

# 3-day Space Weather Conditions (SUPARCO)

Friday, February 22, 2019, 15:26 PST

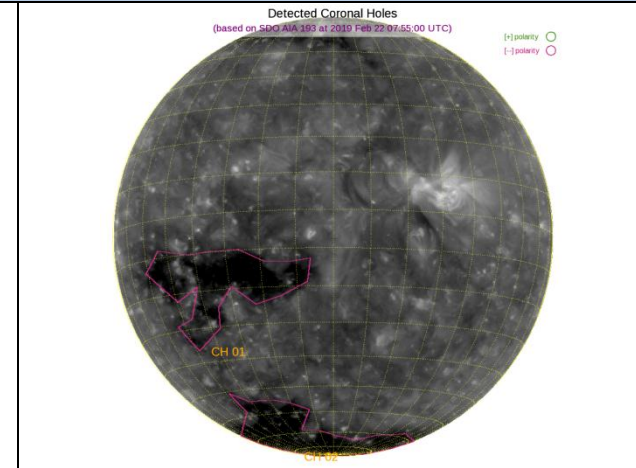
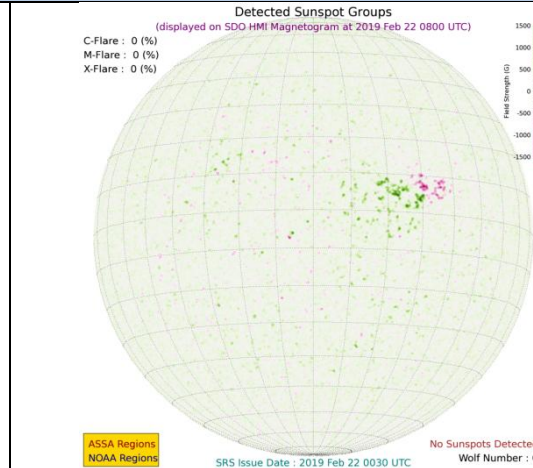


LOCAL CURRENT IONOSPHERIC CONDITIONS OVER PAKISTAN <sup>a</sup>																								
DATE	22-Feb-19 (noon)						23-Feb-19 (noon)						24-Feb-19 (noon)											
foF2	8.9 MHz						8.0 MHz						7.5 MHz											
h'F2	285 km						280 km						275 km											
TEC	21 TECU						19 TECU						16 TECU											
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 (22, 23, & 24 Feb)	9.0	8.1	7.6	9.4	8.5	8.0	10.8	9.8	9.2	12.8	11.6	10.9	14.9	13.5	12.8	17.1	15.6	14.8	22.1	20.1	19.1	30.1	27.3	25.8
FOT (MHz) for 3 days (22, 23, & 24 Feb)	7.7	6.9	6.5	8	7.2	6.8	9.2	8.3	7.9	10.8	9.8	9.3	12.7	11.5	10.9	14.5	13.2	12.5	18.8	17.1	16.3	25.5	23.2	22.0
Local ionospheric conditions are nominal with normal MUF conditions. It is advised to use the frequency range mentioned above w.r.t the distances (km).																								
LOCAL GEOMAGNETIC CONDITIONS OVER PAKISTAN <sup>ab</sup>																								
K-index	1						2						1											
F	45312 /49862 nT						45320±30 /49860±25 nT						45310±30 /49820±20 nT											
D	0.54 /0.73 degrees						0.60 /0.73 degrees						0.62 /0.72 degrees											
The local geomagnetic field is quiet at the moment.																								
SOLAR CONDITIONS																								
SN	0						6 (SSN-predicted)						6 (SSN-predicted)											
F 10.7	71 sfu						71 sfu						71 sfu											
V <sub>sw</sub>	463 km/sec (varied in the past 12 hrs between 438 & 463 km/s)						Elevated solar wind speed expected						Solar wind expected to return to ambient levels											
Solar flares	A 0.0 (max. flare in the past 24 hrs: A 0.0 0039 UT Feb 22)						Very low levels of solar flare activity expected						Very low levels of solar flare activity expected											
IMF Bt	4.2 nT (varied in the past 12 hrs between 3.2 & 6.1 nT)						Expected to vary between positive and negative sectors.						Expected to vary between positive and negative sectors											
Bz	+0.6 nT (varied in the past 12 hrs between -2.9 & +2.6 nT)																							
Solar conditions are at <u>very low</u> levels with background X-ray flux at A-class levels. Local HF working frequencies are <u>normal</u> as compared to monthly average predicted values.																								

## Daily Sun: 22 February 2019

There is no active region available on the Sun at the moment.

02 Coronal Holes (CH) are detected on the solar disk, both with negative polarity. The CH might continue producing high speed solar wind streams.



## 2-Day Conditions

Solar activity is expected to remain at very low levels over the weekend.

Quiet to slightly unsettled geomagnetic conditions are expected due to high speed solar wind streams associated with current coronal holes. The solar wind speed might remain elevated till 23<sup>rd</sup> Feb and is expected to return to ambient levels by 24<sup>th</sup> Feb.

Nominal HF conditions are expected to prevail for the next 2 days. It is advised to use the frequency ranges mentioned for next 2 days 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 (SELab).

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>

<sup>a</sup>Sonmiani (SON): 25.2° N, 66.75° E

<sup>b</sup>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
ISP	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.