

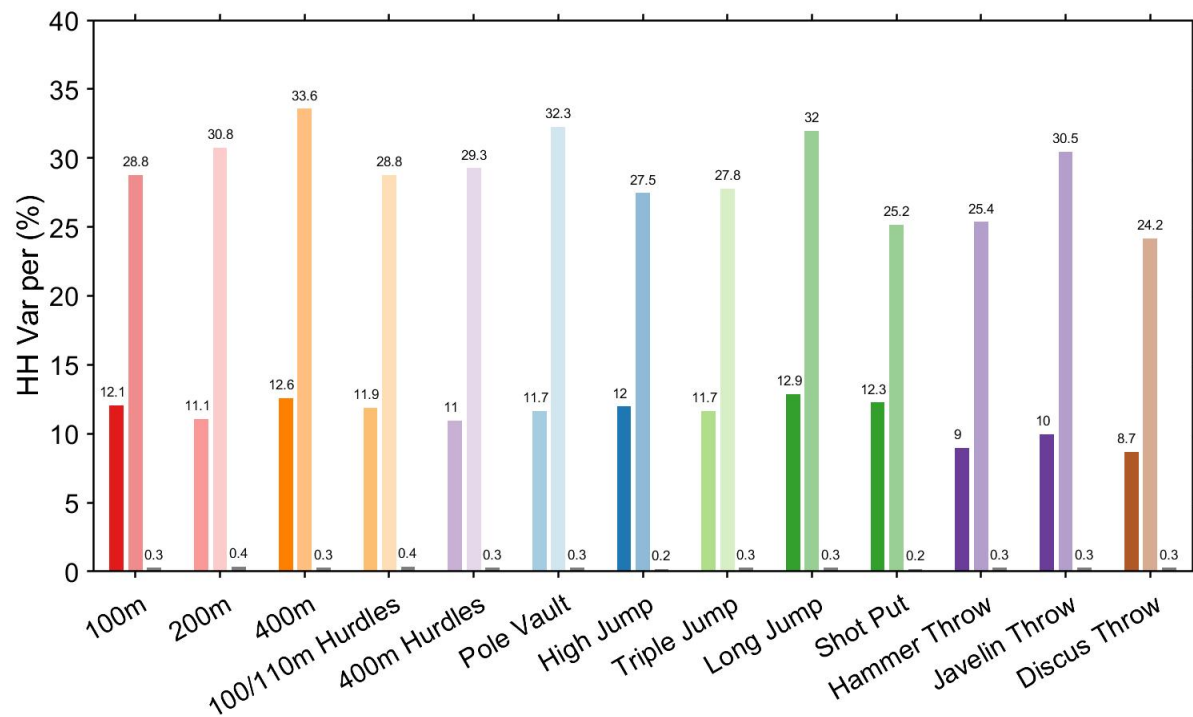
Supplementary Materials for
**Warming climate is helping human beings run faster, jump higher and throw
farther through less dense air**

Shixin Wang *et al.*

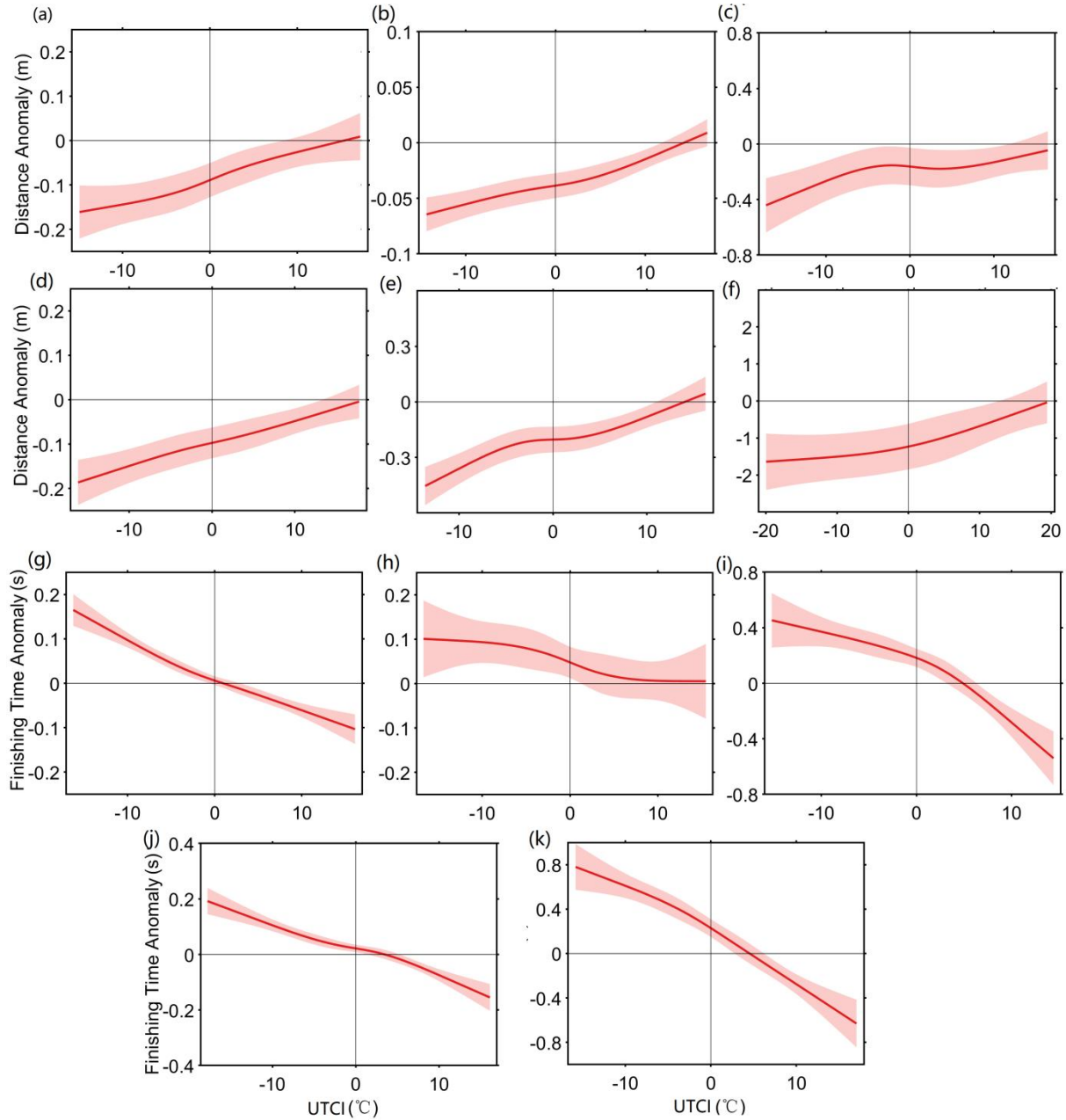
*Corresponding author. Email: jjluo@nuist.edu.cn

This PDF file includes:

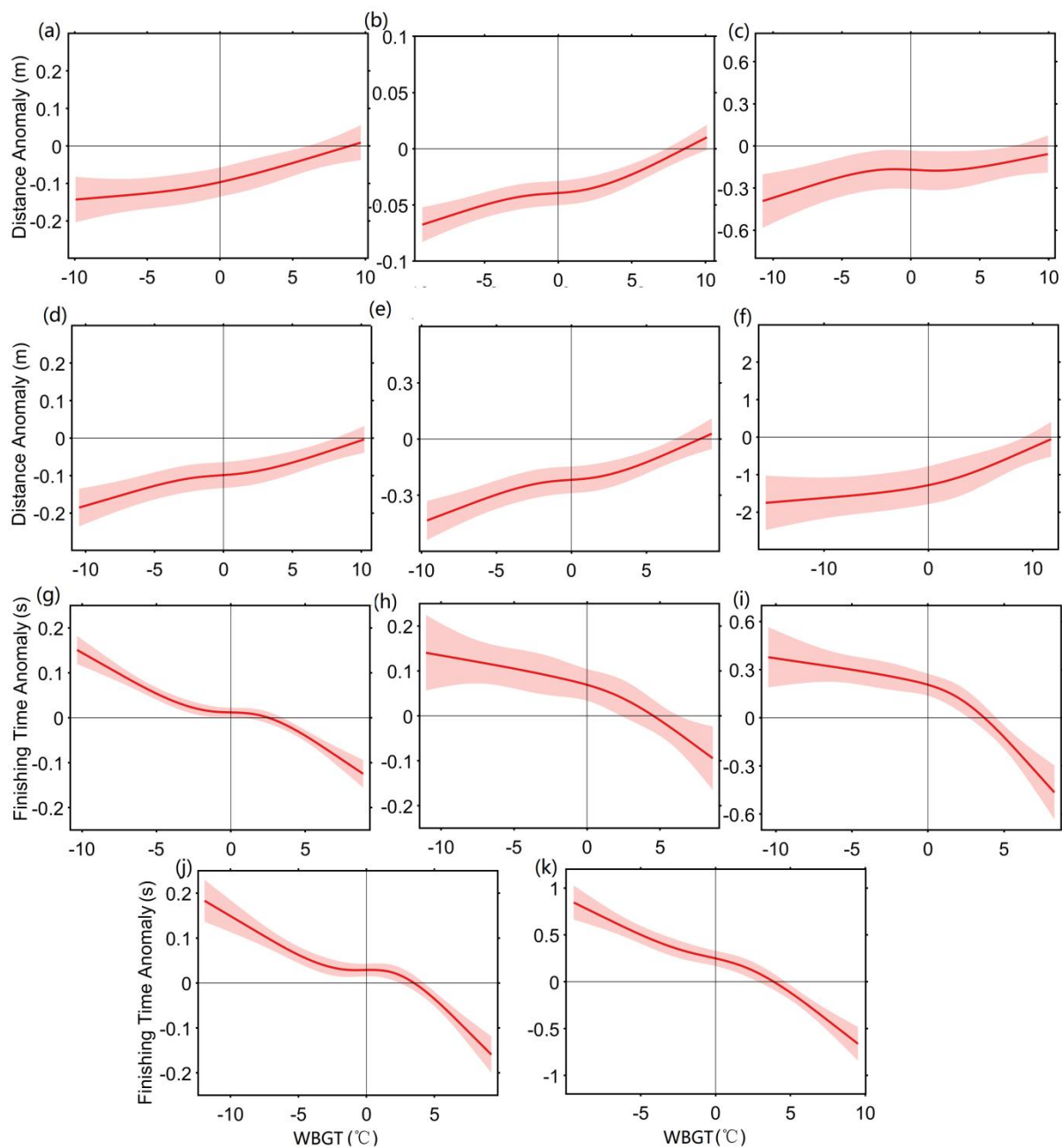
Supplementary Figures 1 to 7 and Tables 1 to 2.



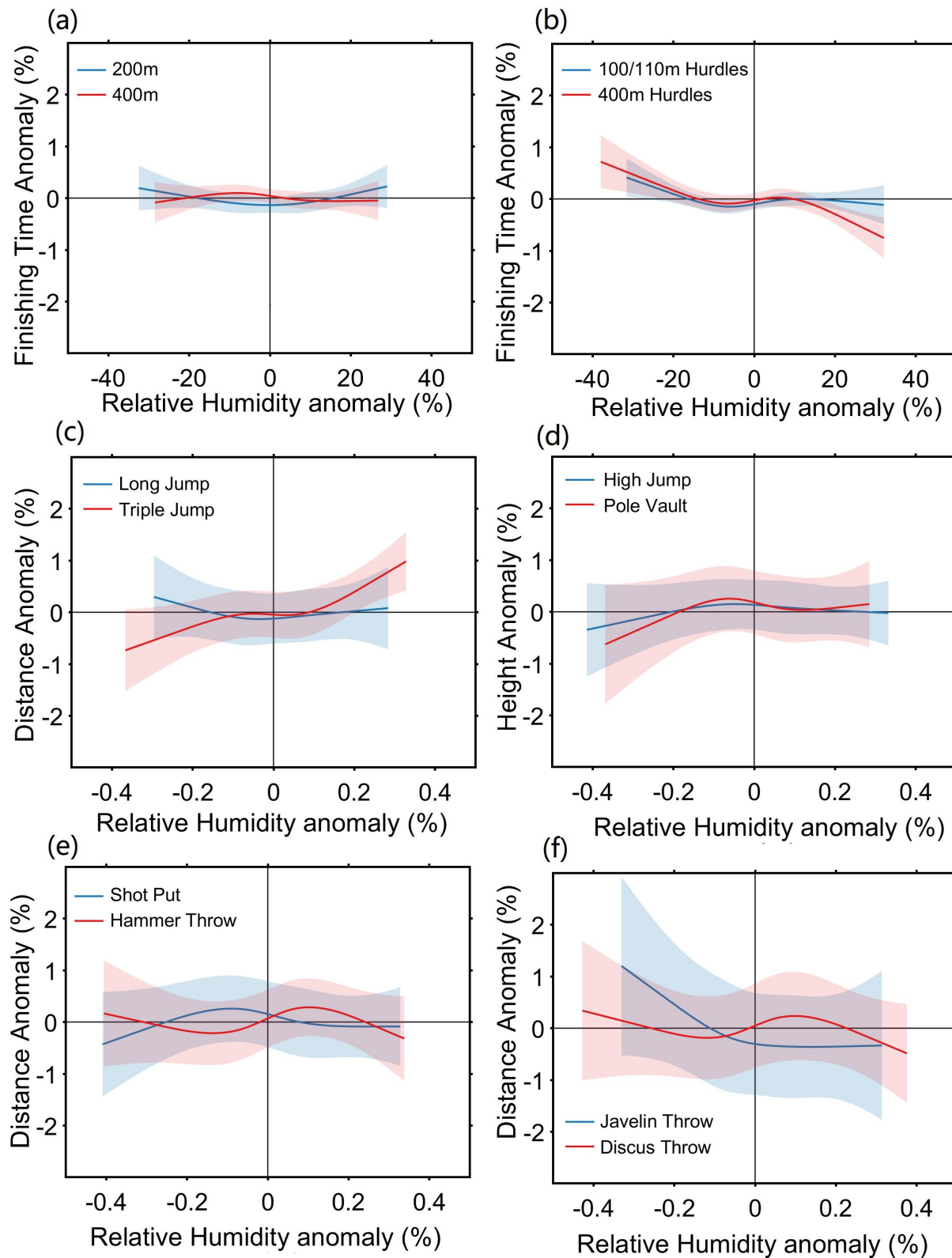
Supplementary Figure 1 Percentage of hour-to-hour variances of weather conditions during 9:00-22:00 to the total competition-to-competition variances. Here we assume that the hour-to-hour variances of weather conditions during 9:00-22:00 and the competition-to-competition variances of average weather conditions during 9:00-22:00 on the day of competition are independent of each other and the total variances are calculated as the sum of them. The left, middle and right bar for each event denote the percentage for ambient temperature, relative humidity and atmospheric pressure, respectively.



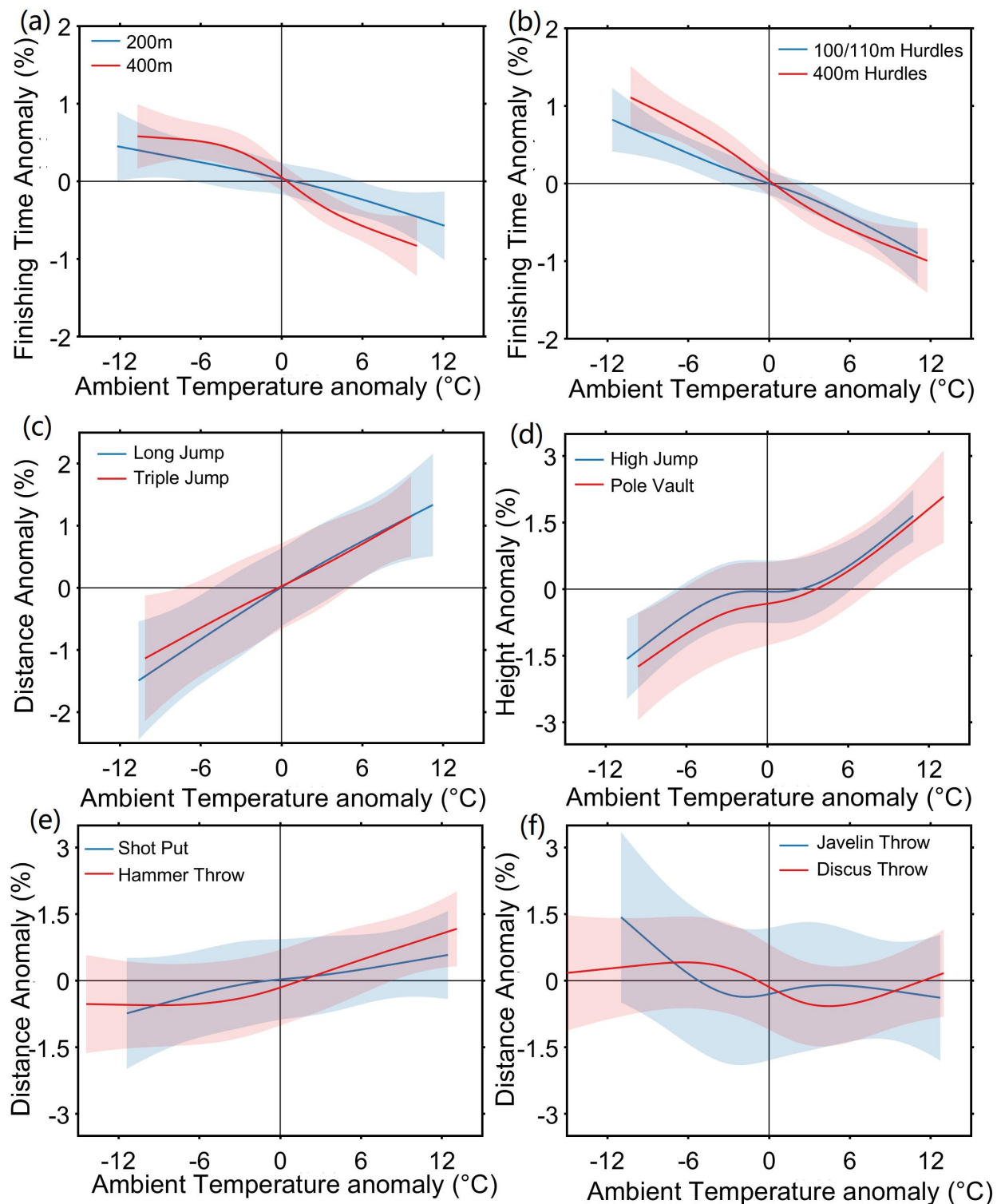
Supplementary Figure 2 Relation of finishing time or distance anomaly (%) with Universal Thermal Climate Index (UTCI). (a)-(k) are for long jump, high jump, shot put, pole vault, triple jump, hammer throw, 100m, 200m, 400m, 100/110 hurdles and 400m hurdles, respectively. The curve in each panel shows the relationship obtained with the same method as that of Fig. 4 in the main manuscript. The shadings denote the 95% confidence intervals for the relationship.



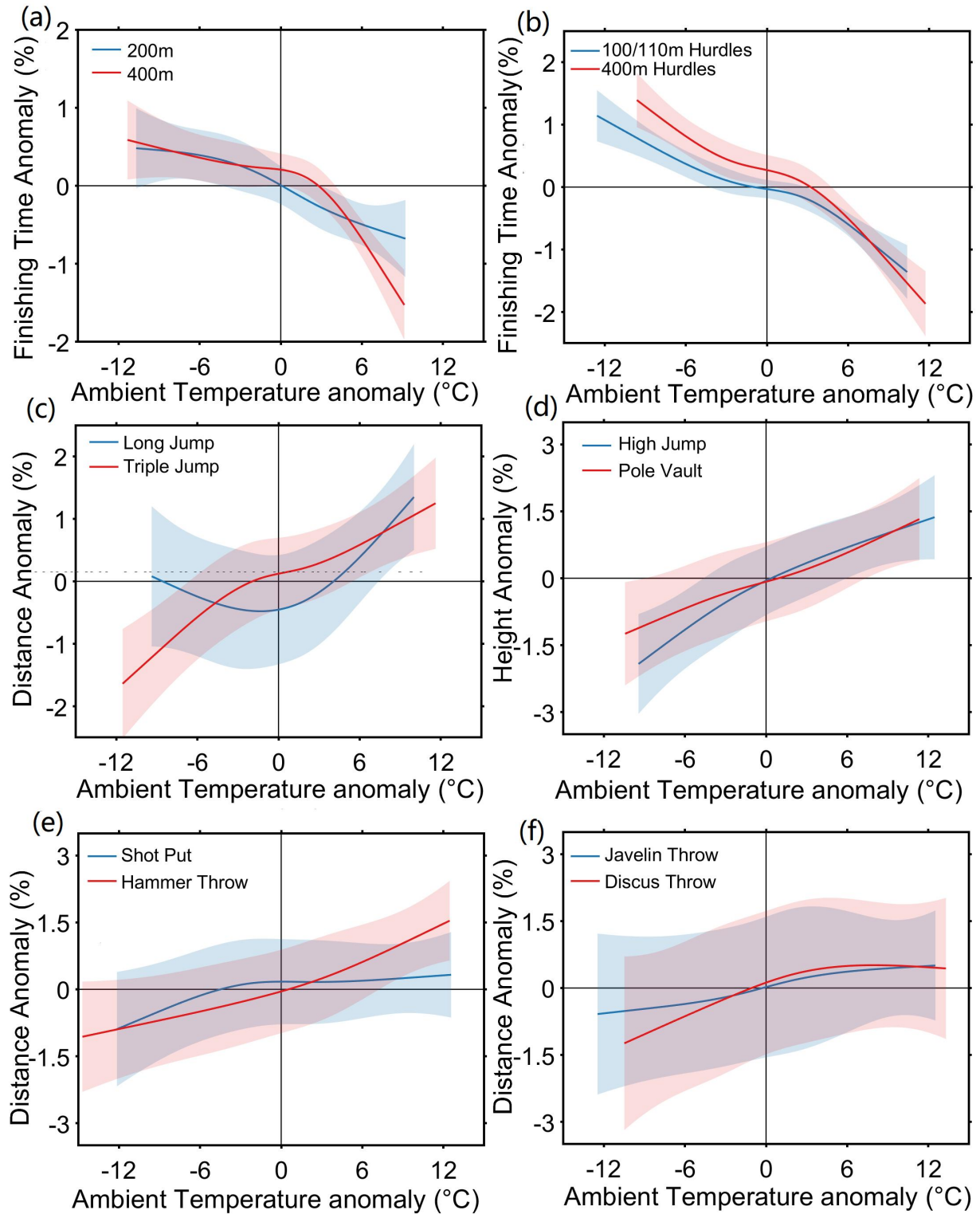
Supplementary Figure 3 Same as Supplementary Figure 2 but for WBGT.



Supplementary Figure 4 Same as Fig. 4 but for the relation of distance/finishing time anomaly with ambient relative humidity.

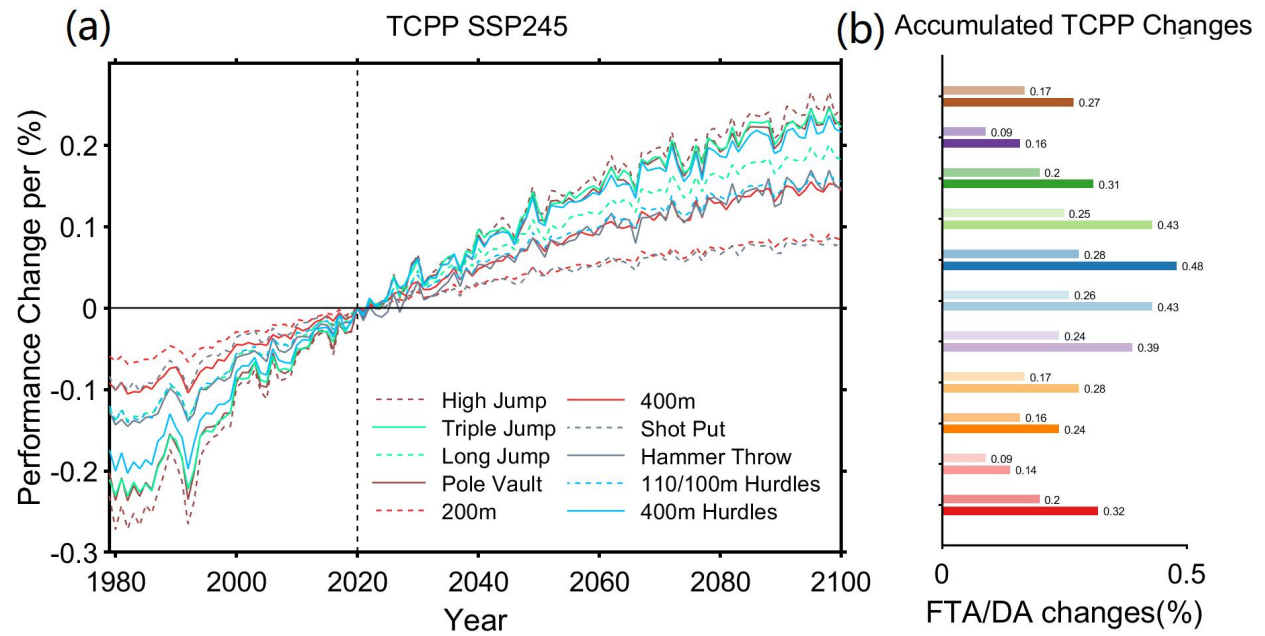


Supplementary Figure 5 As Fig. 4 in the main paper, but for the result of men athletes.



Supplementary Figure 6 As Fig. 4 in the main paper, but for the result of women

athletes.



Supplementary Figure 7 Same as Fig. 8b,c in the main paper, but under the SSP245. The order of the events for the bars in (b) is the same as that in Fig. 8c in the main paper.

Supplementary Table 1: Statistics of multiple linear regression of competitors' performance upon meteorological elements and the round of competition for each athlete of each event. The column 'Opposite' and 'Same' denotes the number of athletes whose regression coefficient on ambient temperature is the same and opposite, respectively, to that conducted using all the 40 competitors' results (Table 2). The column 'AMP' denotes the correlation between each competitor's regression coefficient on ambient temperature and his/her annual mean performance (AMP). The column 'Age' and 'TC' denote the correlation with each competitor's age and the climatological-mean temperature at the capital of his/her country, respectively. The correlation coefficients marked with * are statistically significant at 95% confidence level.

Events	Opposite	Same	AMP	Age	TC
100m	3	37	-0.37*	0.13	0.02
200m	12	26	-0.56*	0.16	0.29
400m	6	33	0.12	-0.37*	-0.05
100/110m Hurdles	3	37	-0.21	0.01	0.07
400m Hurdles	1	39	0.14	0.05	0.39*
Long Jump	12	28	0.16	-0.3	0.03
Triple Jump	8	31	0.33*	0.47*	0.11
High Jump	6	31	0.57*	-0.23	-0.2
Pole Vault	8	32	-0.11	0.12	0.01
Hammer Throw	10	30	0.34*	0.05	-0.23
Shot Put	16	24	0.29	0.28	-0.17
Total	85	348	/	/	/

Supplementary Table 2 List of the athletics anaerobic events, meteorology variables and numbers of the athletes and competitions for each event used in the present study. VA denotes tail wind speed anomalies. Temperature, pressure and humidity denote ambient temperature, atmospheric pressure and relative humidity anomalies, respectively.

Events		Athletes		Competitions		Different Variables	Common Variables
		Men	Women	Men	Women		
Sprints	100m	20	20	499	489	VA	Temperature, Pressure, Humidity, AMP, Round, Age, Sex, TC.
	200m	20	20	327	287	VA	
	400m	20	20	391	371	/	
Hurdles	100/110m Hurdles	20	20	541	581	VA	
	400m Hurdles	20	20	421	410	/	
Jumps	Long Jump	20	20	423	364	VA	
	Triple Jump	20	20	336	370	VA	
	High Jump	20	20	372	408	/	
	Pole Vault	20	20	502	415	/	
Throws	Discus Throw	20	20	649	275	/	
	Javelin Throw	20	20	468	442	/	
	Hammer Throw	20	20	519	478	/	
	Shot Put	20	20	541	471	/	
Total	/	260	260	5989	5361	/	/