3-day Space Weather Conditions (SUPARCO)

Friday, October 11, 2024, 15:34 PST

Radio Blackouts			Solar Radiation Storms			Geomagnetic Storms		
-24 Hr	Current	Predicted	-24 Hr	Current	Predicted	-24 Hr	Current	Predicted
R1	R0	R1- R3	S3	S0	S1/S2	G4	G2	G3/G4

LOCAL CURRENT IONOSPHERIC CONDITIONS (SON)			
DATE	**11-Oct-24 (noon)**	**12-Oct-24 (noon)**	**13-Oct-24 (noon)**
foF2	14.3 MHz	14.5 MHz	14.8 MHz
h'F2	310 km	350 km	370 km
TEC	75 TECU	77 TECU	79 TECU

Maximum Usable Frequency (MUF) and Optimum Traffic Frequency (FOT) for various distances

Distance (km)	100	200	400	600	800	1000	1500	3000
MUF (MHz) for 3 days (11 Oct – 13 Oct)	14.4	14.8	16.1	17.9	20.1	22.5	28.3	36.0
	14.6	14.9	16.6	18.6	20.8	23.7	29.1	36.4
	14.9	15.3	16.8	18.8	21.1	23.8	29.9	37.0
FOT (MHz) for 3 days (11 Oct – 13 Oct)	12.2	12.6	13.7	15.2	17.1	19.1	24.1	30.6
	12.3	12.7	14.1	15.8	17.7	20.1	24.7	29.6
	12.7	13.0	14.3	16.0	17.9	20.2	25.4	31.4

Local ionospheric conditions are enhanced as compared to the predicted monthly median MUF.

LOCAL GEOMAGNETIC CONDITIONS			
K-index	6 (Storm)	Disturbed geomagnetic activity is expected.	Unsettled to disturbed geomagnetic activity is expected.
F (SON/ISB)	45552/50525 nT	45565±10 /50530±20 nT	45565±10/50530±20 nT

The local geomagnetic field is disturbed (Moderate Storm Condition) at the moment.

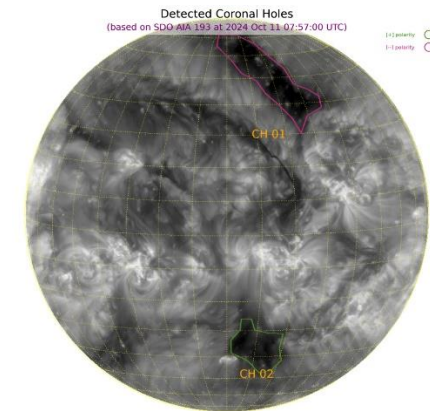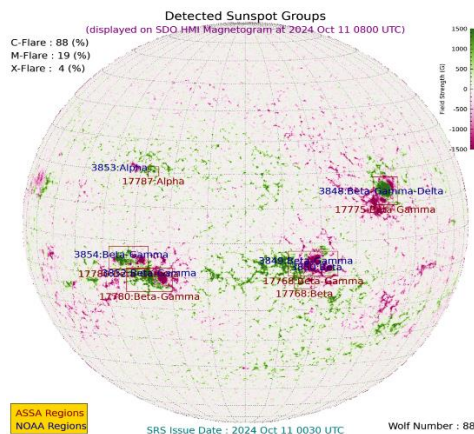| SOLAR CONDITIONS			
SN	150	155 (SSN-predicted)	160 (SSN-predicted)
F 10.7	216 sfu	220 sfu	225 sfu
V_sw	700.4 km/s (Extremely High) (Varied in the past 12 hrs between 265 & 833 km/s)	High levels of solar windspeed may prevail.	High levels of solar windspeed may prevail.
Solar flares	C1.9 (max. flare in the past (M2, 2230 UT)	High level of solar activity is expected.	High level of solar activity is expected.

IMF Bt	+21.34 nT (varied in the past 12 hrs between +21.24 nT & +43.09 nT)	Expected to vary between positive and negative sectors.	Expected to vary between positive and negative sectors.
Bz	+12.63 nT (varied in the past 12 hrs between -42.18 nT & -10.7 nT)		

Solar conditions are at high levels with background X-ray flux at C-class levels.

Daily Sun: 11 October 2024

There are four active regions AR3848, AR3849, AR3852 and AR3854 present on the Sun capable of producing strong M and X-class solar flares having chances of 19% and 4% respectively.

02 Coronal Holes (CHs) are detected on the solar disk.

Detected Sunspot Groups
(displayed on SDO HMI Magnetogram at 2024 Oct 11 0800 UTC)
C-Flare : 88 (%)
M-Flare : 19 (%)
X-Flare : 4 (%)
3853:Alpha
17787-Alpha
3848:Beta-Gamma-Delta
17775-Beta-Gamma
3854:Beta-Gamma
17788 Beta-Gamma
17780:Beta-Gamma
17768:Beta-Gamma
17768:Beta
ASSA Regions
NOAA Regions
SRS Issue Date : 2024 Oct 11 0030 UTC
Wolf Number : 88

Detected Coronal Holes
(based on SDO AIA 193 at 2024 Oct 11 07:57:00 UTC)
CH 01
CH 02

2-Day Conditions

- Solar activity is expected to be at high levels.
- Multiple M-class solar flares, have already occurred from the regions present on the solar limb causing minor to moderate radio frequency blackouts of R1-R2 levels and Severe Geomagnetic storms of G4 levels.
- In case of more M/X-class solar flares, R2 – R3 levels radio blackouts are expected.
- Geomagnetic storms of G3-G4 levels and elevated solar windspeed are expected to prevail due to the ongoing CME effect.
- Enhanced ionospheric conditions are expected for the next 2 days due to increased solar activity levels. It is advised to use the frequency ranges mentioned in the ionospheric section.

For information on radio blackout levels, please follow the link:

http://www.swpc.noaa.gov/noaa-scales-explanation

Sonmiani (SON): 25.2º N, 66.75º E
Islamabad (ISB): 33.7º N, 73.13º E

ANNEXURE

DEFINITIONS OF TERMINOLOGIES USED IN THIS SUMMARY	
foF2	Maximum frequency of F2-layer of the ionosphere
h'F2	Virtual height of the F2-layer
MUF	Maximum usable frequency for 3000 km
K-index	Local index defining geomagnetic conditions
Declination	Planetary A index defining geomagnetic conditions, predicted value during geomagnetic unsettled Conditions
F	Magnitude of the total geomagnetic field vector (unit in nano Teslas)
SON, difference	Sonmiani Geomagnetic Observatory mean value, <u>difference limit</u> from night time value of quiet conditions: 25-30 nT, max: 260 nT
ISB	Islamabad Geomagnetic Observatory mean value
SN	Relative sunspot numbers
V_{SW}	Solar Wind Speed (km/s)
F10.7	Solar radio flux at 2.8 GHz (10.7 cm wavelength)
sfu	Solar flux unit (defines the solar radio 10.7 cm flux)
Solar Flare	Could be B, C, M and X depending upon the intensity of x-rays being emitted (each type has further 10 classes based on amount of energy released by the flare)
IMF	Interplanetary magnetic field (the source of which is the Sun)
Bt	Total IMF (unit in Nano Teslas)
Bz	Vertical component of IMF (could be north/upward/positive or south/downward/negative) (unit in nano Teslas)
AR	Active Regions on the sun currently in view
CME	Coronal Mass Ejection
CH	Coronal Hole
KASI	Korean Astronomy & Space Science Institute
SWFs	Short-wave fadeouts, caused by M/X class flares on the daylit side of the hemisphere absorbing lower Frequencies and hampering HF communication.
SSN-predicted	Smooth Sunspot Number-it is an estimated value using a mathematical relation to forecast it.

RSG SCALES

Radio Blackouts

Minor	Moderate	Strong	Severe	Extreme
R1	R2	R3	R4	R5

Solar Radiation Storms

Minor	Moderate	Strong	Severe	Extreme
S1	S2	S3	S4	S5

Geomegnatic Storms

Minor	Moderate	Strong	Severe	Extreme
G1	G2	G3	G4	G5