

Meteorological Service



**Solar Radiation
Observations
1988**

Dublin
1989

U.D.C.
551.506.3
551.521.12(419.6)

Price £ 2.00

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Introduction

Solar radiation observations by the Irish Meteorological Service commenced in 1954 when the first pyranometer was installed at Valentia Observatory. At present, global and diffuse radiation instruments are installed at Valentia Observatory, Kilkenny, Birr, Dublin Airport, Clones and Malin Head. Global radiation only is measured at Belmullet. Net radiation balance is measured at Valentia Observatory and at Kilkenny by means of Funk net pyrrometers. Diffuse radiation is measured using a pyranometer and shade ring to screen the pyranometer from the direct sun; correction factors are applied to allow for the portion of the sky obscured by the ring. Kipp and Zonen CM6 pyranometers are used throughout the network. Data are recorded by strip chart recorders and, for all global and some diffuse installations, by electronic integrators.

In addition to the global, diffuse and net radiation balance instruments Valentia Observatory is also equipped with the following:-

Eppley Normal Incidence Pyrheliometer and a solar tracker for the measurement of Direct Sun radiation.

Eppley Precision Radiometer (Pyrgeometer) for the measurement of Terrestrial Downward Infra Red radiation.

Kipp and Zonen Linke-Feussner Actinometer No. 93 with OG₁, RG₂ and RG₈ filters for the measurement of Atmospheric Turbidity.

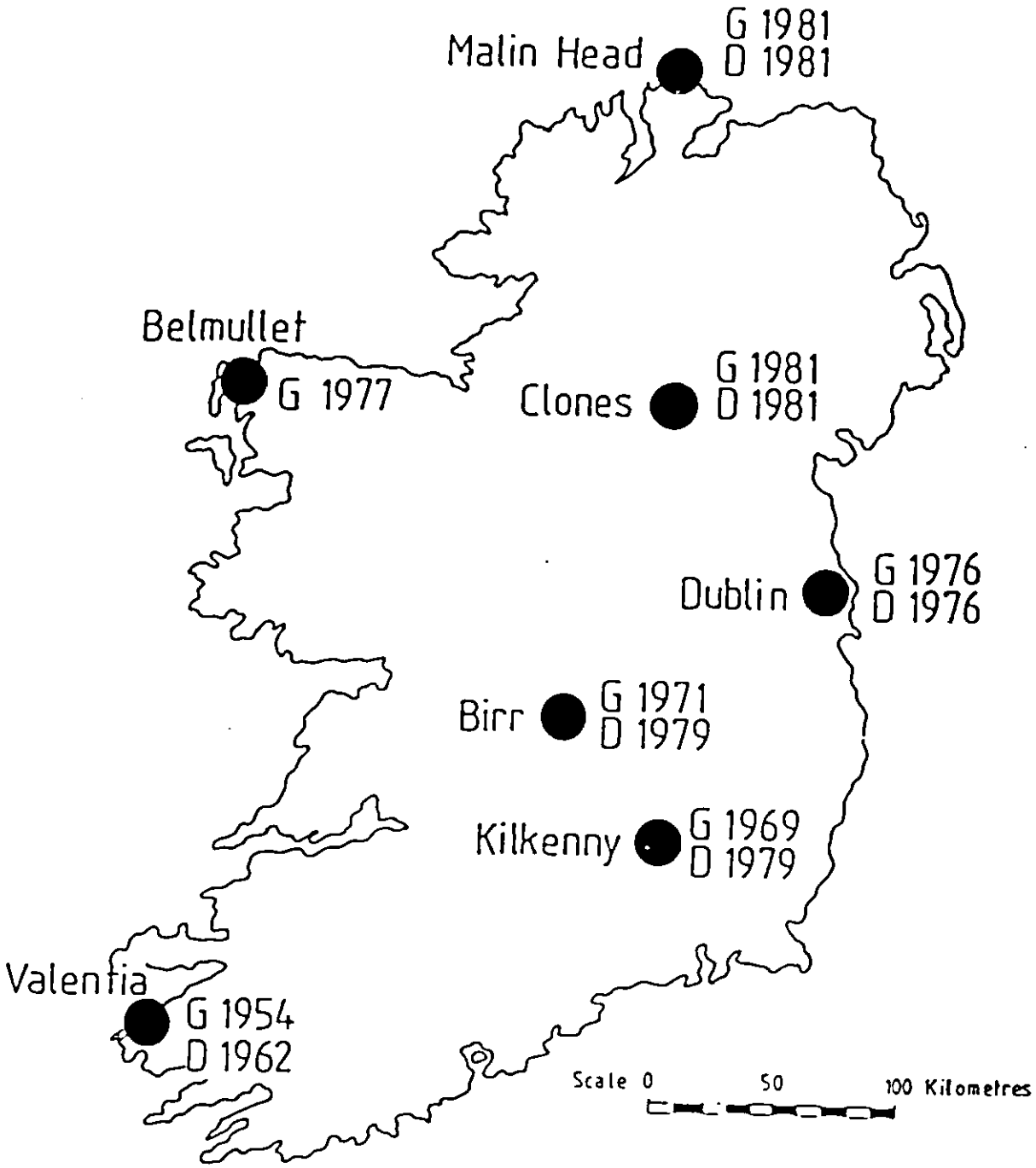
Volz sun photometer for the measurement of Atmospheric Turbidity.

An Angstrom Compensation Pyrheliometer, No. 548, is maintained as a national reference instrument and is regularly calibrated against the World Radiometric Reference standard at World Meteorological Organisation international comparisons. All the network pyranometers and pyrheliometers are calibrated using the Angstrom Pyrheliometer as a standard reference.

A complete list of instruments in use is contained in Page 3. A detailed description of each site, including obstruction diagrams, will be found in [1]. Further information on solar radiation measurements and the Irish network is available in [2].

Only daily totals are published, apart from spot values of direct sun at normal incidence (Table 4). Hourly values may be had, on request, from the Director, Irish Meteorological Service, Glasnevin Hill, Dublin 9.

- References [1] "Solar Radiation Observations 1983 and 1984" (Meteorological Service 1986).
[2] "An Introduction to the Nature and Measurement of Solar Radiation" by K. G. Commins (Meteorological Service Internal Memorandum 110/86).



IRISH METEOROLOGICAL SERVICE
SOLAR RADIATION STATION NETWORK

Table of Instruments in use - 1988

	Sensor	Recorder	Integrator	Diffuse Width mm	Ring Diam. mm
<u>Valentia</u>					
Global	CM6 816084	BD40 846096 (1/1- 2/3)	{ CC11 830150 (1/1 - 3/3)		
		BD41 871124 (3/3- 31/12)	{ CC11 850274 (3/3- 6/7)		
Diffuse	CM6 838785	No. 29 (1/1- 2/3)	{ CC11 830150 (6/7 -31/12)	48	308
		BD41 871124 (3/3- 31/12)			
Balance	FUNK 695	Honeywell 68B/2124			
Infra-Red	Eppley 17154F3	-	Eppley 411-5879		
Direct Sun	Eppley 17247E6	-	Eppley 411-5880 (1/1 - 21/3)		
			CC11 830151 (21/3 - 1/11)		
			CC11 850274 (2/11- 31/12)		
<u>Birr</u>					
Global	CM6 849324	BD40 846094	CC2 750308		
Diffuse	CM6 690224	BDB 806742	-	51	305
<u>Kilkenny</u>					
Global	CM6 849332	XR4 550106 (1/1 - 16/5)	Eppley 411-4094		
		BDB 785761 (16/5 - 31/12)			
Diffuse	CM6 785154	BDB 806748	-	51	305
Balance	FUNK 1263	BD40 844848 (1/1 - 3/1)			
		BDB 785761 (3/1 - 31/3)			
		BD40 844848 (31/3 - 31/12)			
<u>Dublin Airport</u>					
Global	CM6 773731 (1/1-8/6)		CC2 750338 (1/1 - 7/6)		
	CM6 752732 (9/6-1/12)		CC2 750262 (8/6 - 1/12)		
	CM6 838910 (1/12-31/12)		CC2 750338 (1/12-31/12)		
Diffuse	CM6 752732 {(1/1-8/6) } Philips 8056		CC2 750262 { (1/1 - 7/6) }	52	315
	{(1/12-31/12)}		{ (1/12-31/12)}		
	No Record (8/6 - 30/11)				
<u>Clones</u>					
Global	CM6 838911	BDB 806739 (1/1 - 20/9)	Eppley 411-7093		
		BD40 846096 (20/9- 31/12)			
Diffuse	CM6 807231	BDB 806744 (1/1 - 16/2)	-	51	304
		BDB 816861 (16/2 - 31/12)			
<u>Malin Head</u>					
Global	CM6 807223	BDB 806738	Eppley 411-7092		
Diffuse	CM6 807230	BDB 806752	-	51	304
<u>Belmullet</u>					
Global	CM6 683279	BDB 785742	CC1 680076		

NOTE: All Instruments are Kipp and Zonen unless otherwise stated.

Table 1 Valentia Observatory

Daily Totals of Global Solar Radiation (J/cm)

1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	79	232	874	1309	1239	1968	1577	1772	705	176	374	369
2	204	425	608	1592	788	2066	2283	2463	1479	315	241	99
3	224	241	682	2029	1358	1900	1637	1060	1245	791	407	150
4	218	529	1090	1748	2044	1935	1878	961	1079	791	146	178
5	246	550	869	1989	1253	1233	1758	336	1106	329	139	233
6	260	569	703	1182	1909	505	850	994	251	838	347	298
7	225	263	840	1548	2035	1635	1820	2299	460	945	171	143
8	93	320	623	1935	896	1792	1978	1464	934	303	108	169
9	334	416	675	1969	1482	2747	613	1421	1074	661	392	172
10	250	292	825	2052	1039	1098	1890	1621	213	498	281	47
11	193	663	1018	1536	915	1779	1518	726	1372	673	354	42
12	103	665	974	1833	474	2729	442	1909	1039	939	479	153
13	225	457	381	2002	2344	3051	515	239	1484	1016	575	294
14	217	117	448	607	2849	3094	2019	1862	997	888	445	173
15	363	652	987	505	2760	2984	1761	1866	1179	869	313	117
16	141	910	1173	464	2453	2772	392	1700	751	274	125	357
17	246	339	221	492	2656	2221	1343	728	734	211	373	156
18	50	470	210	816	2836	1706	1075	690	498	280	274	92
19	369	332	643	1381	2557	1980	1784	1559	577	617	360	91
20	229	561	742	1633	2624	2130	1192	1731	656	553	539	74
21	249	321	1287	1206	1719	1460	1059	2125	1195	228	501	61
22	444	356	1063	820	2285	2992	620	887	894	648	463	91
23	141	854	320	592	2156	3100	2377	1059	1284	461	411	159
24	354	814	664	490	2076	3075	1172	1321	281	419	299	66
25	531	727	1262	2129	2355	1495	2207	823	279	82	105	84
26	485	448	1398	2169	2534	1159	1967	330	593	392	172	64
27	80	411	994	843	1105	1493	1578	1634	745	709	118	166
28	89	922	999	701	2576	2458	2299	1377	1047	262	157	206
29	305	606	1261	490	1930	962	1755	1174	1211	733	61	109
30	391		1105	729	1994	809	1442	1157	1339	797	326	207
31	85		1109		2145		991	1000		721		127
Total	7423	14462	26048	38791	59386	60328	45792	40288	26701	17419	9056	4747
Mean	239.5	498.7	840.3	1293.0	1915.7	2010.9	1477.2	1299.6	890.0	561.9	301.9	153.1

Table 2 Valentia Observatory Daily Totals of Diffuse Solar Radiation (J/cm) 1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	78	181	406	694	1103	978	1270	969	701	176	299	123
2	166	274	542	601	777	1532	1029	775	988	315	235	96
3	166	219	536	304	966	1272	1000	1028	931	427	336	135
4	180	312	430	547	989	1227	1174	888	903	517	141	152
5	116	246	520	433	1070	1203	1358	336	893	329	135	176
6	185	270	621	932	786	502	846	579	251	551	278	150
7	217	229	652	1039	881	951	1418	813	453	466	154	131
8	88	279	616	585	887	830	1487	803	704	298	107	167
9	193	349	581	483	1200	999	611	1016	889	361	271	156
10	172	244	695	517	974	1004	1330	1213	213	355	237	47
11	184	262	709	703	901	1279	1301	718	804	504	289	42
12	91	240	711	879	470	885	417	1113	868	339	194	149
13	175	375	381	886	911	375	514	239	686	384	135	124
14	177	117	418	603	438	449	1083	1010	924	306	217	149
15	201	275	543	505	607	616	1561	774	919	303	254	115
16	141	170	585	464	989	934	392	1161	751	271	125	97
17	207	337	220	491	711	1304	1272	704	734	205	261	141
18	48	455	210	778	662	1583	1061	675	498	279	206	90
19	208	330	619	1034	997	1536	1529	966	576	534	300	91
20	180	295	510	1069	532	1728	1084	991	656	427	130	73
21	216	320	598	897	1185	948	1008	634	511	210	110	61
22	237	355	557	796	1432	532	615	885	643	252	141	89
23	139	415	310	583	1005	362	850	951	601	356	117	145
24	238	466	644	488	948	419	831	1076	281	359	194	66
25	241	443	682	865	1094	1399	1120	815	279	82	102	82
26	127	367	657	955	785	1077	1264	330	557	385	168	64
27	77	337	821	832	1036	1153	1185	995	470	307	118	136
28	87	385	721	698	706	1533	791	803	609	261	154	160
29	238	444	664	486	910	962	1067	962	464	222	60	106
30	268		856	689	1072	805	1179	686	368	140	203	167
31	85		794		1434		988	697		230		126
Total	5126	8991	17809	20836	28458	30377	32635	25605	19125	10151	5671	3606
Mean	165.4	310.0	574.5	694.5	918.0	1012.6	1052.7	826.0	637.5	327.5	189.0	116.3

Table 3 Valentia Observatory Daily Totals of Radiation Balance (J/cm) 1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	38	21	238	524	626	961	818	676	318	50	-126	-192
2	-131	-11	225	483	351	966	1265	1076	596	156	120	-50
3	-103	10	134	576	650	944	730	549	561	295	-28	-107
4	-120	116	340	562	758	825	831	487	511	243	41	-21
5	-145	6	299	519	479	581	792	191	407	167	79	-72
6	-171	-11	221	277	655	290	471	404	172	286	33	-157
7	-78	-80	334	657	835	929	918	1041	238	293	-199	28
8	45	27	258	565	318	774	1011	720	433	50	5	0
9	-127	6	71	591	620	1227	343	702	501	184	61	19
10	-188	-89	256	588	535	410	990	811	86	81	-73	-17
11	-67	-30	423	506	488	742	824	368	472	98	-122	-13
12	-116	141	331	674	209	1124	168	850	413	67	27	69
13	-175	34	160	673	1035	1266	289	147	526	275	-65	37
14	-205	4	195	338	1146	1218	816	804	413	121	-83	-1
15	-93	50	425	250	1063	1273	853	735	445	138	-63	-14
16	13	102	448	199	821	1156	250	810	330	103	9	-245
17	-56	89	140	256	971	1071	701	325	328	110	109	-49
18	-58	175	141	422	1153	876	602	312	204	130	92	4
19	4	91	278	711	1004	932	913	859	291	144	31	22
20	-136	213	137	766	940	971	561	839	317	93	-212	43
21	-84	110	444	418	586	565	559	918	568	-49	-332	-26
22	-5	102	434	314	1087	1235	308	477	302	29	-301	36
23	39	246	93	274	1085	1319	1238	471	526	125	-202	-17
24	-101	82	204	184	914	1325	598	671	179	91	-59	-4
25	31	165	482	901	930	705	1120	407	163	28	-120	24
26	-189	74	434	882	989	529	819	218	264	2	10	-161
27	-120	51	288	353	499	680	774	725	221	95	11	-133
28	-68	310	339	313	1219	1165	1121	554	313	-16	73	38
29	-67	136	503	220	872	440	904	574	328	-81	-20	-8
30	-101		424	365	935	413	694	447	307	-139	-83	-146
31	-179		376		920		433	391		-20		-39
Total	-2713	2140	9075	14361	24693	26912	22714	18559	10733	3149	-1387	-1152
Mean	-87.5	73.8	292.7	478.7	796.5	897.1	732.7	598.7	357.8	101.6	-46.2	-37.2

Table 4

DIRECT SOLAR RADIATION AT NORMAL INCIDENCES
INSTANTANEOUS VALUES (mW/cm^2) 1988

MONTH AND DAY	TIME L.A.T.	ZENITH DISTANCE (Z)	AIR MASS (m)	RADIATION				PRESSURE	TEMPERATURE	VAPOUR PRESSURE	VISIBILITY	CLOUD	
				CLEAR	RED (RG_2)	YELLOW (OG_1)	RED (RG_B)					TYPE	AMOUNT
				$\times 10^1$	$\times 10^1$	$\times 10^1$	$\times 10^1$	hPa	$^{\circ}C$	hPa	Km.		Okta
Feb.													
6	0928	75.3	3.92	635	455	536	384	1004	6.5	6.1	40	Cb	1
15	1336	68.0	2.65	794	540	653	438	1018	8.3	7.7	50	Cu	2
16	1112	65.3	2.38	839	556	671	457	1029	7.6	7.7	50	FcCi	3
16	1316	66.5	2.50	833	560	679	455	1029	8.8	7.4	60	FcCi	Tr
16	1440	73.1	3.43	728	511	612	416	1029	8.6	7.3	60	FcAc	Tr
Apr.													
2	1524	62.8	2.18	820	546	660	443	1015	10.6	7.9	60	CuFc	2
3	0924	56.5	1.81	903	590	717	480	1023	9.5	7.8	60	CuSc	Tr
3	1356	52.3	1.63	902	592	718	482	1023	11.7	7.5	80	Fc	Tr
5	0912	57.3	1.85	747	503	607	414	1027	10.0	8.2	40		0
5	1016	50.5	1.57	782	516	626	425	1027	12.3	8.8	40		0
5	1320	48.5	1.51	788	522	633	428	1026	15.9	9.4	40		0
9	1024	48.5	1.51	874	580	704	470	1022	9.4	7.5	15	Cu	1
13	0944	50.9	1.58	635	461	517	379	1020	13.5	9.3	12	Cu	Tr
May													
7	0912	48.2	1.50	847	551	671	445	1015	16.2	11.0	60	Ci	Tr
7	1040	38.5	1.28	889	567	697	458	1014	17.6	11.1	50	ScAcCi	3
14	0912	46.6	1.45	910	577	708	468	1015	14.7	10.3	60	Cu	1
14	1416	42.5	1.36	921	584	721	471	1015	15.3	11.6	60	Cu	Tr
15	0916	46.0	1.44	751	497	603	408	1016	13.8	11.9	50	Ci	1-
15	1248	34.3	1.21	889	560	690	454	1017	15.1	11.4	50	FcCi	1
15	1440	45.3	1.42	802	517	634	420	1017	15.3	11.4	50	FcCi	1
19	1440	44.6	1.40	891	582	710	473	1021	12.5	8.7	60	CuScCi	3
19	1508	48.5	1.51	878	576	704	468	1021	12.5	8.7	60	CuScCi	3
28	0958	38.6	1.28	929	581	717	468	991	12.5	11.6	50	CuFc	3
28	1440	43.3	1.37	919	576	711	463	991	13.5	10.2	60	Cu	2
29	1448	44.2	1.39	916	574	709	466	994	13.1	11.5	60	CuSc	3+
June													
9	1432	41.0	1.32	803	515	632	414	1020	19.5	15.8	18	FcScAcCi	3
12	0916	42.4	1.35	888	559	690	454	1019	19.5	15.0	16	FcCi	Tr
13	0944	38.7	1.28	921	577	715	469	1019	19.3	11.7	35	Fc	Tr
13	1008	35.9	1.23	912	574	707	464	1019	19.3	11.7	35	Fc	Tr
13	1400	36.8	1.25	889	563	690	454	1018	22.6	12.7	50	CuCi	1
15	0924	41.3	1.33	807	534	650	439	1020	17.5	15.7	30	Sc	Tr
15	1332	33.6	1.20	800	522	640	424	1019	17.6	15.8	20	Cu	Tr

Table 4

DIRECT SOLAR RADIATION AT NORMAL INCIDENCES
INSTANTANEOUS VALUES (mW/cm²) 1988

MONTH AND DAY	TIME L.A.T.	ZENITH DISTANCE (Z)	AIR MASS (m)	RADIATION				PRESSURE	TEMPERATURE	VAPOUR PRESSURE	VISIBILITY	CLOUD	
				CLEAR	RED (RG ₂)	YELLOW (OG ₁)	RED (RG ₈)					TYPE	AMOUNT
				x10 ¹	x10 ¹	x10 ¹	x10 ¹	hPa	°C	hPa	Km.		Okta
June													
16	1508	45.7	1.43	769	515	624	416	1019	17.0	14.9	20	Cu	Tr
17	1248	30.0	1.15	896	552	685	443	1021	17.6	16.1	40	StScCi	3
22	1348	35.2	1.22	805	564	701	452	1031	16.0	13.5	50	Ci	2
22	1528	48.6	1.51	844	535	663	428	1030	16.0	13.1	50	Ci	Tr
23	0830	48.9	1.52	893	575	701	465	1030	16.2	14.9	50	Ci	Tr
23	1104	30.5	1.16	907	565	699	455	1030	18.8	14.0	50	Ci	Tr
23	1522	47.8	1.49	874	546	670	454	1030	19.2	16.6	50	Ci	Tr
24	0814	51.3	1.60	877	560	688	453	1029	17.3	14.4	50	Ci	Tr
24	0916	42.3	1.35	899	568	701	454	1029	17.3	14.4	50	Ci	Tr
24	1030	33.3	1.20	919	573	708	460	1029	17.0	14.7	50	Ci	Tr
24	1352	35.7	1.23	896	561	698	449	1028	17.5	15.3	50	CuCi	Tr
Aug													
2	1408	42.6	1.36	882	552	686	443	1020	15.9	12.7	50	CuAcCi	3
Sep													
11	1336	51.5	1.60	815	525	646	419	1026	14.7	12.9	40	CuSc	4
30	1020	58.8	1.93	861	561	686	448	1029	13.3	10.1	60	CuCi	2
Oct													
30	1028	68.8	2.75	764	526	634	423	1026	11.8	9.2	50	Ci	Tr
30	1132	66.1	2.46	819	551	667	444	1026	13.0	9.1	50	Ci	Tr
30	1424	72.8	3.37	686	494	586	405	1025	12.2	9.0	50	Ci	Tr
30	1538	81.0	6.24	471	383	429	314	1025	11.2	9.0	50	Ci	Tr
Nov													
13	1032	72.6	3.33	667	457	556	374	1033	7.4	9.7	50	Ci	3
20	0944	77.6	4.61	717	534	622	436	1020	5.7	6.8	50	CuFc	2
20	1356	76.1	4.13	758	557	653	455	1021	5.8	6.3	50	CuFc	1
21	1308	73.5	3.51	790	561	668	459	1029	6.3	5.5	70	ScCi	Tr
22	0944	78.0	4.75	711	526	619	432	1032	-1.7	4.4	60	Sc	Tr
22	1028	74.9	3.82	757	539	648	446	1032	1.0	5.1	60		0
22	1432	79.4	5.35	631	487	564	400	1032	6.6	4.4	70	FcScCi	1+
23	0956	77.3	4.50	621	475	550	392	1032	-1.0	5.0	70	ScCi	Tr
23	1200	72.3	3.26	730	521	626	428	1032	3.9	5.1	70	ScCi	1
Dec													
16	1048	76.9	4.37	630	460	553	373	1029	7.0	9.0	50	Sc	Tr
16	1200	75.2	3.89	681	481	577	390	1028	7.0	8.8	50	Cu	1-

Table 5 Valentia Observatory

Daily Totals of Direct Solar Radiation (J/cm)

1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1		129	909	1017	131	1222	416	1490	12		157	1086
2	121	408	90	1875	7	767	1591	2642	724		2	
3	153	42	310	3321	522	683	959	20	519	572	100	24
4	106	586	1376	2297	1662	843	1010	122	278	555		82
5	487	812	627	2878	336	29	683		300	2		217
6	280	973	105	444	1843	4	1	883		428	217	545
7	18	57	330	905	1792	818	444	2178	12	914	84	19
8	5	75	49	2315	11	1305	518	968	347	9		
9	468	105	193	2425	350	2617	5	466	222	636	262	47
10	288	98	265	2716	43	208	774	542		351	101	
11	17	1018	495	1476	11	824	251	5	973	347	157	
12	92	1036	389	1417		3100	112	1088	319	1459	903	12
13	176	148		1825	1965	4248	2		1395	1472	1600	620
14	137		57	1	3892	4246	1614	1147	167	1324	727	70
15	644	1008	753		3301	3789	382	1845	386	1316	128	
16		2184	925		2153	2893		1032	9	8		1229
17	118				3242	1124	48	29			298	111
18		12		60	3414	103	9	41		3	177	
19	538	4	55	416	2472	607	309	723	2	236	196	
20	186	614	643	637	3634	420	151	1045		200	1707	
21	59		1253	643	1052	980	38	2199	1148	32	1511	
22	601		802	17	980	3799			473	1045	1338	
23		974	3	3	1497	4551	2229	104	1301	180	1088	35
24	326	665	19		1326	4392	446	211		73	328	
25	936	655	852	2011	1937	182	1593	10			11	
26	1306	134	1230	1743	2756	92	1021		58	23	1	
27		147	294	11	108	378	528	934	452	1078		107
28		1054	374		2620	1143	2194	777	904	1		114
29	155	291	1010	1	1353		845	223	1481	1431		
30	341		514	67	1047	3	318	758	2021	1989	474	114
31			480		1189		2	598		1399		
Total	7558	13229	14402	30521	46646	45370	18493	22080	13503	17083	11567	4432
Mean	243.8	456.2	464.6	1017.4	1504.7	1512.3	596.5	712.3	450.1	551.1	385.6	143.0

Table 6 Valentia Observatory Daily Totals of Long Wave (Infra Red) Radiation (J/cm) 1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	3123	2746	2600	2683	3021	3002	2958	2949	3132	3165	2560	2439
2	2683	2504	2781	2365	3017	3003	3063	2704	2944	3200	3038	2763
3	2610	2698	2569	2234	2955	3006	2997	3195	2916	3040	2747	2754
4	2544	2620	2410	2249	2613	2813	2919	3281	3131	2964	2990	2810
5	2424	2367	2709	2270	2712	3113	3018	3395	3010	3173	3075	2662
6	2387	2351	2786	2455	2569	3240	3177	3189	3475	2874	2834	2535
7	2557	2586	2861	2707	2814	3089	3051	3029	3436	2662	2734	2968
8	3061	2713	2889	2425	2840	2947	3009	3165	3217	3008	3153	2978
9	2530	2523	2543	2307	2835	2987	3250	3235	3234	2761	2826	3003
10	2390	2401	2635	2221	3069	3013	3059	3108	3270	2677	2770	3020
11	2690	2264	2778	2499	3123	2927	3120	3297	2843	2659	2571	3125
12	2751	2532	2745	2530	2984	2771	3084	2969	2959	2394	2691	3137
13	2468	2614	2883	2533	2649	2765	3220	3428	2766	2574	2369	2795
14	2420	2860	2991	3099	2528	2667	2940	3068	2961	2656	2568	2885
15	2245	2433	2736	3176	2547	2720	3148	2809	2879	2615	2812	2968
16	2713	2195	2619	3142	2669	2835	3293	2972	3061	3043	3121	2225
17	2546	2739	2987	3159	2490	3017	3155	3280	3067	3231	3014	2689
18	2724	2818	3130	3108	2369	3223	3269	3193	3056	3258	3024	3077
19	2553	2799	2986	2911	2443	3069	3163	3125	3113	2906	2813	3047
20	2448	2785	2702	3002	2301	3013	3056	3064	3189	2926	2200	3145
21	2473	2817	2693	2925	2655	2946	3383	2821	2976	2977	1866	3018
22	2507	2711	2950	2953	2946	2596	3224	3241	2861	2710	1896	3052
23	3015	2529	3046	2994	2860	2713	3004	3081	2922	3009	2070	2921
24	2549	2313	2872	2899	2675	2653	3101	3146	3283	3009	2644	3080
25	2511	2536	2737	2474	2624	3258	2956	3242	3337	3236	2779	3100
26	2222	2734	2544	2658	2680	3138	2916	3434	3177	2865	2873	2799
27	2688	2766	2718	2950	2924	3220	2954	2959	2972	2653	2969	2790
28	2729	2815	2644	2948	2846	3123	2892	2900	2670	2802	3163	3075
29	2574	2665	2613	3000	2911	3169	3047	3041	2571	2327	3109	3019
30	2400		2648	2984	2963	3168	3105	2976	2403	2222	2772	2766
31	2564		2647		2889		3139	2999		2434		2969
Total	80099	75434	85452	81860	85521	89204	95670	96295	90831	88030	82051	89614
Mean	2583.8	2601.2	2756.5	2728.7	2758.7	2973.5	3086.1	3106.3	3027.7	2839.7	2735.0	2890.8

Table 7 Kilkenny

Daily Totals of Radiation Balance (J/cm)

1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	-18	-76	154	269	716	700	991	831	476	151	112	-96
2	-69	-152	237	621	350	943	860	1110	751	36	110	-31
3	-134	-243	-40	678	350	954	784	517	677	143	79	-182
4	-241	-10	92	628	932	910	502	607	568	265	62	-162
5	-159	-27	119	686	772	984	937	993	605	247	40	-278
6	-168	32	106	522	1079	354	525	870	512	161	45	-222
7	-167	-97	274	346	483	355	651	820	579	274	-21	50
8	77	145	167	612	1082	637	786	270	320	-1	-31	21
9	-171	-11	83	796	574	1412	799	732	721	-82	133	-44
10	-246	-65	257	637	871	973	1381	653	212	267	-77	-44
11	-31	-3	235	818	725	895	1145	459	670	-13	-10	-152
12	-102	154	299	551	868	1534	438	968	722	-2	15	-94
13	-280	91	133	750	1124	1589	713	197	659	369	-65	50
14	-262	14	223	112	1026	1358	1061	799	219	153	60	-29
15	7	-118	264	331	1135	1542	742	688	447	272	-19	-67
16	67	60	256	354	1229	1274	498	975	344	65	41	-167
17	-19	84	98	453	1320	655	510	207	399	46	28	-110
18	-57	159	129	331	742	880	979	506	555	115	8	19
19	-38	86	122	800	1209	705	770	792	169	62	-23	-147
20	-110	97	191	794	814	810	926	697	364	245	-80	24
21	-77	79	587	490	1128	567	476	559	206	50	-178	-72
22	-52	162	157	658	1170	1587	368	342	582	129	-30	24
23	76	141	391	704	575	1529	930	437	666	50	-52	-49
24	-21	150	400	631	555	1606	1159	614	165	220	-9	-9
25	6	7	501	786	1124	825	1284	374	334	45	33	-14
26	-8	142	521	442	796	429	1094	291	278	76	-47	-103
27	-38	55	440	523	1074	454	1001	779	142	210	-23	4
28	12	359	544	776	480	885	609	806	310	32	54	-4
29	49	62	491	163	558	808	1041	570	353	-49	-31	-112
30	-17		671	171	742	710	734	203	370	66	44	-88
31	-140		583		880		803	801		67		-195
Total	-2331	1277	8685	16433	26483	28864	25497	19467	13375	3669	168	-2279
Mean	-75.2	44.0	280.2	547.8	854.3	962.1	822.5	628.0	445.8	118.4	5.6	-73.5

Table 8 Kilkenny

Daily Totals of Global Solar Radiation (J/cm)

1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	75	172	681	891	1282	1548	1827	1705	839	627	699	79
2	284	282	628	1521	661	1910	1683	2119	1639	244	596	58
3	301	153	568	1491	665	1777	1593	1054	1656	498	537	150
4	203	598	714	1652	1890	1834	1128	1111	1286	634	447	313
5	146	584	546	2006	1596	1875	1805	2158	1443	653	145	174
6	354	638	360	1497	2399	719	1041	2019	825	827	186	372
7	388	206	599	822	1240	857	1229	1912	1110	1098	355	191
8	222	638	491	1448	1940	1255	1517	805	708	320	46	167
9	230	349	509	1782	1338	2540	1347	1505	1518	426	421	140
10	278	336	868	1546	1776	1818	2491	1335	463	964	251	65
11	353	801	661	2339	1595	1754	2024	859	1531	265	561	112
12	41	843	803	1494	1789	3029	892	2051	1478	144	521	144
13	224	411	409	1908	2179	3237	1437	426	1524	904	496	242
14	299	109	490	310	2180	2701	2047	1548	773	851	511	103
15	356	166	787	594	2555	2969	1267	1691	1050	995	403	102
16	185	841	734	734	2644	2555	871	2197	687	217	209	345
17	181	453	360	850	2739	1503	940	464	809	114	265	143
18	89	348	240	615	1721	1686	1692	988	1140	212	276	137
19	343	256	495	1616	2493	1344	1568	1639	406	410	206	321
20	367	302	674	1520	1909	1517	1904	1512	747	639	503	77
21	398	478	1280	1168	2504	1273	916	1192	490	166	523	90
22	478	513	621	1490	2503	3051	709	759	1247	458	532	151
23	186	771	915	1579	1204	3024	1829	976	1413	260	488	226
24	443	837	1084	1459	1390	3027	2049	1441	374	645	262	185
25	251	422	1254	1911	2425	1648	2332	887	623	91	398	202
26	357	549	1571	1075	1825	899	2248	603	720	375	134	56
27	87	375	1172	1257	2130	989	1876	1702	662	762	117	246
28	115	844	1297	1573	997	1798	1293	1715	1142	696	363	301
29	525	785	1419	405	1285	1532	2039	1190	1213	751	55	159
30	482		1589	390	1441	1213	1509	635	1352	764	346	318
31	276		1480		1772		1669	1771		758		291
Total	8517	14060	25299	38943	56067	56882	48772	41969	30868	16768	10852	5660
Mean	274.7	484.8	816.1	1298.1	1808.6	1896.1	1573.3	1353.8	1028.9	540.9	361.7	182.6

Table 9 Kilkenny

Daily Totals of Diffuse Solar Radiation (J/cm²)

1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	74	170	423	699	1095	994	1406	959	758	531	259	79
2	156	209	578	668	644	1326	1264	857	719	240	306	56
3	168	147	434	866	663	1202	1092	985	716	445	347	94
4	165	245	421	820	1122	N/A	1031	1051	887	440	366	124
5	106	278	492	500	967	1456	1439	1040	988	414	145	117
6	110	254	347	916	790	708	976	1232	700	500	184	122
7	146	177	494	703	1027	813	1178	881	651	390	271	162
8	170	211	479	986	1306	1065	1304	594	689	315	46	158
9	147	306	466	692	953	957	1102	1018	796	348	290	135
10	179	294	545	673	1495	1415	1181	957	460	362	233	65
11	199	239	589	526	1255	1285	1230	788	697	263	278	107
12	41	160	636	662	1263	827	762	968	616	144	161	144
13	129	356	399	921	1026	376	998	416	675	419	218	175
14	174	107	477	307	1344	872	1292	962	671	363	192	103
15	180	147	550	567	1269	722	1152	1117	821	268	252	99
16	184	252	552	699	859	1134	850	683	678	217	209	94
17	170	388	337	729	1110	1327	886	459	728	114	242	142
18	85	347	239	574	964	1543	1324	745	791	212	181	132
19	203	251	466	923	924	1273	1311	972	405	322	188	128
20	273	302	592	1005	952	1410	1239	1022	647	345	125	77
21	224	467	519	1034	908	1062	871	974	451	163	127	90
22	155	490	411	866	1300	584	701	749	537	254	216	142
23	179	462	629	1277	947	610	1148	952	472	239	105	138
24	167	408	792	1163	1056	571	972	876	367	379	210	140
25	247	411	634	974	1021	1410	966	874	558	91	155	162
26	304	415	433	1032	1211	799	1089	599	655	329	134	56
27	86	373	730	1075	1210	941	1087	1035	546	294	116	170
28	110	522	599	1303	856	1438	929	750	451	230	173	207
29	186	403	729	405	1066	1117	949	980	475	157	53	140
30	322		591	389	1143	1065	1179	557	405	179	255	164
31	237		587		1325		1308	719		236		197
Total	5276	8791	16170	23954	33071	N/A	34216	26771	19010	9203	6037	3919
Mean	170.2	303.1	521.6	798.5	1066.8	N/A	1103.7	863.6	633.7	296.9	201.2	126.4

Notes: "N/A" indicates value not available due instrument malfunction

Table 10 Birr

Daily Totals of Global Solar Radiation (J/cm)

1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	67	192	682	1202	1596	1186	1844	2135	876	382	598	63
2	198	345	509	1488	853	1695	1871	1936	1440	310	646	56
3	184	182	615	1581	992	1729	1279	786	1509	412	591	162
4	153	449	864	1874	1164	1448	1758	774	1123	629	471	274
5	99	570	567	1961	1369	1677	1327	1479	1035	692	164	249
6	326	566	264	985	1944	612	1152	1546	1266	638	193	328
7	303	245	457	434	1280	766	2098	2380	1188	991	413	165
8	206	612	666	939	1195	2085	1332	937	783	406	139	70
9	251	276	409	1779	1208	2527	1362	1517	1361	596	376	118
10	251	303	821	1057	977	1549	2092	1239	275	958	241	58
11	238	703	727	2049	1329	2669	1772	966	1303	393	459	93
12	59	818	843	1854	1225	3057	920	1829	1366	164	497	114
13	331	386	344	1842	2064	3089	1577	415	1347	651	472	136
14	330	265	352	545	2056	2881	1855	841	643	879	532	125
15	347	258	787	783	2304	1855	1026	1699	551	934	382	110
16	248	710	489	931	2608	1729	681	2005	512	217	364	323
17	270	482	419	915	1919	1392	870	414	578	161	224	116
18	92	234	325	1363	1657	1263	1353	1076	508	425	224	68
19	211	263	548	2024	1931	878	1833	1389	494	558	215	306
20	302	319	578	1584	2219	1363	1595	1131	560	679	403	45
21	323	425	1109	998	2259	1029	1215	1367	623	205	577	97
22	409	427	568	1763	2195	2939	604	976	1053	772	247	59
23	136	650	615	1371	901	2950	1851	967	1384	183	492	162
24	421	719	772	628	1458	2700	1703	1372	434	718	286	95
25	170	305	1249	2101	2323	1295	1905	1062	290	142	413	176
26	238	406	1334	1348	2510	940	1845	658	808	497	179	69
27	319	363	1051	1597	1676	1873	1699	1344	1018	658	83	286
28	217	560	1159	1790	1003	1598	1242	1637	1008	607	311	270
29	457	610	1342	981	1523	1129	1702	1179	1081	786	70	298
30	337		1246	479	1076	869	1406	833	1197	726	247	311
31	258		1502		1523		1796	1731		750		257
Total	7751	12643	23213	40246	50337	52772	46565	39620	27614	17119	10509	5059
Mean	250.0	436.0	748.8	1341.5	1623.8	1759.1	1502.1	1278.1	920.5	552.2	350.3	163.2

Table 11 Birr

Daily Totals of Diffuse Solar Radiation (J/cm)

1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	67	188	511	689	1215	998	1384	974	727	329	335	63
2	130	181	491	637	790	1115	1402	886	829	302	270	56
3	138	168	531	618	880	1234	868	766	732	340	306	124
4	113	267	404	609	1018	1259	1169	758	668	415	318	168
5	93	267	440	433	1119	1221	1151	1192	844	504	164	110
6	108	292	254	879	1025	603	998	1203	816	458	190	114
7	159	216	426	433	987	741	1180	599	837	420	293	152
8	165	198	599	805	1024	1191	1165	749	705	363	138	70
9	149	261	347	685	1017	1192	1087	1030	780	472	241	116
10	186	262	515	980	886	1299	1176	991	268	308	215	50
11	200	239	615	484	1165	1006	1236	929	747	381	337	64
12	59	198	657	582	974	548	797	988	620	163	249	113
13	159	324	341	930	975	367	1072	410	663	355	165	128
14	197	259	342	540	1191	596	1235	760	623	312	122	125
15	193	234	458	744	1121	1081	976	1052	547	253	214	110
16	213	429	426	859	663	1235	669	686	509	213	226	102
17	219	327	408	755	1083	1127	837	409	574	158	208	114
18	92	233	325	1016	1267	1208	1058	716	504	337	201	66
19	173	260	534	777	1040	864	1200	832	481	379	182	112
20	234	312	527	994	959	1271	1227	881	538	261	143	44
21	168	413	467	908	1016	783	1104	1010	524	200	110	95
22	192	420	437	1010	1245	563	598	904	630	243	246	52
23	135	358	426	1151	835	570	1040	903	516	174	108	132
24	189	494	674	620	863	662	947	867	428	269	191	95
25	159	279	573	814	923	1125	928	943	286	138	148	140
26	218	372	486	1069	897	858	1167	623	620	429	159	69
27	237	357	626	1180	1058	1358	1106	816	449	240	83	159
28	185	413	686	1160	920	1219	894	705	507	258	153	197
29	188	411	719	927	1042	1031	1013	909	447	151	69	118
30	240		651	472	857	830	1079	627	429	228	178	180
31	222		635		1189		1242	681		197		180
Total	5180	8632	15531	23760	31244	29155	33005	25799	17848	9250	5962	3418
Mean	167.1	297.7	501.0	792.0	1007.9	971.8	1064.7	832.2	594.9	298.4	198.7	110.3

Table 12 Dublin Airport

Daily Totals of Global Solar Radiation (J/cm)

1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	129	298	903	791	N/A	N/A	1869	1875	1168	706	618	14
2	263	359	623	1722	N/A	N/A	1318	1441	1477	244	158	23
3	277	215	694	1505	N/A	N/A	2316	1210	1392	338	345	82
4	189	361	905	1608	N/A	N/A	1540	1063	1312	373	562	324
5	203	571	729	1862	N/A	N/A	1243	2126	1095	647	163	238
6	229	534	365	1291	N/A	N/A	1550	1966	869	706	139	336
7	334	216	543	397	N/A	N/A	1692	2336	1496	1064	328	176
8	156	675	570	868	N/A	N/A	1307	755	1095	579	121	119
9	196	315	362	1447	N/A	2631	1503	1271	1201	572	333	286
10	237	424	921	1115	N/A	1593	2061	904	359	1050	230	71
11	229	651	553	1955	N/A	2708	2188	1184	1427	343	488	150
12	26	719	1040	1947	N/A	2945	1155	1678	1412	121	397	90
13	318	249	514	1696	N/A	3046	1851	534	1242	503	425	76
14	294	297	314	745	N/A	2860	1743	1129	809	926	496	126
15	327	148	N/A	935	N/A	1678	1680	1822	730	927	434	109
16	370	849	N/A	N/A	N/A	1525	1127	1740	779	427	391	338
17	220	515	N/A	N/A	N/A	2592	951	763	579	237	224	153
18	115	265	N/A	N/A	N/A	1649	1338	967	598	182	402	87
19	260	176	N/A	N/A	N/A	1296	1484	1339	507	382	250	290
20	219	158	N/A	N/A	N/A	1299	1870	954	577	735	326	101
21	399	409	N/A	N/A	N/A	1268	1428	1346	476	104	448	95
22	441	331	N/A	N/A	N/A	2875	593	993	1032	737	188	58
23	184	785	N/A	N/A	N/A	2824	1979	1025	1360	155	429	229
24	351	902	881	N/A	N/A	2869	2034	1600	729	647	445	132
25	128	422	N/A	N/A	N/A	1035	2287	1258	514	83	67	145
26	254	339	1384	N/A	N/A	924	1906	1025	1043	411	87	78
27	273	337	1211	N/A	N/A	1456	1724	1508	649	618	148	281
28	80	610	N/A	N/A	N/A	1657	862	1695	1144	771	333	282
29	362	763	1368	N/A	N/A	1039	1914	1320	1229	618	66	312
30	308		1202	N/A	N/A	1175	1479	614	1212	560	219	294
31	362		1070		N/A		1444	1801		496		273
Total	7743	12893	N/A	N/A	N/A	N/A	49436	41242	29512	16262	9260	5368
Mean	249.8	444.6	N/A	N/A	N/A	N/A	1594.7	1330.4	983.7	524.6	308.7	173.2

Notes: "N/A" indicates value not available due instrument malfunction

Table 13 Dublin Airport

Daily Totals of Diffuse Solar Radiation (J/cm)

1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	110	235	308	712	984	1126	N/A	N/A	N/A	N/A	N/A	14
2	134	234	498	469	1150	1198	N/A	N/A	N/A	N/A	N/A	23
3	115	203	408	756	465	1163	N/A	N/A	N/A	N/A	N/A	63
4	146	238	434	571	847	1326	N/A	N/A	N/A	N/A	N/A	127
5	129	163	550	469	962	1397	N/A	N/A	N/A	N/A	N/A	160
6	144	240	363	781	810	735	N/A	N/A	N/A	N/A	N/A	96
7	96	145	465	396	1009	909	N/A	N/A	N/A	N/A	N/A	158
8	155	189	459	745	1142	N/A	N/A	N/A	N/A	N/A	N/A	118
9	130	314	358	679	875	N/A	N/A	N/A	N/A	N/A	N/A	212
10	137	277	471	814	N/A	N/A	N/A	N/A	N/A	N/A	N/A	69
11	184	219	522	519	852	N/A	N/A	N/A	N/A	N/A	N/A	94
12	26	188	677	542	1262	N/A	N/A	N/A	N/A	N/A	N/A	90
13	118	247	492	873	945	N/A	N/A	N/A	N/A	N/A	N/A	73
14	117	269	304	717	998	N/A	N/A	N/A	N/A	N/A	N/A	124
15	152	104	480	907	N/A	N/A	N/A	N/A	N/A	N/A	N/A	105
16	120	287	315	829	584	N/A	N/A	N/A	N/A	N/A	N/A	79
17	203	386	492	880	1059	N/A	N/A	N/A	N/A	N/A	N/A	140
18	113	263	288	974	920	N/A	N/A	N/A	N/A	N/A	N/A	86
19	163	176	395	587	909	N/A	N/A	N/A	N/A	N/A	N/A	112
20	175	157	610	843	920	N/A	N/A	N/A	N/A	N/A	N/A	101
21	157	385	510	1068	538	N/A	N/A	N/A	N/A	N/A	N/A	94
22	136	329	356	1115	1111	N/A	N/A	N/A	N/A	N/A	N/A	58
23	173	287	584	1041	965	N/A	N/A	N/A	N/A	N/A	N/A	145
24	199	202	643	1021	903	N/A	N/A	N/A	N/A	N/A	N/A	124
25	126	406	490	762	832	N/A	N/A	N/A	N/A	N/A	N/A	118
26	227	309	407	815	1072	N/A	N/A	N/A	N/A	N/A	N/A	77
27	266	334	601	1018	883	N/A	N/A	N/A	N/A	N/A	N/A	150
28	71	447	607	1171	656	N/A	N/A	N/A	N/A	N/A	N/A	172
29	269	416	509	1267	1203	N/A	N/A	N/A	N/A	N/A	N/A	107
30	251		565	267	1114	N/A	N/A	N/A	N/A	N/A	N/A	147
31	216		742		1143		N/A	N/A		N/A		138
Total	4758	7649	14903	23608	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3374
Mean	153.5	263.8	480.7	786.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	108.8

Notes: "N/A" indicates value not available due instrument malfunction

Table 14 Malin Head

Daily Totals of Global Solar Radiation (J/cm)

1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	23	215	481	1430	1184	704	2281	2354	509	235	175	107
2	138	243	303	1792	1867	1547	851	1945	867	895	573	78
3	135	342	521	1639	1726	1814	2820	823	1186	410	375	129
4	183	330	557	1816	874	2117	2876	665	1206	182	196	117
5	178	422	744	1933	1410	1992	1469	919	1603	757	454	174
6	154	430	559	969	1762	664	1138	1064	354	378	190	187
7	192	250	495	1392	1810	1121	1355	2077	1230	324	403	96
8	104	301	610	1492	1504	2777	716	687	766	442	186	73
9	201	139	724	1886	1457	3059	723	1150	437	478	305	57
10	163	338	875	1127	993	3020	1643	1171	418	958	175	64
11	225	419	502	1383	1176	2927	1517	830	1188	534	248	162
12	50	505	351	1043	1682	3095	1457	1620	1368	85	178	64
13	293	293	331	1285	1916	1629	1725	1081	1372	425	228	55
14	258	150	317	1023	2422	1471	1979	990	551	554	136	111
15	222	176	497	640	2667	1237	1889	1599	761	920	364	79
16	286	469	935	856	2804	1228	538	1608	847	197	251	169
17	128	565	643	1023	2358	1884	1503	607	1238	139	157	91
18	188	289	257	1194	1966	2026	1222	861	549	101	257	52
19	102	253	594	1742	2389	1225	1597	756	610	423	167	170
20	156	502	874	1131	2622	994	1179	512	452	821	329	64
21	296	603	1286	1755	1448	1526	852	1632	585	199	233	80
22	278	384	528	1106	2518	2577	1244	913	1046	783	211	103
23	122	699	772	1540	1362	2007	1350	810	996	206	323	154
24	313	612	694	1320	1605	1781	2352	1410	1161	656	336	54
25	90	485	1369	1952	2349	1570	1079	785	257	174	243	158
26	208	287	988	1224	1545	1646	1940	1033	901	377	207	89
27	457	421	1165	2333	1677	2362	2386	1508	879	402	118	214
28	78	525	1077	1673	1439	1263	1592	1369	877	581	214	99
29	85	345	797	2121	967	1602	1849	1208	919	503	92	89
30	216		1600	1547	2395	1316	2175	681	723	668	66	36
31	329		1526		890		2312	1340		553		156
Total	5851	10992	22972	43367	64784	64181	49609	36008	25856	14360	7390	3331
Mean	188.7	379.0	741.0	1445.6	1767.2	1806.0	1600.3	1161.5	861.9	463.2	246.3	107.5

Table 15 Malin Head

Daily Totals of Diffuse Solar Radiation (J/cm)

1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	22	213	388	658	872	701	1070	809	499	225	174	89
2	97	223	303	333	1240	993	836	973	570	461	307	72
3	117	201	413	497	1107	1310	771	754	829	325	216	93
4	155	200	435	401	667	1077	813	659	667	180	133	103
5	116	209	513	290	1032	1336	1178	889	442	492	312	129
6	108	205	510	938	1085	657	1021	914	352	291	181	136
7	126	183	489	705	916	1025	1156	862	727	320	208	95
8	101	259	449	817	1332	855	706	626	715	381	159	72
9	137	138	417	492	1152	486	711	962	435	432	235	57
10	129	271	540	1014	921	540	954	946	417	168	134	61
11	143	238	464	865	1050	588	1325	787	697	412	200	136
12	49	225	351	887	959	482	1070	976	576	82	175	64
13	105	287	331	830	1138	1617	1350	949	603	369	172	55
14	153	150	317	695	758	1355	1149	842	549	362	136	110
15	178	175	453	626	635	1225	1336	1087	604	190	101	70
16	96	342	614	804	410	1157	534	1045	824	195	205	120
17	128	281	567	905	867	1729	1341	585	465	138	128	89
18	183	286	256	783	1177	1066	1118	816	537	98	192	52
19	91	251	495	725	852	1189	1314	647	608	368	164	118
20	146	376	645	710	884	982	1093	508	428	176	128	63
21	162	369	401	809	1017	1201	816	787	479	198	163	76
22	166	312	488	898	988	1025	1160	905	525	142	157	96
23	121	312	494	1160	948	1478	861	765	507	199	101	109
24	170	463	658	1050	865	1532	918	759	418	276	157	52
25	90	381	448	780	855	1341	1001	773	254	172	192	110
26	192	279	713	1062	735	1216	1054	813	551	311	164	88
27	200	373	518	506	1028	938	783	633	415	304	118	133
28	77	374	655	1064	1222	1168	993	751	451	234	172	90
29	85	321	649	887	942	1323	1110	877	493	265	89	89
30	187		339	1017	727	1083	899	528	533	273	66	35
31	200		528		874		829	718		241		124
Total	4030	7897	14841	23208	29255	32675	31270	24945	16169	8280	5039	2786
Mean	130.0	272.3	478.7	773.6	943.7	1089.2	1008.7	804.7	539.0	267.1	168.0	89.9

Table 16 Clones

Daily Totals of Global Solar Radiation (J/cm)

1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	35	183	568	1014	1164	867	2049	2144	1179	365	373	89
2	191	428	340	1697	946	1714	1354	1801	1307	744	140	83
3	196	240	715	1352	839	1532	2048	499	1314	424	483	86
4	105	302	896	1673	1179	1185	2362	874	1258	329	346	299
5	119	523	616	1886	1739	1612	941	986	1391	495	226	244
6	279	547	432	1130	1271	680	1186	833	292	408	113	242
7	276	201	489	891	1538	1138	970	2026	898	915	203	122
8	84	N/A	566	1179	1082	2572	1046	742	1170	285	154	69
9	195	96	397	1815	1617	2760	842	1515	1003	905	366	161
10	142	426	840	815	1354	2596	2320	1194	625	1086	239	78
11	227	585	363	1854	1340	2823	1601	598	1084	437	330	220
12	60	683	624	1670	1428	2620	924	1429	1218	154	264	128
13	322	394	232	1213	2142	3024	1215	536	1317	308	382	56
14	251	187	191	532	2199	2674	1723	719	689	927	304	134
15	201	167	422	480	2627	2133	1286	1327	615	866	373	129
16	152	488	377	955	2727	1068	578	1912	647	181	366	229
17	303	484	469	970	2587	1359	869	383	561	153	143	129
18	124	274	173	862	1410	1423	1170	976	483	144	362	35
19	199	280	798	1672	1494	1275	1804	1136	366	434	236	227
20	248	456	715	1167	1872	1133	1543	1039	276	818	430	43
21	364	623	1085	538	2251	1384	517	1177	518	122	379	109
22	341	401	362	1738	2459	2776	755	1105	862	697	306	74
23	120	695	792	1286	1092	2827	1648	910	1194	174	433	196
24	326	698	1181	854	1630	2810	1589	1399	1286	609	409	92
25	226	242	1263	1647	2033	1626	1617	1032	322	146	272	205
26	89	299	1386	1051	2159	1208	1580	973	687	551	132	86
27	425	463	1090	1748	1800	2006	1876	1358	982	426	95	208
28	67	351	830	985	735	2037	1109	1406	964	609	352	201
29	260	438	1349	1406	1803	1216	1761	1166	1144	774	52	234
30	247		1338	273	1659	933	1579	845	1232	715	172	133
31	327		1121		1310		2231	1715		549		210
Total	6501	N/A	22020	36353	51486	55010	44093	35755	26884	15750	8435	4551
Mean	209.7	N/A	710.3	1211.8	1660.8	1833.7	1422.4	1153.4	896.1	508.1	281.2	146.8

Notes: "N/A" indicates value not available due instrument malfunction

Table 17 Clones

Daily Totals of Diffuse Solar Radiation (J/cm)

1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	33	177	425	578	941	804	1210	804	814	340	334	86
2	149	193	322	484	862	1156	1091	1016	783	557	137	82
3	156	174	495	691	805	1260	1109	498	753	355	290	83
4	104	203	439	736	938	1098	1266	827	745	295	295	188
5	116	205	528	467	1248	1292	882	882	738	442	221	131
6	107	288	423	933	1069	669	1004	778	284	334	109	112
7	128	182	465	610	1075	919	890	641	742	491	187	120
8	84	N/A	530	912	972	1207	945	650	688	271	147	68
9	144	92	308	506	1251	957	799	1053	805	414	236	149
10	137	N/A	563	785	1086	1178	1169	922	594	293	219	76
11	194	N/A	357	503	1294	692	1234	551	685	391	253	93
12	59	N/A	596	685	1130	1002	872	861	715	150	221	118
13	113	N/A	230	1010	1001	428	1003	516	666	283	202	52
14	128	N/A	186	513	1044	661	1115	630	652	332	181	129
15	179	162	342	479	679	1043	1150	1046	602	315	194	116
16	152	381	375	830	484	1034	570	842	611	179	282	110
17	197	342	464	876	1051	1238	835	380	550	152	137	116
18	121	264	172	732	914	1240	1067	738	470	144	201	32
19	155	272	720	840	1191	1034	1230	826	360	356	170	104
20	188	429	669	745	1341	1047	1222	914	272	193	98	41
21	177	354	594	510	992	873	509	879	456	119	189	101
22	171	362	353	1098	1111	837	739	988	536	301	153	71
23	120	405	615	1023	974	834	1081	854	491	168	92	135
24	250	419	651	813	952	794	927	809	411	344	102	84
25	210	235	607	762	959	787	1027	827	308	141	187	146
26	87	283	499	858	894	1051	1092	606	571	363	129	78
27	191	317	675	1169	1189	1240	1121	912	465	292	93	138
28	67	285	637	912	712	1361	904	761	497	388	132	179
29	217	359	741	919	1242	1131	961	836	474	156	49	153
30	215		544	272	1138	887	1011	692	387	164	165	128
31	233		650		1005		1054	647		242		165
Total	4582	N/A	15175	22251	31544	29754	31089	24186	17125	8965	5405	3384
Mean	147.8	N/A	489.5	741.7	1017.5	991.8	1002.9	780.2	570.8	289.2	180.2	109.2

Notes: "N/A" indicates value not available due instrument malfunction

Table 18 Belmullet

Daily Totals of Global Solar Radiation (J/cm)

1988

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Day 1	44	322	700	1555	878	817	1464	2409	493	373	326	113
2	149	338	331	1453	1454	1899	1977	1487	1480	899	616	30
3	169	158	499	1106	1461	1888	2637	426	1607	906	497	103
4	236	445	660	1679	1634	1711	1519	709	1094	483	66	243
5	131	255	830	1807	1906	820	654	381	1228	421	480	203
6	159	506	194	1527	1387	885	999	1787	232	514	152	266
7	213	301	595	1577	2261	1737	888	1922	710	888	409	97
8	111	N/A	629	1345	1030	1464	1560	1028	1150	457	53	69
9	190	N/A	962	1829	940	1577	603	1567	396	924	220	130
10	138	147	764	639	1184	2131	1916	1497	595	953	203	41
11	148	459	744	1705	887	2638	1532	582	1199	460	380	286
12	89	647	917	623	1178	2608	720	1926	1321	344	210	98
13	167	353	267	1608	1876	2758	1363	675	1361	474	321	131
14	244	158	434	265	2419	2625	2266	1181	795	971	359	114
15	187	438	751	499	1946	1497	1215	1654	881	878	N/A	68
16	106	388	579	779	2492	1537	839	2023	835	133	211	232
17	194	558	299	679	1490	1790	1407	1406	503	109	196	94
18	125	194	298	1544	2052	2020	1221	607	549	261	182	45
19	175	528	1201	1923	2025	1406	1540	1559	830	275	203	211
20	210	676	813	1584	2076	992	897	1344	500	454	342	68
21	257	577	1102	875	2263	2125	540	1910	1194	96	214	81
22	277	621	666	848	1421	2091	891	746	997	836	159	56
23	172	789	865	879	1096	2218	2108	781	1161	187	276	157
24	369	746	1158	643	1687	2003	1785	1503	1376	630	369	153
25	311	621	1091	963	1333	1889	1238	1059	271	143	234	82
26	303	359	1401	1514	2461	1134	1908	737	1004	582	341	78
27	323	424	725	707	1604	2382	2043	1672	751	473	55	124
28	80	720	846	1456	1120	1354	2101	1567	991	363	290	63
29	440	259	1220	1432	2301	1301	1483	1260	992	738	52	141
30	136		1209	690	1319	911	2108	1167	852	704	244	96
31	163		1248		1289		2436	1459		687		47
Total	6016	N/A	23998	35733	50470	52208	45858	40031	27348	16616	N/A	3720
Mean	194.1	N/A	774.1	1191.1	1628.1	1740.3	1479.3	1291.3	911.6	536.0	N/A	120.0

Notes: "N/A" indicates value not available due instrument malfunction