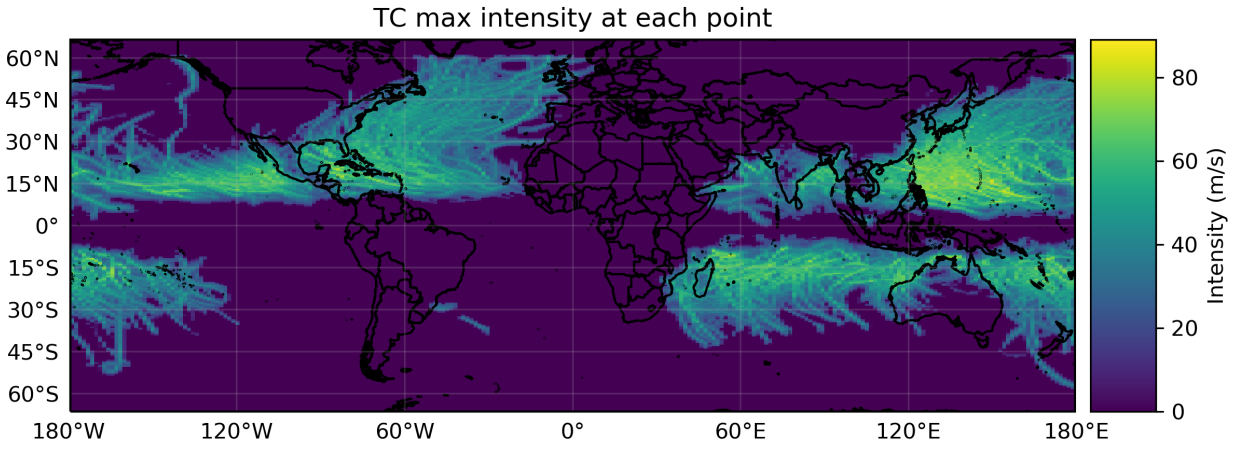


Figure S1: Tropical cyclone hazard set: Maximum intensity (sustained windspeed) per grid cell as simulated with CLIMADA (c.f. Sect. 2.2.1). The maximum intensity per grid cell is determined for an aggregate over all 4'097 TC tracks used for the simulation of annual expected damage.

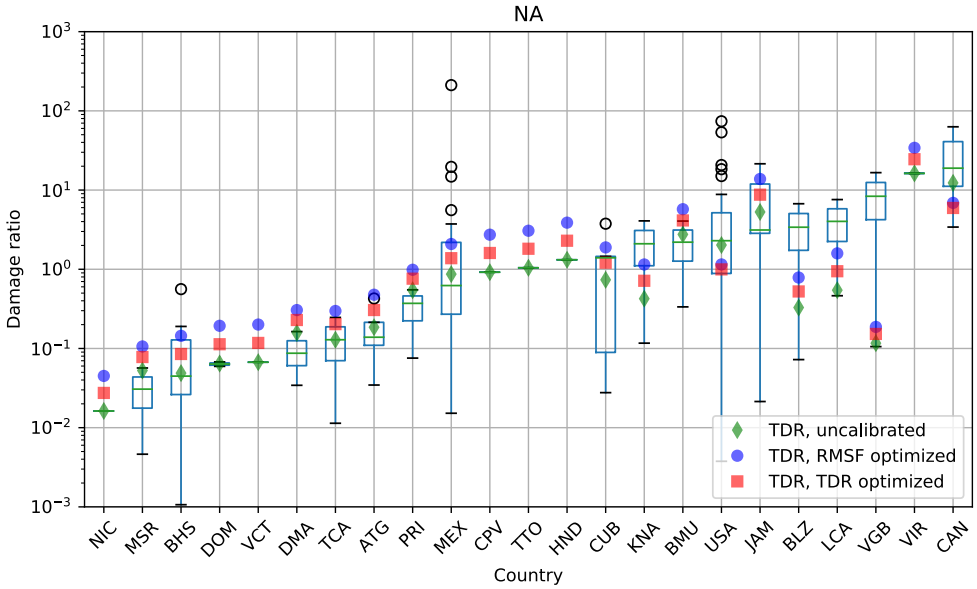


Figure S2a: Spread of event damage ratio (EDR, uncalibrated) and total damage ratio (TDR) per country in the North Atlantic and North East Pacific basin (NA). The plots are based on data from 23 countries. The EDR boxplots show the median (green line), the first and third quartiles (IQR, blue box), data points outside the IQR but not more than 1.5·IQR distance from either the first or the third quartile (black whiskers), and outliers (black circles). The additional markers show TDR before calibrated (green diamond) and after calibration (blue circle: RMSF optimized and red squares: TDR optimized).

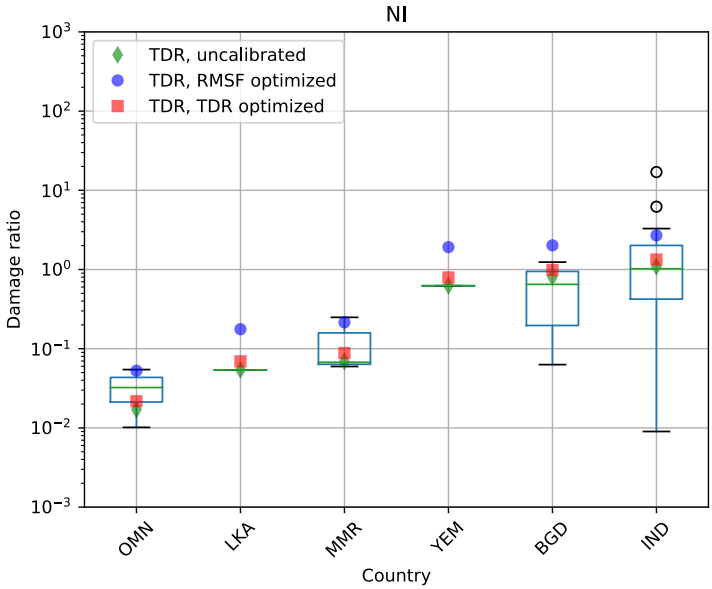


Figure S2b: Spread of event damage ratio (EDR, uncalibrated) and total damage ratio (TDR) per country in the North Indian Ocean basin (NI). The plots are based on data from six countries. The EDR boxplots show the median (green line), the first and third quartiles (IQR, blue box), data points outside the IQR but not more than 1.5·IQR distance from either the first or the third quartile (black whiskers), and outliers (black circles). The additional markers show TDR before calibrated (green diamond) and after calibration (blue circle: RMSF optimized and red squares: TDR optimized).

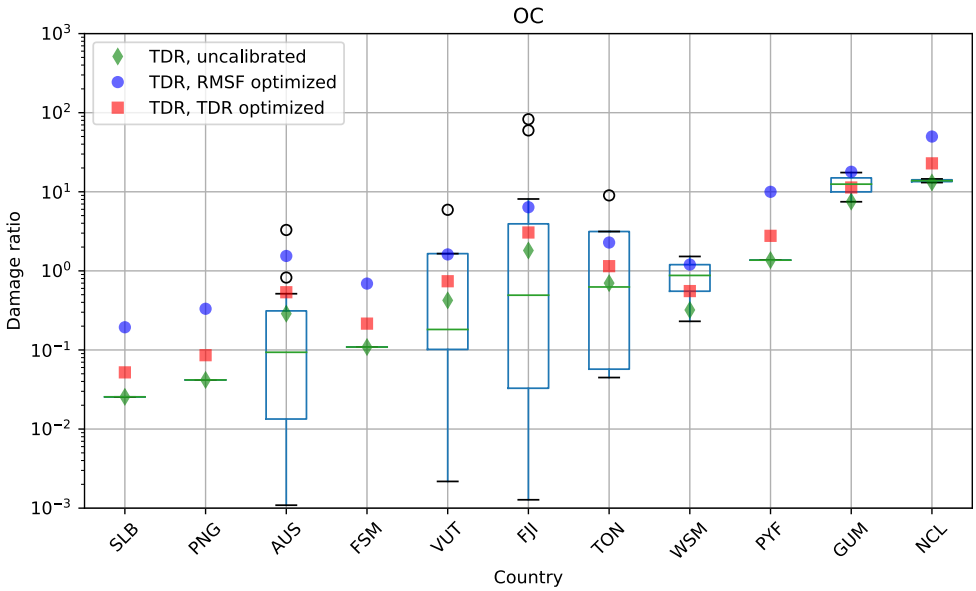


Figure S2c: Spread of event damage ratio (EDR, uncalibrated) and total damage ratio (TDR) per country in Oceania with Australia (OC). The plots are based on data from 11 countries. The EDR boxplots show the median (green line), the first and third quartiles (IQR, blue box), data points outside the IQR but not more than 1.5·IQR distance from either the first or the third quartile (black whiskers), and outliers (black circles). The additional markers show TDR before calibrated (green diamond) and after calibration (blue circle: RMSF optimized and red squares: TDR optimized).

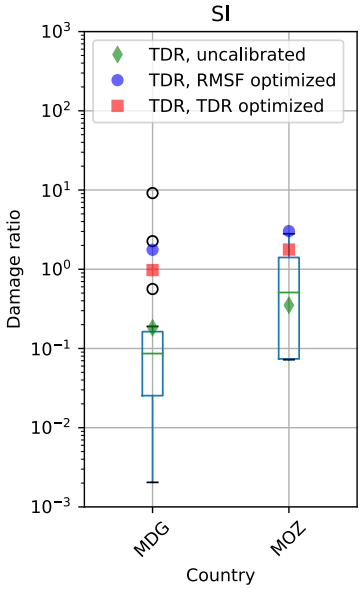


Figure S2c: Spread of event damage ratio (EDR, uncalibrated) and total damage ratio (TDR) per country in the South Indian Ocean basin (SI). The plots are based on data from two countries. The EDR boxplots show the median (green line), the first and third quartiles (IQR, blue box), data points outside the IQR but not more than 1.5·IQR distance from either the first or the third quartile (black whiskers), and outliers (black circles). The additional markers show TDR before calibrated (green diamond) and after calibration (blue circle: RMSF optimized and red squares: TDR optimized).

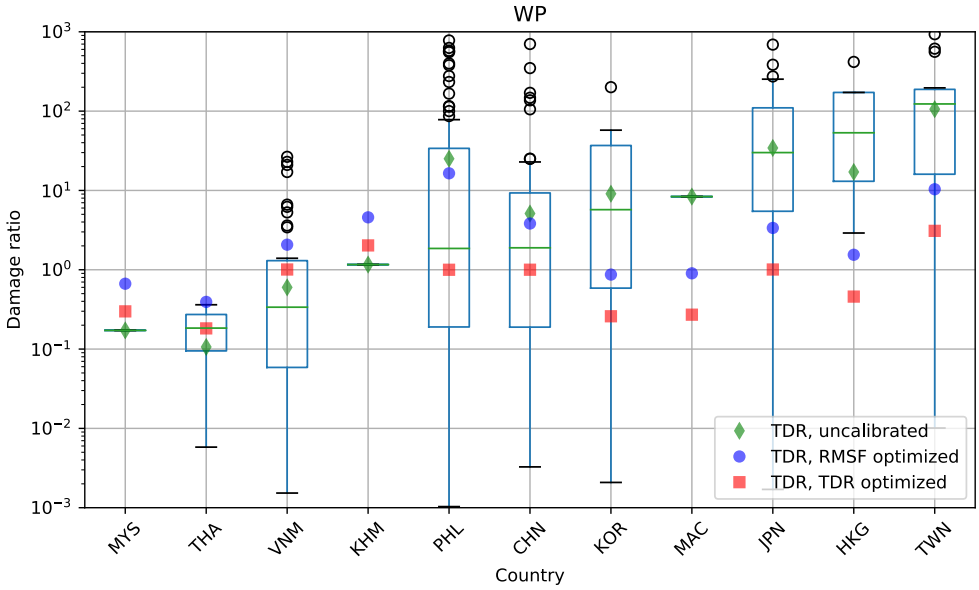
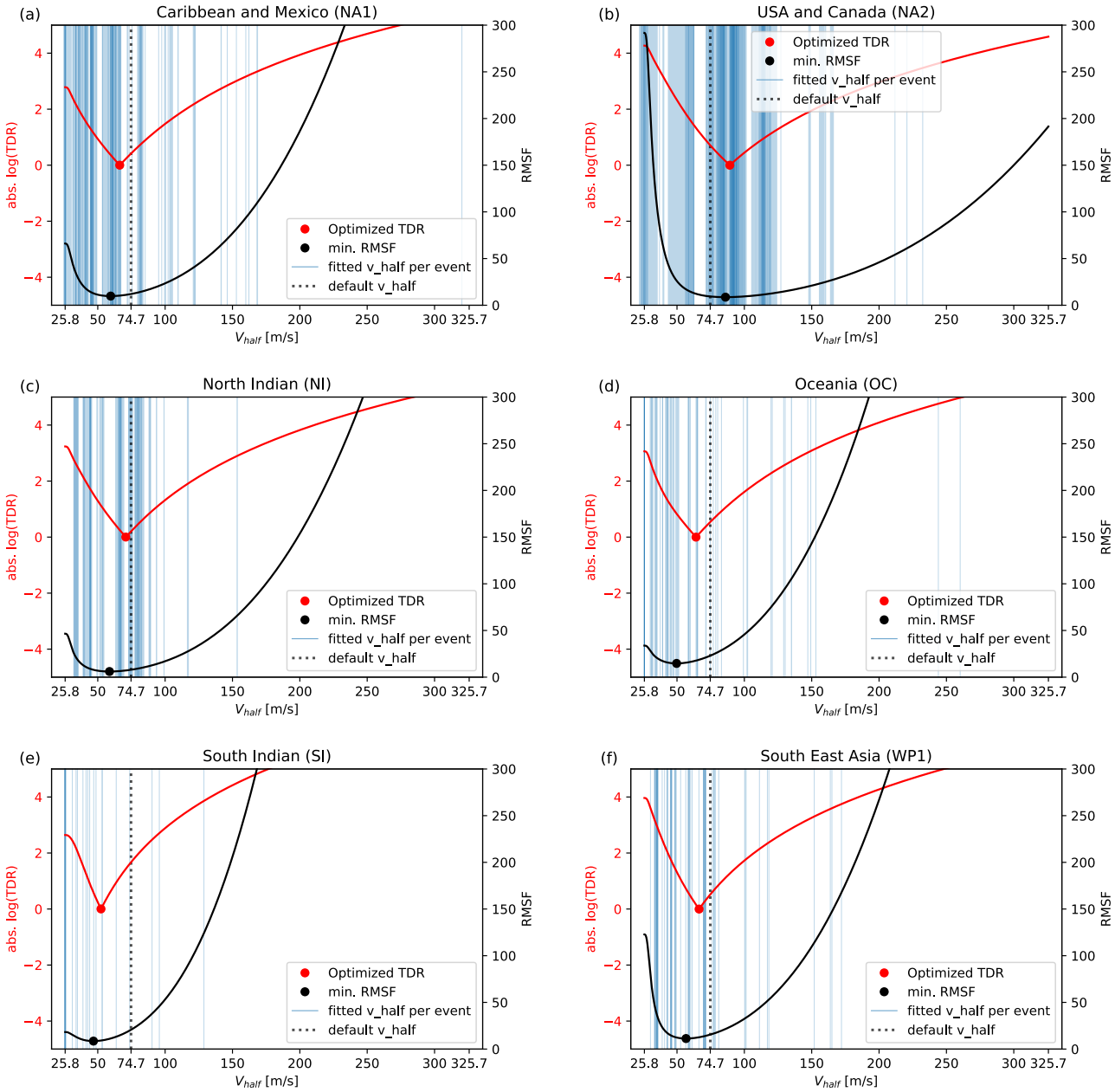


Figure S2d: Spread of event damage ratio (EDR, uncalibrated) and total damage ratio (TDR) per country in the North West Pacific basin (WP). The plots are based on data from 11 countries. The EDR boxplots show the median (green line), the first and third quartiles (IQR, blue box), data points outside the IQR but not more than 1.5·IQR distance from either the first or the third quartile (black whiskers), and outliers (black circles). The additional markers show TDR before calibrated (green diamond) and after calibration (blue circle: RMSF optimized and red squares: TDR optimized).


(a)
Caribbean and Mexico (NA1)
(b)
USA and Canada (NA2)
(c)
North Indian (NI)
(d)
Oceania (OC)
(e)
South Indian (SI)
(f)
South East Asia (WP1)
Optimized TDR
min. RMSF
fitted v_half per event
default v_half
abs. log(TDR)
RMSF
V_{half} [m/s]
25.8
50
74.7
100
150
200
250
300
325.7

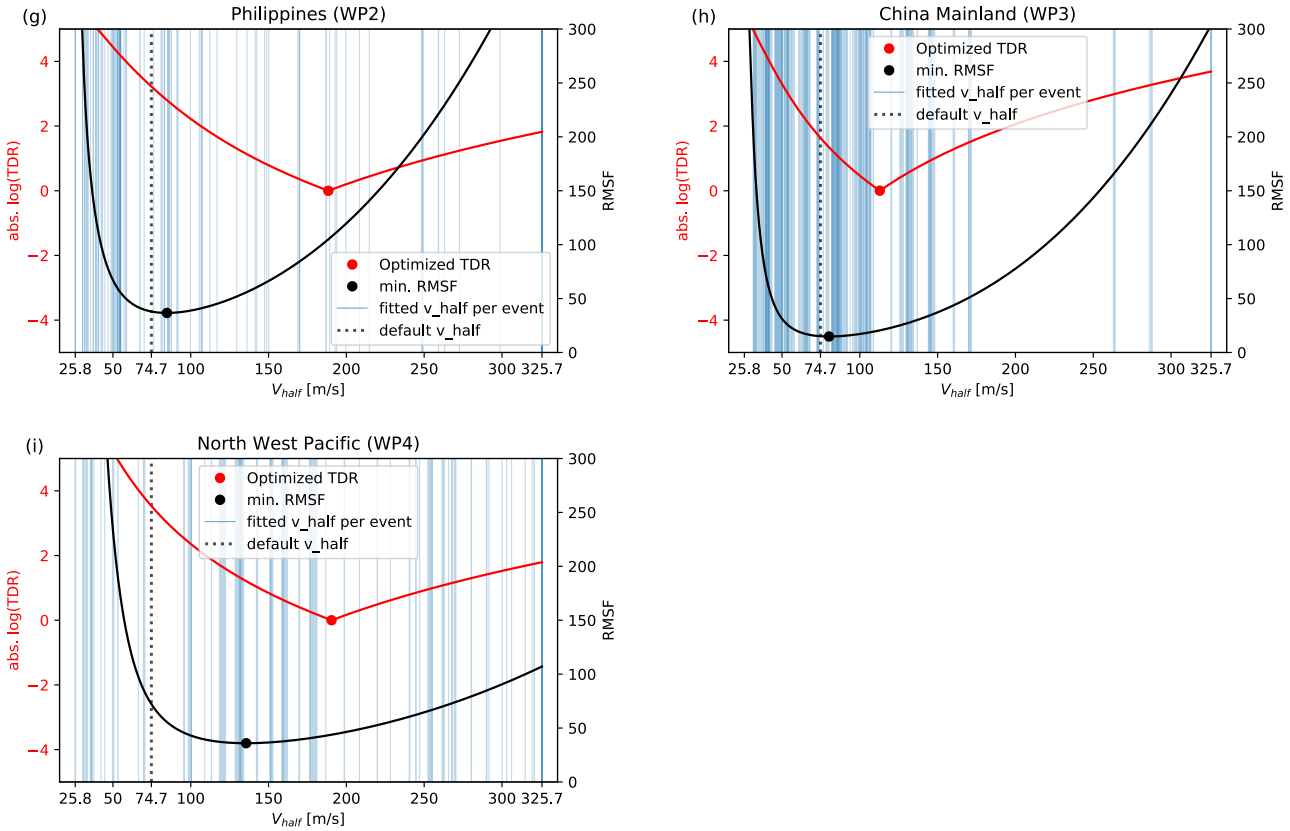


Figure S3: Calibration metrics used for the fitting of V_{half} per region: The lines show the cost functions total damage ratio (TDR, red) and root-mean-squared fraction (RMSF, black) as functions of the impact function shape parameter V_{half}. The optimized values of TDR and RMSF are marked with a round dot. The vertical blue lines demarcate individually fitted values of V_{half} per event. For the individual fitting per event, the value of V_{half} is determined that would be required to obtain an event damage ratio (EDR) equal to 1.

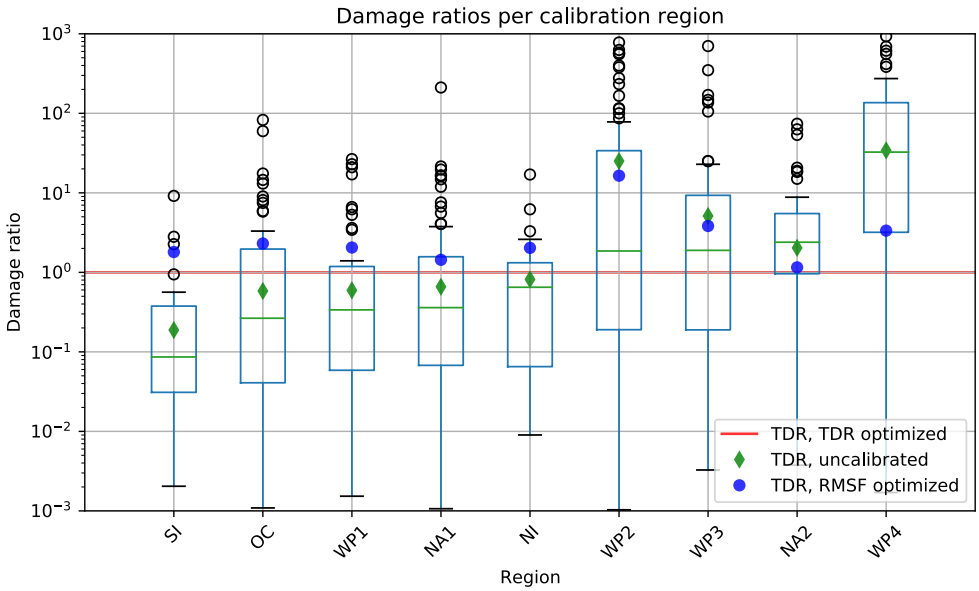


Figure S4: Boxplot displaying the same as Figure 4 with calibrated TDR added for comparison: Spread of event damage ratio (EDR, uncalibrated) and total damage ratio (TDR) per calibration region. The plots are based on data from 473 TC events affecting 53 countries. The EDR boxplots show the median (green line), the first and third quartiles (IQR, blue box), data points outside the IQR but not more than 1.5·IQR distance from either the first or the third quartile (black whiskers), and outliers (black circles). The additional markers show TDR before calibrated (green diamond) and after calibration (blue circle: RMSF optimized and red line: TDR optimized).