

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

Friday, May 10, 2019, 12:42 PST

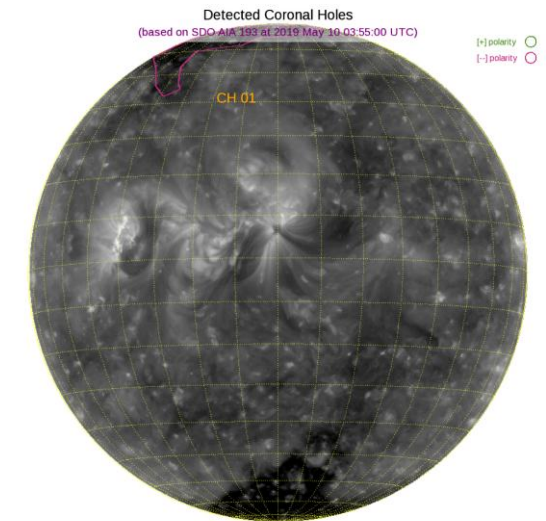
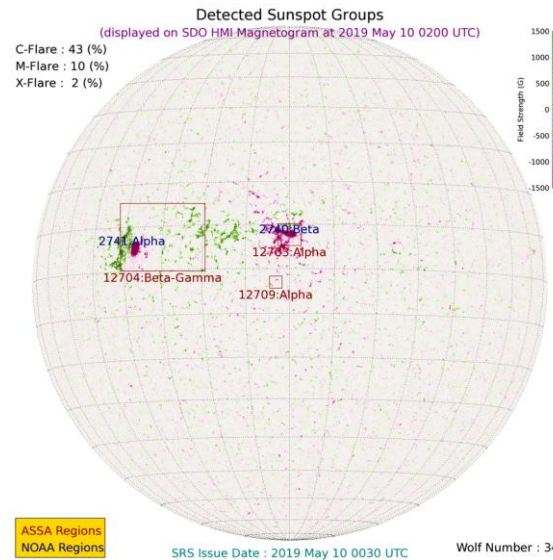


LOCAL CURRENT IONOSPHERIC CONDITIONS OVER PAKISTAN <sup>a</sup>																								
DATE	10-May-19						11- May -19 (noon)						12- May -19 (noon)											
foF2	5.8 MHz						9 MHz						11 MHz											
h'F2	408 km						280 km						270 km											
TEC	20 TECU						25 TECU						30 TECU											
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 (10, 11, & 12 May )	5.8	9.1	11.2	6.0	9.6	11.7	6.4	11.0	13.6	7.2	13.0	16.2	8.0	15.2	19.1	8.9	17.5	21.9	11.2	22.6	28.4	15.9	30.7	38.3
FOT (MHz) for 3 days (10, 11, & 12 May )	5.0	7.8	9.5	5.1	8.1	10.0	5.5	9.4	11.6	6.1	11.1	13.8	6.8	13.0	16.2	7.6	14.9	18.6	9.5	19.2	24.2	13.5	26.1	32.5
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						2											
F	45343 /49860 nT						45340±30 /49850±25 nT						45320±30 /49855±20 nT											
D	0.56 /0.74 degrees						0.55 /0.73 degrees						0.57 /0.75 degrees											
The local geomagnetic field is quiet at the moment.																								
SOLAR CONDITIONS																								
SN	25						14 (SSN-predicted)						14 (SSN-predicted)											
F 10.7	76 sfu						76 sfu						76 sfu											
V <sub>sw</sub>	352 km/sec (varied in the past 12 hrs between 352 & km/s)						Moderate solar wind speed expected						Solar wind speed expected to elevate											
Solar flares	A 9.8 (max. flare in the past 24 hrs: B 1.0 0551 UT May 10)						low levels of solar flare activity with C-class activity expected						low levels of solar flare activity with C-class activity expected											
IMF Bt Bz	3.3 nT (varied in the past 12 hrs between 3.0 & 4.0 nT)  -2.4 nT (varied in the past 12 hrs between -2.8 & -0.6 nT)						Expected to vary between positive and negative sectors						Expected to vary between positive and negative sectors											
Solar conditions are at <u>very low</u> levels with background X-ray flux at A-class levels. Local HF working frequencies are <u>very good</u> as compared to monthly average predicted values.																								

## Daily Sun: 10 May 2019

AR 2740 and AR 2741 are active regions on the solar disk with 43%, 10% and 2% chances to produce C, M and X-class solar flare(s) respectively.

01 Coronal Hole (CH) is detected on the solar disk at the moment.



## 2-Day Conditions

Solar activity is expected to remain at low levels over the weekend with slight chances of C-class activity. Solar wind speed is expected to remain moderate due to CME effects. Geomagnetic conditions are also expected to get slightly unsettled as the solar wind elevates. 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 (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
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.
CIR	Co-rotating Interaction Region