

## **Supplimentary Information**

### **Evaluating the Effect of Noise from Traffic on HYB Magnetic Observatory data during COVID-19 Lockdown**

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#### **Introduction**

The main sources of noise in the data of Hyderabad (HYB) comes from the vehicular traffic, power lines and power station, 500 m to 1 km away. During the nationwide COVID-19 pandemic lockdown from 24<sup>th</sup> March to 17<sup>th</sup> May 2020, both road and Metrorail traffic came to a complete halt. The data from this time interval gives us an opportunity to evaluate the effects of the absence of traffic generated noise sources. We found noticeable differences in the noise levels present in vector and scalar variation data due to vehicular noise observed before and during lockdown periods.

The supplementary Information provides an additional case studies for before (07,10,14 March, 2020) and during (17, 19, 29 April, 2020) lockdown period of figures 1 and 2.

# 1. Variation of H, D, Z and F components before and during lockdown

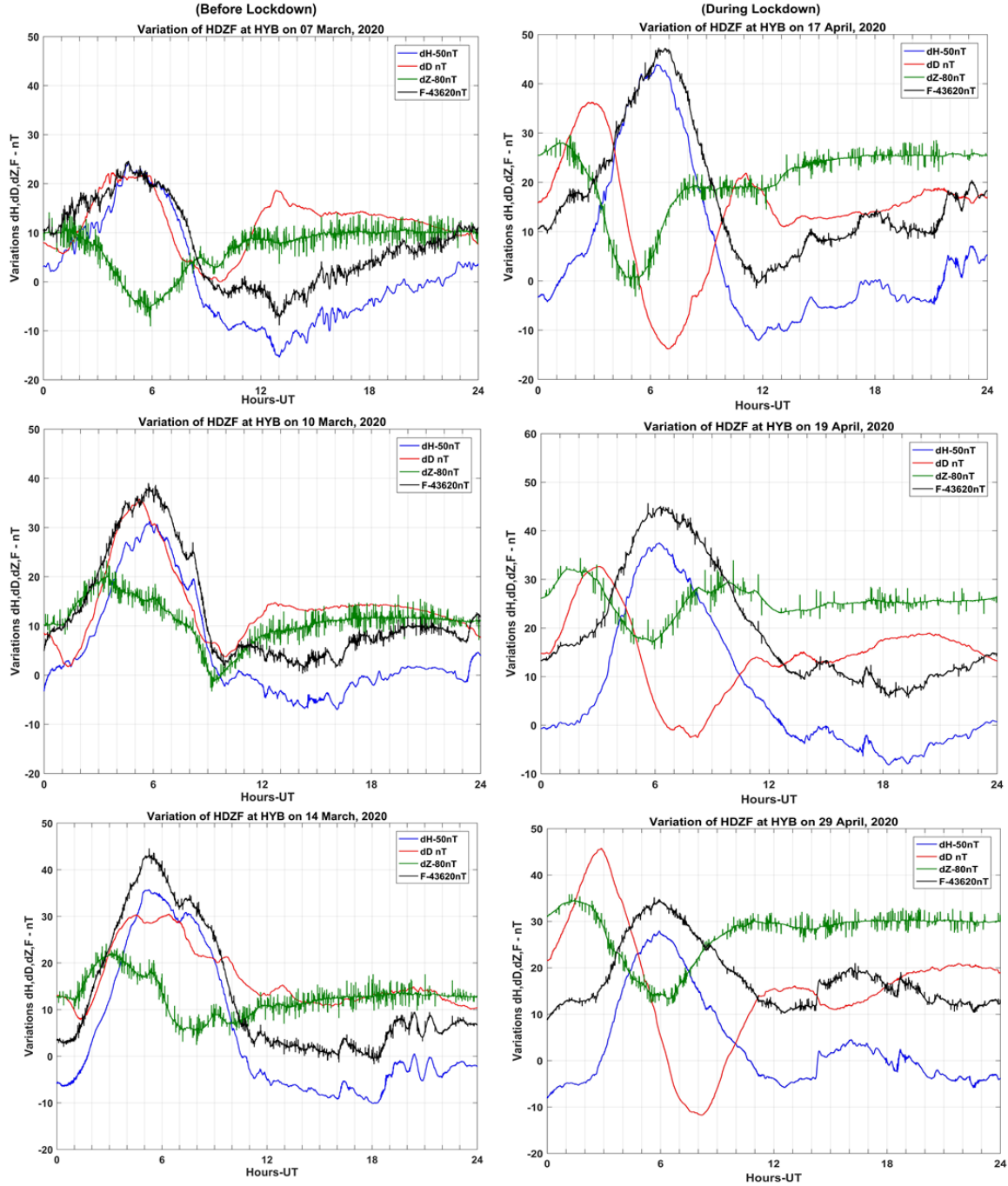


Figure S1: Diurnal variation of HDZ & F along with K-index values on 07,10,14 March (left) and 17,19,29 April 2020 (right) are best quiet days of the respective months. For plotting convenience dH, dZ and dF are subtracted by 50 nT and 80 nT and 43620 nT.

The above figure S1, left panel indicates the raw variations of geomagnetic field of HYB (vector and scalar) on quiet days before lockdown (i.e. 07, 10, 11 March 2020)

and right panel indicates the data during lockdown (i.e. 17, 19, 29 April 2020). Visually, it appears that there is no significant change noticed in data quality of H (blue) & D (red) components, before and during lockdown. Comparing Z (green) and F (black) components before and during lockdown periods show visibly reduced occurrence frequency of noise peaks as well as reduced amplitudes during lockdown period (As observed in figure-1).

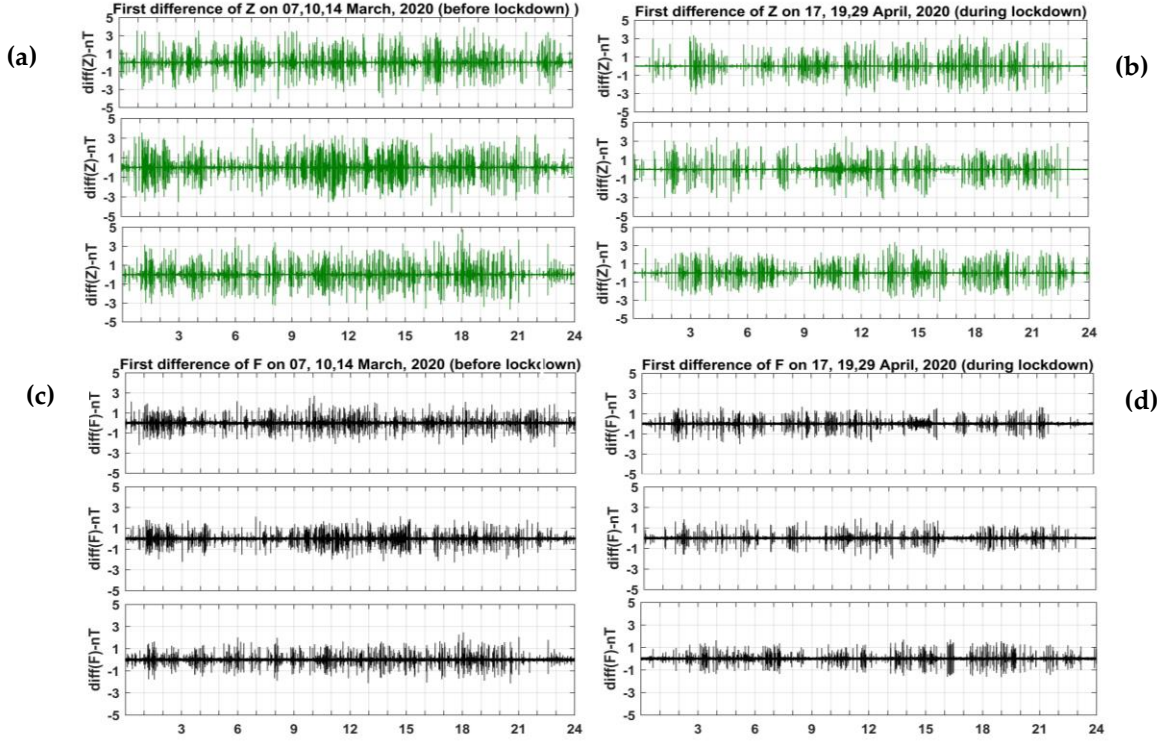


Figure S2: Shows first difference of 1-second measurements of Z and F. (a) First difference of Z-component on 07, 10, 14 March, 2020 (before lockdown) (b) First difference of Z-component on 17, 19, 21 April, 2020 (during lockdown) (c) First difference of F-component on 07, 10, 14 March, 2020 (before lockdown) (d) First difference of F-component on 17, 19, 21 April, 2020 (during lockdown).

The above figure indicates the first differences of Z and F components before (07, 10, 14 March, 2020) and during lockdown (17, 19, 21 April, 2020) period. As we discussed in the main manuscript similar results were noticed from above figure. The spikes having amplitude between 3-4 nT is reduced by 8 times in lockdown period when compared to before lockdown. Similarly, it is reduced to half for the amplitude of spikes between 1-3 nT in lockdown period when compared before lockdown. The maximum amplitude of first difference of F-component is noticed as  $\pm 2$  nT both before and during lockdown. The range of first difference values in each component is independent of magnetic activity levels.