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CENTRAL REGION TECHNICAL ATTACHMENT 90-33

CREATING A CC CURVE FOR USE ON SWIS ZA SECTORS

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1. Introduction

The CC curve is one of the most used curves in many forecast offices in northern climates during the cold season. Unfortunately, the CC curve is not provided on any sector during daylight hours from the GOES-TAP. To solve this problem, two CC based enhancement curves were made on SWIS for a ZA enhanced KF1 image. These images are routinely available on SWIS from the GOES TAP at least once an hour, 24 hours a day. This provides the forecaster with uninterrupted loops of the CC curve which are extremely valuable in the cold months for low cloud tracking and forecasting.

2. How The Curves Were Produced

Central Region Technical Attachment 88-23 (Hentz, 1988) provided a table assigning a temperature in degrees Celsius to each digital count (from 0 to 255) in the ZA curve. Enhancing any desired temperature range on an image with a ZA curve can now be done by assigning a particular color or gray shade to a range of digital counts (of known corresponding temperatures), located on the bottom of the SWIS color control work space. The digital count versus degrees Celsius table, along with the graphical display of the CC curve, and its enhancement table contained in the GOES User Guide (Clark, 1983), were used to develop two "pseudo" CC curves listed below.

It was not possible to develop an exact CC curve, since the black and white enhancement shades available on SWIS are assigned values 192 through 255, while the original CC curve has use of a full 256 gray shades. One curve (A) is for cold temperature winter use, and the other (B) is for cool temperature regimes during spring and fall.

3. The Enhancement Tables

A. CC Curve (cold)

ZA digital count	temp (c)	gray shade	ZA digital count	temp (c)	gray shade
0 - 44	28.8 to 19.1	192	146	-16.2	225
45 - 64	18.9 to 14.7	193	147	-16.7	226
65 - 74	14.5 to 12.5	194	148	-17.2	227
75 - 84	12.3 to 10.3	195	149	-17.7	228
85 - 94	10.1 to 8.1	196	150	-18.2	229
95 - 104	7.9 to 4.8	197	151	-18.7	230
105 - 109	4.3 to 2.3	198	152	-19.2	231
110 - 114	1.8 to -.2	199	153	-19.7	232
115 - 116	-.7 to -1.2	200	154	-20.2	233
117 - 118	-1.7 to -2.2	201	155	-20.7	234
119 - 120	-2.7 to -3.2	202	156	-21.2	235
121 - 122	-3.7 to -4.2	203	157	-21.7	236
123 - 124	-4.7 to -5.2	204	158	-22.2	237
125 - 126	-5.7 to -6.2	205	159	-22.7	238
127	-6.7	206	160	-23.2	239
128	-7.2	207	161	-23.7	240
129	-7.7	208	162	-24.2	241
130	-8.2	209	163 - 164	-24.7 to -25.2	242
131	-8.7	210	165 - 166	-25.7 to -26.2	243
132	-9.2	211	167 - 168	-26.7 to -27.2	244
133	-9.7	212	169 - 170	-27.7 to -28.2	245
134	-10.2	213	171 - 172	-28.7 to -29.2	246
135	-10.7	214	173 - 174	-29.7 to -30.2	247
136	-11.2	215	175 - 176	-30.7 to -31.2	248
137	-11.7	216	177 - 178	-32.2 to -33.2	249
138	-12.2	217	179 - 180	-34.2 to -35.2	250
139	-12.7	218			
140	-13.2	219	181 - 186	-36.2 to -41.2	214
141	-13.7	220	187 - 192	-42.2 to -47.2	230
142	-14.2	221	193 - 197	-48.2 to -52.2	242
143	-14.7	222	198 - 210	-53.2 to -58.8	204
144	-15.2	223	211 - 219	-59.2 to -62.2	192
145	-15.7	224	220 - 255	-62.5 to -75.2	black to white

The black to white overshooting thunderstorm tops enhancement for both curves, from digital counts 220-255 is as follows:

ZA digital count	gray shade	ZA digital count	gray shade	ZA digital count	gray shade
220	197	229	215	238	233
221	199	230	217	239	235
222	201	231	219	240	237
223	203	232	221	241	239
224	205	233	223	242	241
225	207	234	225	243	243
226	209	235	227	244	245
227	211	236	229	245	222 *
228	213	237	231	246-255	keep ZA segment

* Digital count 245 is the "white" shade assigned to the geographical map background. The shading was darkened somewhat from the standard almost white map background.

B. CC Curve (cool)

ZA digital count	temp (c)	gray shade	ZA digital count	temp (c)	gray shade
0 - 34	28.8 to 21.3	192	138	-12.2	225
35 - 44	21.1 to 19.1	193	139 - 140	-12.7 to -13.2	226
45 - 54	18.9 to 16.9	194	141 - 142	-13.7 to -14.2	227
55 - 64	16.7 to 14.7	195	143 - 144	-14.7 to -15.2	228
65 - 69	14.5 to 13.6	196	145 - 146	-15.7 to -16.2	229
70 - 74	13.4 to 12.5	197	147 - 148	-16.7 to -17.2	230
75 - 79	12.3 to 11.4	198	149 - 150	-17.7 to -18.2	231
80 - 84	11.2 to 10.3	199	151 - 152	-18.7 to -19.2	232
85 - 89	10.1 to 9.2	200	153 - 154	-19.7 to -20.2	233
90 - 94	9.0 to 8.1	201	155 - 156	-20.7 to -21.2	234
95 - 99	7.9 to 7.0	202	157 - 158	-21.7 to -22.2	235
100 - 104	6.8 to 4.8	203	159 - 160	-22.7 to -23.2	236
105 - 109	4.3 to 2.3	204	161 - 162	-23.7 to -24.2	237
110 - 114	1.8 to -.2	205	163 - 164	-24.7 to -25.2	238
115 - 116	-.7 to -1.2	206	165 - 166	-25.7 to -26.2	239
117 - 118	-1.7 to -2.2	207	167 - 168	-26.7 to -27.2	240
119 - 120	-2.7 to -3.2	208	169 - 170	-27.7 to -28.2	241
121 - 122	-3.7 to -4.2	209	171 - 172	-28.7 to -29.2	242
123	-4.7	210	173 - 174	-29.7 to -30.2	243
124	-5.2	211	175 - 176	-30.7 to -31.2	244
125	-5.7	212	177 - 178	-32.2 to -33.2	245
126	-6.2	213	179 - 180	-34.2 to -35.2	246
127	-6.7	214			
128	-7.2	215			
129	-7.7	216			
130	-8.2	217			

131	-8.7	218				
132	-9.2	219		181 - 186	-36.2 to -41.2	214
133	-9.7	220		187 - 192	-42.2 to -47.2	230
134	-10.2	221		193 - 197	-48.2 to -52.2	242
135	-10.7	222		198 - 210	-53.2 to -58.8	204
136	-11.2	223		211 - 219	-59.2 to -62.2	192
137	-11.7	224		220 - 255	-62.5 to -75.2	black to white

3. References

- Clark J. D., 1983: The GOES Users Guide. NOAA, National Environmental Satellite, Data, and Information Service, Washington, D.C.
- Hentz, S. J., 1988: Using a digital count value/degrees Celsius table to build enhancement curves on SWIS, Central Region Technical Attachment 88-23. Available from NWS Central Region Scientific Services Division, Kansas City, MO.