

solar

THE HANDIMAN'S GUIDE TO SOLAR/GEOMAGNETIC CONDITIONS

from Paul Harden, NA5N

GEOMAGNETIC INDICES AND CONDITIONS

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Kp	Ap	GEOMAGNETIC	HF	
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Index=	Index=	FIELD CONDITIONS	NOISE	AURORA	
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	0		0 - 2		Very Quiet	solar		S1-S2		None	
	1		3 - 5		Quiet			S1-S2		Very Low	
	2		6 - 9		Quiet			S1-S2		Very Low	
	3		12 - 18		Unsettled			S2-S3		Low	
	4		22 - 32		Active			S3-S4		Moderate	
	
	5		39 - 56		MINOR Storm			S4-S6		High	
	6		67 - 94		MAJOR Storm			S6-S9		Very High	
	7		111 -154		SEVERE Storm			S9+		Very High	

	8		179 -236		SEVERE Storm	solar		Blackout		Extreme	
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	9		300 -400		EXTREMELY SEVERE		Blackout		Extreme	
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Kp= Planetary K-index, averaged over past 3 hours and tends

to be a measure of current conditions

Ap= Planetary A-index, 24-hour average and represents overall

geomagnetic field conditions for the UTC day

HF Noise= approximate "S-meter" noise level <10 MHz.

Aurora - Approximate level of ^{solar}auroral activity

High conditions usually extends to: Latitude 45 deg.

Very High conditions extends to about: Latitude 35 deg.

Extreme conditions can extend to below: Latitude 35 deg.

SOLAR WIND averages 350-450 km/sec and density $<10 \text{ p/cm}^3$

$>500 \text{ km/sec}$ or high density can trigger geomagnetic activity

SHOCK WAVE from a solar flare or Coronal Mass Ejection (CME)

arrives at the Earth about 55 hours after the solar event.

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SOLAR FLARE CLASSIFICATIONS

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	FLARE		TYPE OF		HF RADIO		RESULTING	
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	CLASS		FLARE		EFFECTS		GEOMAGNETIC STORM	
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	A		Very small		None		None	
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	B		Small		None		None	
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	C		Moderate		*Low ^{solar} absorption		*Active to Minor	
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	M		Large		*High absorption		*Minor to Major	
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	X		Extreme		*Poss. blackout		*Major to Severe	
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*Conditions cited if Earth is in trajectory of flare emissions

Flare class further rated from 1-9, ex. M1, M2, M3 ... M9

The larger the number, the larger the flare within that class

An X7-X9 is considered a "Grand daddy" flare. Only a few have

occured over the past 30 years and ^{solar} causes total disrptions

to communications, huge aurora's, power grid failures, etc.

Radio and x-ray emissions from a flare effect the Earth for the

duration of the solar event, usually 30 minutes or less.

The Earth is 8 light minutes from the Sun.

SUNSPOT/ACTIVE REGION CLASSIFICATIONS

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SUNSPOT	DESCRIPTION OF		POTENTIAL FOR	
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CLASS	THE ACTIVE REGION	solar FLARE ACTIVITY
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Alpha	Unorganized, unipolar	Little threat, but
	magnetic fields	watched for growth
Beta	Bipolar magnetic fields	C class flares and
	between sun spots	possible large M class
Delta	Strong, compact bipolar	High potential for a M
	fields between spots	or X class major flare
		Major Flare Alert issued

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