

P(h,k) 1286 91
 Pixels Per Inch 300
 h - Needle Height (Inches) 8.31
 Calculated Latitude (Degrees) 40.00

Point Position Center Line Delta from Center Line

Date	Julian DOY	x	y	x	y	X	Y	X (Inches)	Y (Inches)	Sun Az (A) (Degrees)	Sun Altitude θ (a) (Degrees)	Dec of Sun δ (Degrees)	HA of Sun H (Degrees)
11/12/2016	317	969	4051	1287	4051	-318	3960	-1.06	13.20	175.3890	32.1171	-17.76	4.10
11/13/2016	318	972	4081	1287	4081	-315	3990	-1.05	13.30	175.4672	31.9254	-17.96	4.04
11/19/2016	324	990	4337	1287	4337	-297	4246	-0.99	14.15	175.9857	30.3654	-19.54	3.67
11/20/2016	325	1008	4373	1287	4373	-279	4282	-0.93	14.27	176.2615	30.1629	-19.76	3.43
11/21/2016	326	1015	4405	1287	4405	-272	4314	-0.91	14.38	176.3827	29.9813	-19.94	3.33
11/25/2016	330	1030	4554	1287	4554	-257	4463	-0.86	14.88	176.6970	29.1544	-20.78	3.09
11/30/2016	335	1054	4703	1287	4703	-233	4612	-0.78	15.37	177.1029	28.3699	-21.58	2.74
12/3/2016	338	1082	4808	1287	4808	-205	4717	-0.68	15.72	177.5084	27.8419	-22.12	2.38
12/4/2016	339	1087	4832	1287	4832	-200	4741	-0.67	15.80	177.5815	27.7232	-22.24	2.31
12/5/2016	340	1098	4857	1287	4857	-189	4766	-0.63	15.89	177.7267	27.6018	-22.37	2.18
12/9/2016	344	1128	4953	1287	4953	-159	4862	-0.53	16.21	178.1256	27.1411	-22.84	1.81
12/11/2016	346	1138	4998	1287	4998	-149	4907	-0.50	16.36	178.2597	26.9291	-23.06	1.69
12/17/2016	352	1220	5116	1286	5116	-66	5025	-0.22	16.75	179.2474	26.3918	-23.61	0.74
12/18/2016	353	1238	5138	1286	5138	-48	5047	-0.16	16.82	179.4551	26.2932	-23.71	0.53
12/21/2016	356	1251	5135	1286	5135	-35	5044	-0.12	16.81	179.6024	26.3072	-23.70	0.39
12/24/2016	359	1289	5070	1286	5070	3	4979	0.01	16.60	180.0345	26.6042	-23.40	-0.03
12/26/2016	361	1318	5054	1287	5054	31	4963	0.10	16.54	180.3579	26.6776	-23.33	-0.35
12/27/2016	362	1322	5036	1287	5036	35	4945	0.12	16.48	180.4055	26.7611	-23.24	-0.39
12/29/2016	364	1338	5011	1287	5011	51	4920	0.17	16.40	180.5939	26.8774	-23.12	-0.58
12/30/2016	365	1364	4976	1287	4976	77	4885	0.26	16.28	180.9032	27.0410	-22.96	-0.87
12/31/2016	366	1365	4958	1287	4958	78	4867	0.26	16.22	180.9183	27.1267	-22.87	-0.89
1/1/2017	1	1376	4942	1287	4942	89	4851	0.30	16.17	181.0513	27.2024	-22.79	-1.01
1/6/2017	6	1419	4888	1287	4888	132	4797	0.44	15.99	181.5770	27.4591	-22.53	-1.51
1/7/2017	7	1434	4852	1287	4852	147	4761	0.49	15.87	181.7696	27.6337	-22.35	-1.70
1/8/2017	8	1448	4818	1287	4818	161	4727	0.54	15.76	181.9522	27.8004	-22.18	-1.86
1/13/2017	13	1482	4672	1287	4672	195	4581	0.65	15.27	182.4404	28.5407	-21.43	-2.30
1/18/2017	18	1529	4480	1287	4480	242	4389	0.81	14.63	183.1624	29.5671	-20.37	-2.93
1/21/2017	21	1521	4357	1287	4357	234	4266	0.78	14.22	183.1460	30.2715	-19.67	-2.89
1/22/2017	22	1520	4314	1287	4314	233	4223	0.78	14.08	183.1645	30.5244	-19.42	-2.89
2/4/2017	35	1540	3781	1287	3781	253	3690	0.84	12.30	183.9346	33.9890	-15.93	-3.39
2/5/2017	36	1535	3735	1287	3735	248	3644	0.83	12.15	183.9054	34.3239	-15.59	-3.35
2/10/2017	41	1541	3526	1287	3526	254	3435	0.85	11.45	184.2445	35.9048	-14.00	-3.54
2/11/2017	42	1536	3492	1287	3492	249	3401	0.83	11.34	184.2024	36.1774	-13.73	-3.49
2/12/2017	43	1527	3438	1287	3438	240	3347	0.80	11.16	184.1155	36.6183	-13.29	-3.39
2/17/2017	48	1505	3248	1287	3248	218	3157	0.73	10.52	183.9627	38.2393	-11.68	-3.18
2/18/2017	49	1503	3209	1287	3209	216	3118	0.72	10.39	183.9755	38.5856	-11.33	-3.17
2/19/2017	50	1507	3176	1287	3176	220	3085	0.73	10.28	184.0929	38.8792	-11.04	-3.25
2/20/2017	51	1492	3134	1287	3134	205	3043	0.68	10.14	183.8657	39.2712	-10.65	-3.04
2/21/2017	52	1492	3089	1287	3089	205	2998	0.68	9.99	183.9239	39.6882	-10.24	-3.07
2/22/2017	53	1489	3052	1287	3052	202	2961	0.67	9.87	183.9148	40.0385	-9.89	-3.04
2/25/2017	56	1490	2938	1287	2938	203	2847	0.68	9.49	184.0923	41.1438	-8.77	-3.12
2/26/2017	57	1485	2893	1287	2893	198	2802	0.66	9.34	184.0555	41.5979	-8.32	-3.06
3/5/2017	64	1455	2640	1287	2640	168	2549	0.56	8.50	183.7817	44.3102	-5.63	-2.72
3/12/2017	71	1423	2393	1286	2393	137	2302	0.46	7.67	183.4139	47.2392	-2.71	-2.32
3/13/2017	72	1422	2364	1286	2364	136	2273	0.45	7.58	183.4323	47.6005	-2.35	-2.32
3/17/2017	76	1401	2253	1286	2253	115	2162	0.38	7.21	183.0505	49.0357	-0.93	-2.00
3/18/2017	77	1393	2218	1286	2218	107	2127	0.36	7.09	182.8847	49.5023	-0.47	-1.87
3/19/2017	78	1388	2189	1286	2189	102	2098	0.34	6.99	182.7878	49.8927	-0.08	-1.80
3/20/2017	79	1384	2156	1286	2156	98	2065	0.33	6.88	182.7212	50.3412	0.37	-1.74
3/21/2017	80	1375	2122	1286	2122	89	2031	0.30	6.77	182.5124	50.8125	0.84	-1.59
3/27/2017	86	1361	1979	1286	1979	75	1888	0.25	6.29	182.2772	52.8492	2.87	-1.38
3/28/2017	87	1354	1947	1286	1947	68	1856	0.23	6.19	182.1001	53.3227	3.34	-1.26
3/29/2017	88	1350	1916	1286	1916	64	1825	0.21	6.08	182.0101	53.7854	3.80	-1.19
4/2/2017	92	1330	1812	1286	1812	44	1721	0.15	5.74	181.4652	55.3807	5.38	-0.84
4/6/2017	96	1313	1702	1286	1702	27	1611	0.09	5.37	180.9604	57.1333	7.13	-0.53
4/8/2017	98	1311	1669	1286	1669	25	1578	0.08	5.26	180.9078	57.6719	7.67	-0.49
4/9/2017	99	1310	1638	1286	1638	24	1547	0.08	5.16	180.8890	58.1835	8.18	-0.47
4/11/2017	101	1296	1596	1286	1596	10	1505	0.03	5.02	180.3807	58.8881	8.88	-0.20
4/14/2017	104	1287	1535	1286	1513	1	1444	0.00	4.81	180.0397	59.9271	9.92	-0.02
4/15/2017	105	1282	1509	1286	1512	-4	1418	-0.01	4.73	179.8384	60.3764	10.37	0.08
4/16/2017	106	1279	1489	1286	1489	-7	1398	-0.02	4.66	179.7131	60.7246	10.72	0.14
4/20/2017	110	1269	1428	1286	1428	-17	1337	-0.06	4.46	179.2714	61.8005	11.80	0.35
4/23/2017	114	1263	1367	1286	1367	-23	1276	-0.08	4.25	178.9671	62.8983	12.90	0.48
4/30/2017	120	1244	1235	1286	1235	-42	1144	-0.14	3.81	177.8955	65.3422	15.35	0.91
5/11/2017	131	1243	1085	1286	1085	-43	994	-0.14	3.31	177.5199	68.2495	18.26	0.97
5/12/2017	132	1238	1072	1286	1072	-48	981	-0.16	3.27	177.1943	68.5028	18.52	1.08
5/13/2017	133	1233	1054	1286	1054	-53	963	-0.18	3.21	176.8435	68.8560	18.88	1.20
5/14/2017	134	1233	1036	1286	1036	-53	945	-0.18	3.15	176.7832	69.2161	19.24	1.21
5/20/2017	140	1242	979	1286	979	-44	888	-0.15	2.96	177.1587	70.3775	20.39	1.02
5/21/2017	141	1244	963	1286	963	-42	872	-0.14	2.91	177.2382	70.7059	20.72	0.98
5/30/2017	150	1254	899	1286	899	-32	808	-0.11	2.69	177.7297	72.0340	22.04	0.76
6/6/2017	157	1270	861	1286	861	-16	770	-0.05	2.57	178.8093	72.8373	22.84	0.38
6/8/2017	159	1275	849	1286	849	-11	758	-0.04	2.53	179.1685	73.0912	23.09	0.26
6/12/2017	161	1273	840	1286	840	-13	749	-0.04	2.50	179.0054	73.2799	23.28	0.31
6/17/2017	162	1288	828	1286	828	2	737	0.01	2.46	180.1555	73.5355	23.53	-0.05
6/20/2017	163	1295	828	1286	830	9	737	0.03	2.46	180.6997	73.5344	23.53	-0.22
6/27/2017	168	1310	835	1286	835	24	744	0.08	2.48	181.8489	73.3796	23.38	-0.58
7/1/2017	171	1317	850	1286	850	31	759	0.10	2.53	182.3414	73.0585	23.07	-0.74
7/4/2017	178	1322	860	1286	860	36	769	0.12	2.56	182.6842	72.8441	22.86	-0.86
7/8/2017	182	1330	875	1286	875	44	784	0.15	2.61	183.2190	72.5218	22.54	-1.05
7/9/2017	185	1331	888	1286	888	45	797	0.15	2.66	183.2385	72.2497	22.27	-1.07
7/15/2017	189	1334	927	1286	927	48	836	0.16	2.79	183.2933	71.4385	21.46	-1.13
7/16/2017	190	1332	939	1286	939	46	848	0.15	2.83	183.1111	71.1937	21.21	-1.08
7/30/2017	196	1350	1080	1286	1080	64	989	0.21	3.30	183.7129	68.3261	18.36	-1.44
8/10/2017	197	1337	1230	1286	1230	51	1139	0.17	3.80	182.5672	65.4301	15.45	-1.11
8/11/2017	211	1333	1243	1286	1243	47	1152	0.16	3.84	182.3389	65.1870	1	