3-day Space Weather Conditions (SUPARCO)

Friday, October 04, 2024, 15:48 PST
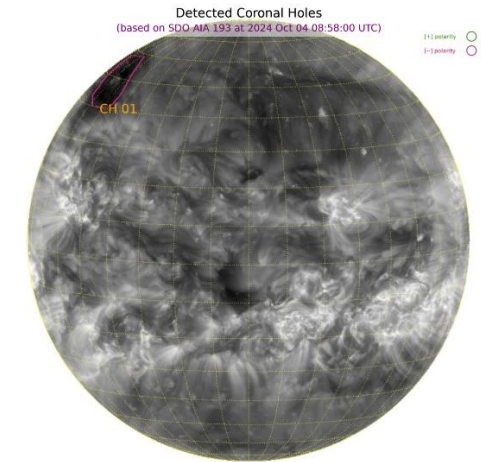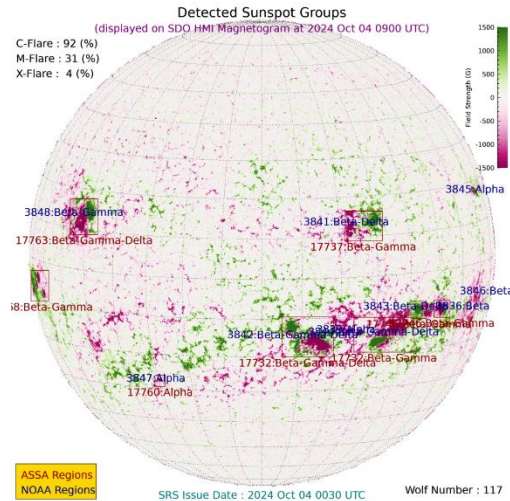
SUPARCO

LOCAL CURRENT IONOSPHERIC CONDITIONS (SON)			
DATE	**4-Oct-24 (noon)**	**5-Oct-24 (noon)**	**6-Oct-24 (noon)**
foF2	14.5 MHz	14.8 MHz	14.3 MHz
h'F2	370 km	350 km	310 km
TEC	75 TECU	78 TECU	72 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 (4 Oct – 6 Oct)	14.6	14.8	16.1	17.9	20.1	22.5	28.3	36.0
	14.9	15.3	16.8	18.8	21.1	23.8	29.9	37.0
	14.4	14.9	16.6	18.6	20.8	23.7	29.1	34.8
FOT (MHz) for 3 days (4 Oct – 6 Oct)	12.3	12.6	13.7	15.2	17.1	19.1	24.1	30.6
	12.7	13.0	14.3	16.0	17.9	20.2	25.4	31.4
	12.2	12.7	14.1	15.8	17.7	20.1	24.7	29.6

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

LOCAL GEOMAGNETIC CONDITIONS			
K-index	1 (Quiet)	Quiet to unsettled geomagnetic activity is expected.	Quiet to unsettled geomagnetic activity is expected.
F (SON/ISB)	45558/50517 nT	45568±10 /50520±20 nT	45568±10/50520±20 nT

The local geomagnetic field is quiet at the moment.

SOLAR CONDITIONS			
SN	229	234 (SSN-predicted)	224 (SSN-predicted)
F 10.7	312 sfu	320 sfu	308 sfu
V_{sw}	390.4 km/s (Varied in the past 12 hrs between 290 & 453 km/s)	Moderate to Slightly elevated levels of solar windspeed may prevail.	Moderate to Slightly elevated levels of solar windspeed may prevail.
Solar flares	C6.0 (max. flare in the past (X9, 1218 UT)	High level of solar activity is expected.	High level of solar activity is expected.
IMF Bt	+6.84 nT (varied in the past 12 hrs between +6.68 nT & +8.19 nT)	Expected to vary between positive and negative sectors.	Expected to vary between positive and negative sectors.
Bz	+4.88 nT (varied in the past 12 hrs between -4.8 nT & +6.89 nT)		

Solar conditions are at high levels with background X-ray flux at C6-class levels.

Daily Sun: 4 October 2024

There are five active regions AR3841, AR3842, AR3843, AR3844 and AR3848 present on the Sun capable of producing strong M and X-class solar flares having chances of 31% and 4% respectively.

01 Coronal Holes (CH) is detected on the solar disk.

Detected Sunspot Groups
(displayed on SDO HMI Magnetogram at 2024 Oct 04 0900 UTC)

C-Flare : 92 (%)
M-Flare : 31 (%)
X-Flare : 4 (%)

SRS Issue Date : 2024 Oct 04 0030 UTC   Wolf Number : 117

Detected Coronal Holes
(based on SDO AIA 193 at 2024 Oct 04 08:58:00 UTC)

2-Day Conditions

- Solar activity is expected to be at high levels.
- X7.1 and X9.1 flare from region AR3842 and multiple M-class solar flares, have already occurred from the regions present on the solar limb causing radio frequency blackouts of R3 levels on the sunlit side.
- In case of more M/X-class solar flares, R2 – R3 levels radio blackouts.
- CME is expected to sideswipe Earth within next 24 to 48 hrs which may which may cause strong (G3) geomagnetic storm.
- Moderate to slightly elevated solar windspeed may be expected to prevail due to the impact of CME.
- 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, difference limit from night time value of quiet conditions: 25-30 nT, max: 260 nT
ISB	Islamabad Geomagnetic Observatory mean value
SN	Relative sunspot numbers
Vsw	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.