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.

WEATHER SYMBOLS

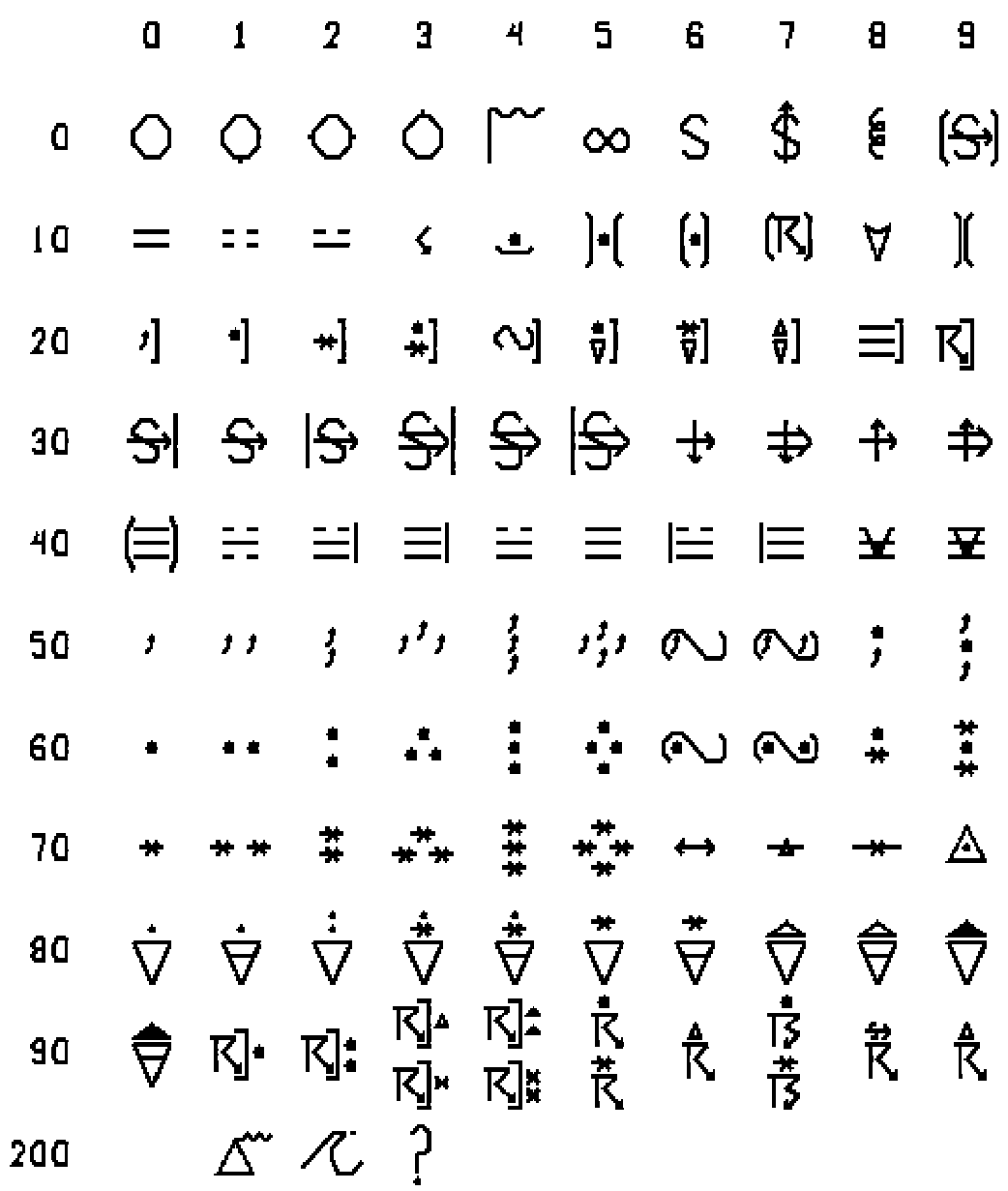
0 - Cloud Development NOT observed or NOT observable during past hour
1 - Clouds generally dissolving or becoming less developed during past hour
2 - State of sky on the whole unchanged during past hour
3 - Clouds generally forming or developing during past hour
4 - Visibility reduced by smoke
5 - Haze
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 - Lighting 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 obsevation
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

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)

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

WEATHER SYMBOLS



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

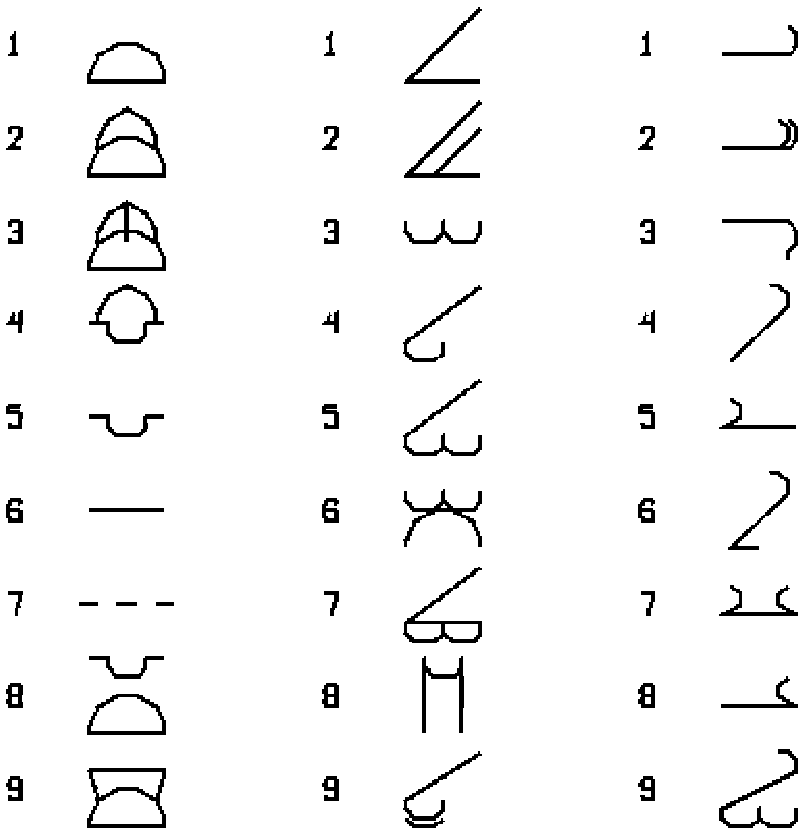
C_M

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

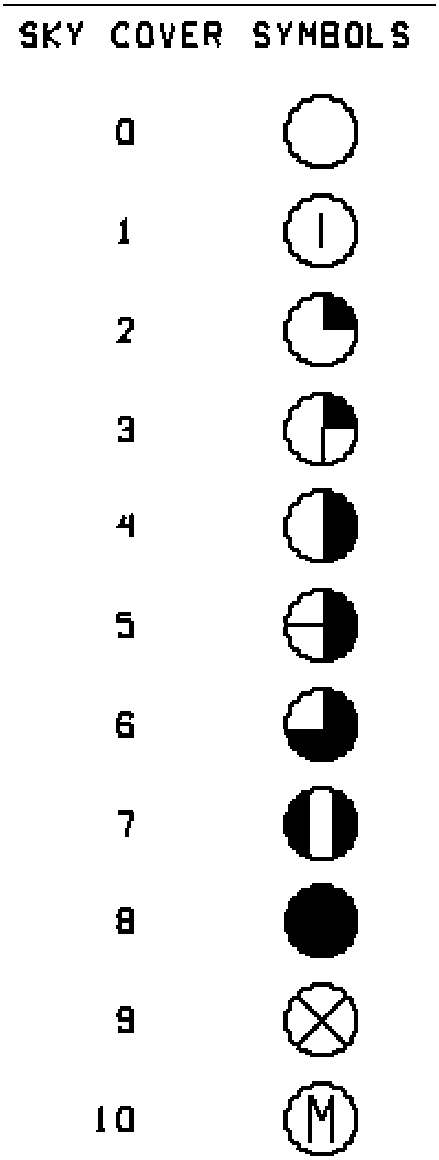
1 - Filaments of Ci, or "mares tails," scattered and not increasing
2 - Dense Ci in patches or twisted sheaves, usually not increasing, sometimes like remains of Cb; or towers or tufts
3 - Dense Ci, often anvil-shaped, derived from or associated with Cb
4 - Ci, often hook-shaped, gradually spreading 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

CLOUD TYPE SYMBOLS



SKY COVER SYMBOLS

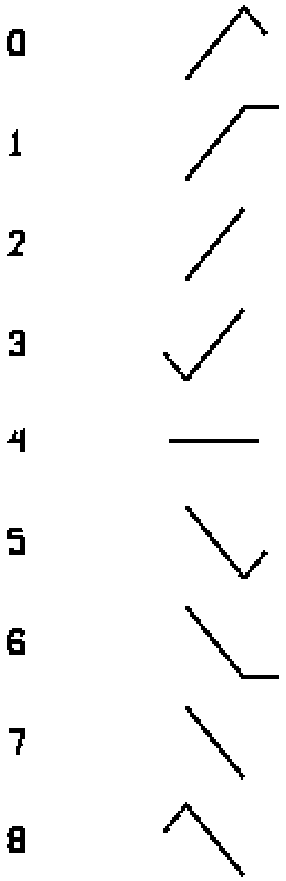
0 - No clouds
1 - Less than one-tenth or one-tenth
2 - Two-tenths or three-tenths
3 - Four-tenths
4 - Five-tenths
5 - Six-tenths
6 - Seven-tenths or eight-tenths
7 - Nine-tenths or overcast with openings
8 - Completely overcast
9 - Sky obscured
10 - Missing


SKY COVER SYMBOLS
0
1
2
3
4
5
6
7
8
9
10
M

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

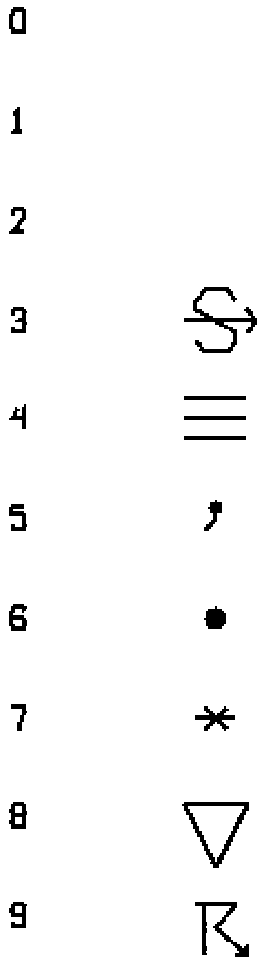
PRESSURE TENDENCY SYMBOLS



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

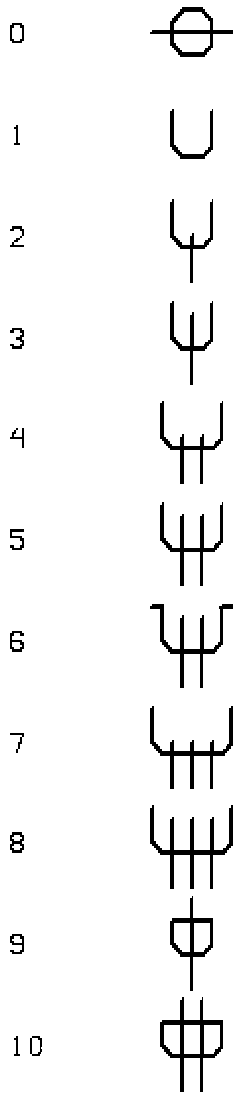
PAST WEATHER SYMBOLS



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

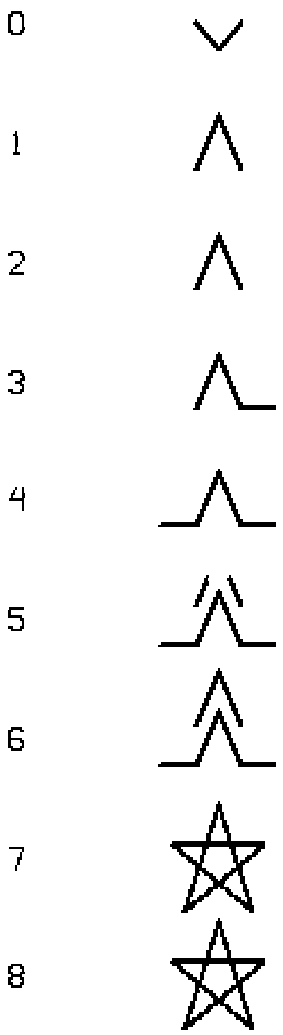
ICING SYMBOLS (SIZE=3.0, WIDTH=2)



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

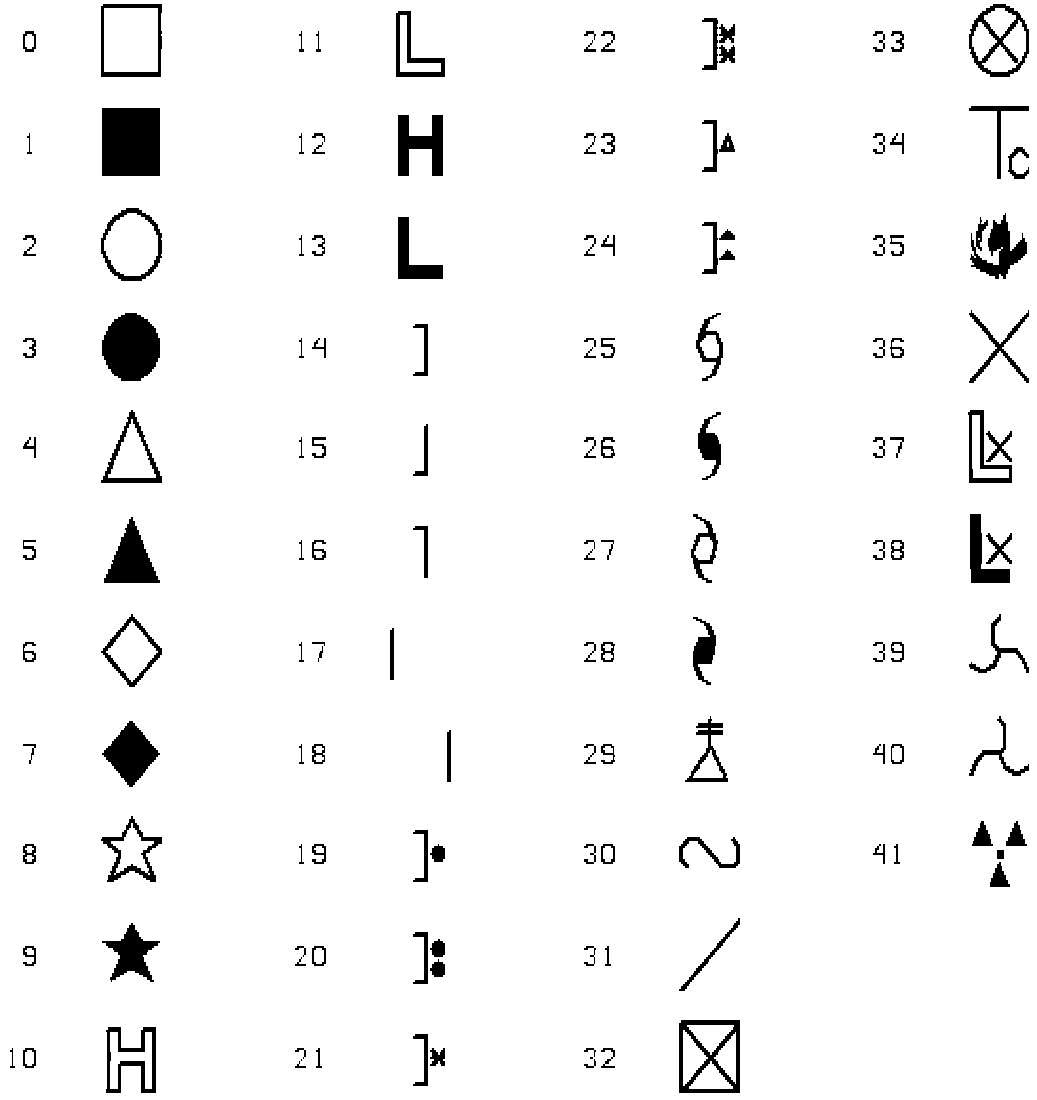
TURBULENCE SYMBOLS (SIZE=3.0, WIDTH=2)



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

SPECIAL SYMBOLS (SIZE=1.8, WIDTH=2)



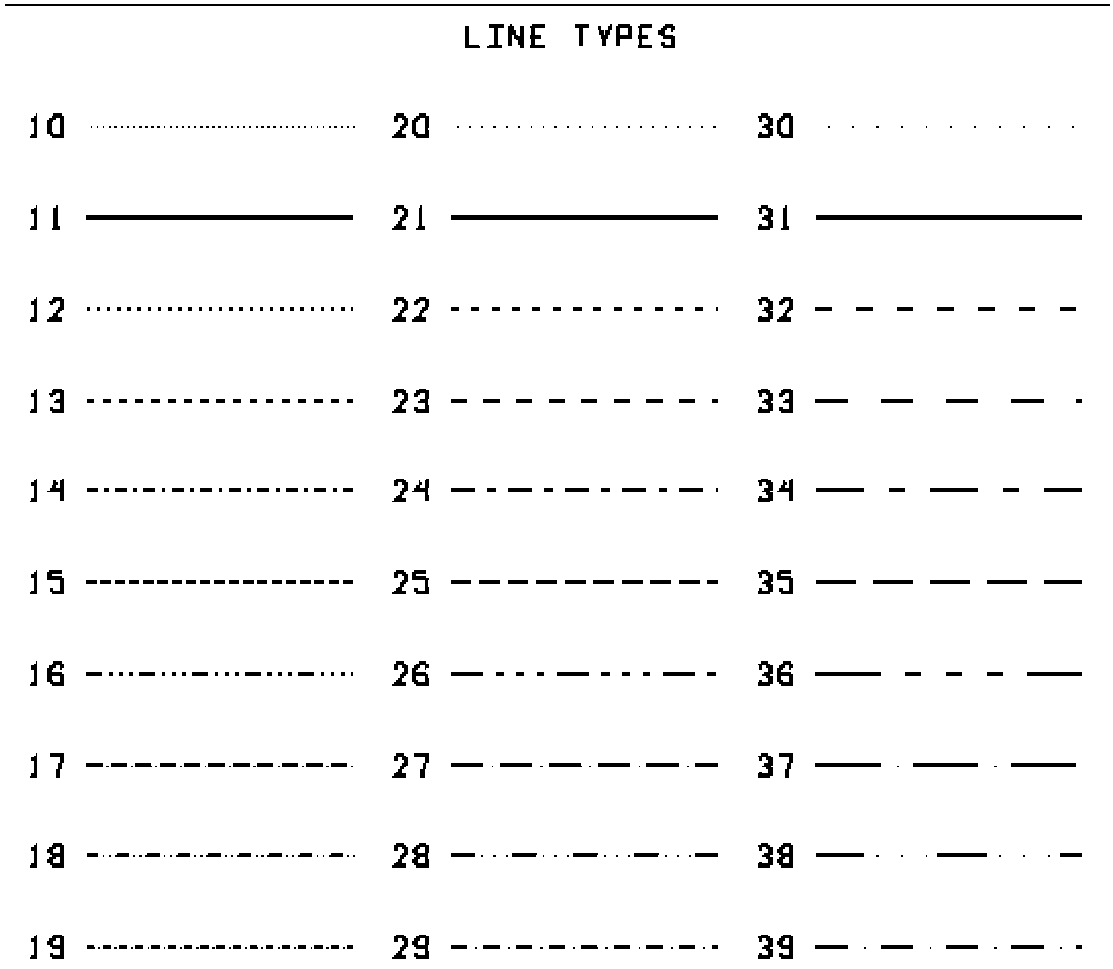
LINE TYPES

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

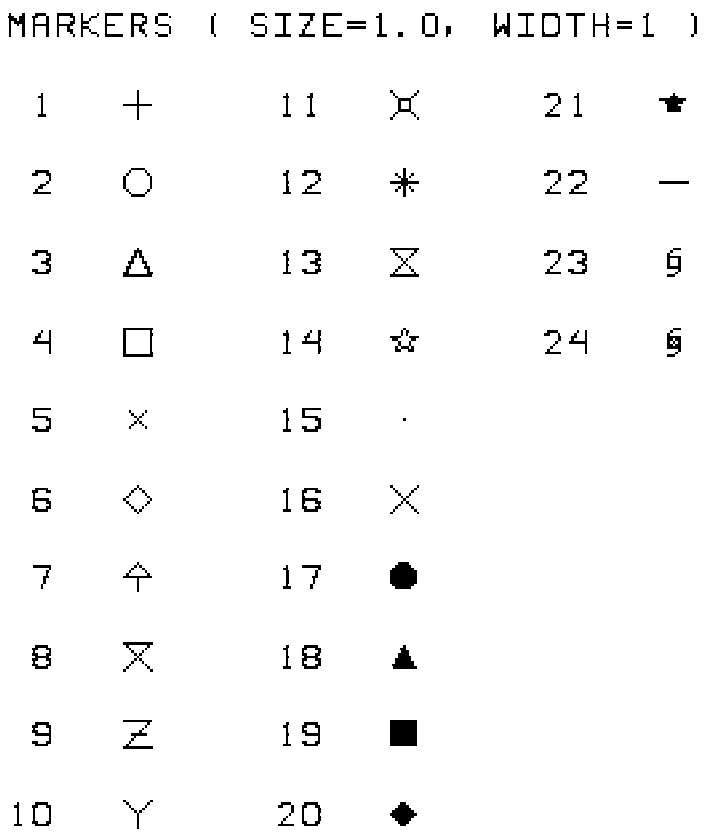
These patterns can be expanded or compressed by prefixing the single digit with a number from 1 to 9. A prefix of 1 compresses the basic pattern, a prefix of 2 is the default, and prefixes 3 - 9 expand the pattern. A single-digit line type n is identical to the two-digit number n+20. Line type numbers 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.


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

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.


MARKERS (SIZE=1.0, WIDTH=1)
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

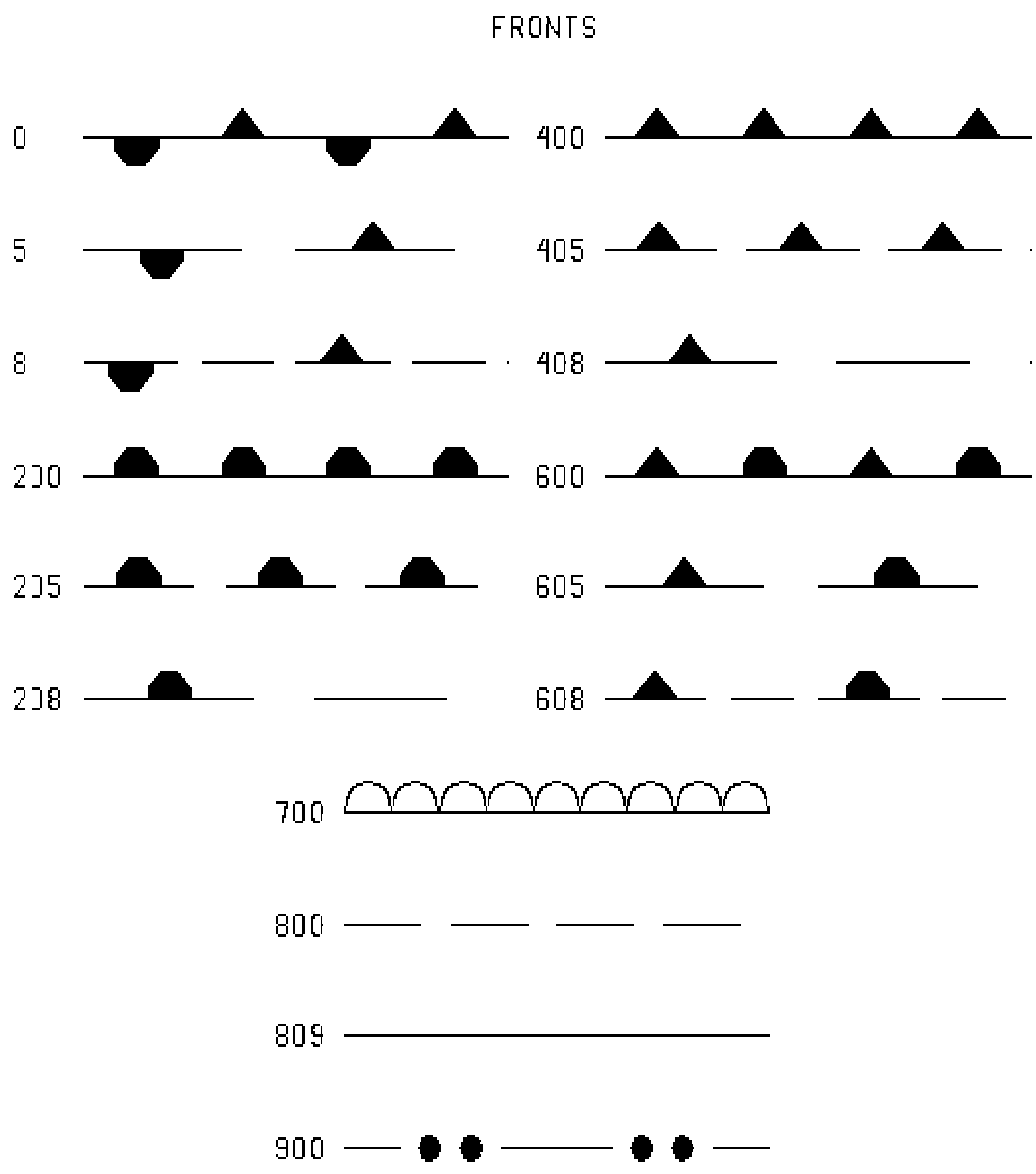
FRONTS

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).


FRONTS
0
400
5
405
8
408
200
600
205
605
208
608
700
800
809
900