

Supplementary Material

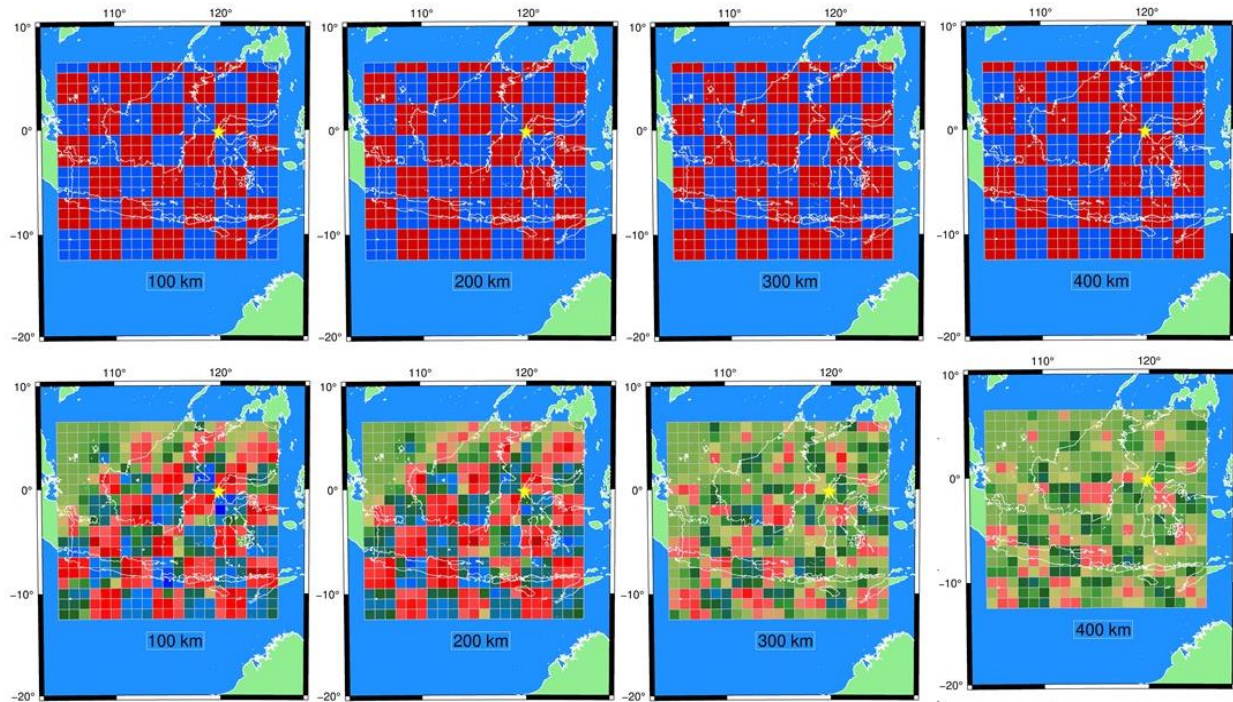


Figure S1. The resolution test with the classical checkerboard pattern. The assumed electron density anomalies (upper) and the output of the 3D tomography (bottom) for altitude 100 km until 400 km are given in map view and north-south, east-west profiles.

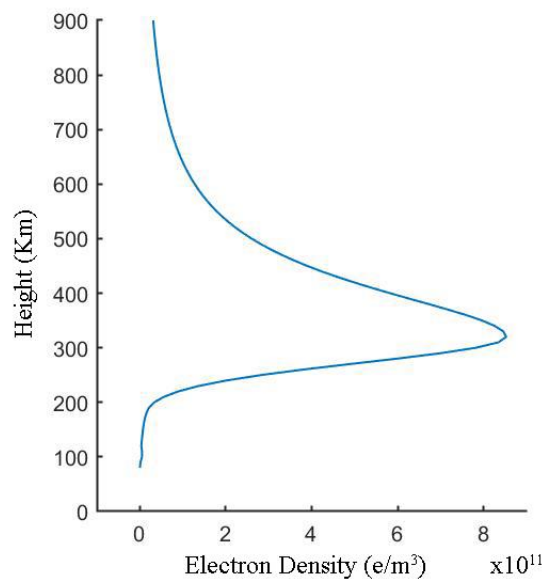


Figure S2. The vertical electron density profiles reconstructed over the epicenter at CID occurred (10.16 UT) from the IRI model (<https://irimodel.org/>).

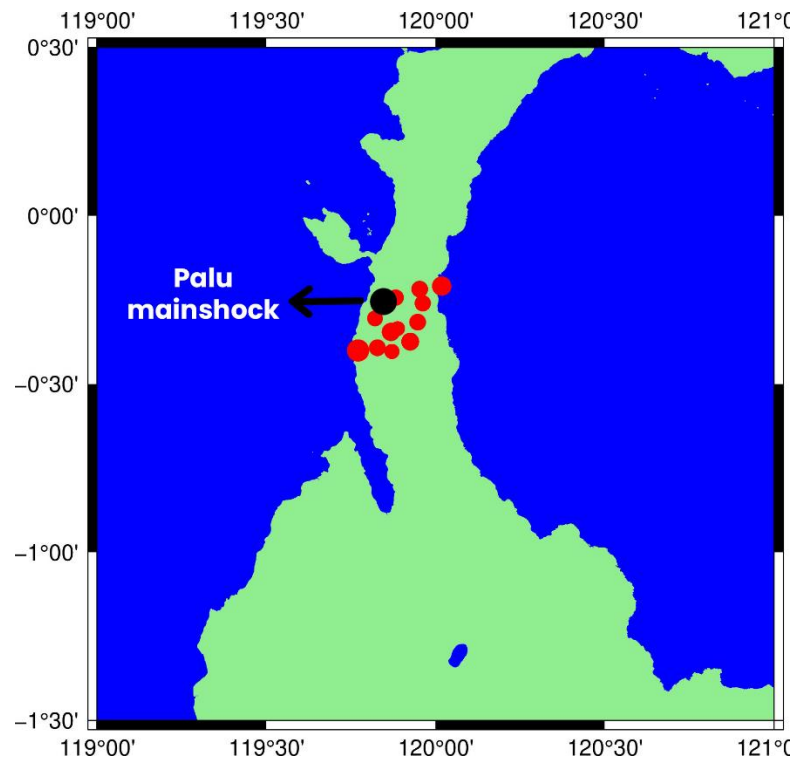
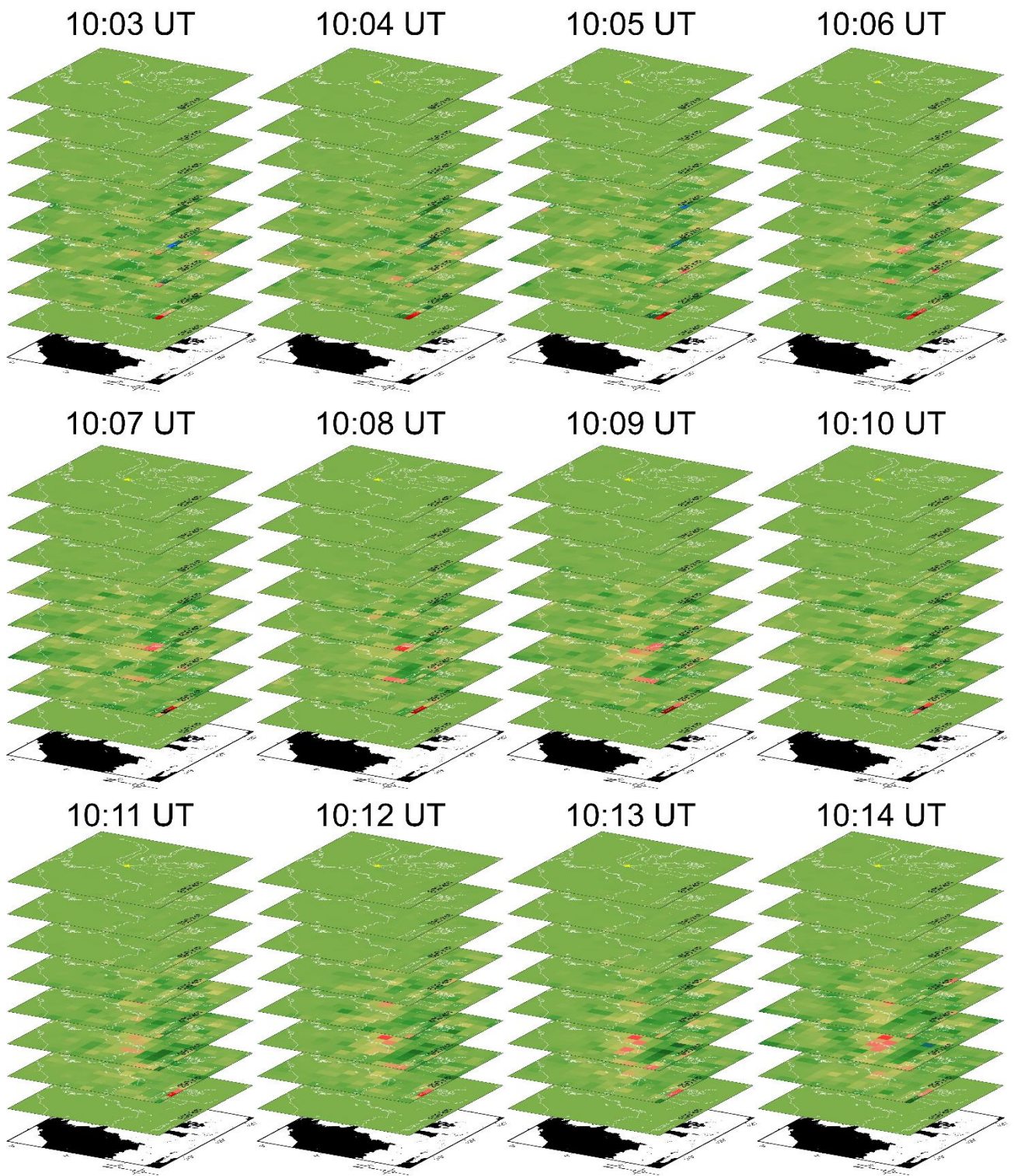


Figure S3. The location of earthquakes epicenter that occurred before the mainshock event (black dot) at 10.16 UT.



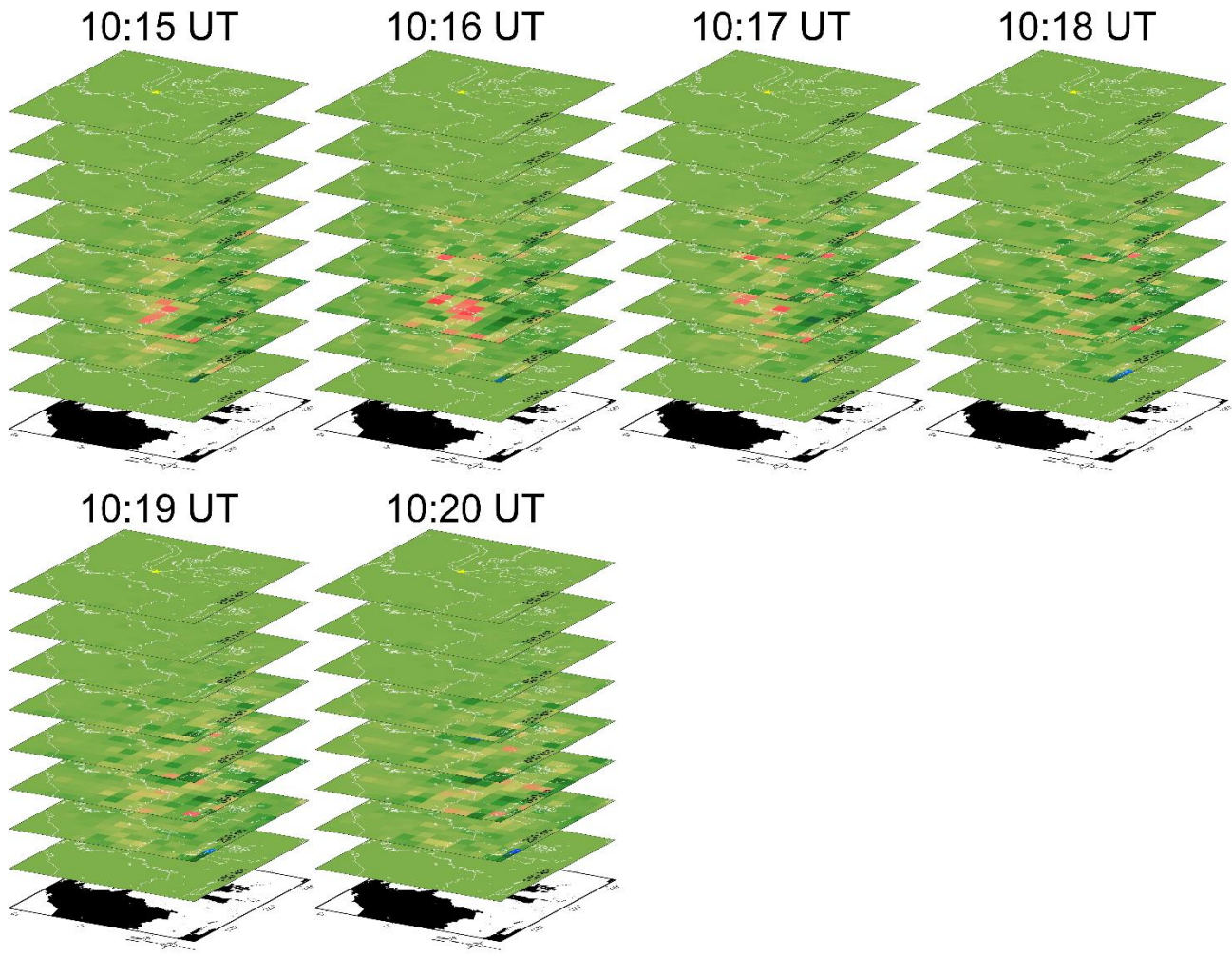


Figure S4. 3D tomography results of the 2018 Sumatra Palu earthquake at 10.03 UT - 10.20 UT.

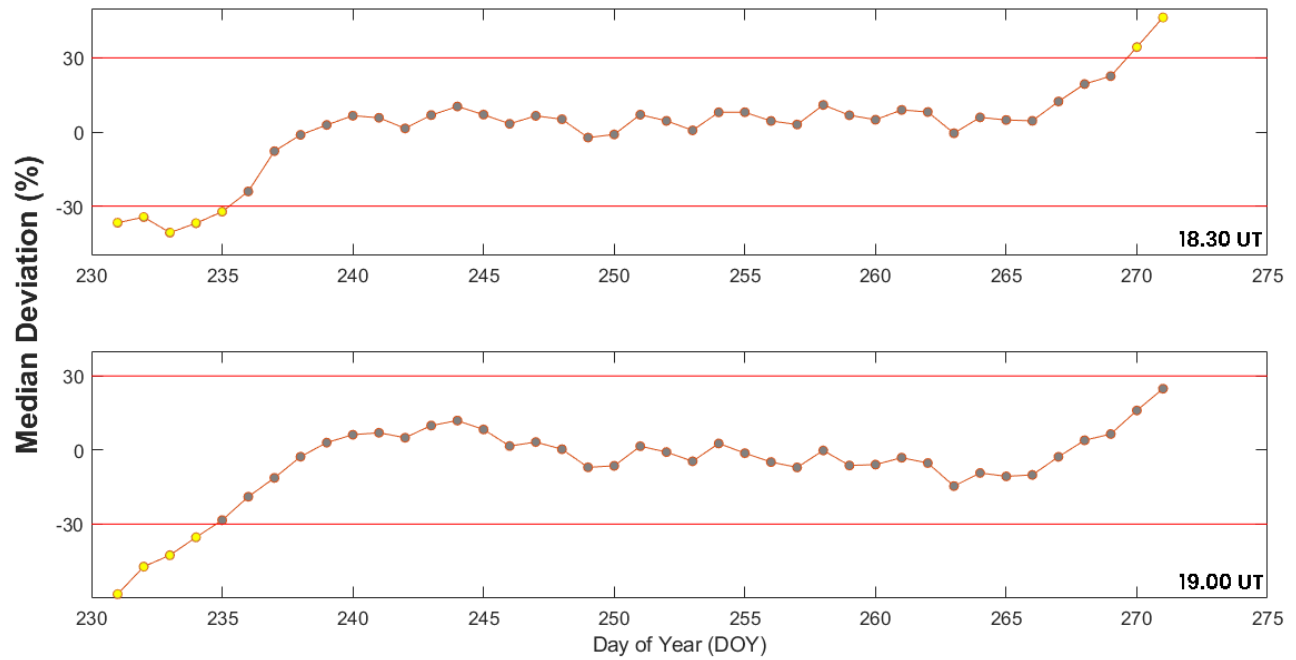


Figure S5. Deviation from the average VTEC and its median at DOY 231-271. The red lines are the boundary of deviation value which ionospheric anomalies before earthquake occurred when the deviation >30%, and the yellow dots are the anomalies.

Table S1. VTEC Calculation using Median Deviation

DOY	Epoch 18:30 UT			Epoch 19:00 UT		
	VTEC (TECU)	Median	Deviation (%)	VTEC (TECU)	Median	Deviation (%)
231	2.8928	4.5740	-36.76	1.9934	4.7879	-58.37
232	3.3891		-25.91	3.2245		-32.65
233	2.7126		-40.70	2.3660		-50.58
234	1.7796		-61.09	3.5257		-26.36
235	2.7783		-39.26	2.6341		-44.98
236	3.7605		-17.79	3.7313		-22.07
237	4.4608		-2.48	4.8826		1.98
238	4.5898		0.34	4.6375		-3.14
239	5.5074		20.41	5.3511		11.76
240	4.2840		-6.34	4.6897		-2.05
241	4.6791		2.30	5.0933		6.38
242	5.3159		16.22	5.6485		17.97
243	4.4008		-3.79	4.8289		0.86
244	4.5219		-1.14	4.8714		1.74
245	5.5188		20.65	5.8707		22.62
246	5.4754		19.70	5.5704		16.34

Supplementary Material

247	4.5621	-0.26	4.7879	0.00
248	3.5477	-22.44	3.2247	-32.65
249	5.2616	15.03	5.2567	9.79
250	5.2010	13.71	5.1769	8.13
251	3.7793	-17.37	3.8148	-20.32
252	4.8513	6.06	4.9329	3.03
253	5.3777	17.57	5.1276	7.09
254	4.6914	2.57	4.6877	-2.09
255	4.3212	-5.53	4.2820	-10.57
256	5.4504	19.16	5.5433	15.78
257	4.8562	6.17	3.9960	-16.54
258	4.5740	0.00	4.2632	-10.96
259	4.3572	-4.74	4.1677	-12.95
260	6.1364	34.16	5.9241	23.73
261	4.4965	-1.70	4.0894	-14.59
262	4.4403	-2.92	4.0825	-14.73
263	5.4801	19.81	4.9320	3.01
264	4.1666	-8.91	3.6521	-23.72
265	4.1711	-8.81	3.6841	-23.05
266	5.9646	30.40	5.3653	12.06
267	4.1959	-8.27	3.7540	-21.60
268	5.4055	18.18	5.0713	5.92
269	5.9581	30.26	5.4063	12.92
270	5.7843	26.46	5.2819	10.32
271	6.6945	46.36	5.9758	24.81