Three Ways to Improve Understanding of Flood Risk

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A reference guide for better interpretation of flood models.

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INTRODUCTION

A flood can occur when an area of land that is normally dry becomes submerged by standing or flowing water as a result of a natural hazard event.

Depending on their type, floods can expand slowly over an extended period of time after prolonged rains, or very quickly — in just a few minutes — without any warning.

Floods can originate from many different sources. However, they are most often caused by the following:

- Overflowing rivers
- Extreme coastal events
- Natural or unnatural ground saturation
- Excessive rainfall
- Disastrous infrastructure breakdown or collapse

The most common type of flood is credited to river flooding, which is also known as fluvial flooding. If the flow of water surpasses the capacity of the river channel, then flooding of the surrounding area can occur.

To understand flood risk, there are flood models of varying types and quality covering the entire world. However, it is important to remember the wisdom of George Box: “all models are wrong, but some are useful.” What Box means is that a model is not a prediction of what will happen or a reflection of what has happened, but an educated guess about what might happen given a certain set of conditions.

If models are uncertain, is there any way to extract better answers from them? Yes — all you need is a bit more information.

The following pages go over the three ways you can better interpret risk from a flood model.

From 1980 to 2008 there were nearly 3,000 reported floods worldwide, affecting almost 2 billion people and causing close to US$400 billion in economic damage.

Source: United Nations Office for Disaster Risk Reduction - www.preventionweb.net

Three Ways to Improve Understanding of Flood Risk

1 Use Multiple Flood Models

With a second (or even better — a third) flood model, you can conduct a correlation analysis. Correlation analysis is important because it offers a clearer picture of results through comparison to other models that were generated using similar (or dissimilar) methods, which can either support or refute the answers. If the two models agree on the flood risk at a specific location, you can be more certain of the risk. If the models disagree, it is definitely worth a deeper look.

2 Use Elevation Data

Flood models are all built on elevation data, but they tend to lose some of the intelligence that a good elevation dataset contains when transformed into a model. If you are able to check a few spot elevations around a property (e.g., at the water body, between the water body and the property, at the property itself, etc.) you can quickly deduce where water will actually flow. This quick analysis can validate or disprove the results from a flood model because, frankly, it is hard to argue with gravity. Ideally, the elevation data is more precise and/or higher resolution than what was used to build the flood model. It is also better to have ground elevations (digital terrain model or field measurements) and not a surface model because you don't want to confuse trees or buildings with the actual terrain.

A common reference in flood risk is the 100 year flood, also known as the 1% flood. This essentially means that in any given year there is a 1% chance a flood risk area will flood.

3 Use Historical Events

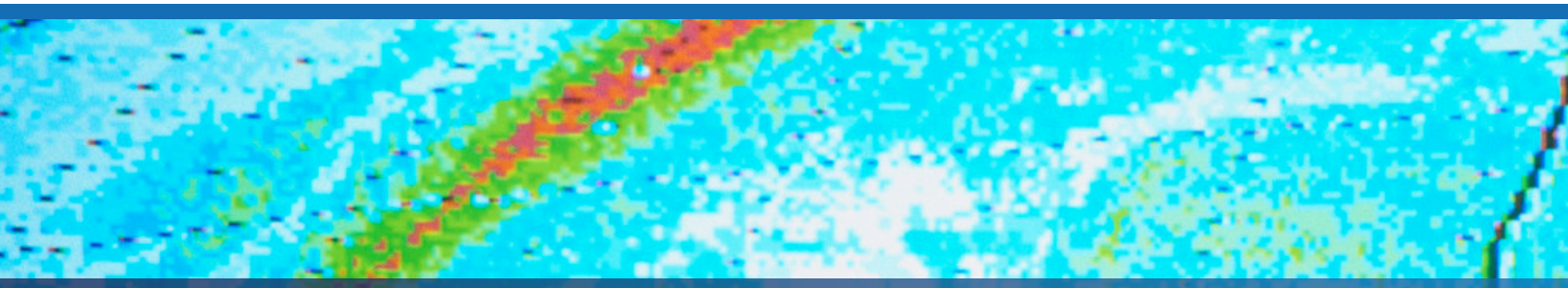
If digital outlines of past flood events for a location are available, they can provide a real-world validation (or denial) of a flood model. For most, this is the surest way to test a flood model, but it does have two weaknesses: First, historical events are sometimes very hard (or impossible) to find for a location. Second, when they are available, it is difficult to know what type of flood it was. You don't want to validate a 1% flood model with a 0.2% flood, because that is not what the flood model was built for. The model will appear entirely incorrect, incorrectly.

Summary

Floods are notoriously hard to predict because of the hundreds of factors that determine where it will get wet and where it will stay dry. There is no model that incorporates all the possible influences on the water, and there are no tricks to coax entirely correct predictions out of the flood model. The best anyone can do is to use the right models for the right applications, and use the three ideas above to improve the performance of those models whenever possible.

About The Author

Ivan Maddox is the Product Manager for InsitePro™ and the Executive Vice President for commercial solutions at Intermap. He has over 20 years of experience in the Product Management and Operations fields, specializing in the delivery of SaaS solutions and platforms.



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