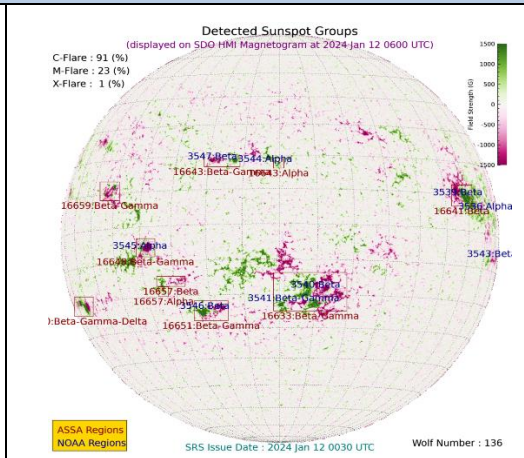
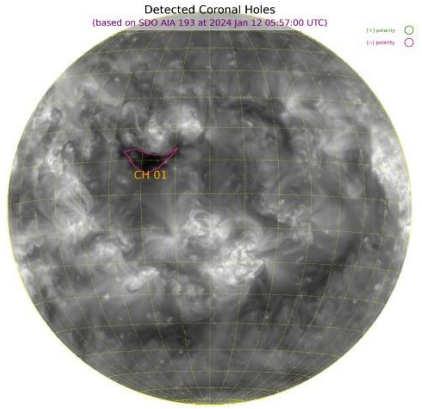
3-day Space Weather Conditions (SUPARCO)

Friday, January 12, 2024, 12:06 PST

SUPARCO

DATE	LOCAL CURRENT IONOSPHERIC CONDITIONS (SON)							
	12-Jan-24 (noon)			13-Jan-24 (noon)			14-Jan-24 (noon)	
foF2	10.3 MHz			10.0 MHz			9.7 MHz	
h'F2	285 km			280 km			276 km	
TEC	42 TECU			40 TECU			38 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 (12 Jan – 14 Jan)	10.5	10.9	12.4	14.4	16.4	18.7	23.5	27.7
	10.2	10.7	11.8	14.0	16.1	18.4	23.4	27.4
	9.9	10.0	11.3	12.4	15.4	17.0	22.5	26.7
FOT (MHz) for 3 days (12 Jan – 14 Jan)	8.8	9.3	10.9	11.6	13.9	15.5	19.9	23.6
	8.6	9.1	10.7	11.5	13.7	15.3	19.7	23.4
	8.1	8.5	10.4	10.5	13.2	15.0	19.2	23.3
Local ionospheric conditions are normal as compared to the predicted monthly median MUF.								
LOCAL GEOMAGNETIC CONDITIONS								
K-index	0 (Quiet)			Quiet to unsettled geomagnetic activity is expected.			Quiet geomagnetic activity is expected.	
F (SON/ISB)	45518/50028 nT			45528±10 /50040±20 nT			45528±10/50040±20 nT	
The local geomagnetic field is Quiet at the moment.								
SOLAR CONDITIONS								
SN	151			143 (SSN-predicted)			134 (SSN-predicted)	
F 10.7	186 sfu			178 sfu			169 sfu	
V_{SW}	489.9 km/s (Varied in the past 12 hrs between 412 & 538 km/s)			Low to moderate levels of solar windspeed may prevail.			Low to moderate levels of solar windspeed may prevail.	
Solar flares	C2.9 (max. flare in the past M1, 1752 UT)			Low to moderate levels of solar activity expected.			Low to moderate levels of solar activity expected.	
IMF Bt	+2.6 nT (varied in the past 12 hrs between +3.7 nT & +4.9 nT)			Expected to vary between positive and negative sectors.			Expected to vary between positive and negative sectors.	
Bz	-1.6 nT (varied in the past 12 hrs between -1.8 nT & +2.1 nT)							
Solar conditions are at low to moderate levels with background X-ray flux at C-class levels.								

Daily Sun: 12 January 2024		
There is one active region AR3541 present on the Sun capable of producing strong M and X-class solar flares having chances of 23% and 1% respectively. 01 Coronal Hole (CH) is detected on the solar disk.		
2-Day Conditions		
Solar activity is expected to be at low to moderate levels. Multiple M-class flares have already occurred from the regions present on the solar limb. In case of more M/X-class solar flares, minor to moderate radio blackouts may be observed. Low to moderate solar windspeed and quiet to unsettled geomagnetic activity is expected over the weekend. Normal ionospheric conditions are expected for the next 2 days. 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

Acknowledgements:

Images source: Solar Dynamics Observatory-SDO both images showing the Solar disk and Coronal Holes have been processed at SUPARCO using Automatic Solar Synoptic Analyzer (ASSA), developed jointly by the Korean Space Weather Centre of the Radio Research Agency (RRA) & Space Environment Laboratory (SE Lab).

Data sources: The planetary indices and solar data are taken from the URLs below:
http://www.spaceweather.go.kr
http://www.sws.bom.gov.au
http://www.solarmonitor.org

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
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.