

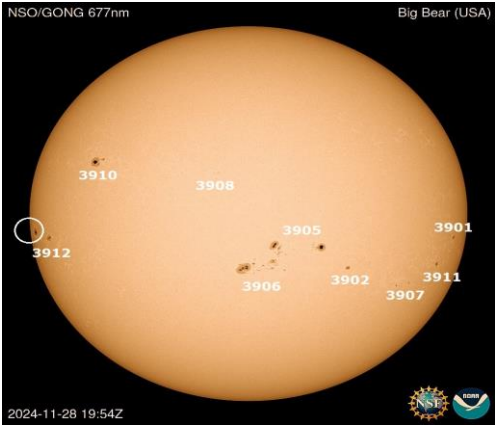
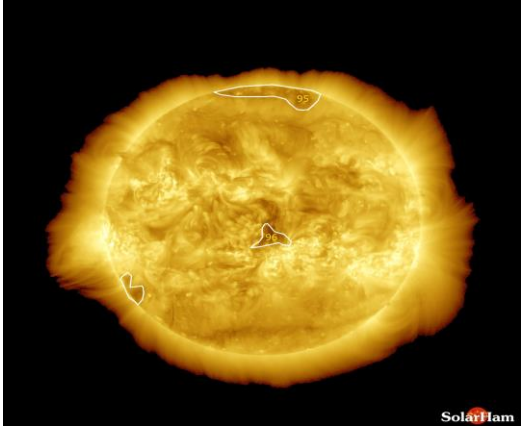
### 3-day Space Weather Conditions (SUPARCO)

Friday, November 29, 2024, 13:36 PST



Radio Blackouts			Solar Radiation Storms			Geomagnetic Storms		
-24 Hr	Current	Predicted	-24 Hr	Current	Predicted	-24 Hr	Current	Predicted
R0 – R1	R0	R1 – R2	S0	S0	S0	G0	G0	G0 / G1

LOCAL CURRENT IONOSPHERIC CONDITIONS (SON)								
DATE	29-Nov-24 (noon)			30-Nov-24 (noon)		01-Dec-24 (noon)		
foF2	14.0 MHz			14.5 MHz		14.2 MHz		
h'F2	305 km			318 km		290 km		
TEC	68 TECU			72 TECU		68 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 (29 Nov – 01 Dec)	14.1	14.7	16.7	19.4	22.6	26.0	29.4	33.4
	14.8	15.2	17.2	20.0	23.1	26.3	29.9	33.9
	14.3	14.9	16.9	19.7	22.9	26.2	29.7	33.7
FOT (MHz) for 3 days (29 Nov – 01 Dec)	12.0	12.4	14.1	16.5	19.2	21.9	24.9	28.4
	12.5	12.9	14.6	17.0	19.6	22.4	25.5	28.8
	12.2	12.6	14.4	16.8	19.5	22.2	25.2	28.7
Local ionospheric conditions are normal as compared to the predicted monthly median MUF.								
LOCAL GEOMAGNETIC CONDITIONS								
K-index	2 (Quiet)			Quiet to unsettled geomagnetic activity is expected.		Quiet geomagnetic activity is expected.		
F (SON/ISB)	45675/50515 nT			45682±10 /50520±20 nT		45682±10/50520±20 nT		
The local geomagnetic field is quiet at the moment.								
SOLAR CONDITIONS								
SN	149			154 (SSN-predicted)		153 (SSN-predicted)		
F 10.7	225 sfu			178 sfu		172 sfu		
Vsw	421.9 km/s (Varied in the past 12 hrs between 341 & 490 km/s)			Low to moderate levels of solar wind speed may prevail.		Low to moderate levels of solar wind speed may prevail.		
Solar flares	C2.3 (max. flare in the past (C5, 0301 UT)			Low level of solar activity is expected.		Low level of solar activity is expected.		
IMF Bt	+9.82 nT (varied in the past 12 hrs between +7.13 nT & +8.61 nT)			Expected to vary between positive and negative sectors.		Expected to vary between positive and negative sectors.		
Bz	+9.55 nT (varied in the past 12 hrs between -2.74 nT & +7.74 nT)							

Solar conditions are at low to moderate levels with background X-ray flux at C-class levels.		
Daily Sun: 29 November 2024		
<p>There are three active regions AR3905, AR3906 and AR3910 present on the Sun capable of producing strong solar flares.</p> <p>03 Coronal Holes (CHs) are detected on the solar disk.</p>		
2-Day Conditions		
<ul style="list-style-type: none"> <li>Solar activity is expected to be at low to moderate levels.</li> <li>In case of M/X-class solar flares, R1 – R2 levels radio blackouts are expected.</li> <li>Low levels of solar wind speed is expected to prevail.</li> <li>Geomagnetic activity is expected to be at quiet to unsettled level.</li> <li>Normal 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.</li> </ul>		

Credits:

Solar conditions courtesy to SOHO, DSCOVR and GOES-16 missions.  
NOAA SWPC is acknowledged for solar radio flux conditions.  
Korean Space Weather Centre is acknowledged for solar disk and coronal hole images.

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

## ANNEXURE

	<b>DEFINITIONS OF TERMINOLOGIES USED IN THIS SUMMARY</b>
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 <sub>sw</sub>	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)
B <sub>t</sub>	Total IMF (unit in Nano Teslas)
B <sub>z</sub>	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**

<b><u>Radio Blackouts</u></b>				
<b>Minor</b> <b>R1</b>	<b>Moderate</b> <b>R2</b>	<b>Strong</b> <b>R3</b>	<b>Severe</b> <b>R4</b>	<b>Extreme</b> <b>R5</b>

<b><u>Solar Radiation Storms</u></b>				
<b>Minor</b> <b>S1</b>	<b>Moderate</b> <b>S2</b>	<b>Strong</b> <b>S3</b>	<b>Severe</b> <b>S4</b>	<b>Extreme</b> <b>S5</b>

<b><u>Geomagnetic Storms</u></b>				
<b>Minor</b> <b>G1</b>	<b>Moderate</b> <b>G2</b>	<b>Strong</b> <b>G3</b>	<b>Severe</b> <b>G4</b>	<b>Extreme</b> <b>G5</b>