



Faith Mitheu^{a)}, Eric Kabuchanga^{a)}, Ashutosh Limaye^{b)}, Africa Flores^{b)}, Robinson Mugo^{a)}, Anastasia Wahome^{a)}, Vincent Mtaroni^{a)}, Hussein Farah^{a)}, Clay Blankenship^{c)}.

a) Regional Centre for Mapping of Resources for Development, Nairobi, Kenya, b) The SERVIR Coordination Office, NASA Marshall Space Flight Centre, Huntsville, Alabama, USA c) NASA-MSFC Short-Term Prediction Research and Transition (SPoRT) Center.

1. Rationale

Several countries in SERVIR hub regions lack real-time information about hydrologic conditions such as stream-flow—the amount of water flowing in their streams and rivers. For example, water managers in eastern Africa are interested in the availability of water in the region in multiple time ranges: historical, current, & near-real time.

This information if provided on time helps the water managers be able to predict when floods or droughts might occur and decision-makers and disaster-response organizations need it to take effective advance action to save lives, crops, and property.

Floods has been one of the catastrophic disaster in most of African countries, and a tool like CREST which can provide timely information is what is needed.

3. Approach/Project Activities

- ▶ Stream flow data was collected from various water agencies
- ▶ CREST (Coupled Routing and Excess Storage) model was set and calibrated for various basins in East-Africa
- ▶ Calibrated basins are Nzoia-Kenya, Malaba-Uganda, Okavango-Namibia.
- ▶ NRT setting of CREST model within cloud instance
- ▶ Personnel from Water agencies in Uganda and Kenya were trained on the use of the model and the model products.
- ▶ Validation of the Near real time stream flow is on going- collection on currently recorded stream flow data

5. Results

- ▶ Calibrated results of the models
- ▶ Near real time stream flows for various basins- accessed through the link, <http://apps.rcmrd.org/floodmaps/>
- ▶ Flood inundation maps from CREST output.
- ▶ Capacity building on the use of the tool
- ▶ 64 water managers trained on the model calibration and use of the outputs
- ▶ 15 institutions trained on the use of CREST model

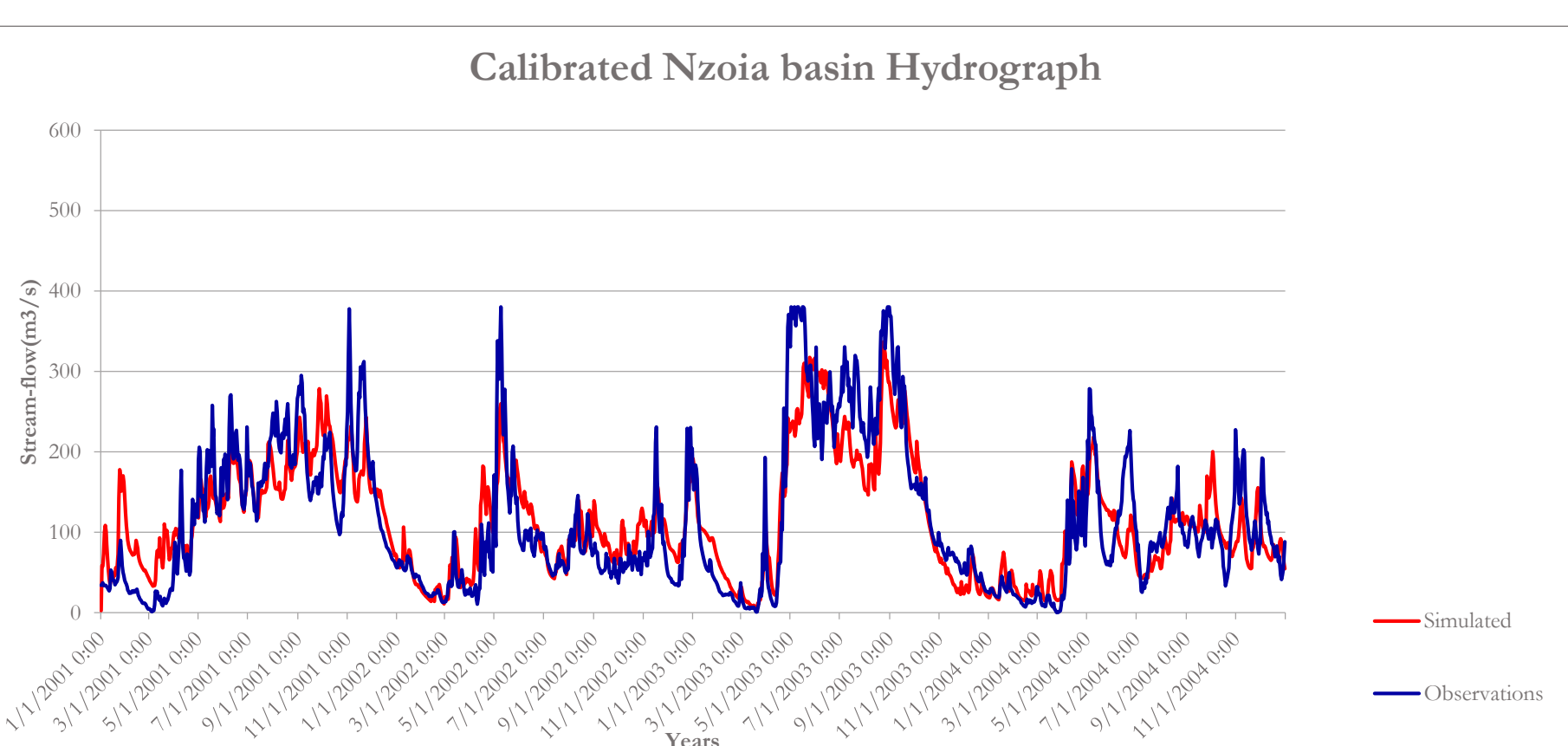


Figure 3: Calibrated hydrograph of Nzoia basin, Kenya

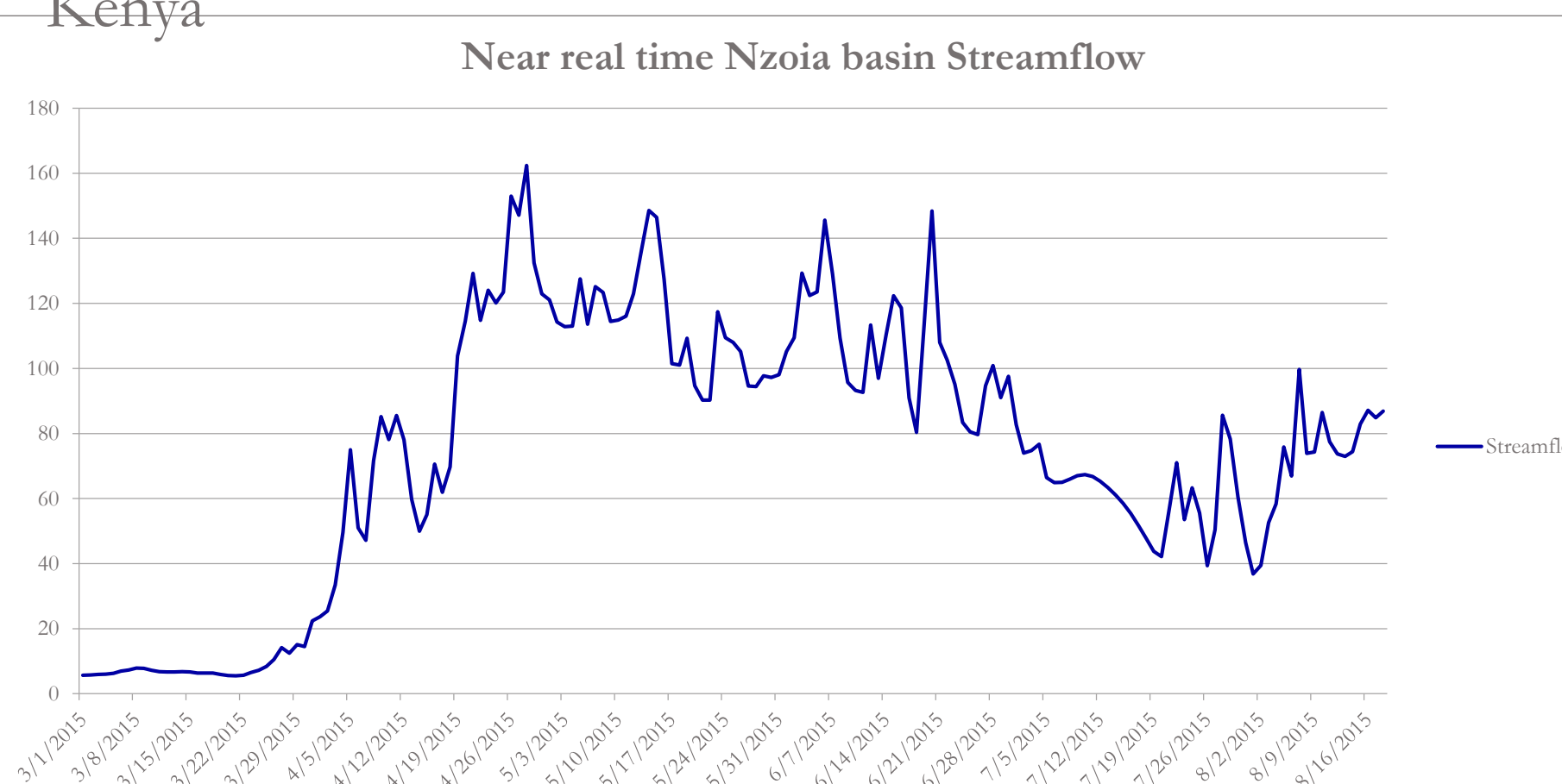


Figure 4: Near real time hydrograph of Nzoia basin



Figure 1: Submerged houses in Bundalangi plains, Kenya

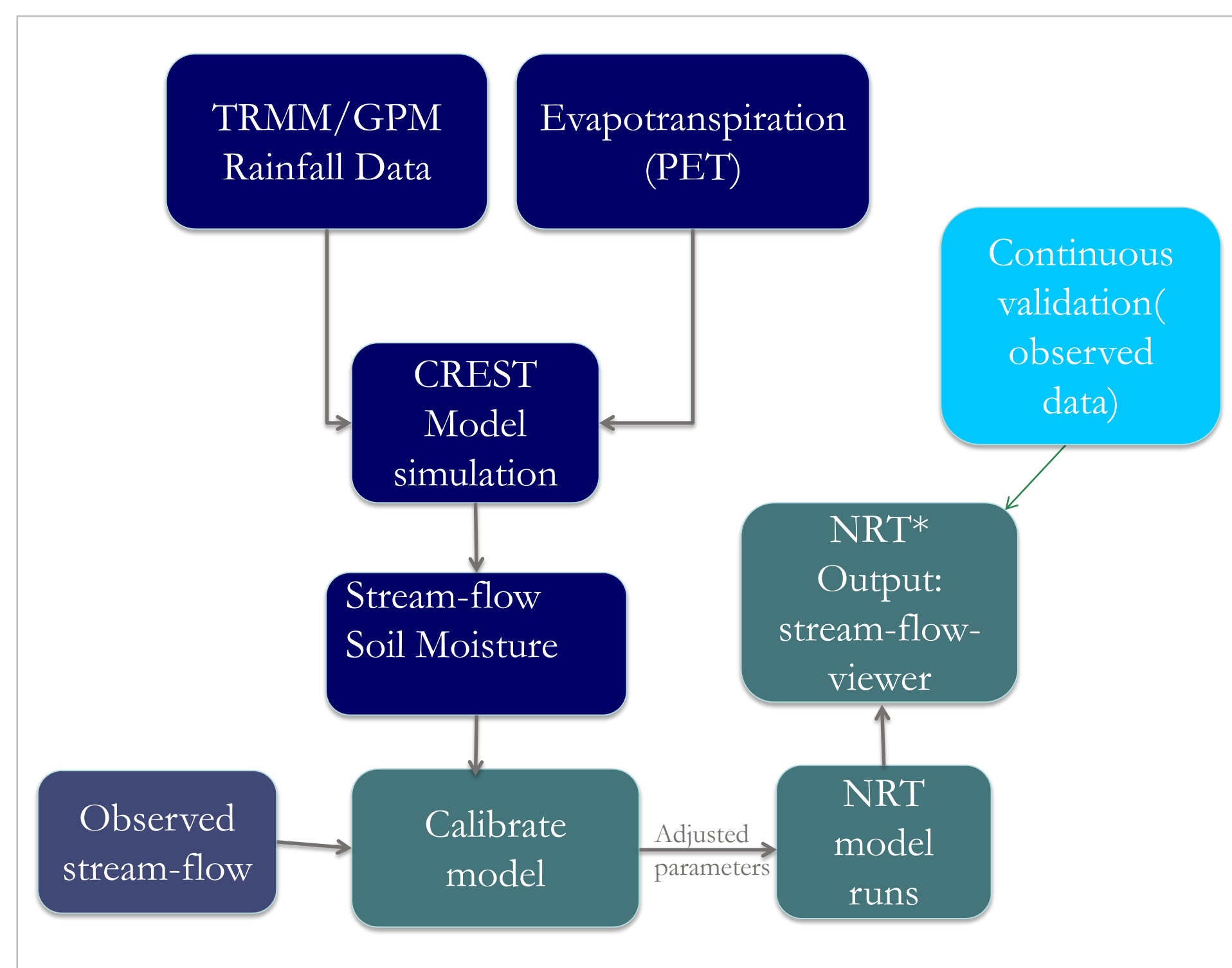


Figure 2: Methodology flow chart



Figure 5: Participants on CREST model applications

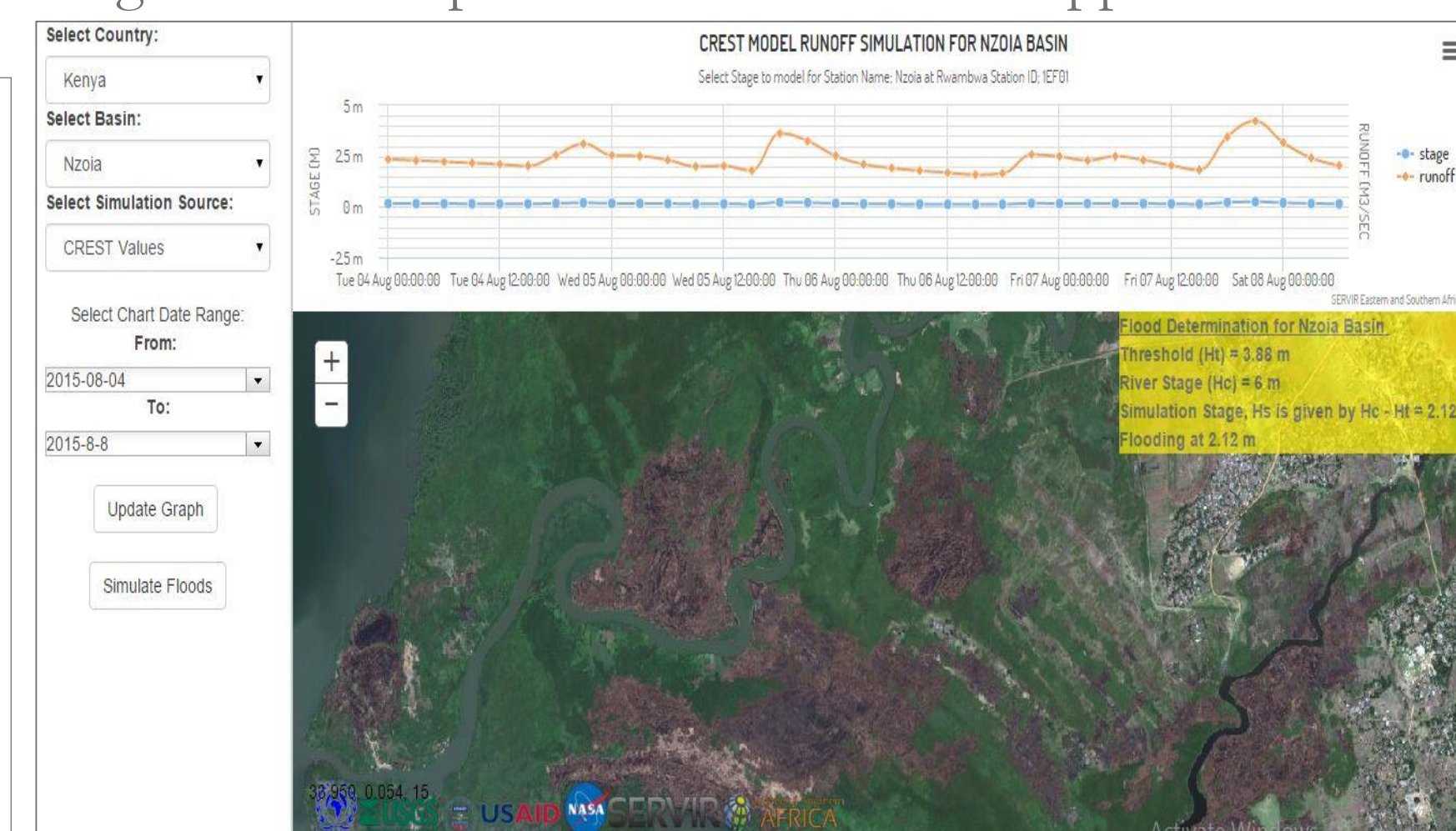


Figure 6: Snapshot of the flood simulator viewer

2. Objectives

- ▶ Provide water managers in the SERVIR hub regions with information about recent precipitation amounts
- ▶ Provide water managers with recent stream flow amounts to enable better decision-making related to water resources, floods, and agriculture.

4. Earth Observations and Other Inputs

- ▶ TRMM (Tropical Rainfall Measuring Mission)
- ▶ SRTM (Shuttle Radar Topography Mission) Digital Elevation Model
- ▶ GPM (Global Precipitation Measurement)
- ▶ Potential evapotranspiration data from FEWSNET
- ▶ Global Land cover and soil properties
- ▶ Stream flow observations data from water agencies in Uganda, Kenya, Rwanda, Namibia

6. Outcomes/Anticipated Impacts

- ▶ Near real time system for various basins in place.
- ▶ More policy makers will use the real time information to help save lives and loss of property
- ▶ Improved capacity of the water agencies on the use of the tool for early prediction of floods

7. Project Partners

- ▶ NASA Coordination office
- ▶ USAID
- ▶ Kenya Department of Water Resources, Ministry of Water and irrigation
- ▶ Water resources Management Authority, Kenya
- ▶ Integrated Water Resource Management Department, Rwanda
- ▶ Ministry of Water and environment, Uganda

8. Project End Users

- ▶ Department of Water Resources, Kenya
- ▶ Water resources Management Authority, Kenya
- ▶ Integrated Water Resource Management Department, Rwanda
- ▶ Ministry of Water and environment, Uganda
- ▶ Hydrology Services, Namibia