



Supplement of

Accumulation-based Runoff and Pluvial Flood Estimation Tool (AccRo v.1.0)

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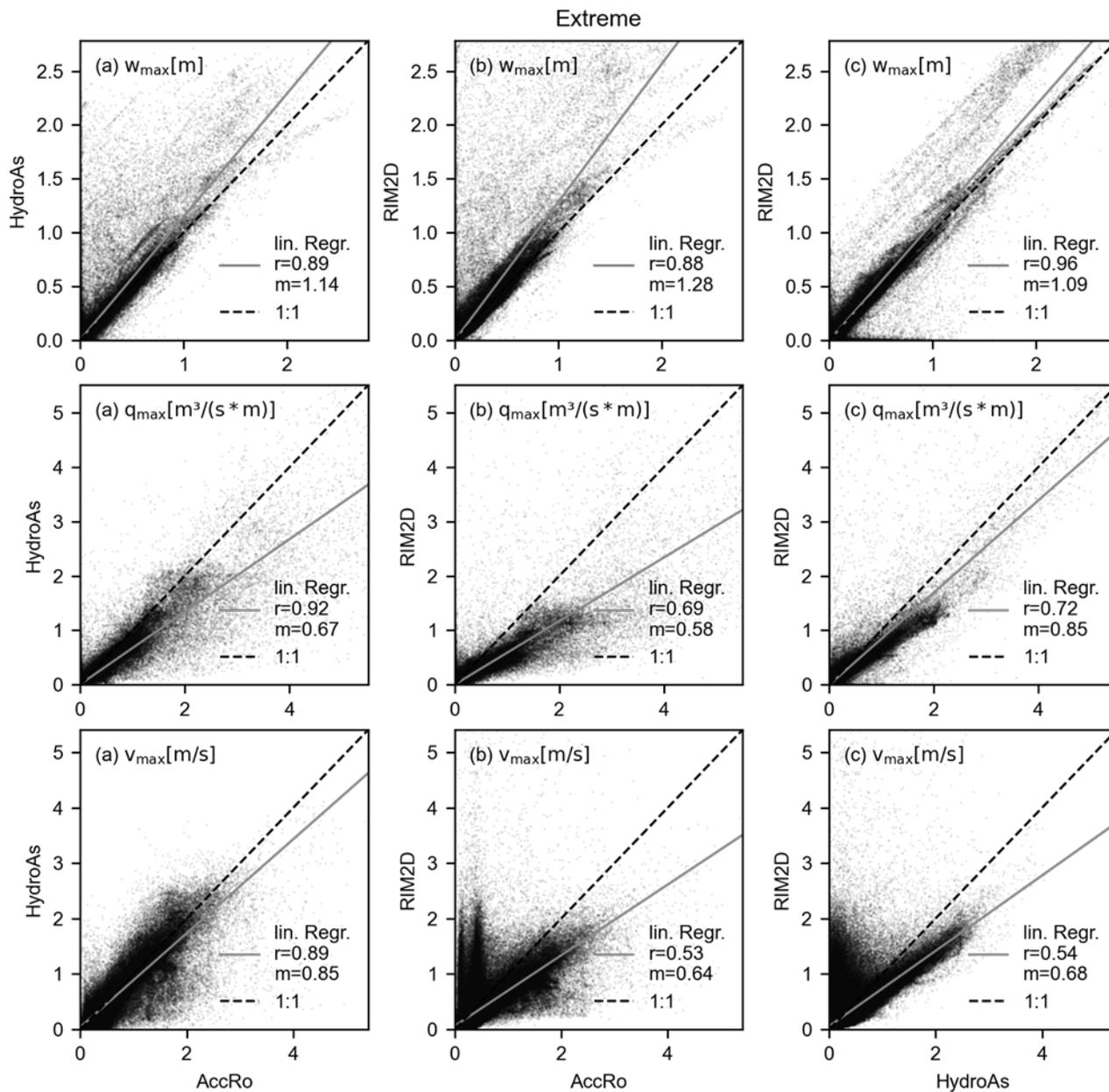
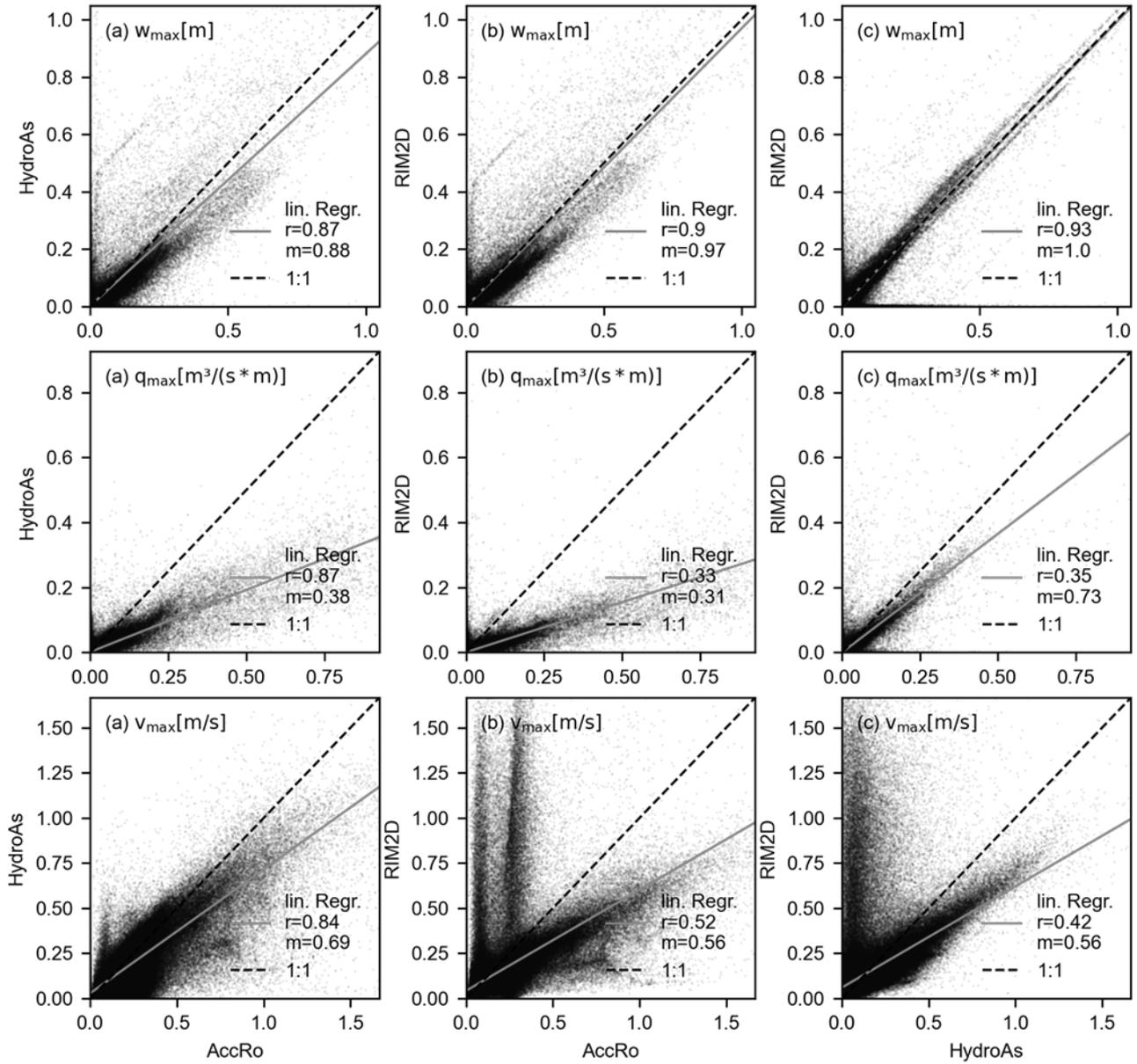


Figure S1: Scatterplot of the three models for the extreme scenario. First row w_{max} (m), second row q_{max} ($m^3/(m \cdot s)$) and third row v_{max} (m/s) for the extreme event. In addition, the linear regression (grey) and 1:1 line (dashed black) as well as the slope of the linear regression (m) and the Pearson correlation coefficient (r) are shown.

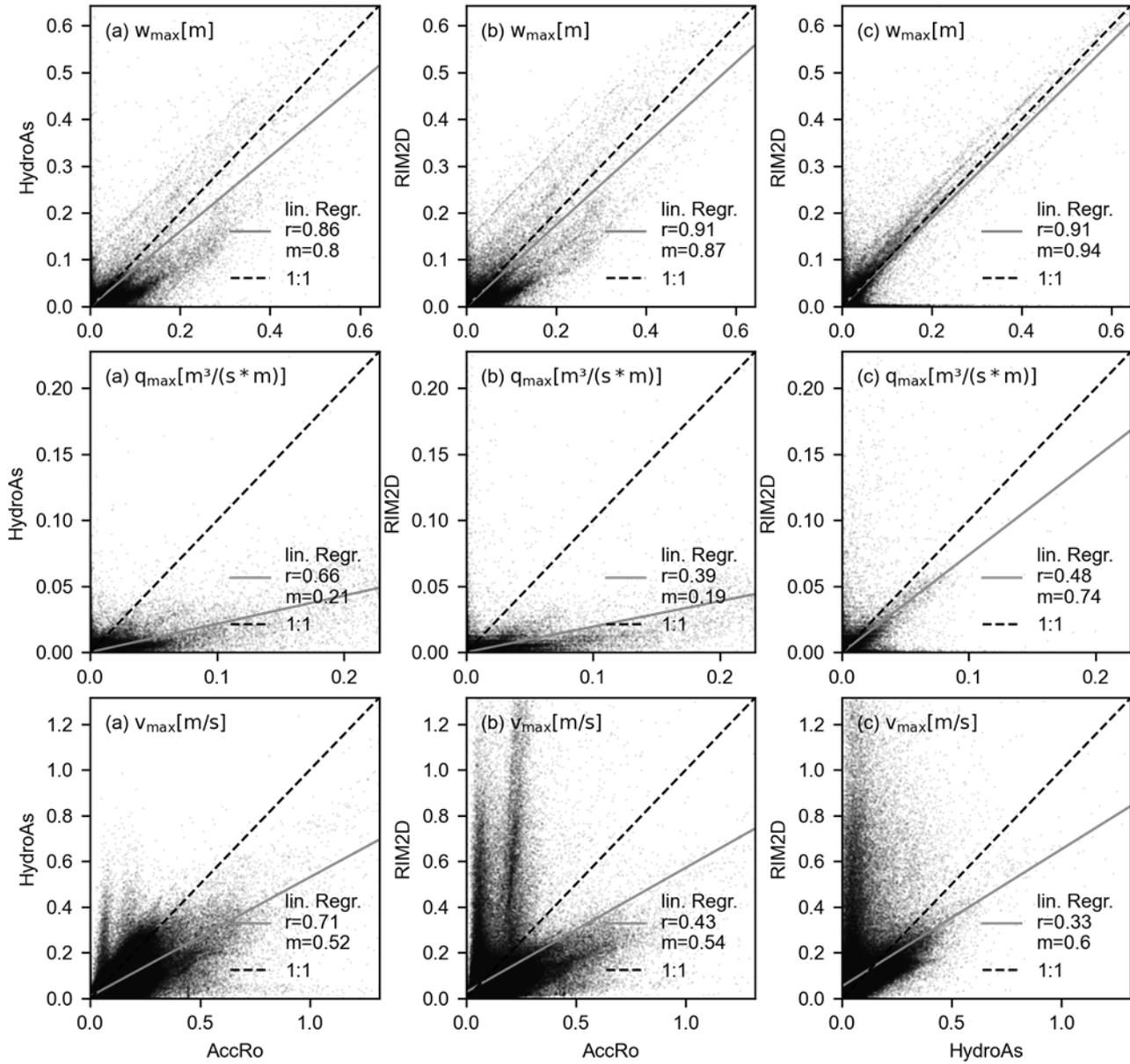
Heavy



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Figure S2: Scatterplot of the three models for the heavy scenario. First row w_{max} (m), second row q_{max} ($m^3/(m \cdot s)$) and third row v_{max} (m/s) for the heavy event. In addition, the linear regression (grey) and 1:1 line (dashed black) as well as the slope of the linear regression (m) and the Pearson correlation coefficient (r) are shown.

Moderate



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Figure S3: Scatterplot of the three models for the moderate scenario. First row w_{max} (m), second row q_{max} ($m^3/(m \cdot s)$) and third row v_{max} (m/s) for the moderate event. In addition, the linear regression (grey) and 1:1 line (dashed black) as well as the slope of the linear regression (m) and the Pearson correlation coefficient (r) are shown.

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Table S1: Peak time difference of the simulated hydrographs at the catchment outlet in hours.

	<i>Event (h)</i>	<i>Moderate (h)</i>	<i>Heavy (h)</i>	<i>Extreme (h)</i>
<i>AccRo - HydroAs</i>	0.02	0.43	-0.54	0.04
<i>AccRo - RIM2D</i>	0.02	0.32	-0.45	0.07
<i>HydroAs - RIM2D</i>	0	-0.11	0.09	0.03

20 **Table S2: Mean absolute error of the simulated hydrographs at the catchment outlet in m³/s and %. For the percentage values baseline was the mean discharge of the model listed first.**

	<i>Event</i>	<i>Moderate</i>	<i>Heavy</i>	<i>Extreme</i>
	m ³ /s %			
<i>AccRo - HydroAs</i>	1.25 44.34	0.24 63.42	1.79 104.44	5.86 45.08
<i>AccRo - RIM2D</i>	1.51 53.64	0.32 63.96	0.75 43.74	8.97 69.0
<i>HydroAs - RIM2D</i>	0.23 9.74	0.01 8.76	0.2 15.57	4.61 25.15

25 **Table S3: Peak percentage difference of the simulated hydrographs at the catchment outlet in %. For the percentage values baseline was the peak discharge of the model listed first.**

	<i>Event</i>	<i>Moderate</i>	<i>Heavy</i>	<i>Extreme</i>
<i>AccRo - HydroAs</i>	9.2%	59.5%	38.07%	-2.72%
<i>AccRo - RIM2D</i>	11.0%	57.85%	39.97%	10.23%
<i>HydroAs - RIM2D</i>	1.98%	-4.08%	3.06%	12.61%

30 **Table S4: Computing times and computing systems for the catchment cases. Note that the simulation length for the 2d hydrodynamic models were 5.25h in the case of the event and 4h for the three other scenario simulations. Since AccRo is independent of an internal model time step (for details see chapter 2), a simulation length does not exist for AccRo.**

	<i>Event</i>	<i>Moderate</i>	<i>Heavy</i>	<i>Extreme</i>	<i>System</i>
<i>AccRo</i>	1.96 min	0.75 min	1.5 min	2.25 min	Windows Server 2016, 2 CPU (used), AMD EPYC 7551P (2 GHz)
<i>HydroAs</i>	115 min	57 min	66 min	102 min	Windows 11, 4 CPU (used), AMD Ryzen 9 7950X (4.50 GHz)
<i>RIM2D</i>	1.8 min	1.07 min	1.23 min	6.17 min	Ubuntu Server 24.04, NVIDIA V100 GPU