

Supplement of Nat. Hazards Earth Syst. Sci., 20, 2195–2220, 2020
<https://doi.org/10.5194/nhess-20-2195-2020-supplement>
© Author(s) 2020. This work is distributed under
the Creative Commons Attribution 4.0 License.



Supplement of

Hydrogeomorphological analysis and modelling for a comprehensive understanding of flash-flood damage processes: the 9 October 2018 event in northeastern Mallorca

Joan Estrany et al.

Correspondence to: Joan Estrany (joan.estrany@uib.cat)

The copyright of individual parts of the supplement might differ from the CC BY 4.0 License.

Supplementary material

INTERNATIONAL	Media
The New York Times	Majorca Flash Flood Kills at Least 10 https://www.nytimes.com/2018/10/10/world/europe/flash-flood-majorca-spain.html
Al Jazeera	Flash floods in Spain's Mallorca kill 9, many missing: Two British nationals among the dead as cars are swept away by raging, muddy waters in the Spanish island https://www.aljazeera.com/news/2018/10/flash-floods-spain-mallorca-kill-9-missing-181010100342382.html
EUROPE	
The Telegraph	Majorca floods: Two Britons among eight dead amid 'biblical' scenes https://www.telegraph.co.uk/news/2018/10/09/majorca-flooding-leaves-two-dead-amid-biblical-scenes/
The Guardian	Mallorca floods: at least 10 dead, including British couple https://www.theguardian.com/world/2018/oct/10/uk-couple-reportedly-killed-mallorca-spain-flooding
BBC	Majorca flash flood kills at least 10 on Spanish islands https://www.bbc.com/news/world-europe-45807978
The Sun	A mum is believed to have been killed rescuing her eight-year-old daughter from the floods which ravaged the holiday island of Mallorca last night https://www.thesun.co.uk/news/7456969/majorca-floods-2018-latest-weather-updates-victims-sant-llorenç/
European Flood Awareness System (EFAS)	Flash floods in Mallorca, October 2018 https://www.efas.eu/en/news/flash-floods-mallorca-october-2018
Le Parisien	Inondations à Majorque: au moins neuf morts, Rafael Nadal au secours des sinistrés http://www.leparisien.fr/faits-divers/espagne-inondations-mortelles-a-majorque-10-10-2018-7915314.php
L'indépendant	Inondations à Majorque: le bilan passe à dix morts et un enfant porté disparu, la vidéo d'un sauvetage en pleine rue https://www.lindependant.fr/2018/10/10/majorque-au-moins-cinq-morts-dans-les-inondations.4726940.php
Le Figaro	Inondations à Majorque: bilan alourdi à 13 morts http://www.lefigaro.fr/flash-actu/2018/10/17/97001-20181017FILWWW00220-inondations-a-majorque-bilan-alourdi-a-13-morts.php
Bild	Land unter im Osten Mallorcas https://www.bild.de/news/ausland/news-ausland/unwetter-drama-auf-mallorca-suche-nach-vermissten-laeuft-57758938.bild.html
NATIONAL	
El País	Doce muertos y un niño desaparecido en la tromba de agua de Mallorca https://elpais.com/politica/2018/10/09/actualidad/1539116387_575481.html Las ramblas de Sant Llorenç estaban catalogadas de máximo riesgo de inundación https://elpais.com/politica/2018/10/11/actualidad/1539255702_359602.html Rafael Nadal dona un millón de euros a los afectados por la tormentada de Sant Llorenç https://elpais.com/tag/sant-llorenç-des-cardassar/a/
El Mundo	Al menos 10 muertos en Sant Llorenç y otros puntos de Mallorca por las fuertes lluvias e inundaciones https://www.elmundo.es/baleares/2018/10/09/5bbd0ee4e2704e405b8b4635.html

ABC	Al menos doce muertos en municipios de Mallorca tras las inundaciones por las tormentas https://www.abc.es/sociedad/abci-lluvia-deja-mas-120-litros-agua-mallorca-y-provoca-graves-inundaciones-sant-llorenc-201810092235_noticia.html
REGIONAL	
Última Hora	Graves inundaciones en Sant Llorenç tras desbordarse el torrente https://www.ultimahora.es/noticias/part-forana/2018/10/09/1030853/graves-inundaciones-sant-llorenc-tras-desbordarse-torrente.html
Diario de Mallorca	Las tormentas causan graves inundaciones en Sant Llorenç https://www.diariodemallorca.es/mallorca/2018/10/09/tormentas-causan-graves-inundaciones-sant/1354754.html
Ara Balears	Deu morts pel temporal de pluja a Mallorca https://www.ara.cat/societat/desborda-Sant-Llorenc-arrossega-vehicles_0_2103389890.html
Majorca Daily Bulletin	Hundreds take part in massive clean-up operation in Sant Llorenç https://www.majorcadailybulletin.com/news/local/2018/10/12/53423/hundreds-take-part-massive-clean-operation-sant-llorenc.html

Table S1 Disaster press coverage of the storm occurred in the 9th October 2018 in Mallorca Island.

Damaged items	Case file number	Amount Paid in €
Commercial, stores and others	22	567,886
Industrial	1	72,786
Offices	4	49,660
Cars	507	2,577,950
Dwellings	240	3,574,186
Total	774	6,842,468

- 5 **Table S2** Compensation payments in the village of Sant Llorenç des Cardassar for damages caused by the flash-flood in 9th October 2018. Source: Insurance Compensation Consortium (CCS, 2018).

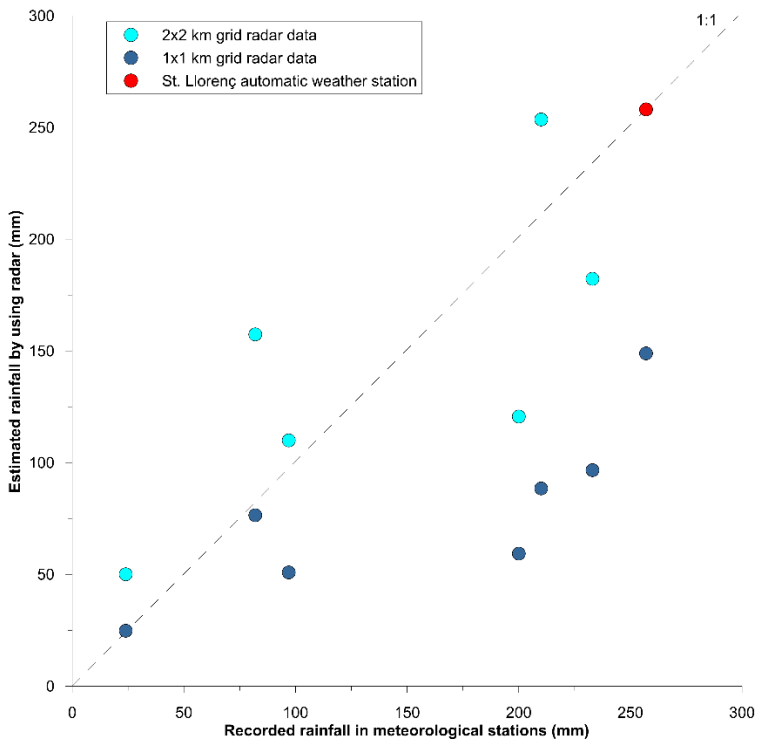


Figure S1 Scatterplot of recorded rainfall in meteorological stations and estimated rainfall by using different grid radar.

10

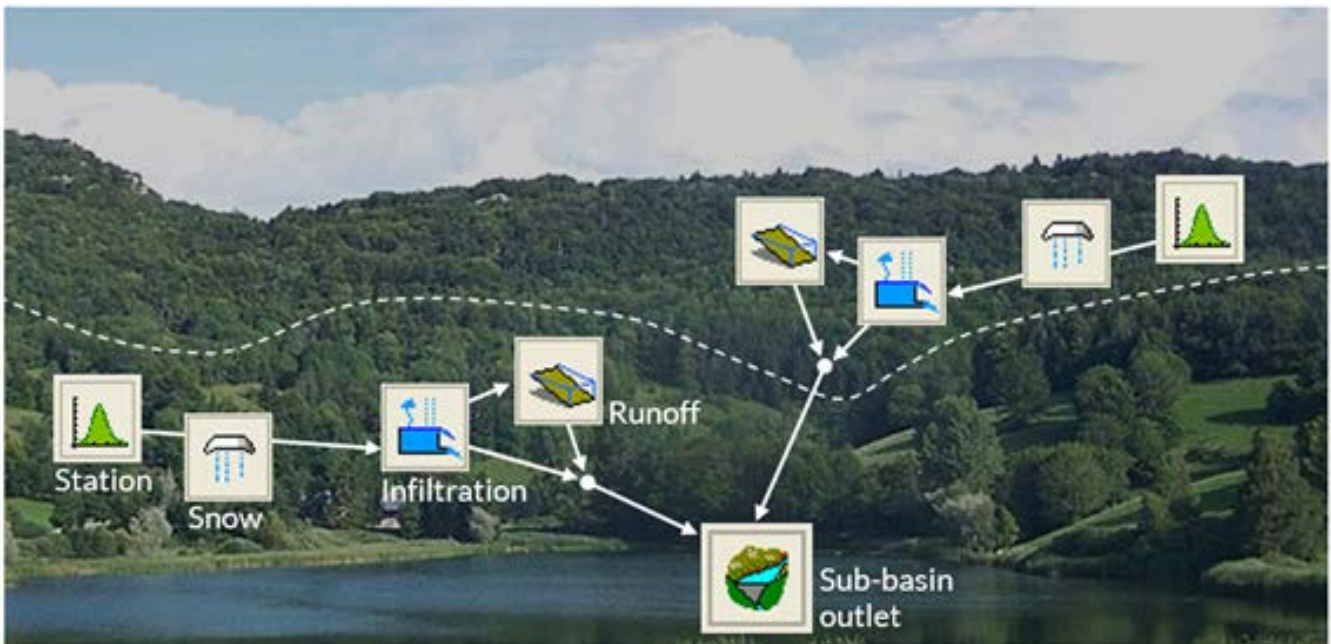


Figure S2 Semi-distributed rainfall-runoff modelling with GSM-SOCONT. The sub-basins is divided in two elevation bands in this example.

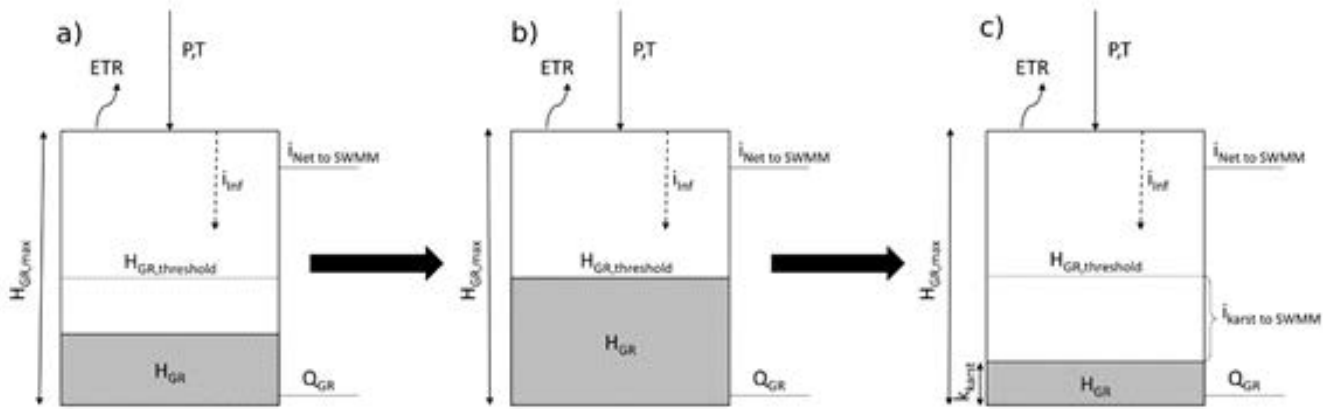


Figure S3 Scheme of the modified infiltration model including a karstic component. Only the relevant parameters are shown, being Q_{GR} : outflow from the infiltration reservoir; H_{GR} : level in infiltration reservoir (State variable); $H_{GR,threshold}$: height of the onset of karstic behaviour; $H_{GR,max}$: Maximum height of infiltration reservoir i_{karst} : karstic release coefficient; ETR : Evapotranspiration; i_{inf} : Infiltration intensity; $i_{Net\ to\ SWMM}$: surface runoff intensity; P,T : Precipitation, Temperature

20