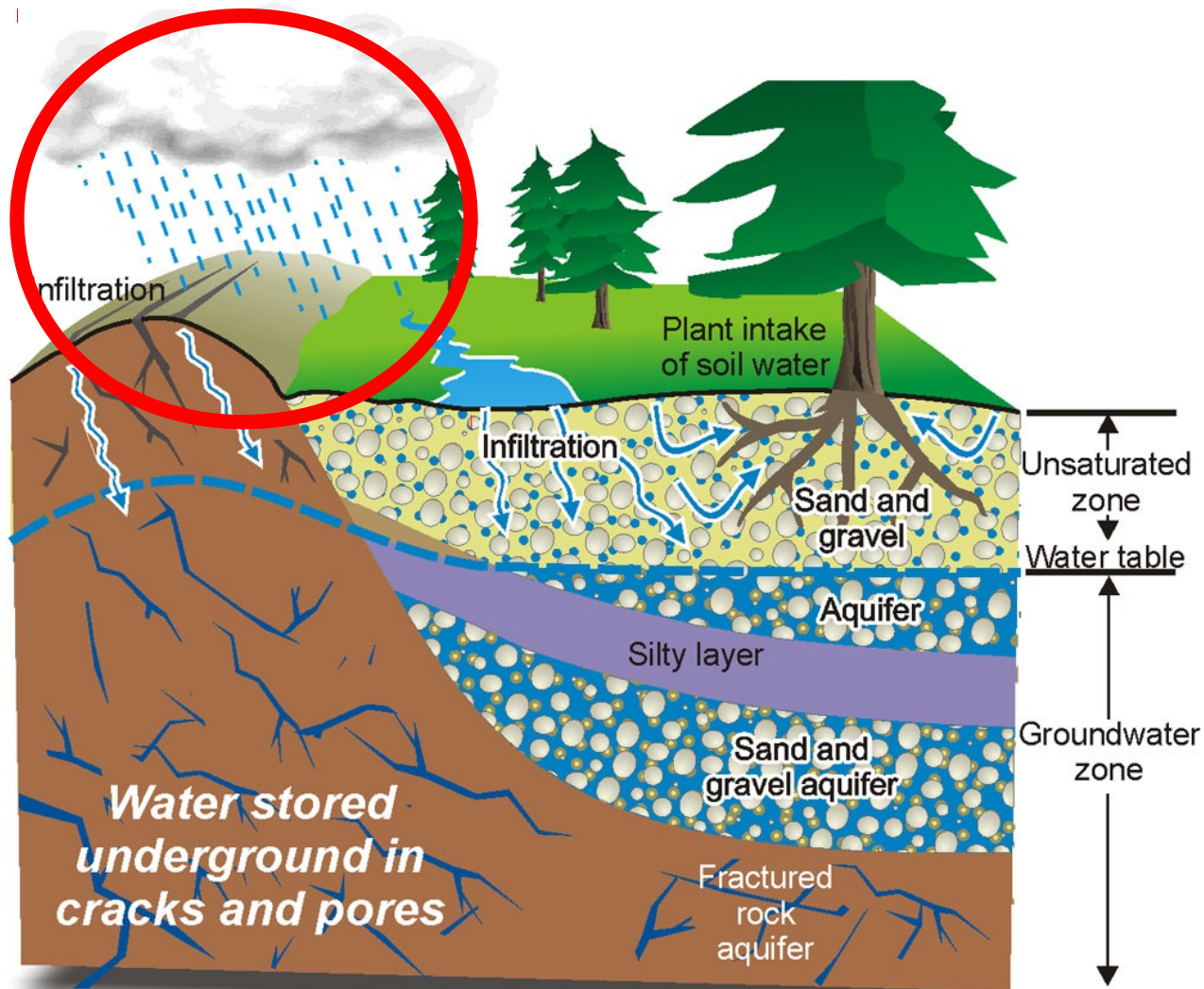


Short-Range and Nowcasting-Scale Flood Prediction

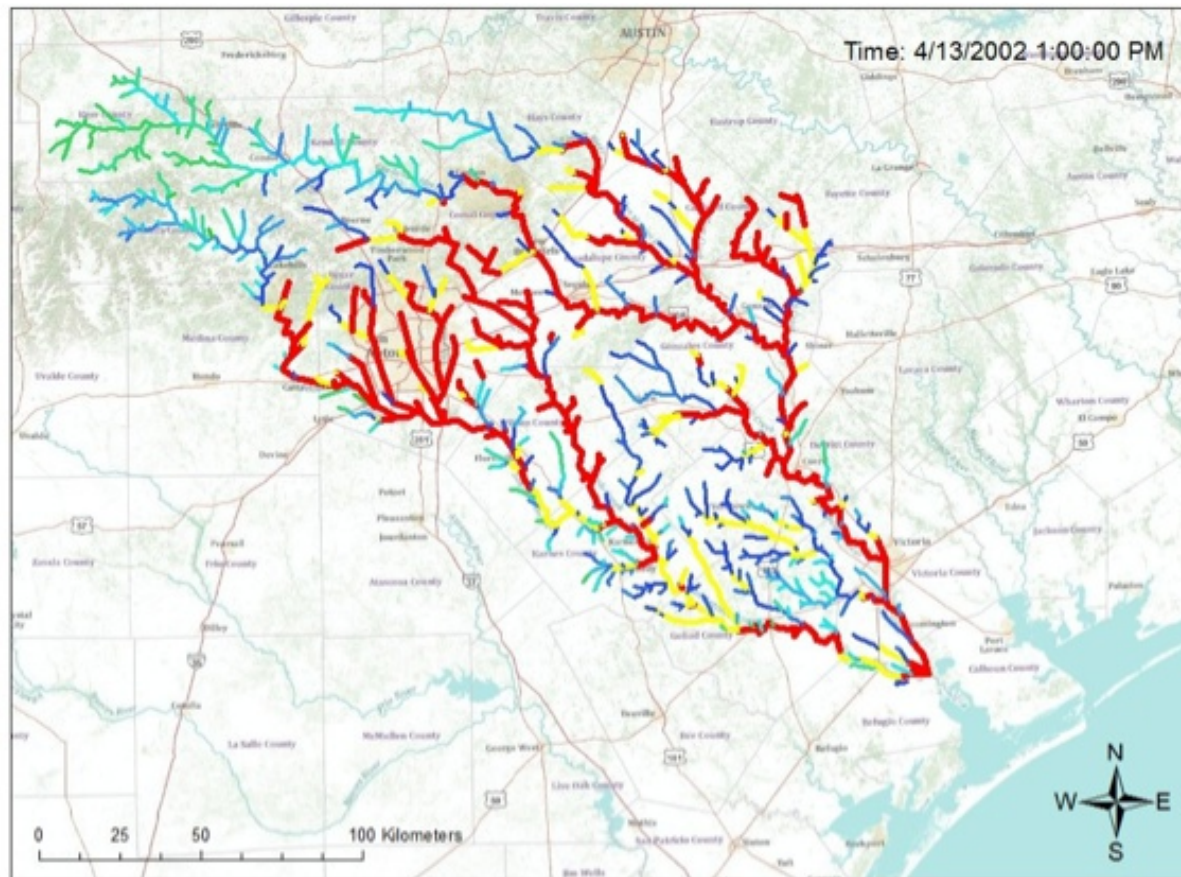
Lucas Villa Real, Kiran Mantripragada, Paula Sesini, Ulisses Mello
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Frank Liu

IBM Research

Flood Modeling - Big Picture



Flood Modeling - Big Picture



Results of dynamic river simulation for a network in North America

Sources of Quantitative Precipitation Estimates (QPEs)

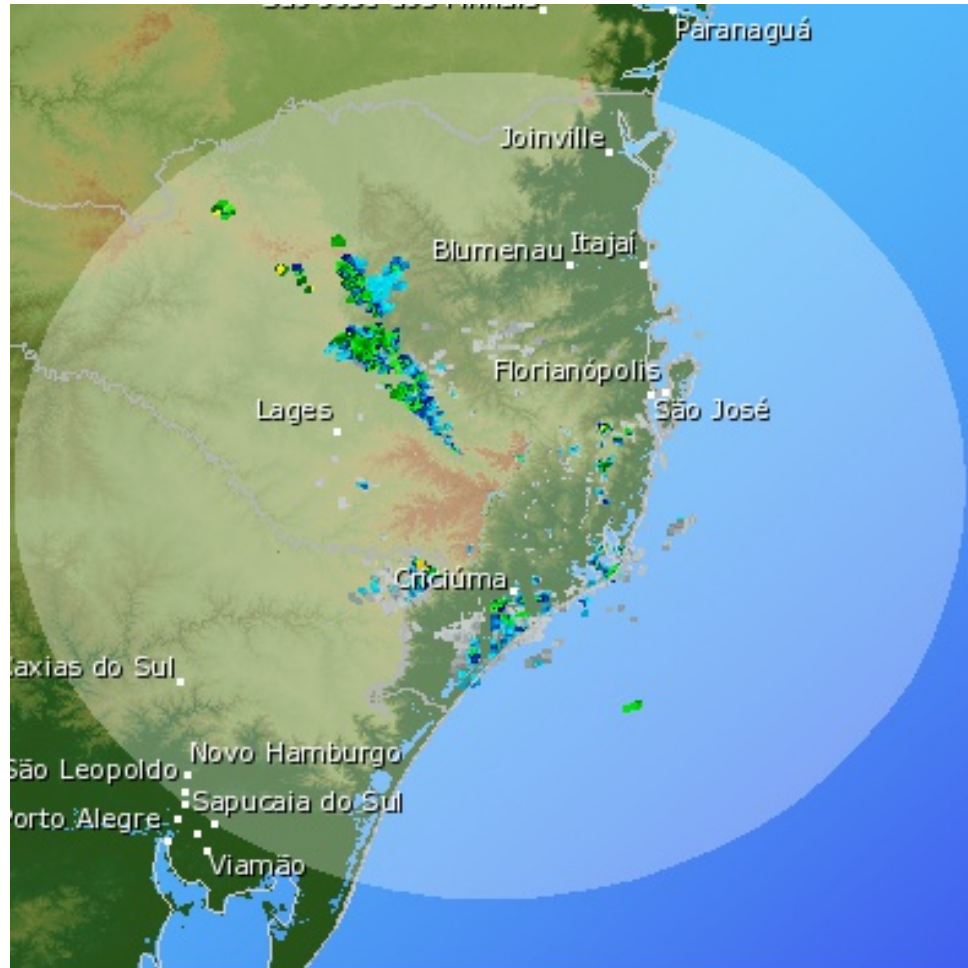
Numerical Weather Prediction

- ❑ WRF-ARW, BRAMS, COSMO and others
- ❑ Short-Range forecasts (beyond 12 hours and up to 72 hours)

High-Resolution Weather Radars

- ❑ Range of a few hundred Kms
- ❑ QPE must be estimated from reflectivity
- ❑ Very short-range forecasts (up to 12 hours)
- ❑ Nowcasting (between 0-2 hours)

High-Resolution Weather Radars



Doppler Radar at Morro da Igreja/SC, Brazil. Image from INPE

Flood Prediction Model

Aims

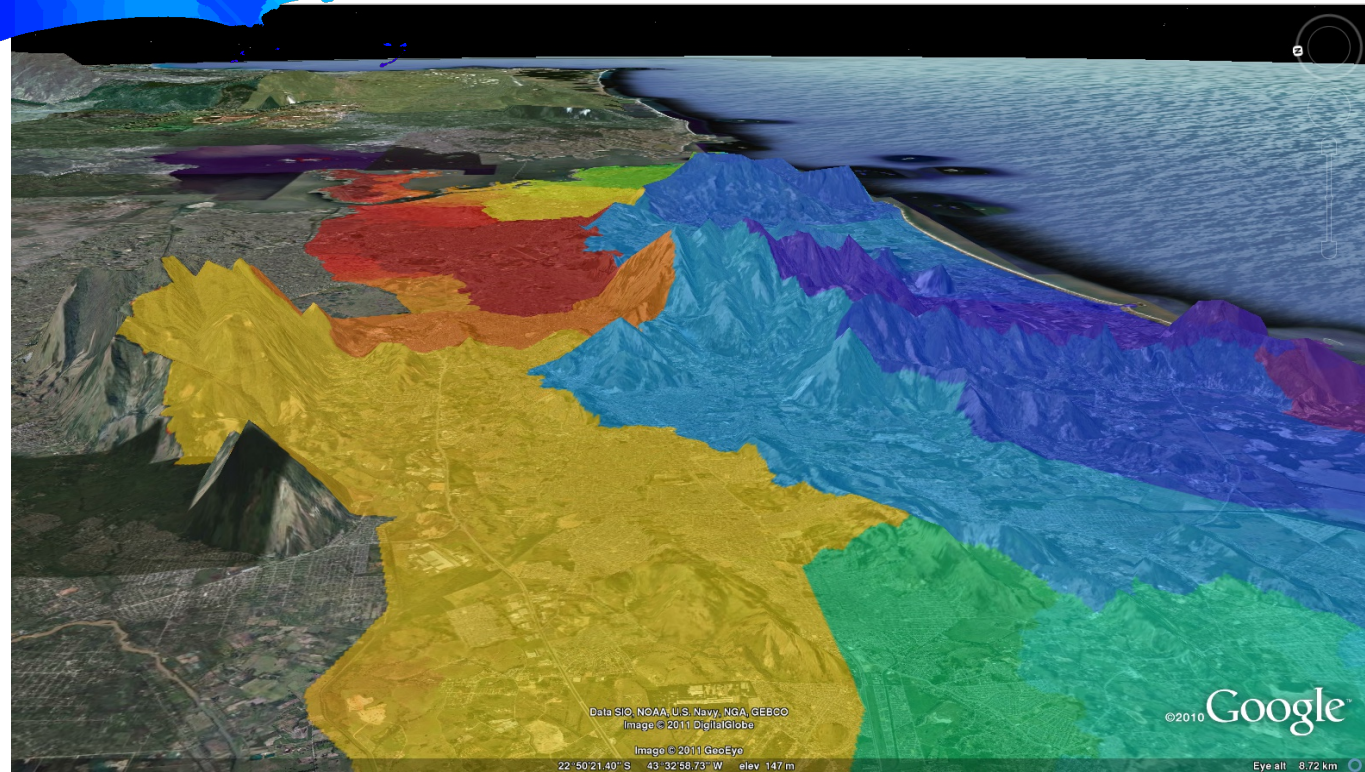
- ❑ To improve an existing 2-D water routing model

Elements

- ❑ Weather Radar data source
- ❑ Soil model (land/vegetation properties)
 - Can be modeled with a probability distribution
 - Potential to detect landslides
- ❑ River flow model
 - Automatic extraction of river streams characteristics
 - Provide detailed information on the river stage
 - Identification of backwaters

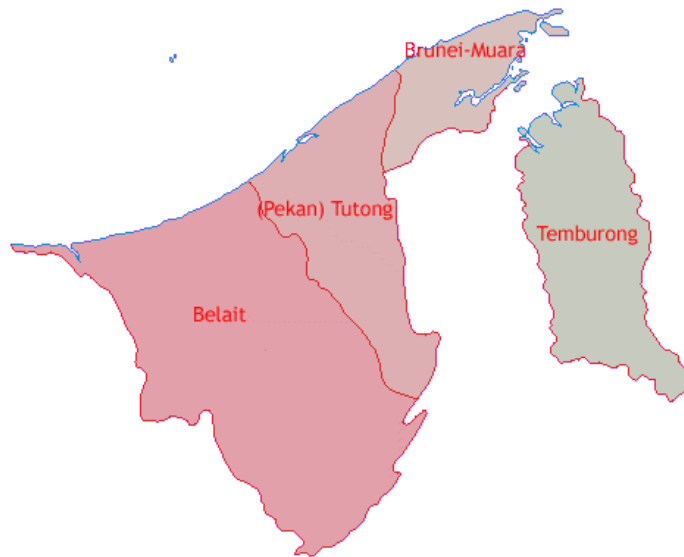
Applied Research - Rio de Janeiro

- Improve the existing 2-D water routing model



Applied Research - Brunei Darussalam

- Has a dual-polarization Doppler weather radar system
 - Ability to provide QPEs in near real time
 - Requires calibration for reliable data acquisition



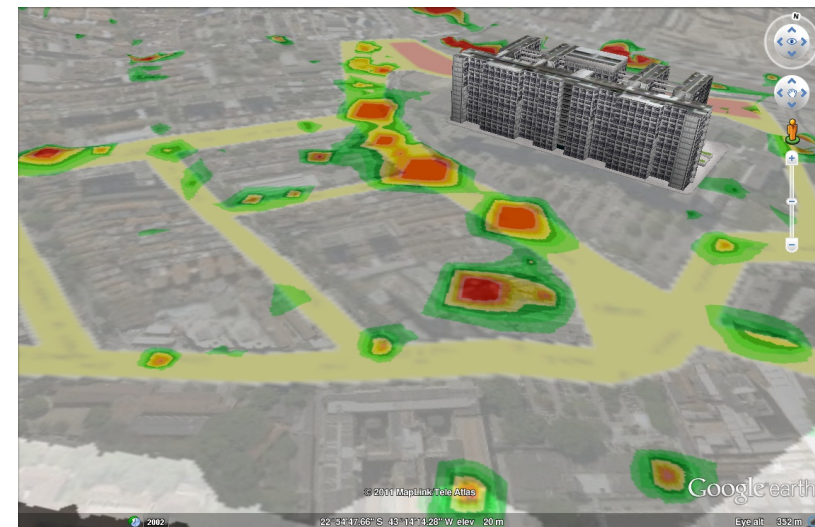
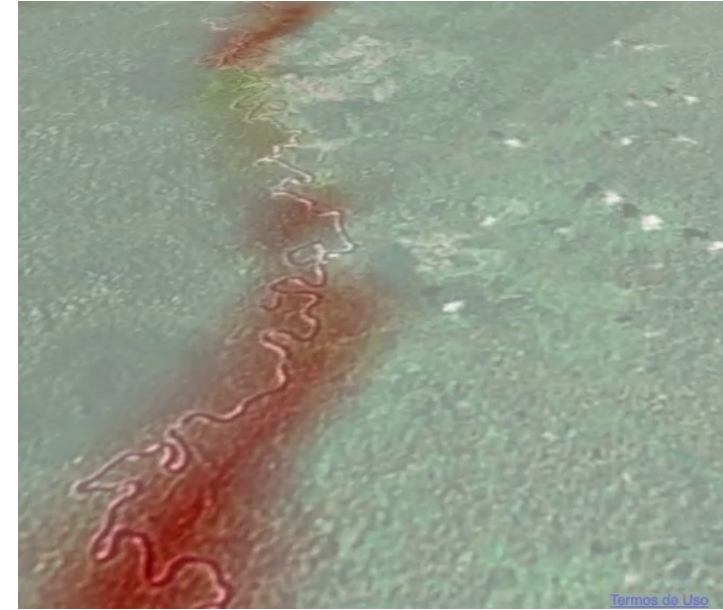
Flood Prediction Challenges

High Resolution DEMs

- ❑ Gaps can exist even with high quality QPEs from radar

Calibration

- ❑ How accurate the model is?
- ❑ Alternative or proxy data sources need to be identified and evaluated
 - Surveillance systems + image analysis
 - Social networks + text mining



Short-Range and Nowcasting-Scale Flood Prediction

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