

### **Supplementary Material Legend**

Table S1. Detailed descriptions about the permanent GPS stations.

Figure S1. The absolute errors of NN VTEC from GPS VTEC for the specific times of the day during 2020 over KURU station.

Figure S2. The absolute errors of NN VTEC from GPS VTEC for the specific times of the day during 2020 over ANMU station.

Figure S3. The relative errors of NN VTEC from GPS VTEC for the specific times of the day during 2020 over KURU stations.

Figure S4. The relative errors of NN VTEC from GPS VTEC for the specific times of the day during 2020 over ANMU station.

Figure S5. The absolute errors of the NN VTEC and the IRI2012 VTEC from the GPS VTEC for the seasonal comparison over KURU station.

Figure S6. The absolute errors of the NN VTEC and the IRI2012 VTEC from the GPS VTEC for the seasonal comparison over ANMU station.