Supplement to
"Explaining neural networks for detection of tropical cyclones and atmospheric rivers in gridded atmospheric simulation data"

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S1 Results for CG-Net with alternative input value normalizations ("z-score+10" and "min-max")

As supplementary material to the main paper, we provide reproductions of Fig. 3 and 5 for CG-Net trained with the alternative input normalizations discussed in Sect. 6 of the paper (z-score shifted by +10 and min-max). For illustration of how normalization impacts the inputs, Fig. S1 in addition shows global distributions of all input variables, showing both variable values before and after z-score normalization.

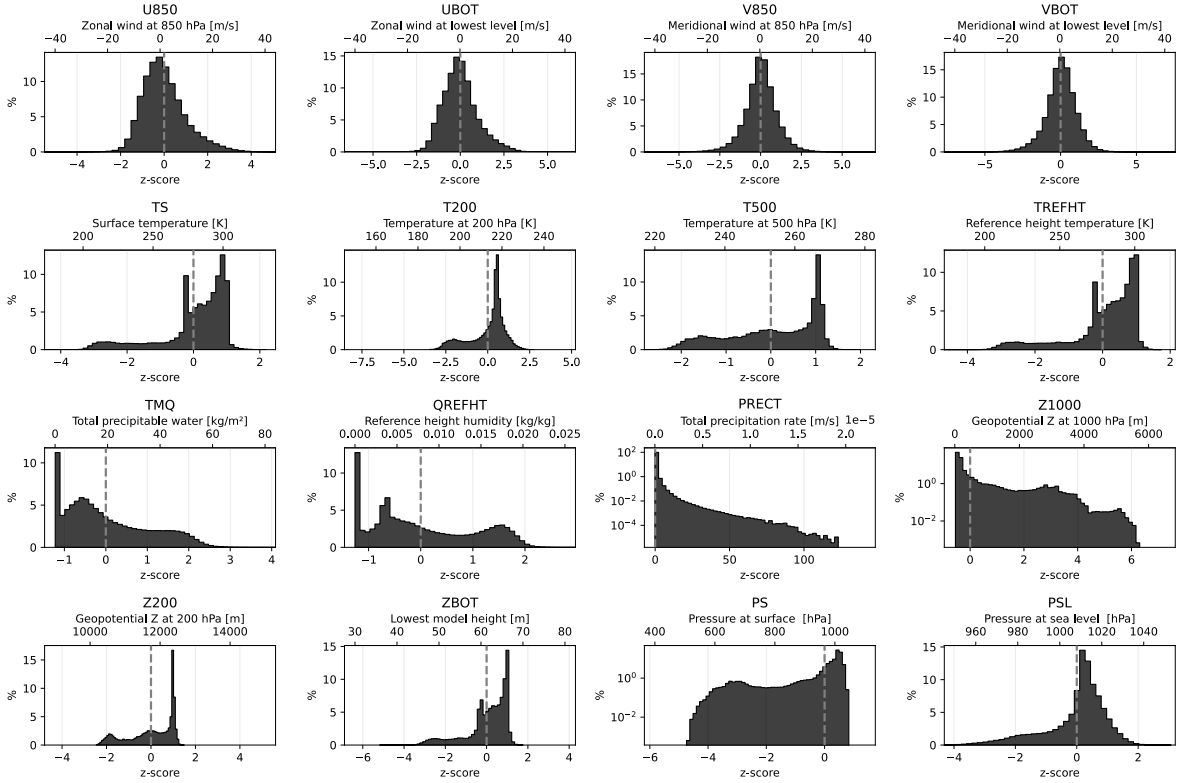

Figure S1: Global distributions of variables values in the ClimateNet test dataset. Values in variable units are shown above each histogram, z-score normalized values below. The gray dashed lines indicate the zero value in the z-score normalized data.

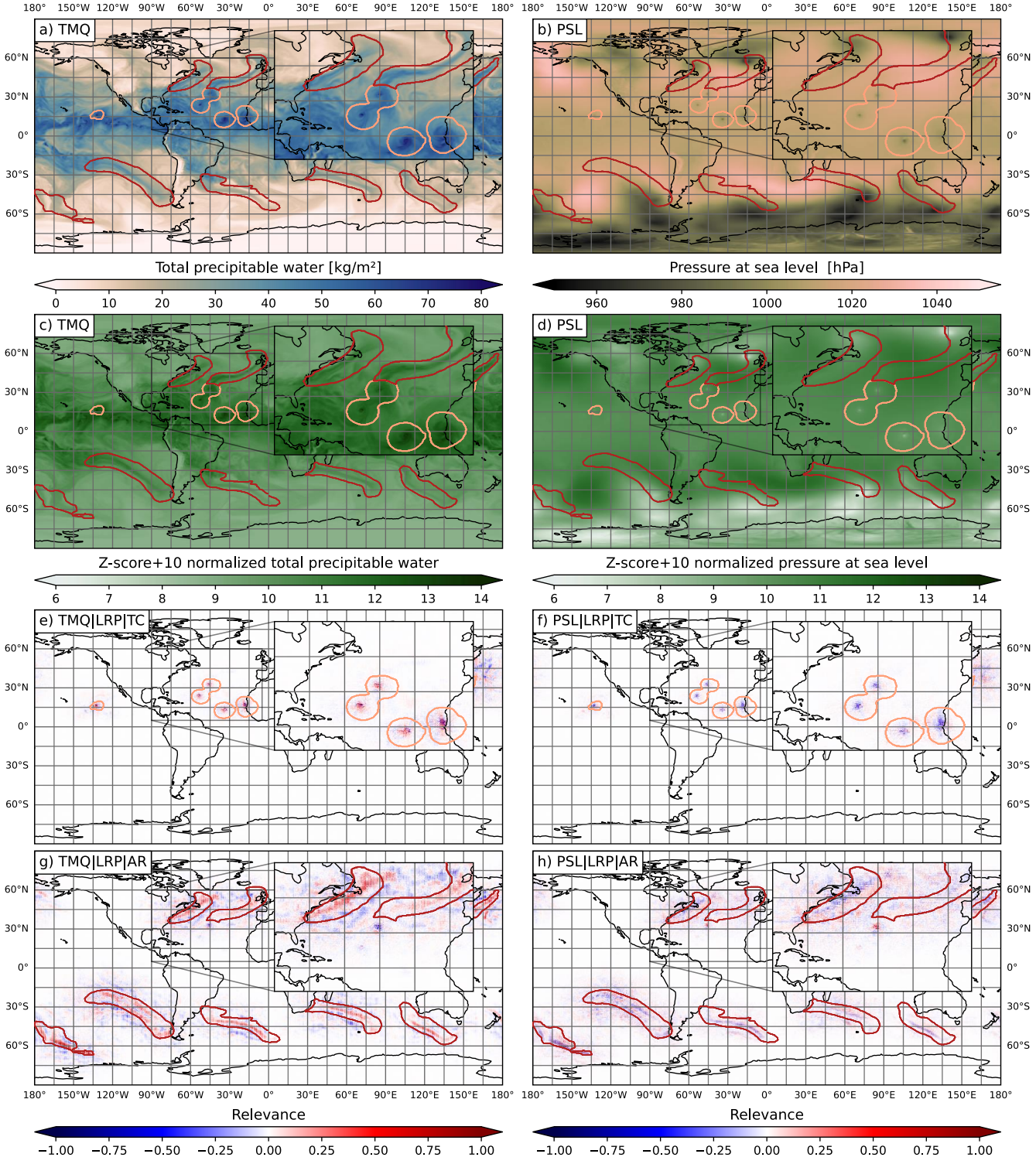

Figure S2: Same as Fig. 3 in the main paper but for CG-Net trained on "z-score+10"-normalized data.

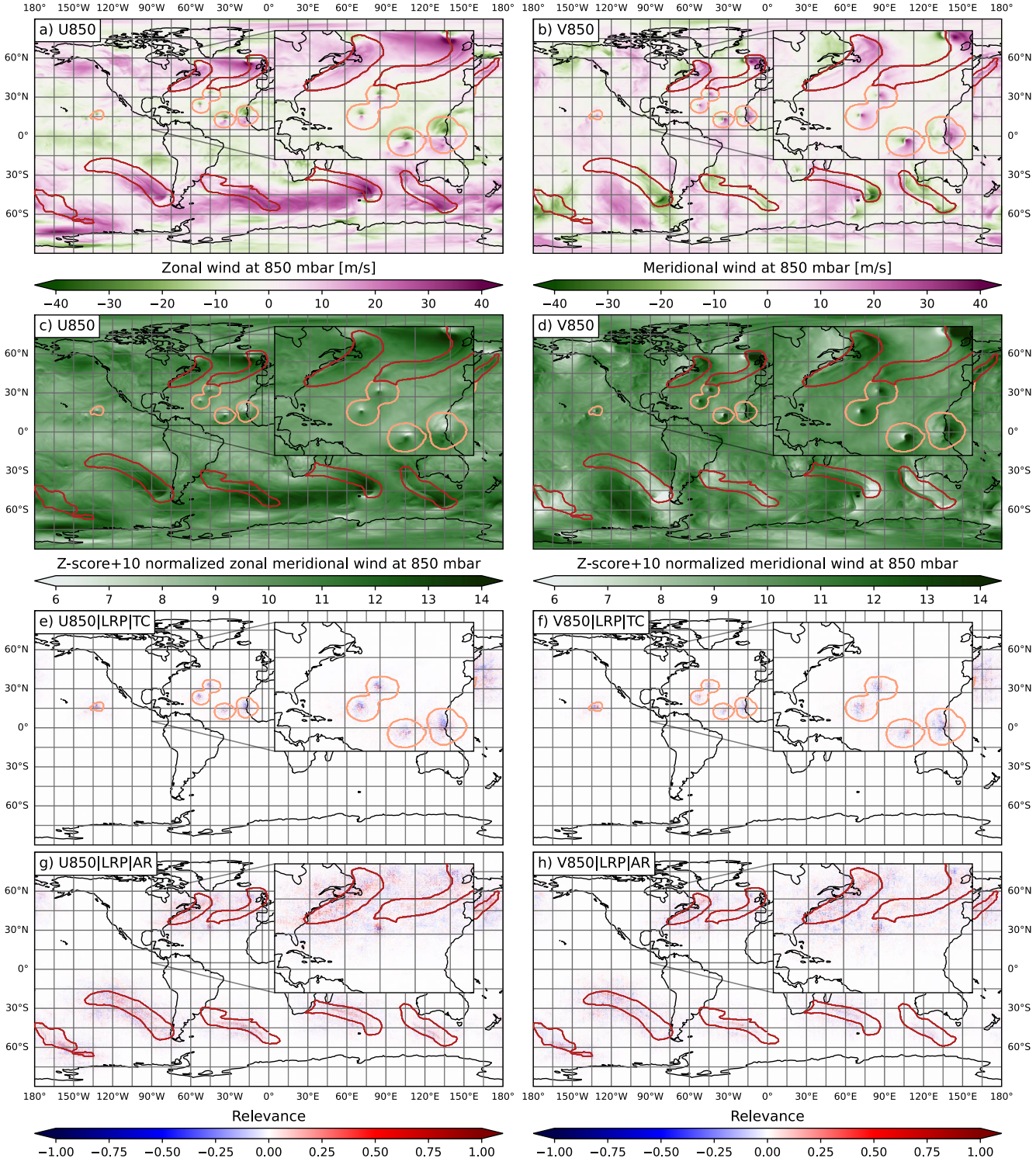

Figure S3: Same as Fig. 5 in the main paper but for CG-Net trained on "z-score+10"-normalized data.

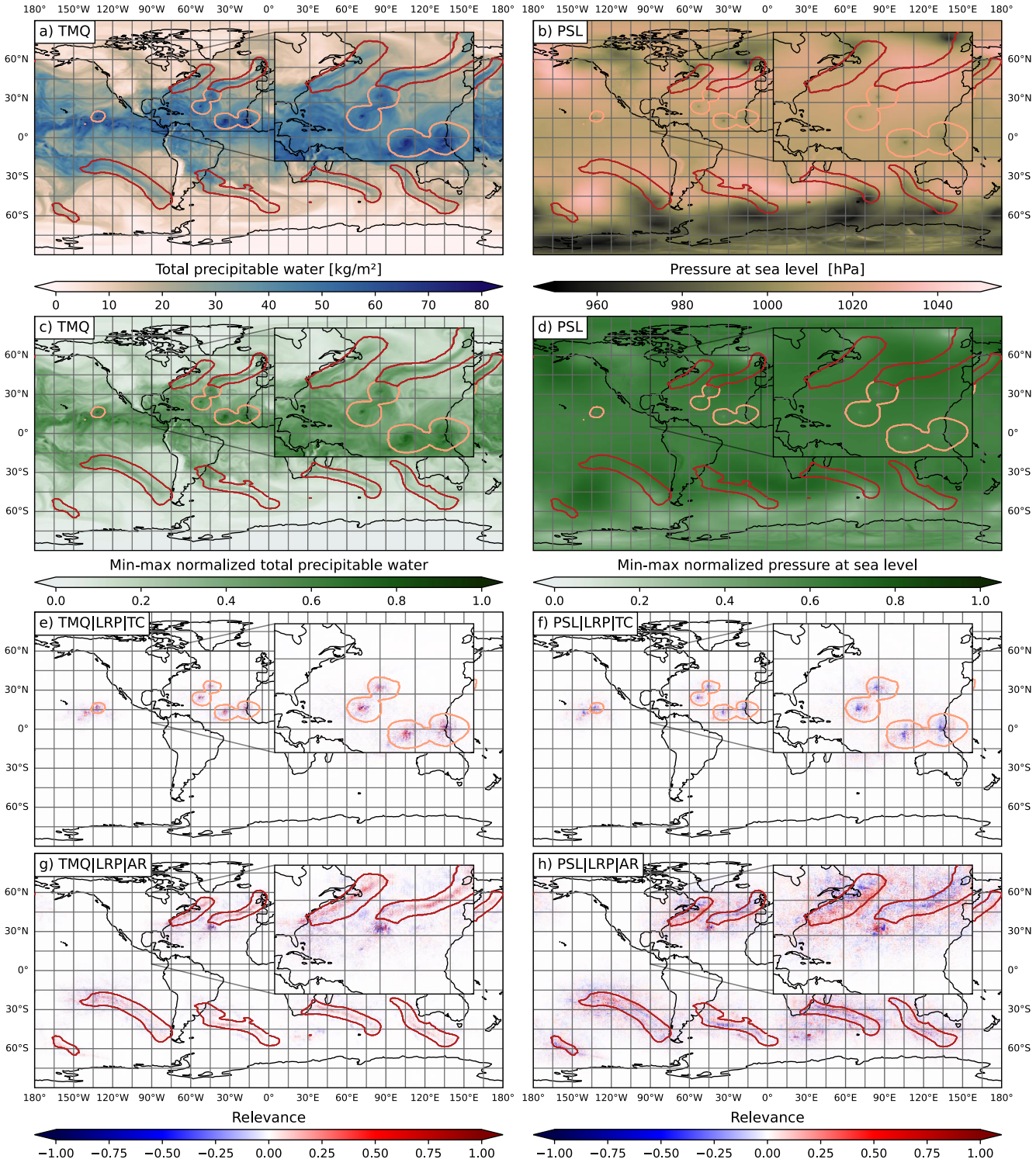

Figure S4: Same as Fig. 3 in the main paper but for CG-Net trained on "min-max"-normalized data.

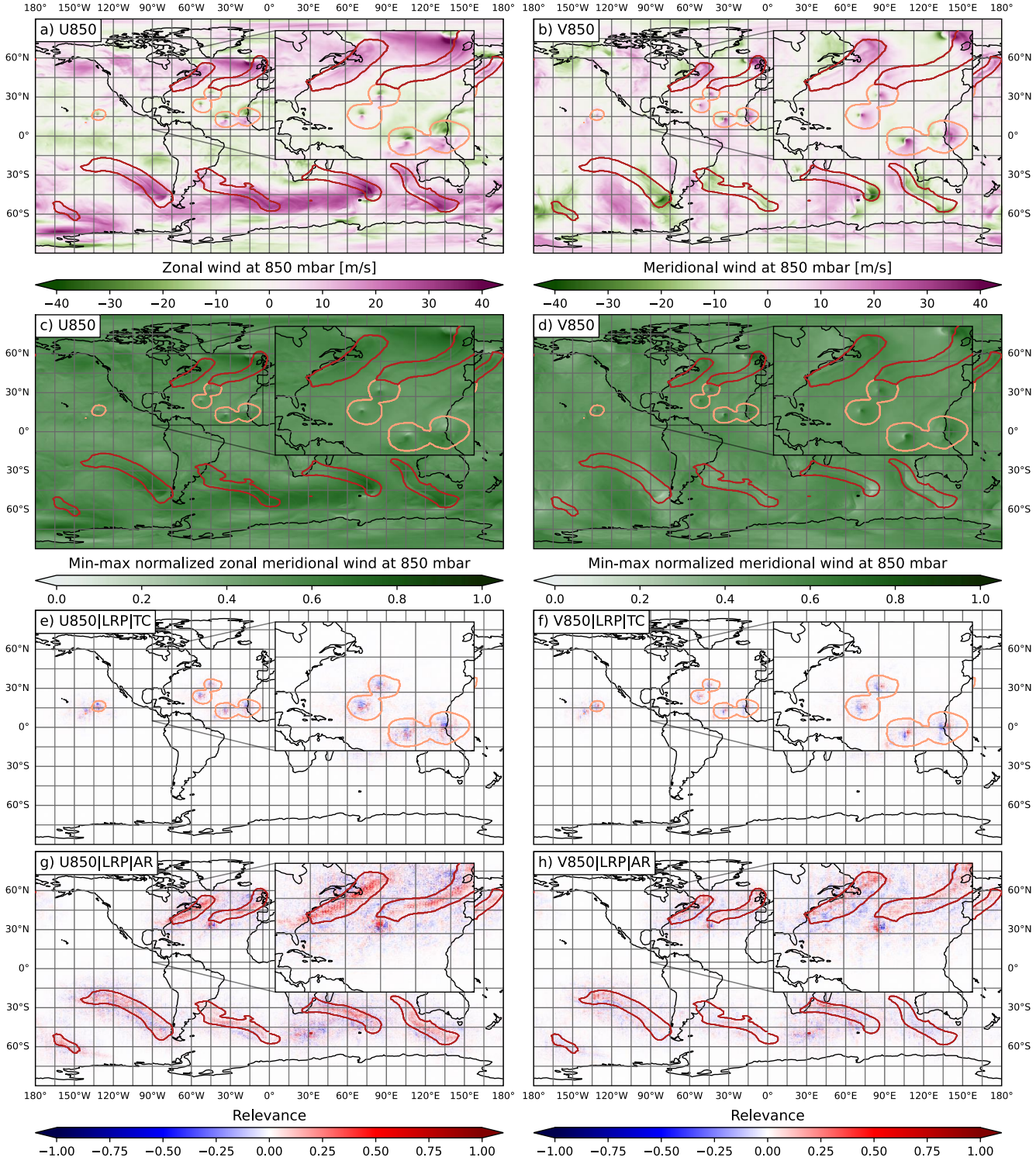

Figure S5: Same as Fig. 5 in the main paper but for CG-Net trained on "min-max"-normalized data.

S2 Results for the U-Net CNN architecture

We provide reproductions of the major figures and tables of the main paper for using the U-Net architecture instead of the CG-Net architecture.

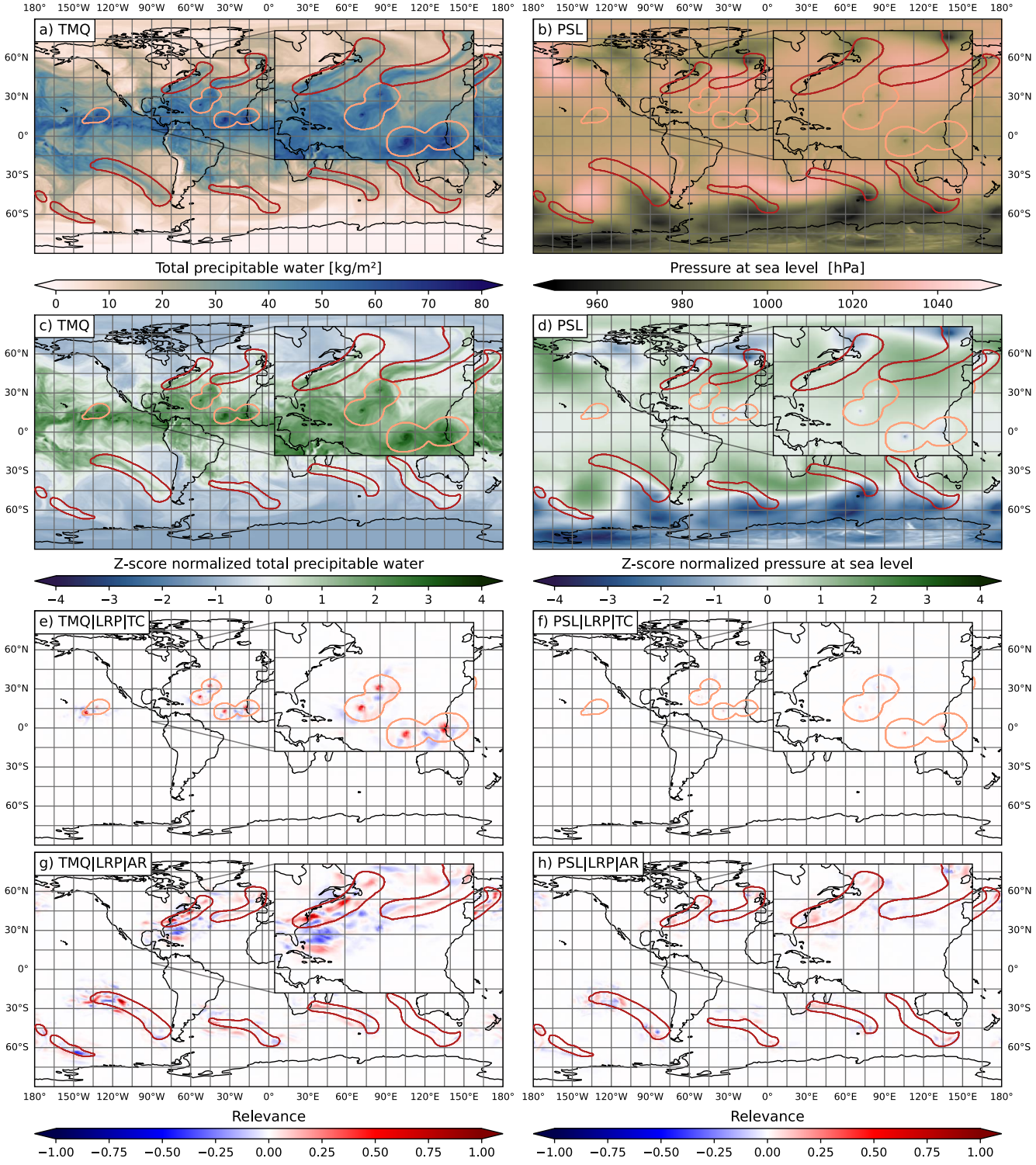

Figure S6: Same as Fig. 3 in the main paper but for U-Net trained on "z-score"-normalized data.

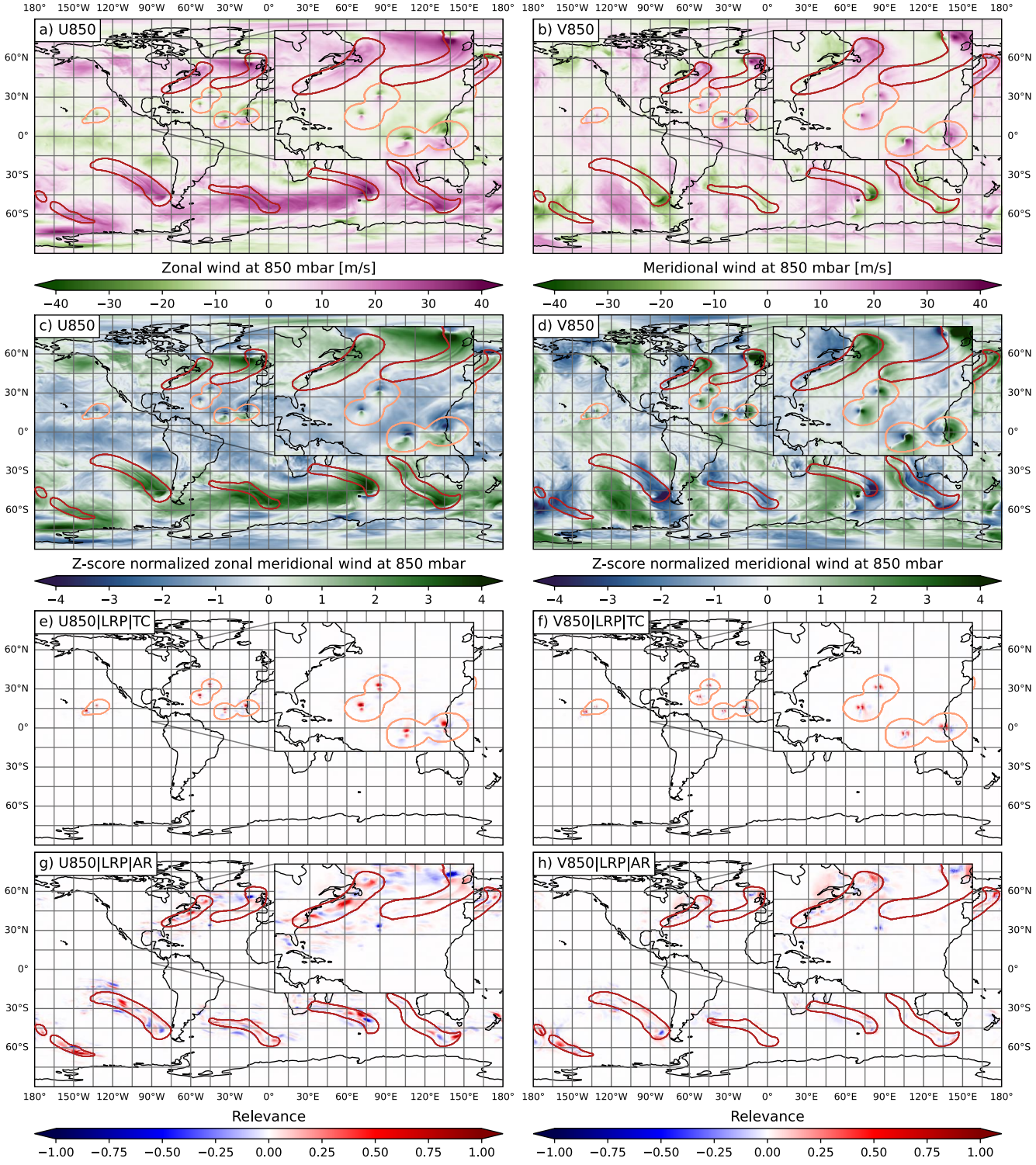

Figure S7: Same as Fig. 5 in the main paper but for U-Net trained on "z-score"-normalized data.

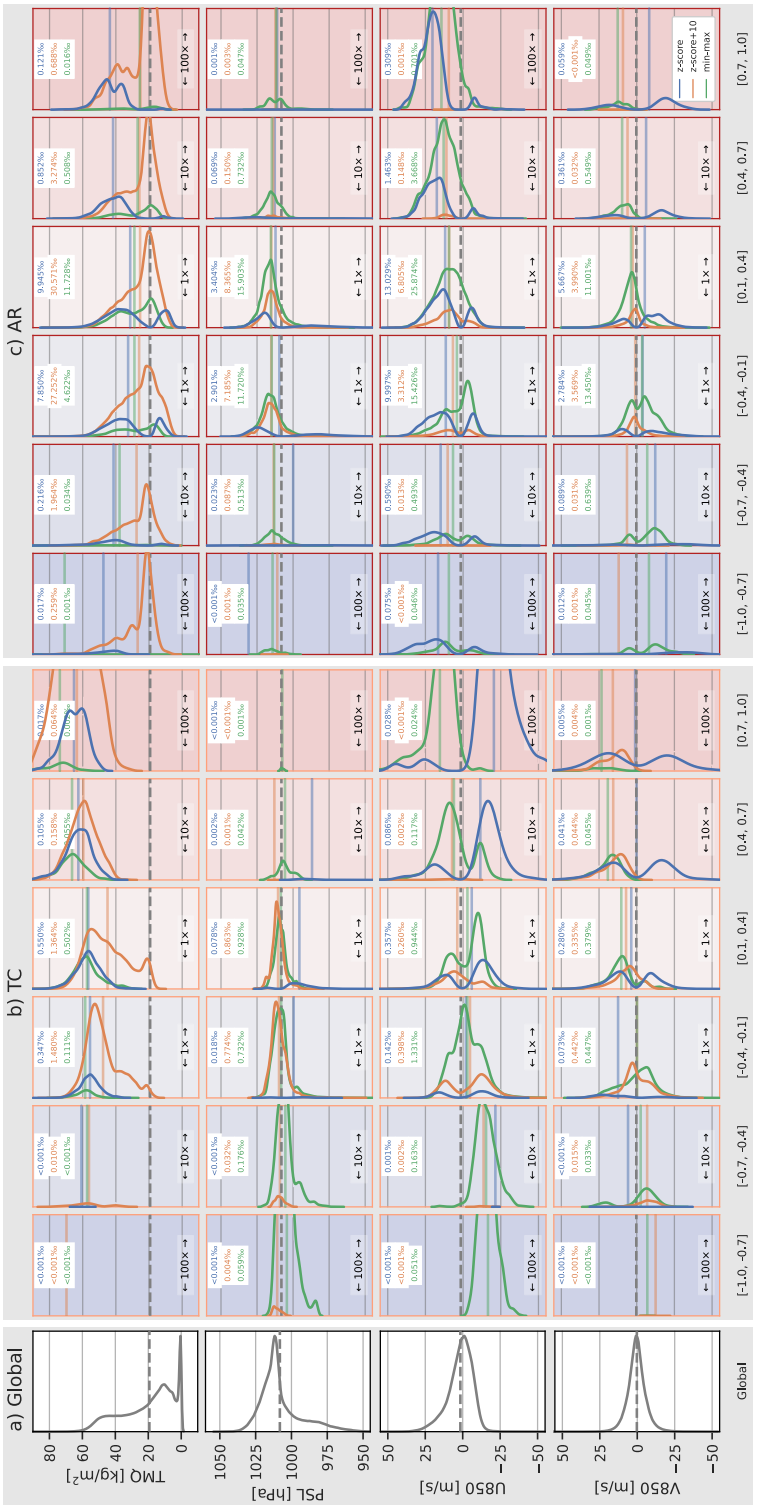

Figure S8: Same as Fig. 6 in the main paper but for U-Net.

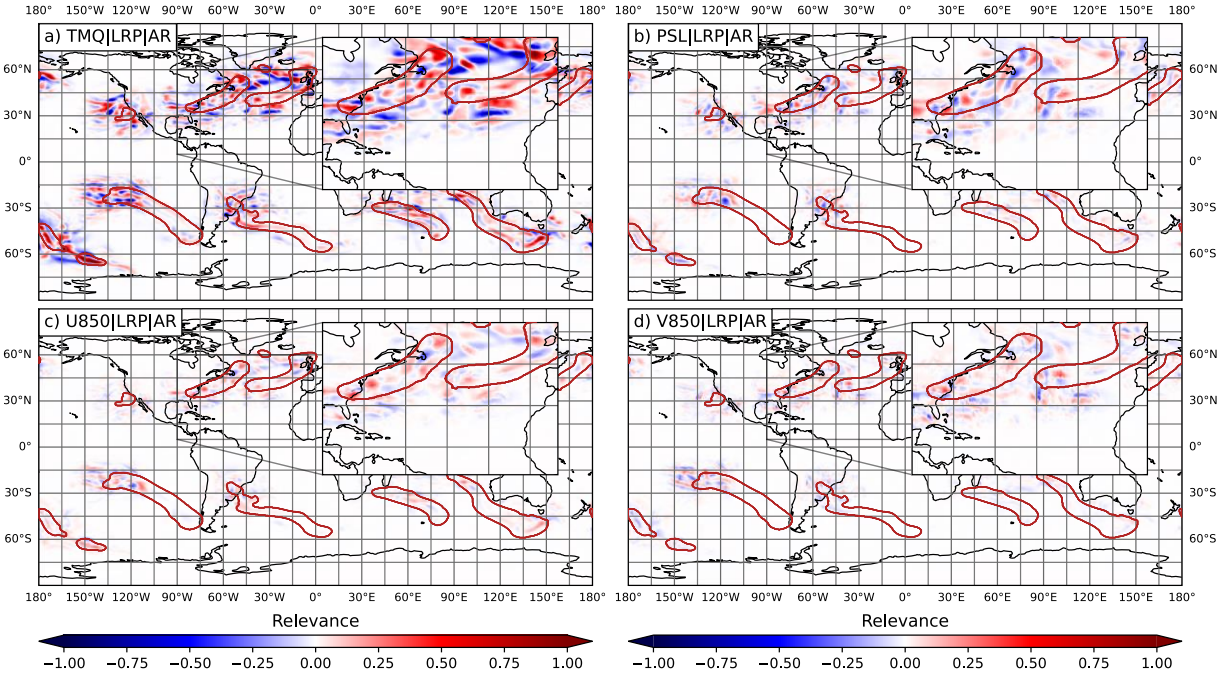

Figure S9: Same as Fig. 8 in the main paper but for U-Net trained on "z-score+10"-normalized data.

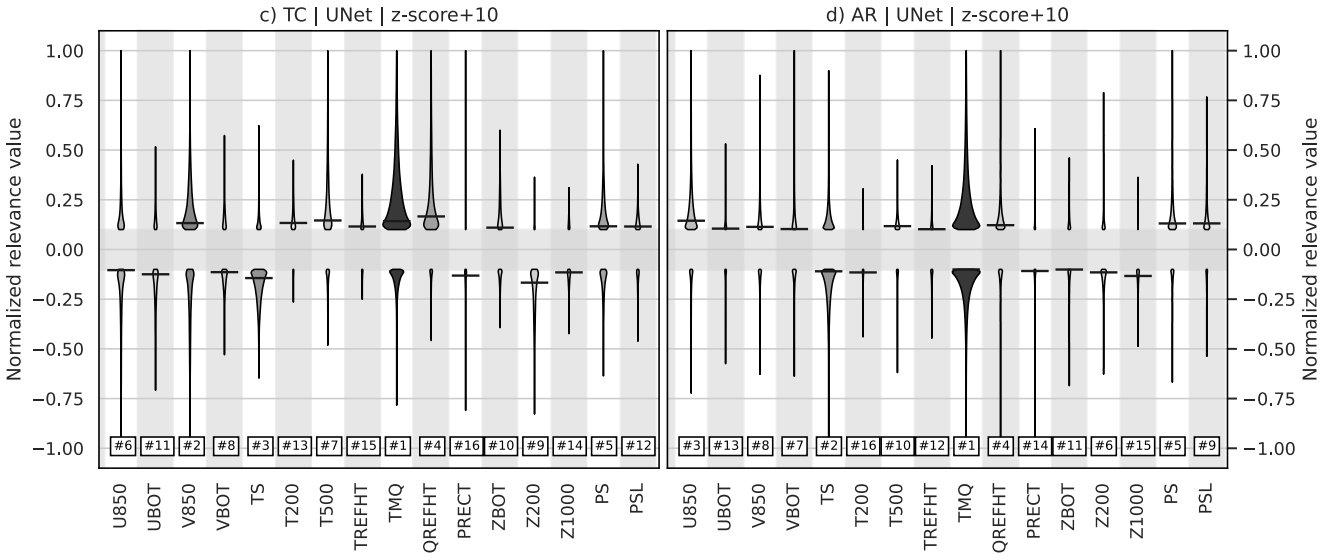

Figure S10: Same as Fig. 9 in the main paper but for U-Net.

Table S1: Same as Table 3 in the main paper but for U-Net. Note that compared to Table 3, different variable combinations are selected, following the ranking in Fig. S10.

Data subset	AR	TC	AR-TC Mean	Background	AR-TC-BG Mean
All 16 variables listed in Table 1	**41.2**	**35.5**	**38.4**	**94.6**	**57.1**
TMQ-TS-QREFHT-U850-V850	40.3	34.7	37.5	94.4	56.5
TMQ-TS-U850-V850	40.8	35.1	38.0	94.5	56.8
TMQ-TS	38.5	30.4	34.4	94.2	54.4
TMQ	38.9	31.9	35.4	94.2	55.0

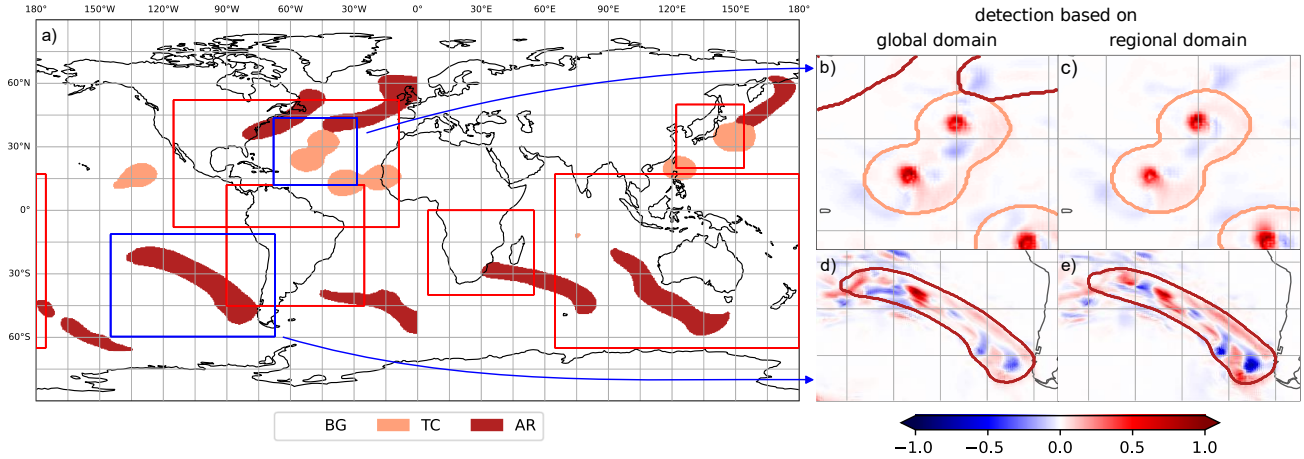

Figure S11: Same as Fig. 10 in the main paper but for U-Net.

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Table S2: Same as Table 4 in the main paper but for U-Net.

Region	**(a) IoU of subregion (detection using global data)**			**(b) IoU of subregion (detection using regional data)**		
	AR	TC	BG	AR	TC	BG
Global (same as in Table 2)	40.1	36.1	94.7			
NOAA (North Atlantic)	34.4	41.4	92.1	33.9	39.9	92.1
CPTEC (South America)	39.5	40.2	92.9	31.5	33.5	92.5
SAWS (Southern Africa)	35.0	19.6	91.3	8.1	12.3	90.0
JMA (Japan)	31.3	42.3	88.8	23.9	42.4	89.2
BoM (Oceania)	39.6	11.6	92.1	37.2	8.5	92.2