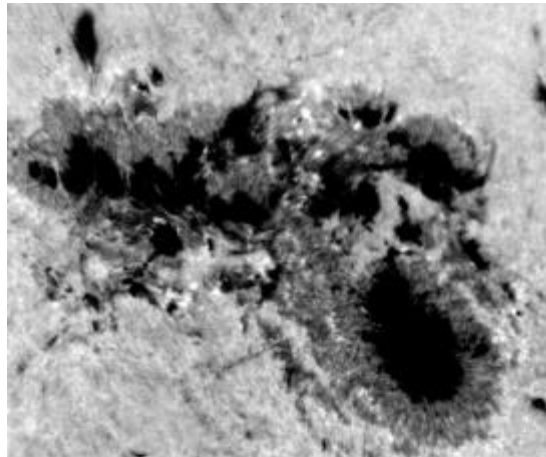
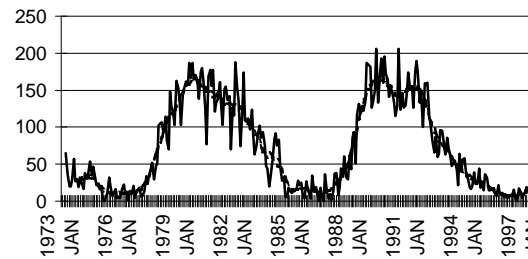


A white-light view of the Sun taken from the USA on 1988 July 01. The huge region in the Sun's southern hemisphere (bottom) is NOAA SEC Region No. 5060 which had an area of 2860 microhemispheres when this photo was taken. Region 5060's area was 3000 microhemispheres two days earlier. On 1988 July 01, the GDSO obtained, a few hours after this photo was taken, the following values; WN = 155, g = 4, BX = 3896, QC = 17 and IS = 119. The Pettis Index and Classification Values were not obtainable.

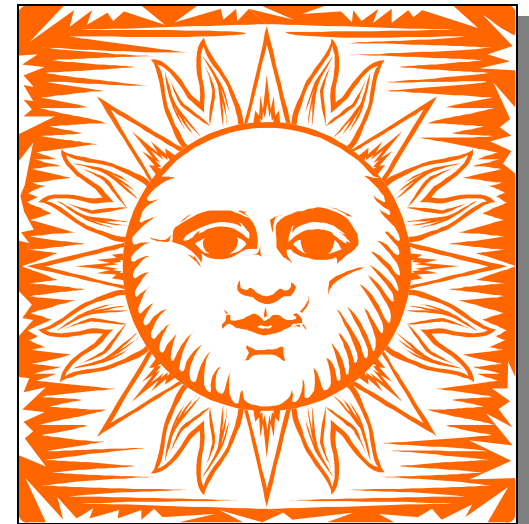


A white-light close-up view of the largest spot within Region 5060, taken on 1988 June 28.

SUNSPOT ACTIVITY from 1973 - 1997.



SUNSPOT ACTIVITY INDICES AND THEIR DEFINITIONS



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A
Georgi Dobrovolski Solar Observatory
Publication.



GDSO

SUNSPOT INDICES

The following are sunspot indices that the GDSO employs, and states in its monthly and annual reports.

WOLF NUMBER [RELATIVE (SUNSPOT) NUMBER]

The Wolf Number is the most well known sunspot index. It has been used for many years and international data in this series stretch back to 1749. It is for this reason that the Wolf Number is in use today. It is NOT a total of sunspots, but is defined as follows;

$$R = k(10g + f) ,$$

where g = number of sunspot regions,
f = number of sunspots, and
k = local co-efficient to bring local observations to a world 'standard'.

The value of k is obtained from dividing 'international' results by local results.

ACTIVE AREA

The AA or g index is merely g in the Wolf Number above. Each region is given 1 point. AA international results are calculated by the BAA Solar Section.

PETTIS INDEX

The Pettis Index (or Pettisindex) [SN or PX] is another sunspot index, but it effectively gives more points to complex regions and fewer to small regions, than what the Wolf Number does. The definition is as follows;

$$SN = 10p + s ,$$

where p = number of penumbrae,
s = number of non-penumbral spots.
Umbræ within penumbrae are not counted.

BECK INDEX

The Beck Index (BX) was devised by Rainer Beck of Germany, and is calculated in the following manner;

$$BX = \sum_{i=1}^g Z_i f_i ,$$

where g = number of regions,
f = number of sunspots,
Z = region constant based on Zürich classes (A to H plus J), the constants for the following regions are;

A	B	C	D	E	F	G	H	J
4	4	8	18	25	36	50	44	37

CLASSIFICATION VALUE

The Classification Value system was devised by Kjell Inge Malde of Hundvåg, Norway. It is calculated from the McIntosh classification system which is an extension of the Zürich classification system, and is as follows;

$$CV = \sum_{i=1}^{ng} M_i ,$$

where g = number of regions, and
M = region constant based on the McIntosh classes, which follow;

AXX = 1	CRO = 5	DKI = 46
BXI = 3	CSI = 12	DKO = 43
BXO = 2	CSO = 11	DRI = 16
CAI = 9	DAC = 31	DRO = 13
CAO = 8	DAI = 22	DSC = 34
CHI = 42	DAO = 19	DSI = 28
CHO = 41	DHC = 58	DSO = 25
CKI = 39	DHI = 52	EAC = 32
CKO = 38	DHO = 49	EAI = 23
CRI = 6	DKC = 55	EAO = 20

continued:

EHC = 59	ESO = 26	FRI = 18
EHI = 53	FAC = 33	FRO = 15
EHO = 50	FAI = 24	FSC = 36
EKC = 56	FAO = 21	FSI = 30
EKI = 47	FHC = 60	FSO = 27
EKO = 44	FHI = 54	HAX = 7
ERI = 17	FHO = 51	HHX = 40
ERO = 14	FKC = 57	HKX = 37
ESC = 35	FKI = 48	HRX = 4
ESI = 29	FKO = 45	HSX = 10

QUALITY COUNT

The Quality Count was devised by Tony Tanti of Naxxar, Malta GC. It gives a number to all 9 Zürich classifications, and is as follows;

$$QC = \sum_{i=1}^g Z_i ,$$

where g = number of regions, and
Z = region constant based on Zürich classes (A to H plus J), the constants for the following regions are;

A	B	C	D	E	F	G	H	J
1	2	3	4	5	6	4	3	2

INTER-SOL INDEX

The Inter-Sol Index was devised by the staff at the Paderborn Public Observatory, Germany, and is as follows;

$$IS = gr + f ,$$

where gr = number of multi-spot regions, and
f = number of sunspots

The GDSO applies a local co-efficient to all of its observed results, in the same manner as the k in the Wolf Number formula.