Fs or both, but no Fs of bad weather
- 7 - Fs and /or Fc of bad weather (scud)
- 8 - Cu and Sc (not formed by spreading out of Cu) with vases at different levels
- 9 - Cb having a clearly fibrous (cirriform) top, often anvil-shaped, with or without Cu, Sc, St, or scud

C_M

- 1 - Thin As (most of cloud layer semi-transparent)
- 2 - Thick As, greater part sufficiently dense to hide sun (or moon), or Ns
- 3 - Thin Ac, mostly semi-transparent; cloud elements not changing much and at a single level
- 4 - Thin Ac in patches; cloud elements continually changing and/or occurring at more than one level
- 5 - Thin Ac in bands or in a layer gradually spreading over sky and usually thickening as a whole
- 6 - Ac formed by the spreading out of Cu
- 7 - Double-layered Ac, or a thick layer of Ac, not increasing; or Ac with As and/or Ns
- 8 - Ac in the form of Cu-shaped tufts or Ac with turrets
- 9 - Ac of a chaotic sky, usually at different levels; patches of dense Ci are usually present also

C_H

- 1 - Filaments of Ci, or “mares tails,” scattered and not increasing
- 2 - Dense Ci in patches or twisted sheaves, usually not increasing, sometimes like remains of Cb; or towers or tufts
- 3 - Dense Ci, often anvil-shaped, derived from or associated with Cb
- 4 - Ci, often hook-shaped, gradually spreading over the sky and usually thickening as a whole
- 5 - Ci and Cs, often in converging bands, or Cs alone; generally overspreading and growing denser; the continuous layer not reaching 45 degrees altitude
- 6 - Ci and Cs, often in converging bands, or Cs alone; generally overspreading and growing denser; the continuous layer exceeding 45 degrees altitude
- 7 - Veil of Cs covering the entire sky
- 8 - Cs not increasing and not covering entire sky
- 9 - Cc alone or Cc with some Ci or Cs, but the Cc being the main cirriform cloud

GEMPAK Symbols, Lines, and Markers

CLOUD TYPE SYMBOLS

	C_L	C_M	C_H
1			
2			
3			
4			
5			
6			
7			
8			
9			

GEMPAK Symbols, Lines, and Markers

SKY COVER SYMBOLS

- 0 - No clouds
- 1 - Less than one-tenth or one-tenth
- 2 - Two-tenths or three-tenths
- 3 - Four-tenths
- 4 - Five-tenths
- 5 - Six-tenths
- 6 - Seven-tenths or eight-tenths
- 7 - Nine-tenths or overcast with openings
- 8 - Completely overcast
- 9 - Sky obscured
- 10 - Missing

GEMPAK Symbols, Lines, and Markers

SKY COVER SYMBOLS

0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

GEMPAK Symbols, Lines, and Markers

PRESSURE TENDENCY SYMBOLS

- 0 - Rising, the falling
- 1 - Rising, then steady; or rising, the rising more slowly
- 2 - Rising steadily, or unsteadily
- 3 - Falling or steady, then rising; or rising, then rising more quickly
- 4 - Steady, same as 3 hours ago
- 5 - Falling, then rising, same or lower than 3 hours ago
- 6 - Falling, then steady; or falling, then falling more slowly
- 7 - Falling steadily, or unsteadily
- 8 - Steady or rising, then falling; or falling, then falling more quickly

GEMPAK Symbols, Lines, and Markers

PRESSURE TENDENCY SYMBOLS

0	
1	
2	
3	
4	
5	
6	
7	
8	

GEMPAK Symbols, Lines, and Markers

PAST WEATHER SYMBOLS

- 0 - Clear or Few Clouds
- 1 - Partly cloudy (scattered) or variable sky
- 2 - Cloudy (broken) or overcast
- 3 - Sandstorm or dust storm, or drifting or blowing snow
- 4 - Fog, or smoke, or thick dust haze
- 5 - Drizzle
- 6 - Rain
- 7 - Snow, or rain and snow mixed, or ice pellets (sleet)
- 8 - Shower(s)
- 9 - Thunderstorm, with or without precipitation

GEMPAK Symbols, Lines, and Markers

PAST WEATHER SYMBOLS

0

1

2

3



4



5



6



7



8



9



GEMPAK Symbols, Lines, and Markers

ICING SYMBOLS

- 0 - No icing
- 1 - Trace icing
- 2 - Trace to light icing
- 3 - Light icing
- 4 - Light to moderate icing
- 5 - Moderate icing
- 6 - Moderate to heavy icing
- 7 - Heavy or moderate to severe icing
- 8 - Severe icing
- 9 - Light superstructure icing
- 10 - Heavy superstructure icing

GEMPAK Symbols, Lines, and Markers

ICING SYMBOLS (SIZE=3.0, WIDTH=2)

0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

GEMPAK Symbols, Lines, and Markers

TURBULENCE SYMBOLS

- 0 - No turbulence
- 1 - Light turbulence
- 2 - Light turbulence
- 3 - Light to moderate turbulence
- 4 - Moderate turbulence
- 5 - Moderate to severe turbulence
- 6 - Severe turbulence
- 7 - Extreme turbulence
- 8 - Extreme turbulence

GEMPAK Symbols, Lines, and Markers

TURBULENCE SYMBOLS (SIZE=3.0, WIDTH=2)

0	
1	
2	
3	
4	
5	
6	
7	
8	

GEMPAK Symbols, Lines, and Markers

SPECIAL SYMBOLS

- 0 - Square (outline)
- 1 - Square (filled)
- 2 - Circle (outline)
- 3 - Circle (filled)
- 4 - Triangle (outline)
- 5 - Triangle (filled)
- 6 - Diamond (outline)
- 7 - Diamond (filled)
- 8 - Star (outline)
- 9 - Star (filled)
- 10 - High pressure "H" (outline)
- 11 - Low pressure "L" (outline)
- 12 - High pressure "H" (filled)
- 13 - Low pressure "L" (filled)
- 14 - Single "]" bracket
- 15 - Bottom half of "]" bracket
- 16 - Top half of "]" bracket
- 17 - Left-adjusted vertical bar
- 18 - Right-adjusted vertical bar
- 19 - Bracket with one dot
- 20 - Bracket with two dots
- 21 - Bracket with one asterisk
- 22 - Bracket with two asterisks
- 23 - Bracket with one triangle
- 24 - Bracket with two triangles
- 25 - Tropical storm (Northern Hemisphere)
- 26 - Hurricane (Northern Hemisphere)
- 27 - Tropical Storm (Southern Hemisphere)
- 28 - Hurricane (Southern Hemisphere)
- 29 - Triangle with antenna
- 30 - Sideways "S"
- 31 - Slash
- 32 - Storm center
- 33 - Tropical depression
- 34 - Tropical cyclone
- 35 - Flame
- 36 - "X" cross
- 37 - Low pressure with "X" Cross "LowX" (outline)
- 38 - Low pressure with "X" Cross "LowX" (filled)
- 39 - Tropical storm NH
- 40 - Tropical Storm SH
- 41 - Nuclear fallout

GEMPAK Symbols, Lines, and Markers

SPECIAL SYMBOLS (SIZE=1.8, WIDTH=2)

0		11		22		33	
1		12		23		34	
2		13		24		35	
3		14		25		36	
4		15		26		37	
5		16		27		38	
6		17		28		39	
7		18		29		40	
8		19		30		41	
9		20		31			
10		21		32			

GEMPAK Symbols, Lines, and Markers

LINE TYPES

GEMPAK provides a variety of line types (dashing patterns) to be used when multiple plots are overlain. The various line types are specified by integers. There are ten basic line types as follows:

- 0 - dotted
- 1 - solid
- 2 - short dashed
- 3 - medium dashed
- 4 - long dash short dash
- 5 - long dash
- 6 - long dash three short dashes
- 7 - long dash dot
- 8 - long dash three dots
- 9 - medium dash dot

These patterns can be expanded or compressed by prefixing the single digit with a number from 1 to 9. A prefix of 1 compresses the basic pattern, a prefix of 2 is the default, and prefixes 3 - 9 expand the pattern. A single-digit line type n is identical to the two-digit number $n+20$. Line type numbers 10 - 19 cause a compressed line pattern while numbers 30 and higher cause expanded line patterns. For example, 32 expands line type 2 while 12 compresses the same pattern.

The first thirty line types are displayed on the following page.

GEMPAK Symbols, Lines, and Markers

LINE TYPES

10	20	30
11	————	21	————	31	————
12	22	-----	32	-----
13	-----	23	-----	33	-----
14	-----	24	-----	34	-----
15	-----	25	-----	35	-----
16	-----	26	-----	36	-----
17	-----	27	-----	37	-----
18	-----	28	-----	38	-----
19	-----	29	-----	39	-----

GEMPAK Symbols, Lines, and Markers

MARKERS

GEMPAK provides a variety of markers that can be plotted using the `MARKER` variable. The available marker shapes are shown on the following page.

GEMPAK Symbols, Lines, and Markers

MARKERS (SIZE=1.0, WIDTH=1)

1	+	11	✕	21	★
2	○	12	*	22	—
3	△	13	⊗	23	Ⓞ
4	□	14	☆	24	Ⓢ
5	×	15	.		
6	◇	16	×		
7	⤴	17	●		
8	⊗	18	▲		
9	⊘	19	■		
10	Υ	20	◆		

GEMPAK Symbols, Lines, and Markers

FRONTS

A variety of fronts can be plotted. The various front types are specified by an integer code. The code is a three digit number. Each of the digits represents a separate piece of information about the front. The front code is interpreted as shown in the table below and the fronts are pictured on the following page.

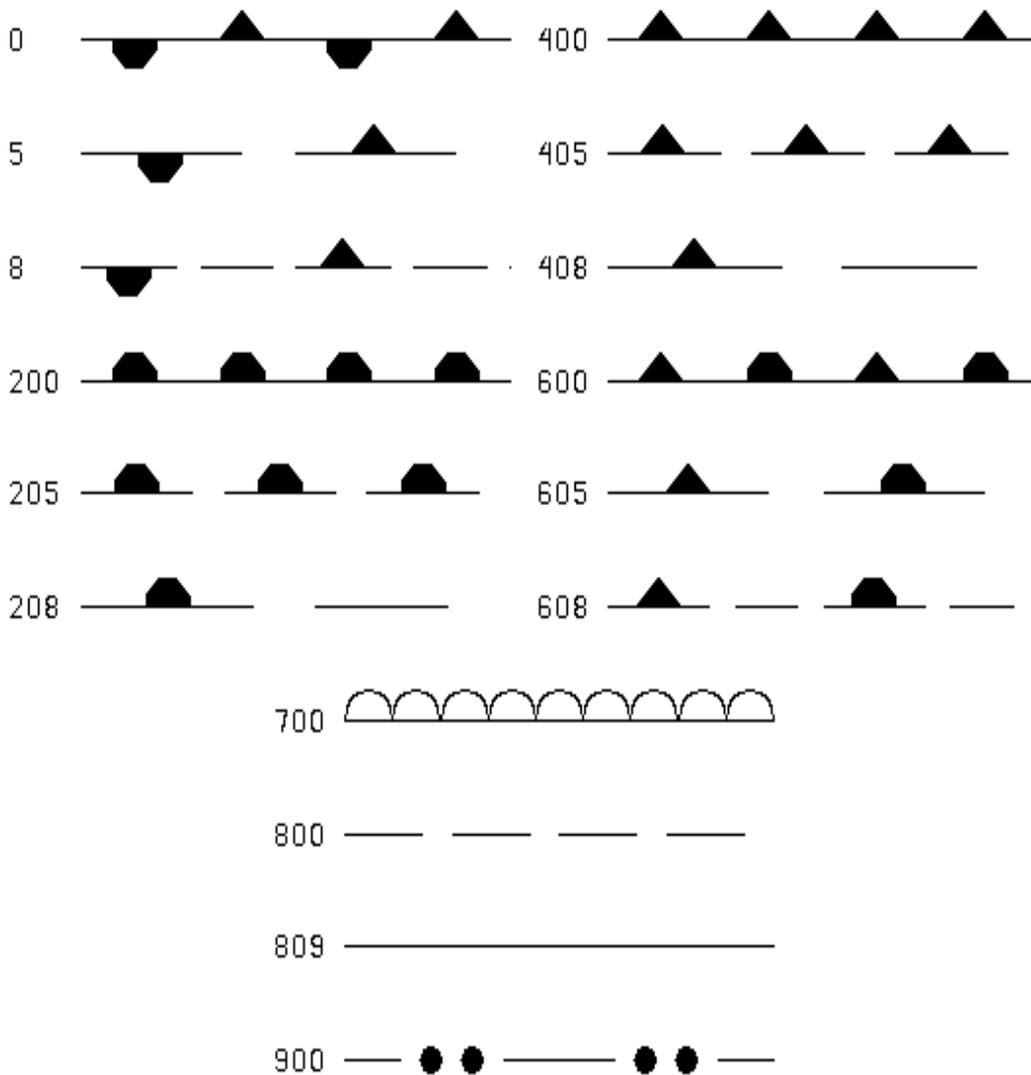
Digit 1: Type	Digit 2: Intensity	Digit 3: Character
0 = stationary	0 = unspecified intensity	0 = unspecified character
1 = stationary above surface	1 = weak, decreasing	1 = frontal decreasing
2 = warm	2 = weak	2 = activity little change
3 = warm above surface	3 = weak, increasing	3 = area increasing
4 = cold	4 = moderate, decreasing	4 = intertropical
5 = cold above surface	5 = moderate	5 = forming or suspected
6 = occlusion	6 = moderate, increasing	6 = quasi-stationary
7 = instability line	7 = strong, decreasing	7 = with waves
8 = intertropical line	8 = strong	8 = diffuse
9 = convergence line	9 = strong, increasing	9 = position doubtful

Example:

425 translates to cold (4) weak (2) and forming (5).

GEMPAK Symbols, Lines, and Markers

FRONTS



GEMPAK Symbols, Lines, and Markers