



The
University
Of
Sheffield.

EPSRC

Engineering and Physical Sciences
Research Council

How do computers forecast floods?

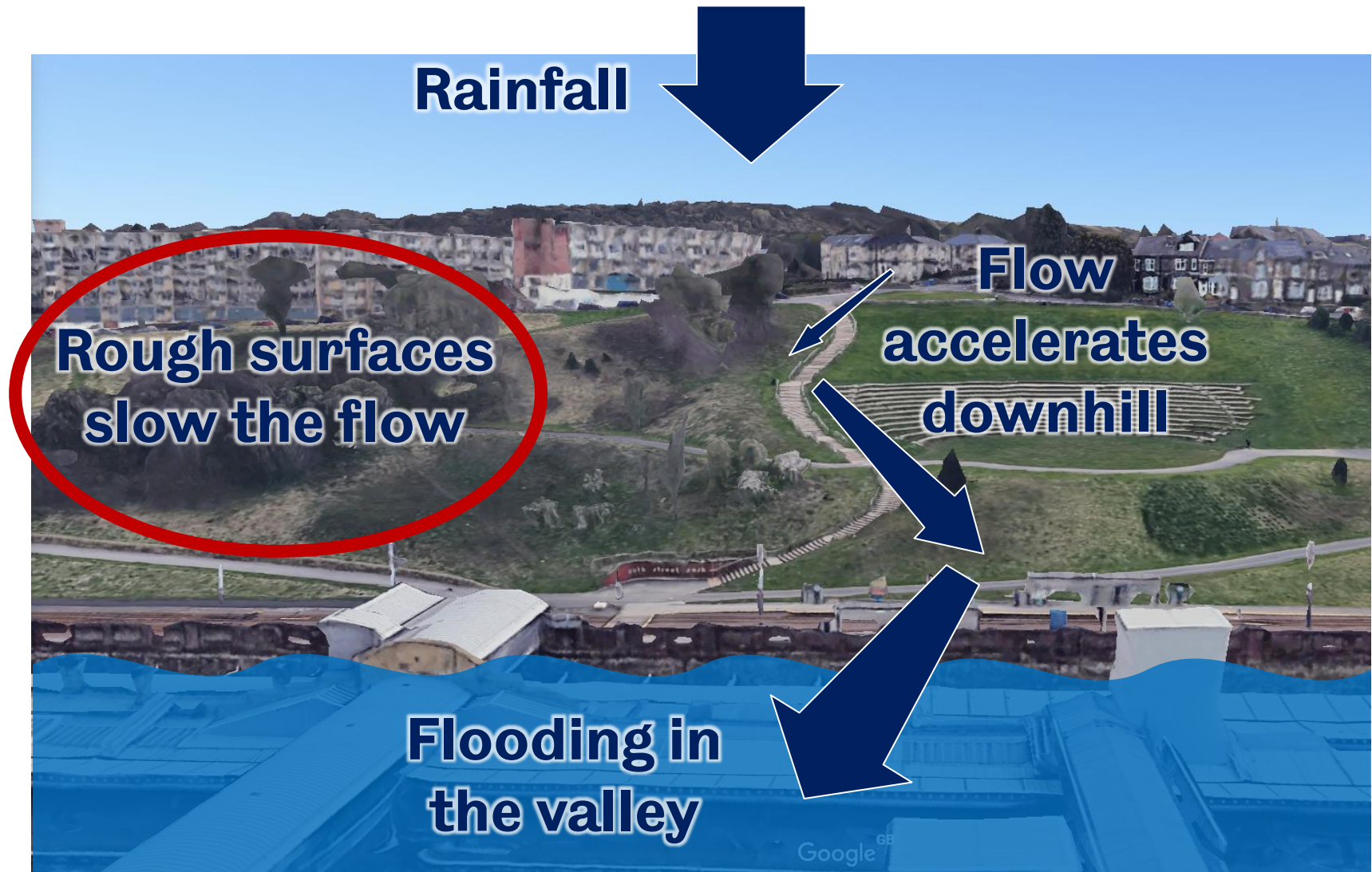
And how much should we believe them?

James Shaw

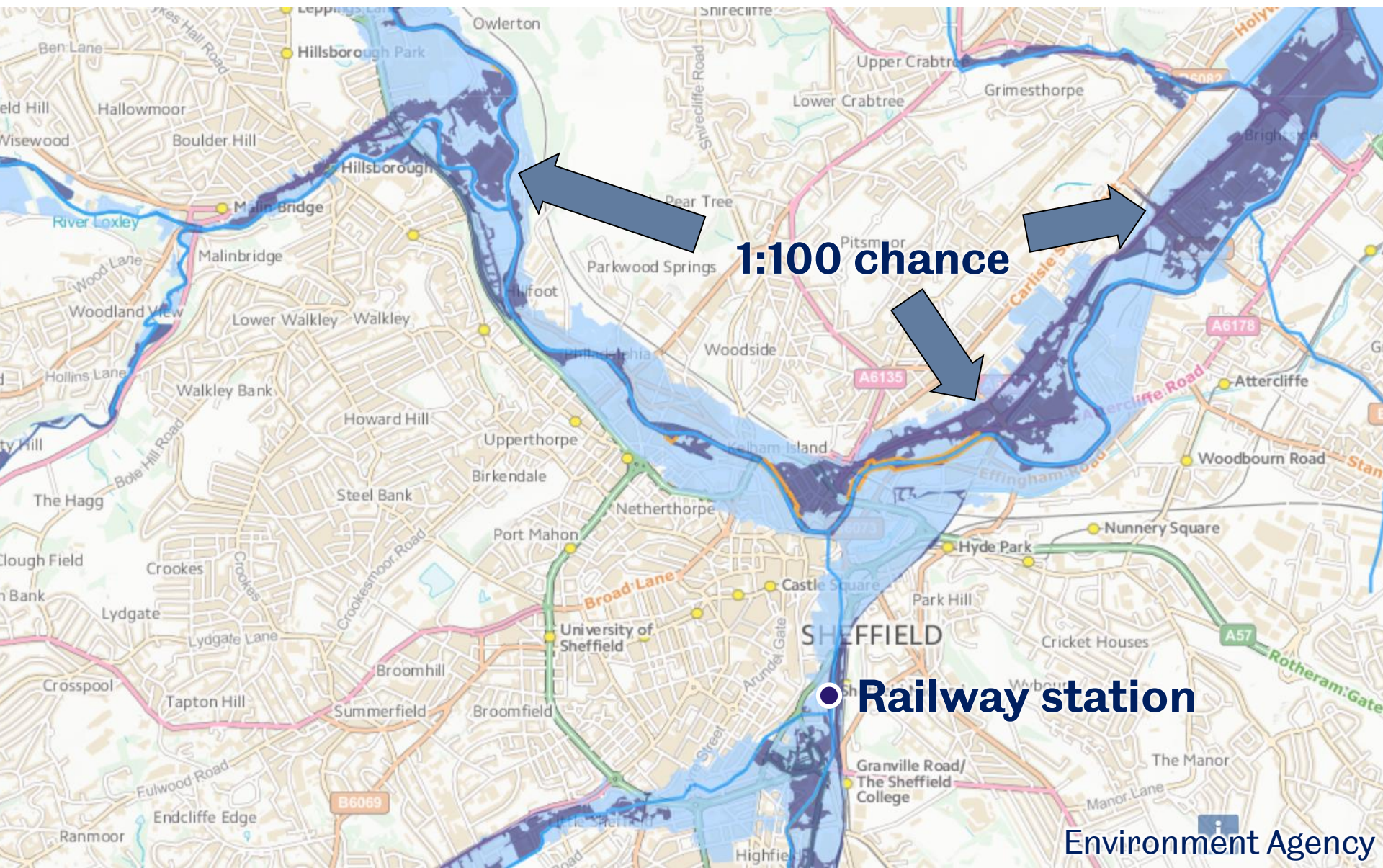


@hertzsprrrung

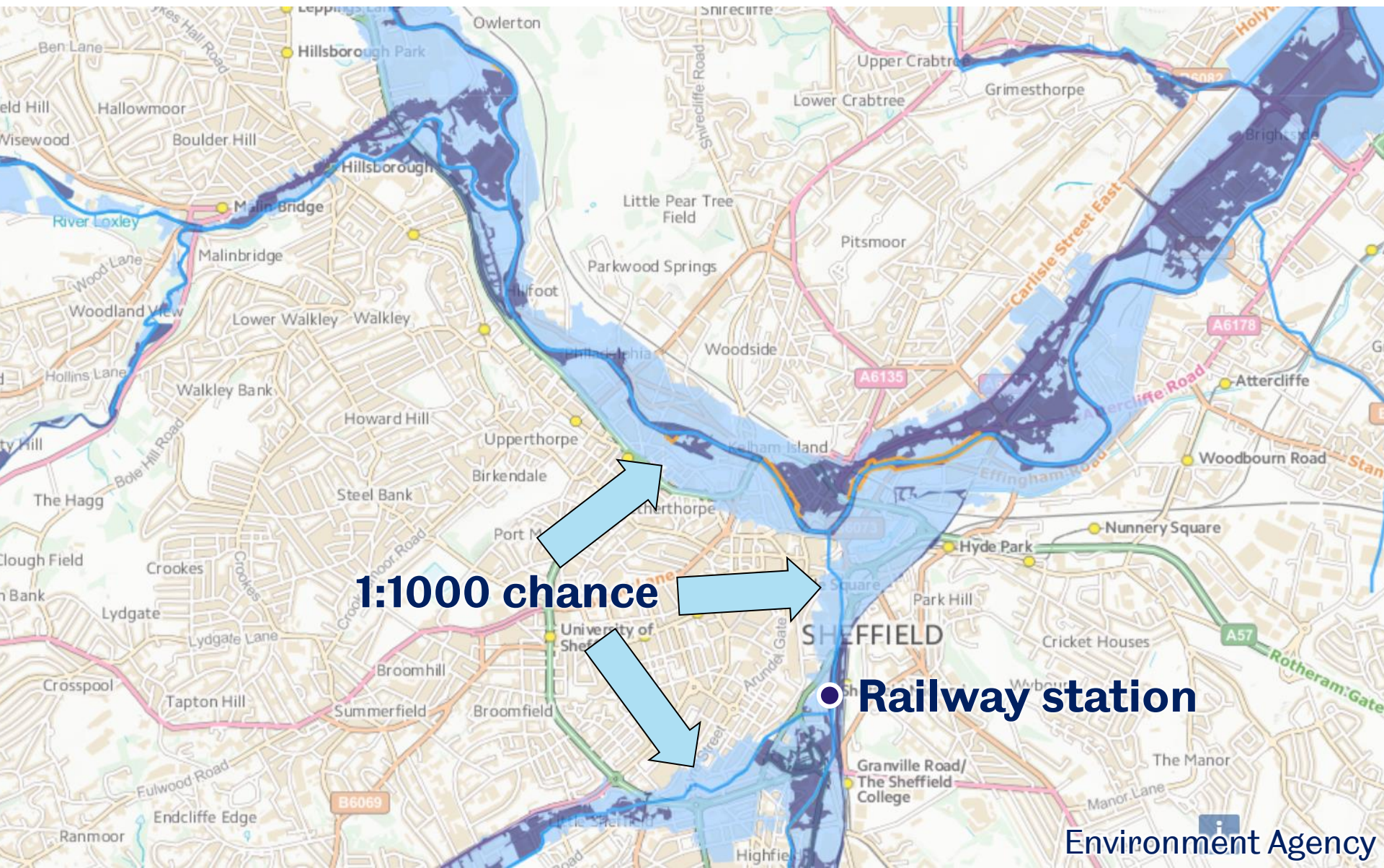
Flooding process



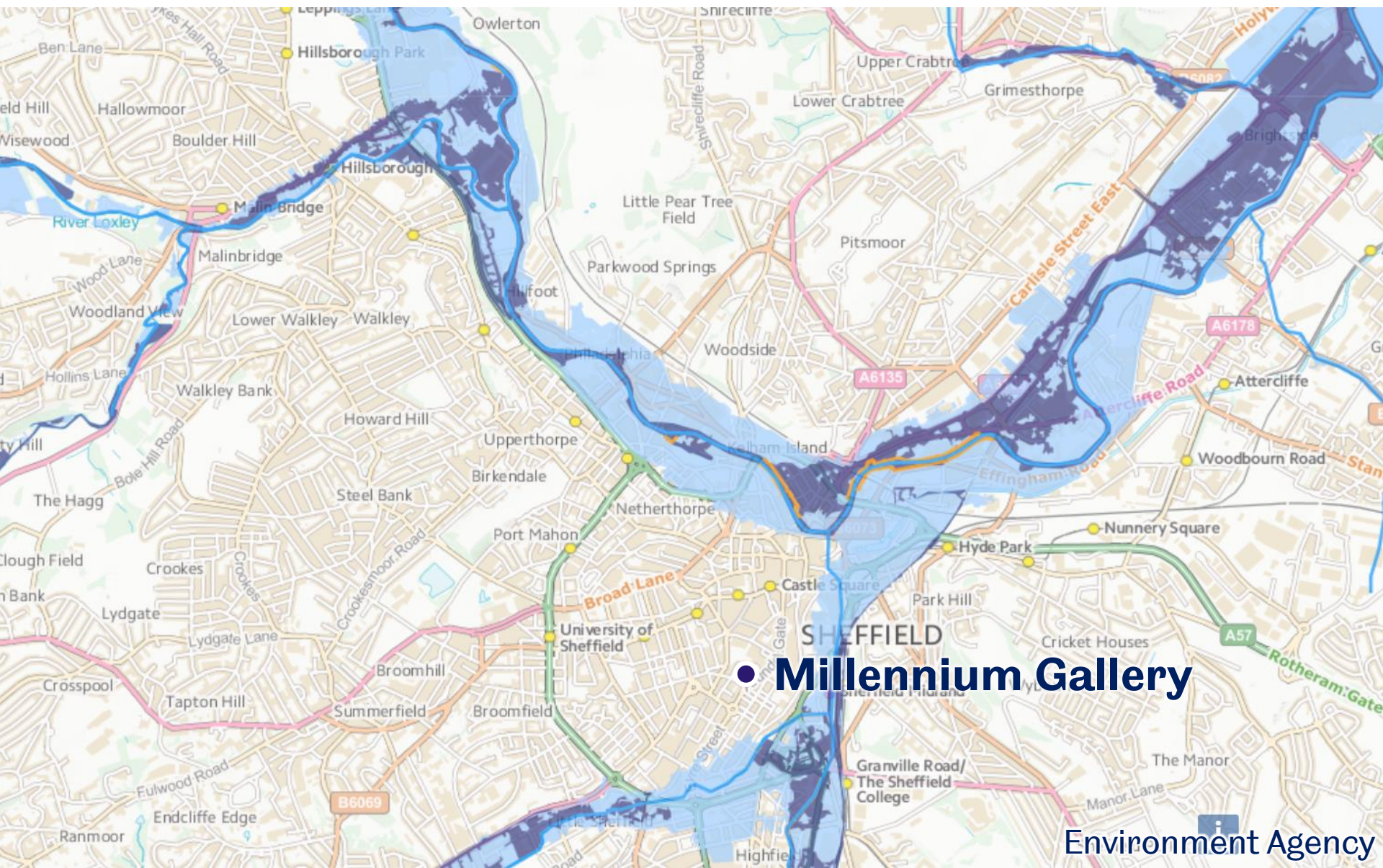
Flood hazard map of Sheffield



Flood hazard map of Sheffield



Flood hazard map of Sheffield



• **Millennium Gallery**

Flood hazard map of Sheffield

A map of Sheffield, UK, showing flood hazard areas. The River Don flows through the city, with several areas shaded in blue and purple, indicating different levels of flood risk. The map includes labels for various neighborhoods and landmarks, such as Hillsborough Park, Malin Bridge, and the University of Sheffield. The text "But how much confidence do we have in this forecast?" is overlaid on the map in a large, bold, dark blue font.

**But how much
confidence do we have
in this forecast?**

- Millennium Gallery

Uncertainties in flood forecasting

How much rainfall?



How rough are the surfaces?

What is the terrain?



- What is the extent of the flood?
- When will the flood water arrive?
- How deep will the water get?



What is the terrain elevation?

Aircraft terrain data at 25cm resolution



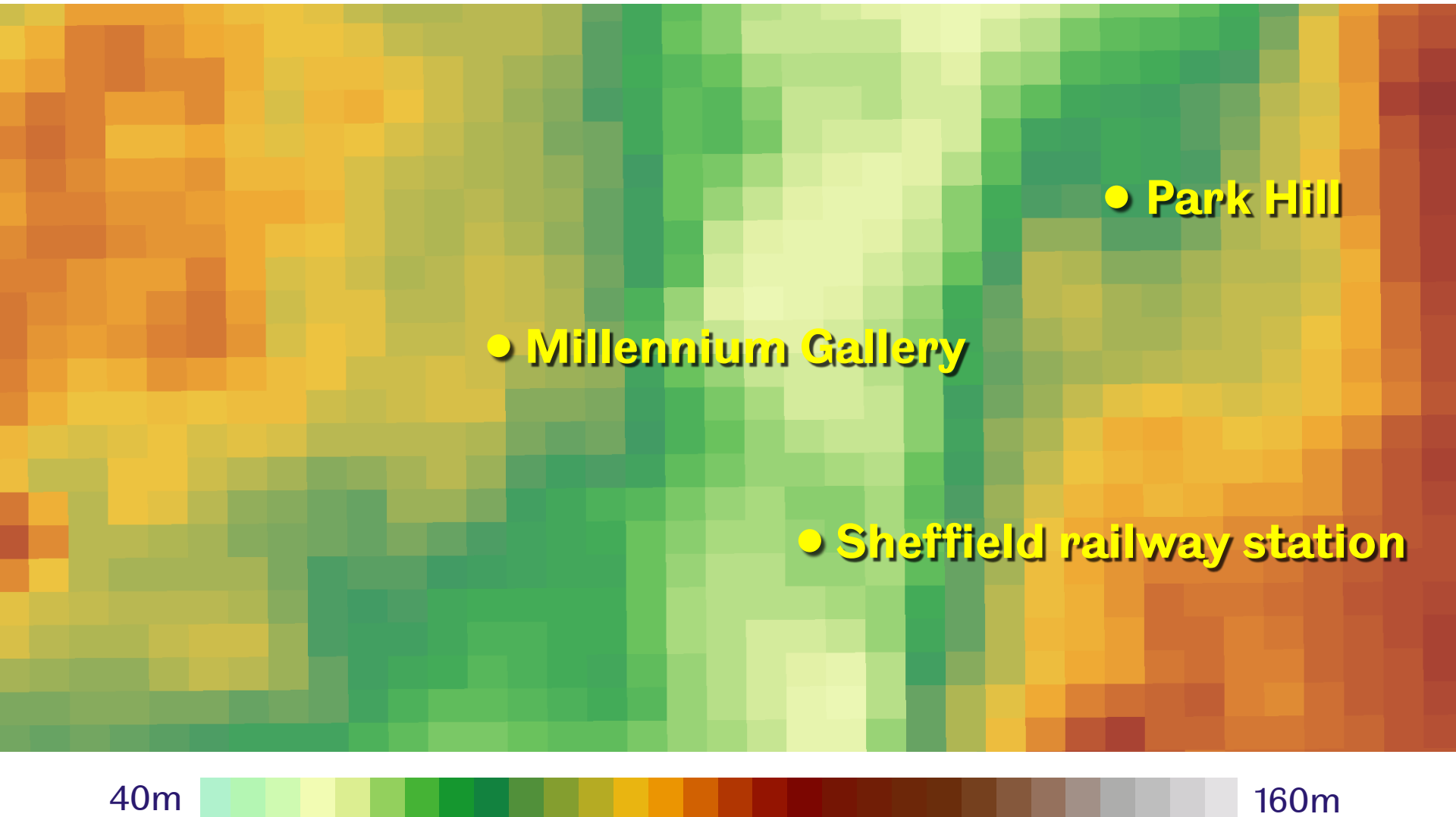
40m



160m

What is the terrain elevation?

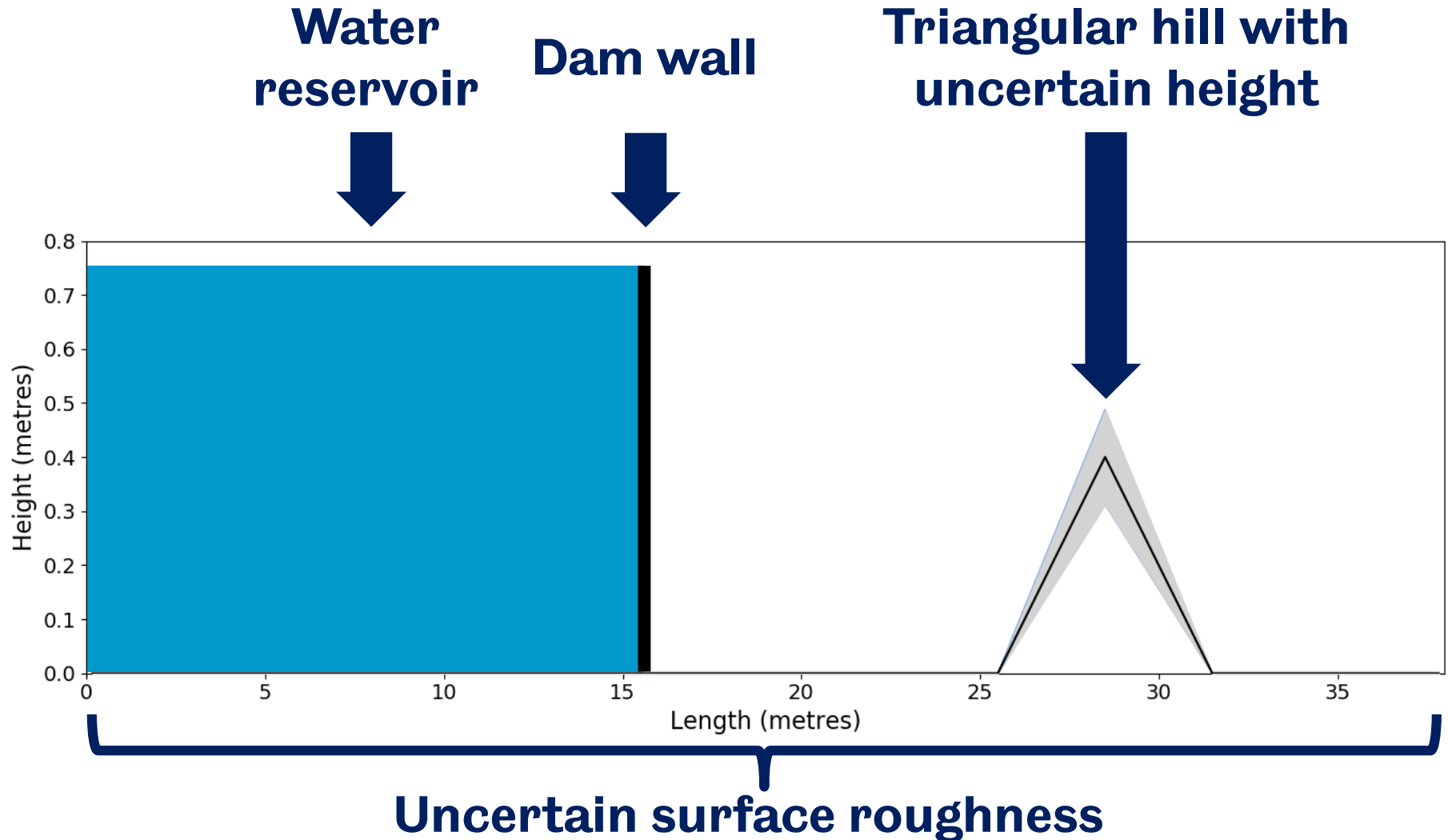
Satellite terrain data at 90m resolution



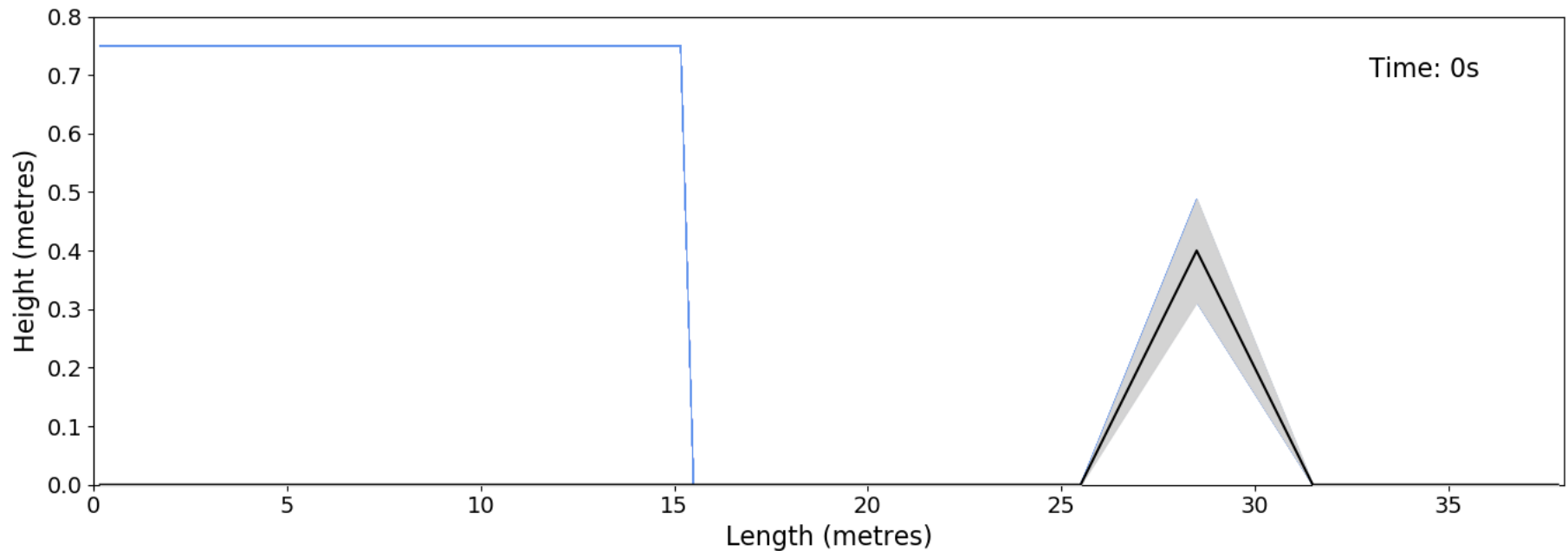
Whaley Bridge dam, August 2019



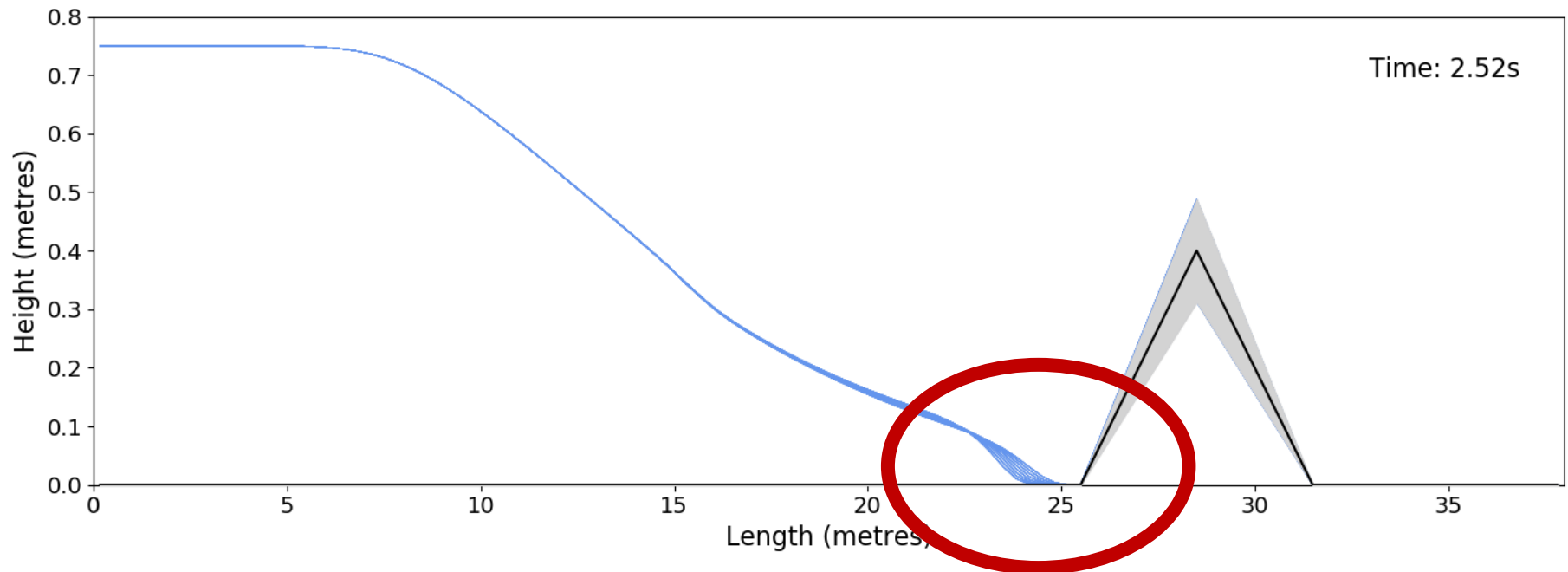
Simplified dam break simulation



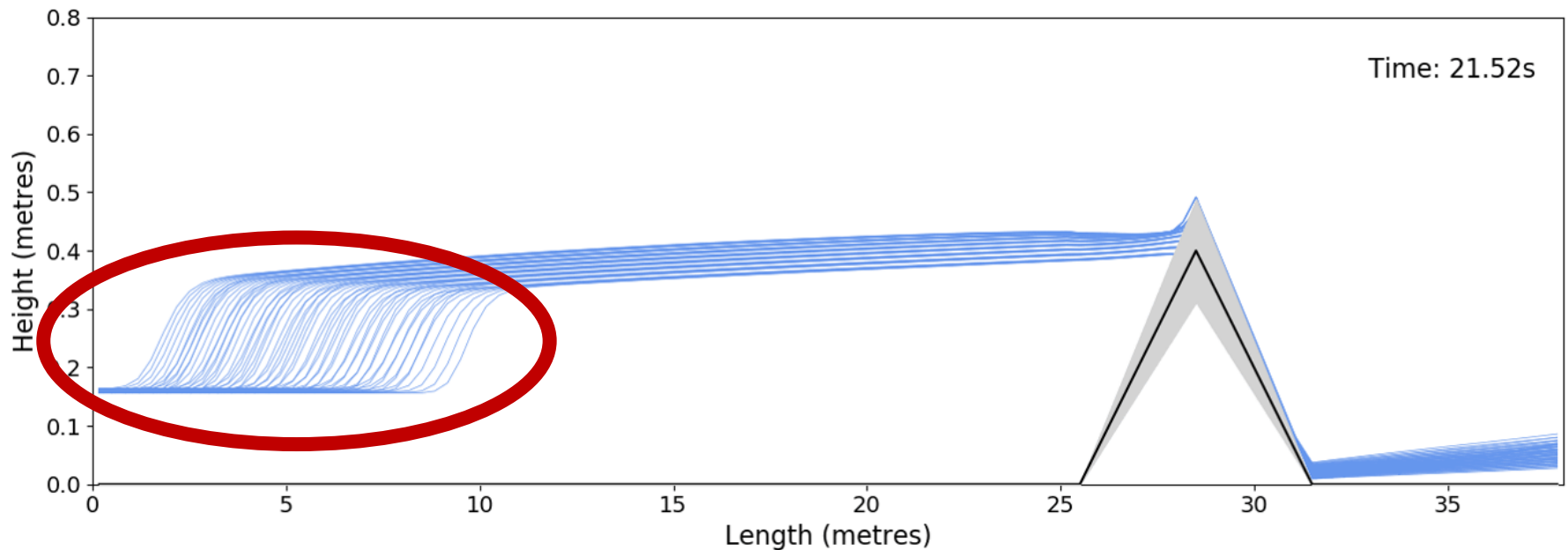
Accounting for uncertain terrain and surface roughness



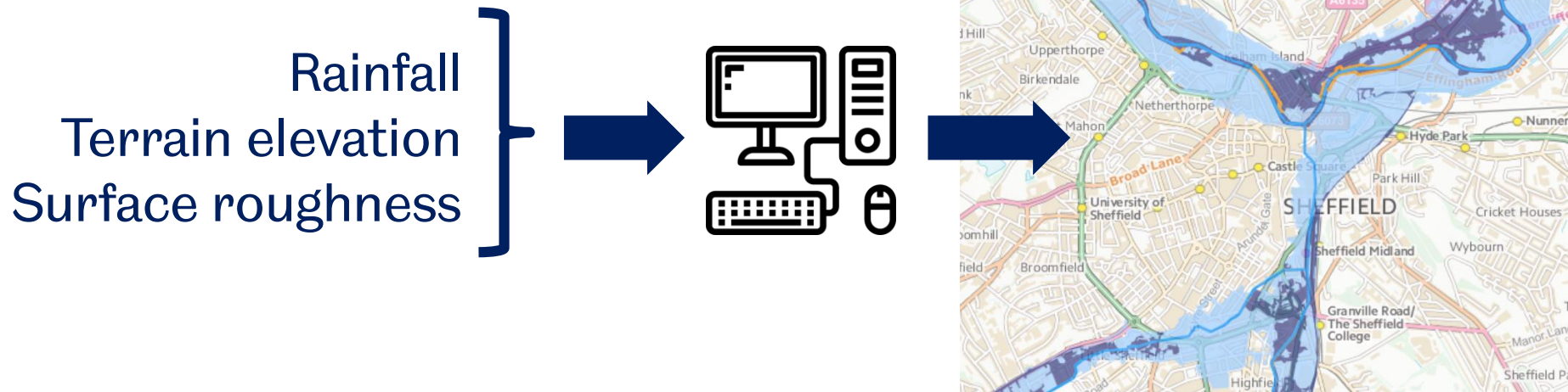
Accounting for uncertain terrain and surface roughness



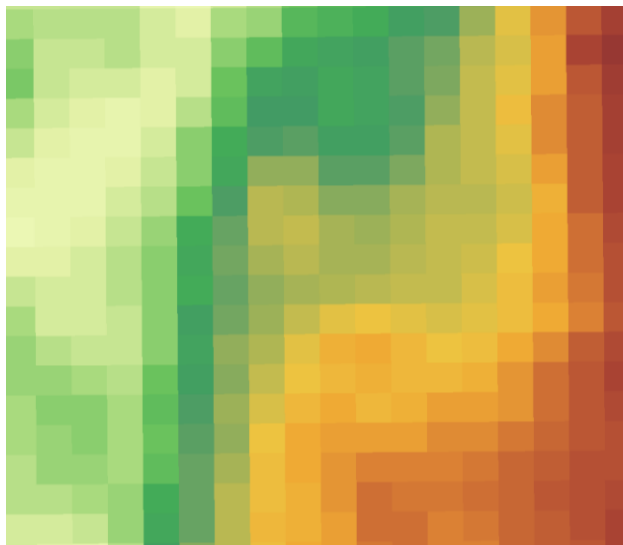
Accounting for uncertain terrain and surface roughness



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And how much should we believe them?



vs

