

Supplementary Material

Table S1. Gauge (upstream) and Tide (downstream) stations description. The stations were used to define the boundary conditions of the 2D hydrodynamic model.

Boundary condition	Section	Gauge/Tide station	Source	Longitude	Latitude
Upstream	Taquari River	Estrela (86879300)	ANA	-51.962	-29.473
	Jacuí River	Rio Pardo (85900000)	ANA	-52.375	-29.995
	Caí River	Barca do Caí (87170000)	ANA	-51.383	-29.590
	Gravataí River	Passo das Canoas (87399000)	ANA	-50.977	-29.964
	Sinos River	Campo Bom (87380000)	ANA	-51.046	-29.691
	Camaquã	Passo do Mendonça (87905000)	ANA	-52.052	-31.011
Downstream	Patos lagoon	Rio Grande 2	SIMCosta	-52.094	-32.167

Table S2. Manning's roughness coefficient (n) used for the main channel and floodplains regions for each main river in the Patos lagoon basin.

Manning region	Main channel	Floodplain
Taquari River	0.030	0.11
Jacuí River	0.035	0.06
Guaíba River	0.035	0.08
Sinos River	0.020	0.12
Gravataí River	0.025	0.10
Caí River	0.035	0.30
Patos Lagoon	0.025	0.08

Table S3. Gauge station used for calibration of the model as well as its location.

Gauge station	Section	Longitude	Latitude
Bom Retiro Montante (86881000)	Taquari River	-51.951	-29.608
Taquari (86950000)		-51.876	-29.806
Porto Mariante (86895000)		-51.970	-29.692
São Jerônimo (87035000)	Jacuí River	-51.696	-29.941
Corsan (87401750)	Gravataí River	-51.036	-29.968
Passo Montenegro (87270000)	Caí River	-51.441	-29.701
São Leopoldo (87382000)	Sinos River	-51.148	-29.758
Cais Mauá (87450004)	Guaíba River	-51.241	-30.034
CatSul – Guaíba (87242000)		-51.311	-30.107

São Lourenço (87921000)	Patos Lagoon	-51.958	-31.377
Laranjal (87955000)		-52.225	-31.772
Rio Grande - FURG (87991100)		-52.101	-32.027

Note. After May 2, gauge station 87450004 was damaged by the flood and was temporarily replaced by a new gauge (87444000), located 2 km downstream.