Evaluation of open global Digital Elevation Models for urban flood modelling

Julio Soriano-Monzalvo, Laurent Courty, Adrián Pedrozo-Acuña

INSTITUTO
DE INGENIERÍA
UNAM

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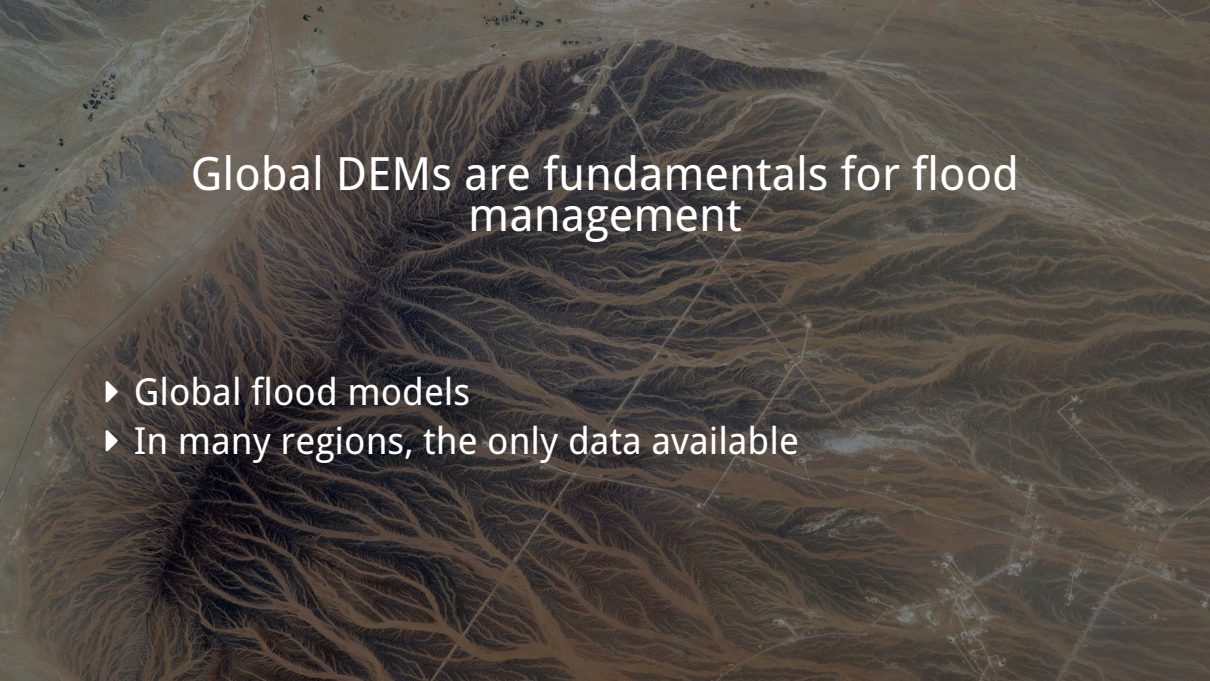


Global DEMs are fundamentals for flood management

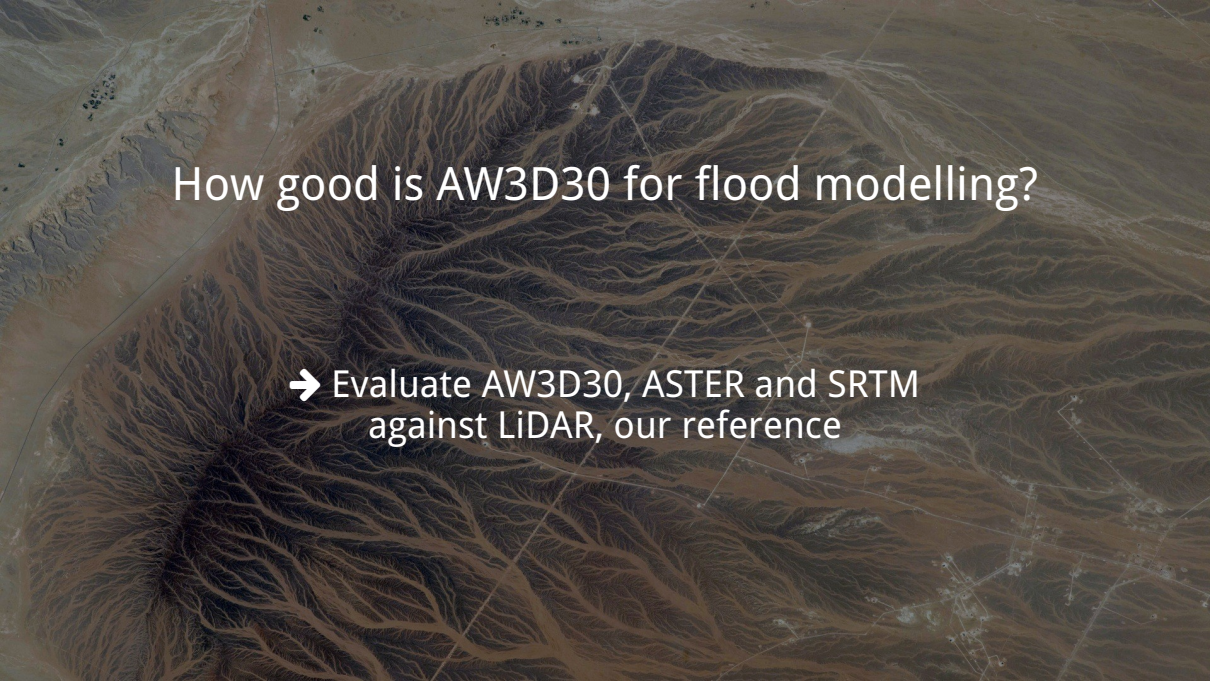
- Global flood models
- In many regions, the only data available

May 2016:

ALOS World 3D-30 v1 is released

Few studies, focus on vertical accuracy

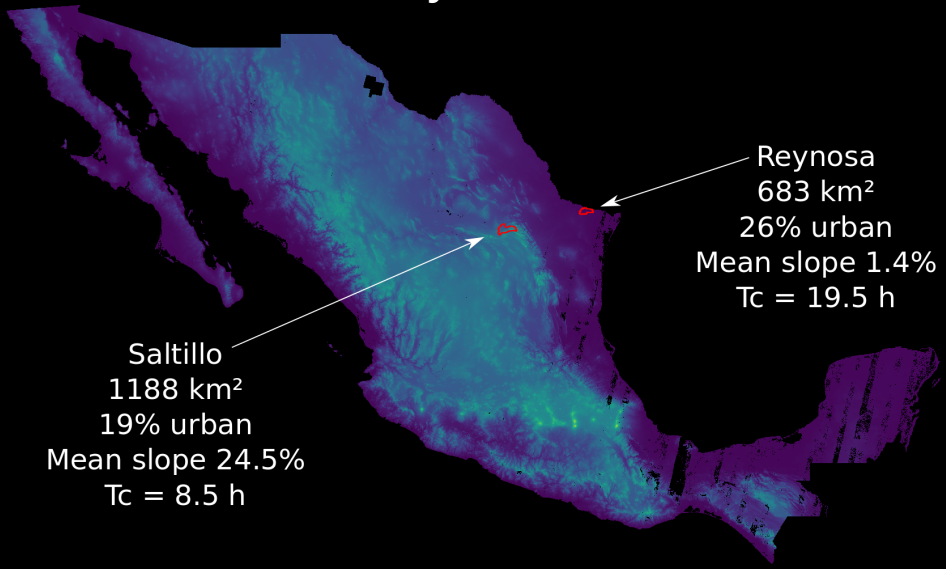
(Santillan et al., 2016; Hu et al., 2017)



How good is AW3D30 for flood modelling?

➔ Evaluate AW3D30, ASTER and SRTM against LiDAR, our reference

Study areas


Reynosa
683 km²
26% urban
Mean slope 1.4%
Tc = 19.5 h
Saltillo
1188 km²
19% urban
Mean slope 24.5%
Tc = 8.5 h

Computer model

itzï

(Courty et al., 2017)

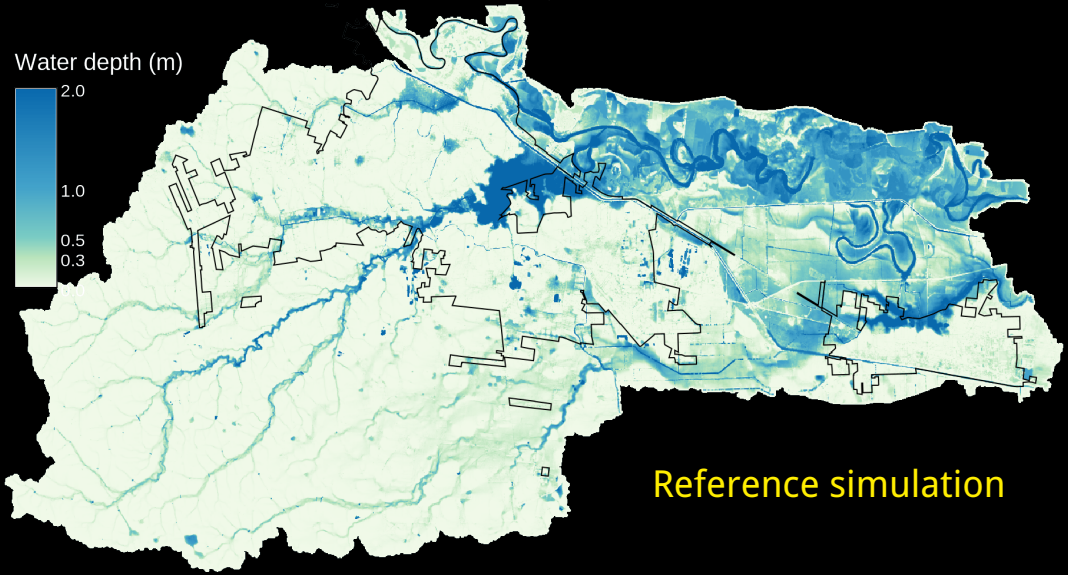
- Raster-based
- Partial inertia
- Gis-integrated
- Open source

www.itzi.org

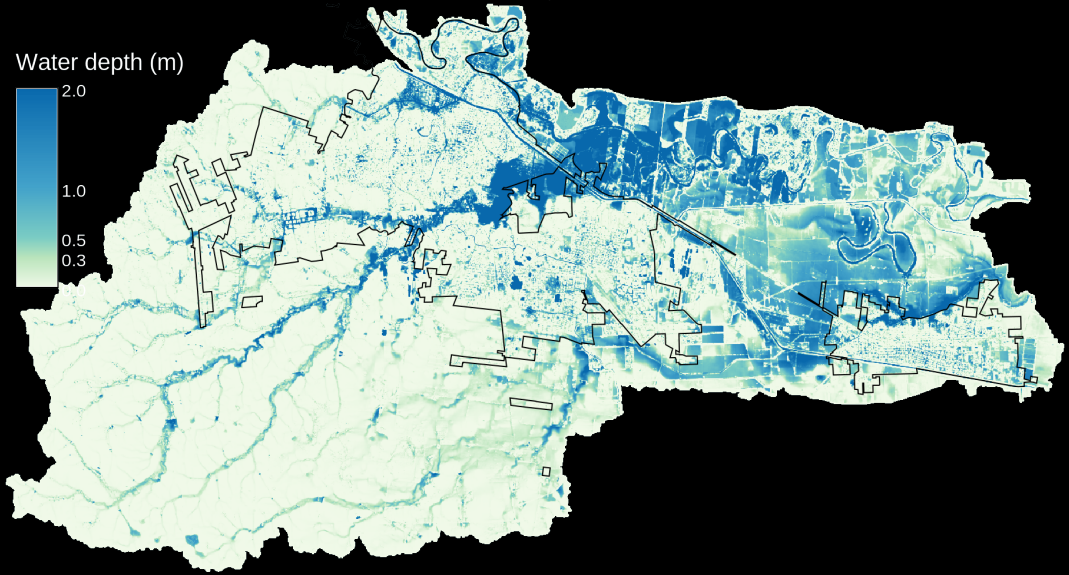
Entry data

- LiDAR resampled to 30 m
- No DEM conditioning
- Uniform & steady rainfall = 10 mm h^{-1}
- Uniform Manning's n = 0.04 s $m^{-1/3}$
- No infiltration
- 48 h of simulation

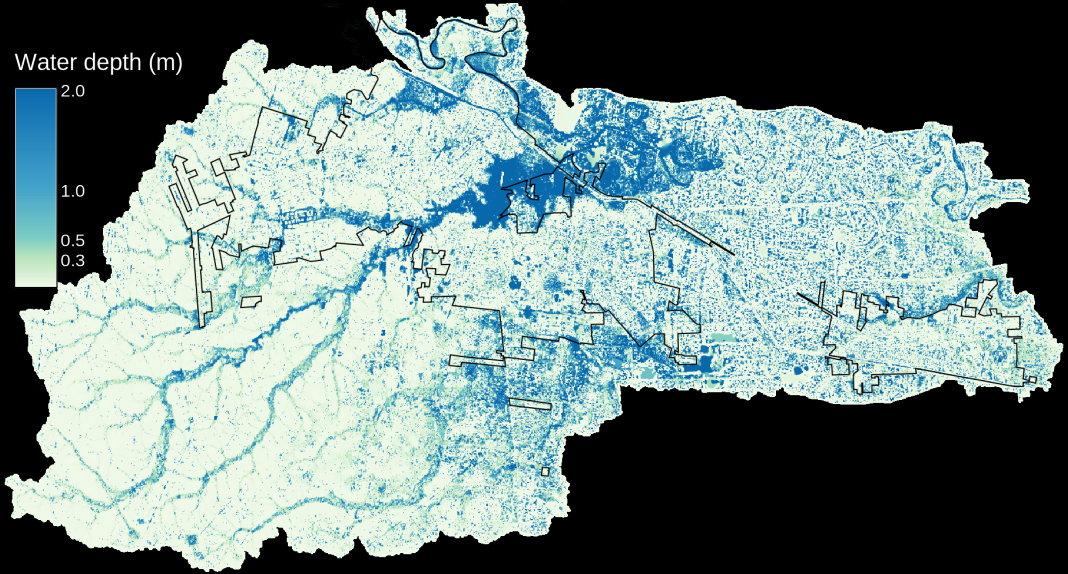
Flat catchment (Reynosa): lidar DTM



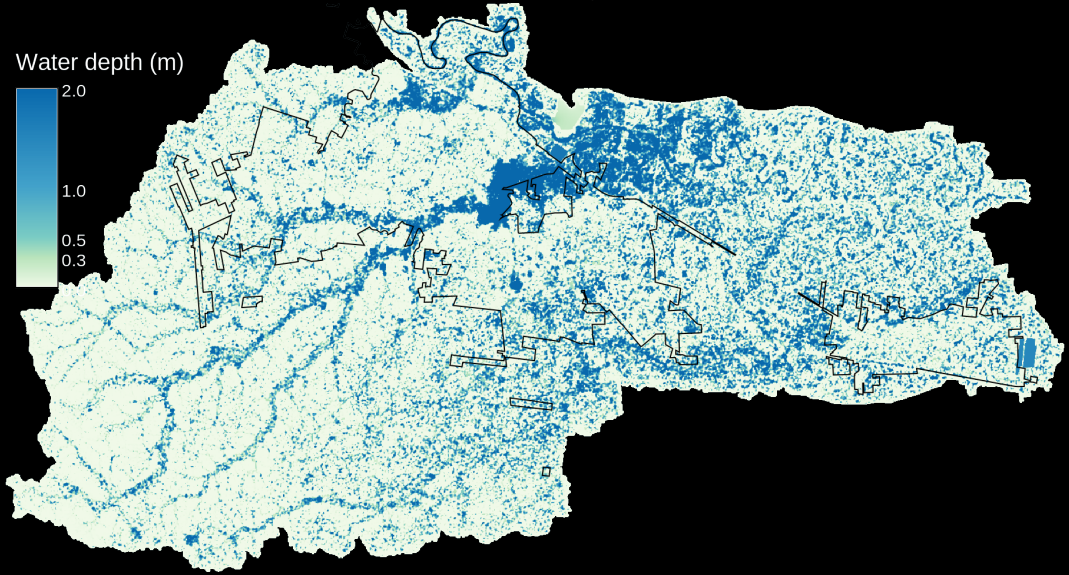
Flat catchment (Reynosa): lidar DSM



Flat catchment (Reynosa): AW3D30

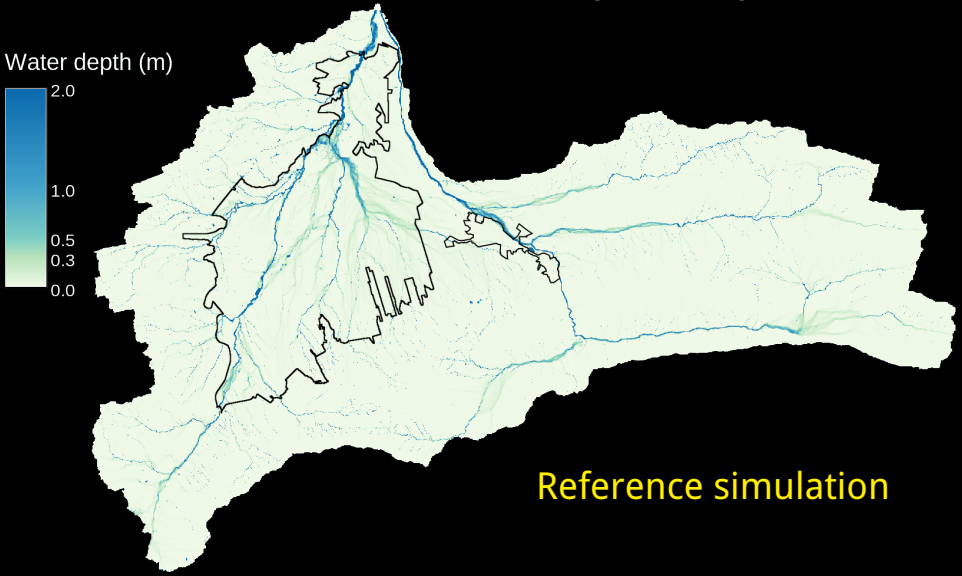


Flat catchment (Reynosa): SRTM

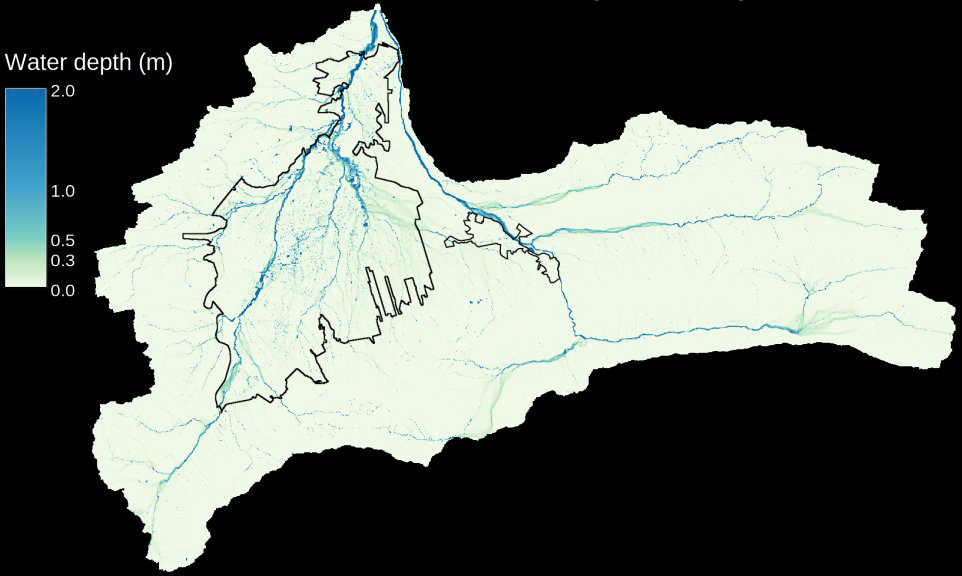


Flat catchment (Reynosa): ASTER

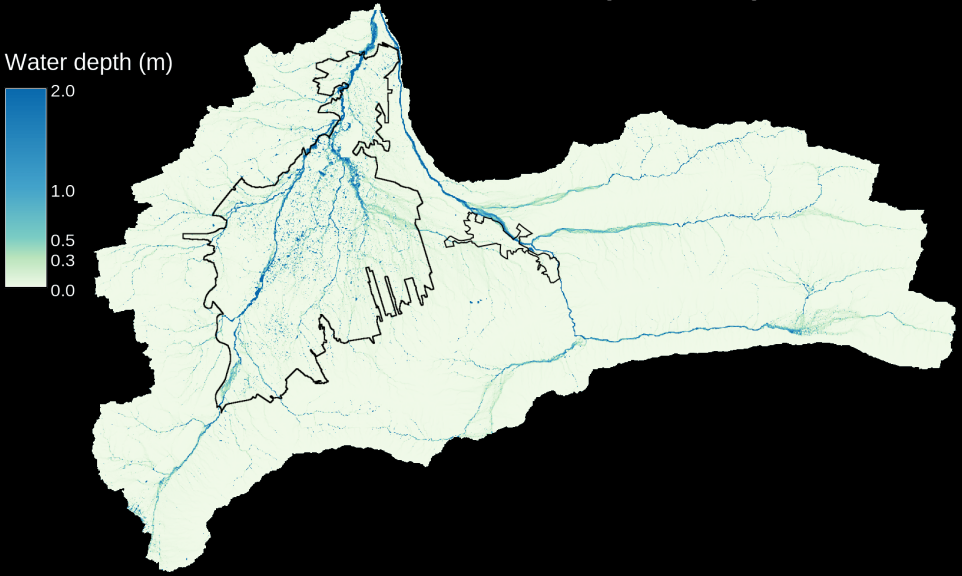
Mountainous catchment (Saltillo): lidar DTM



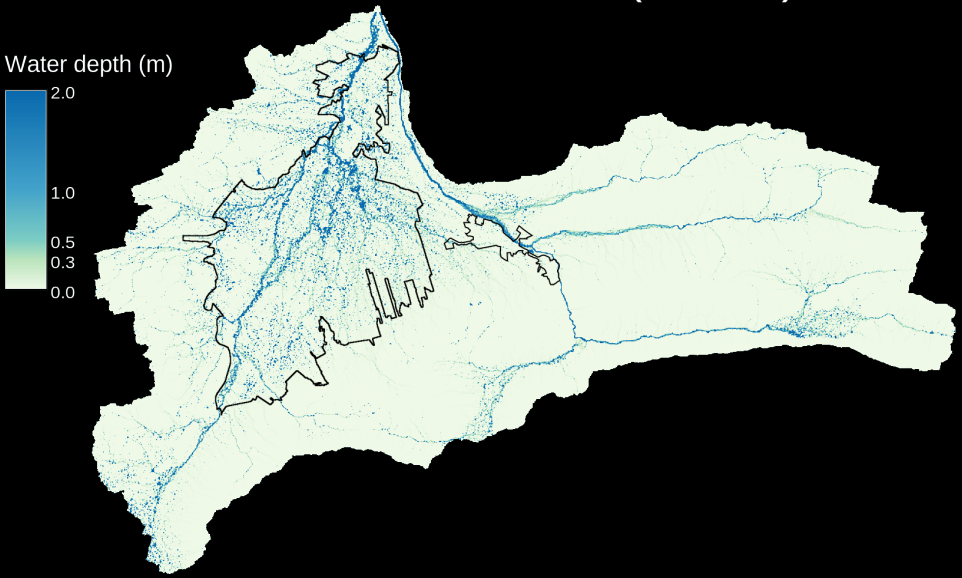
Mountainous catchment (Saltillo): lidar DSM



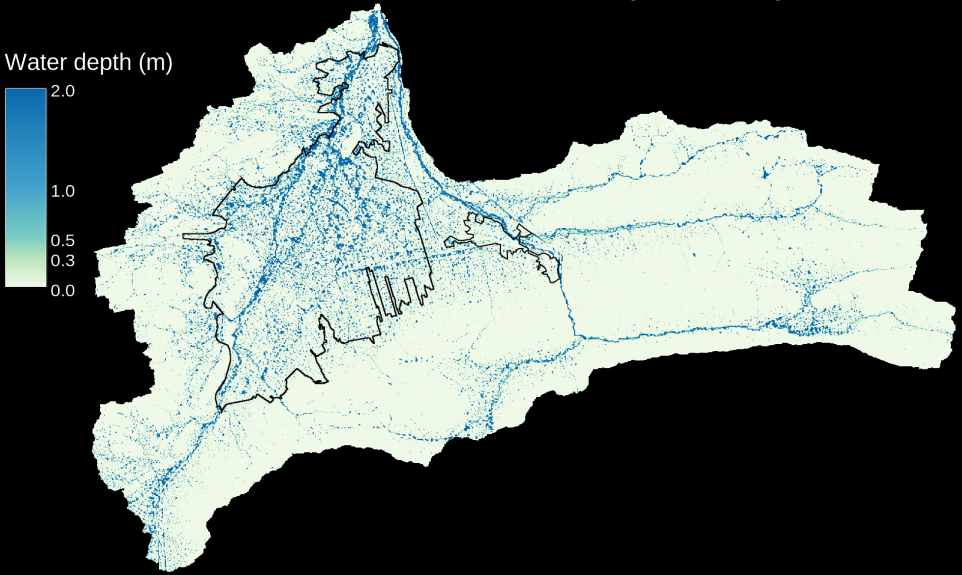
Mountainous catchment (Saltillo): AW3D30



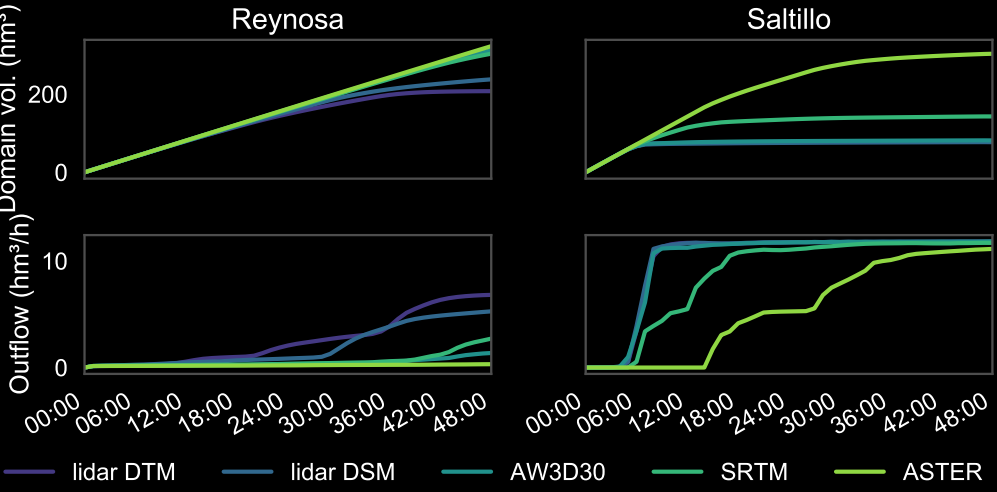
Mountainous catchment (Saltillo): SRTM



Mountainous catchment (Saltillo): ASTER



Evolution of the water volume in the domain



MAE against results with lidar DTM

Conclusions

- AW3D30 > SRTM
- Evaluation in other regions are needed
- AW3D30 might be a good base for hydraulic conditioning

Thank you

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lcourty@ii.unam.mx @LaurentCourty

Background photography by NASA on Unsplash

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