20101124 PCweber

South African Flash Flood Guidance system (SAFFG)

"TOO MUCH WATER, TOO LITTLE TIME":

ENHANCING PREPAREDNESS AGAINST FLASH FLOOD DISASTERS IN SOUTH AFRICA

Note: Very few countries have effective Flash Flood Guidance system

The South African Flash Flood Guidance (SAFFG) System

- International best practice warning system, based on:
  - Flash flood warning system used in USA over last 3 decades
  - Adapted by NOAA for Central America (proven in developing countries)
  - Adopted by WMO for implementation in various regions around the world
- High resolution radar version implemented in flash flood prone regions around major urban hubs of South Africa by SAWS and NDMC
- Lower resolution satellite version will be rolled out mid 2011 to rest of the country and SADC by WMO
- Development was concluded, tested in SA from April 2010 to September 2010
- Operational on 1 October 2010

Defining Flash Floods

- Differ from slower riverine floods like Vaal or Orange River floods
- Quick response flood events causing sudden flooding in small river basins.
- Flooding follows ***within 6 hours or less*** after the heavy rain event
  - Associated with small fast responding basins
  - Can occur in normally dry areas with no visible stream channel,
  - Serious problem in urban areas
- Vast majority of flood disasters-are due to flash floods

What is Flash Flood Guidance (FFG)?

- FFG is an estimate of how much rainfall (mm) over a specified time in a small basin is needed to initiate flooding on small streams
- Example: 3-hour FFG = 50mm, flooding should begin on small streams if 50mm or more falls in a 3-hour period over the basin

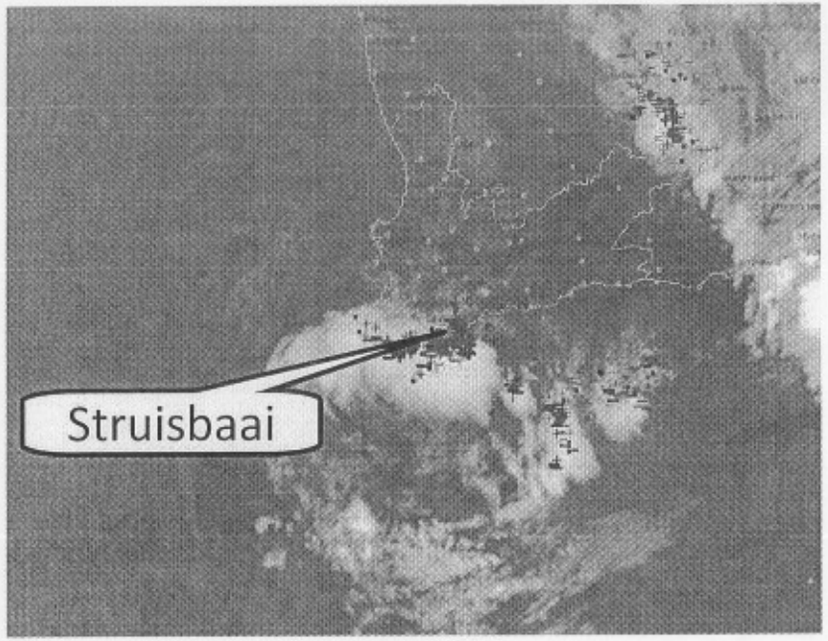
"ENHANCING PREPAREDNESS AGAINST FLASH FLOOD DISASTERS"

⇨SAFFG provides useful information that can support early preparedness even for a flash flood

⇨Give early indications of which small river basins are more vulnerable

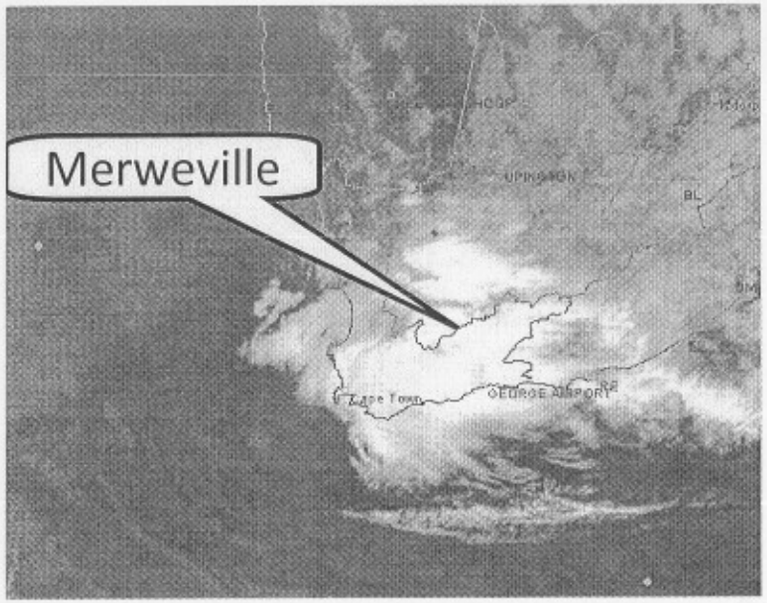
⇨Disaster manager can follow the developing of potential dangerous conditions in specific basins

Floods in SA.
Struisbaai, 22 January 2009



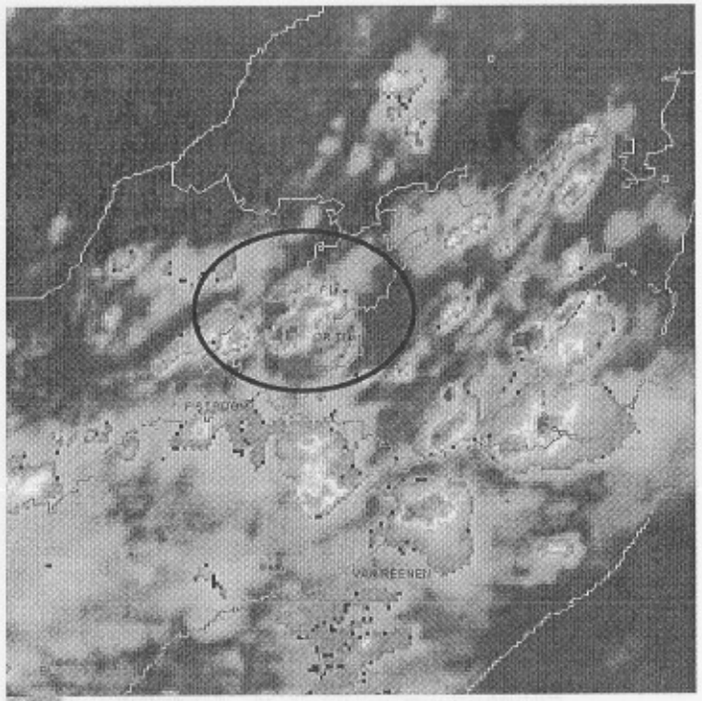
- Early hours heavy rain (cut-off low) over the ocean brushed the Overberg:
  - 153 mm at Cape Agulhas in 3 hours
  - 115 mm at Struisbaai
  - Other surrounding towns received little rain
- Severe flooding in Struisbaai, Agulhas
- An advisory was issued, days earlier by SAWS,
- There was no flash flood warning system that time

Floods in SA
Merweville, 23 February 2010



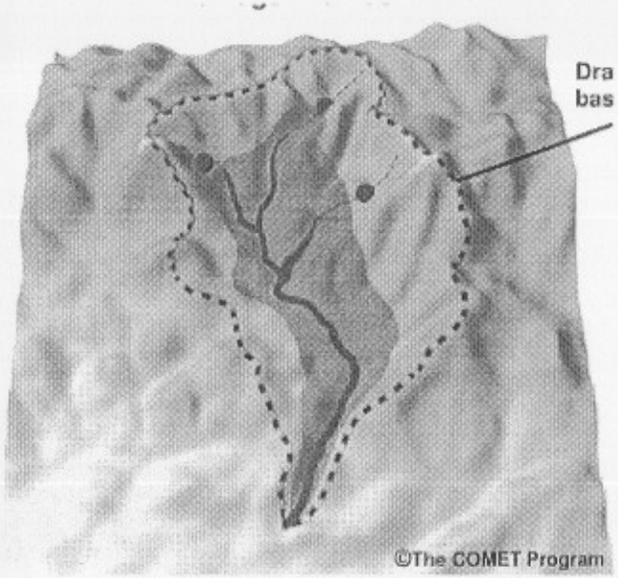
- Early hours heavy rain over the South Western Cape:
  - 157 mm at Victoria West over 2 days
  - 50-75 mm near Merweville
  - Other surrounding towns received significant rain
- General widespread heavy rain was expected
- No indication where, and if, flash flooding was possible, there was no flsh flood warning system that time

Floods in SA
Soweto, 26 February 2009



- 2 schoolgirls died when a severe thunderstorm hit the area with heavy rain
- Several houses flooded
- "One of the worst thunderstorms in years"
- A specific warning for flooding for the region could not be issued at such short notice-because there was no flash flood warning system

How do you monitor Flash Flood potential?



A forecaster need to know:

- How much rain is needed in the next 1 or 3 hours over a small river basin that will cause the stream to overflow? 30mm?

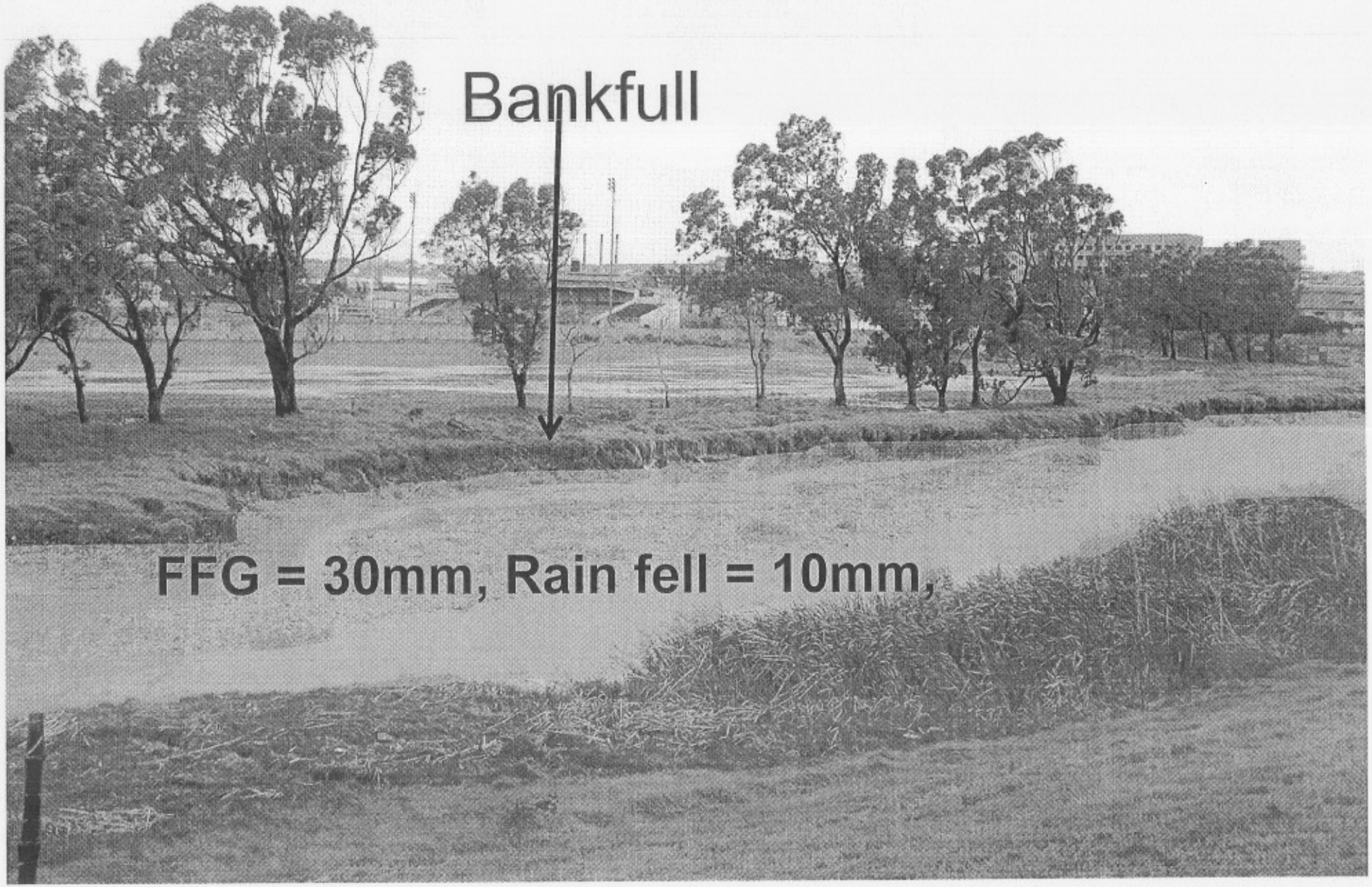
Advanced Hydrological Modeling

- How much rain is expected to fall in the next 1 to 3 hours over that basin? 20mm or 50mm?

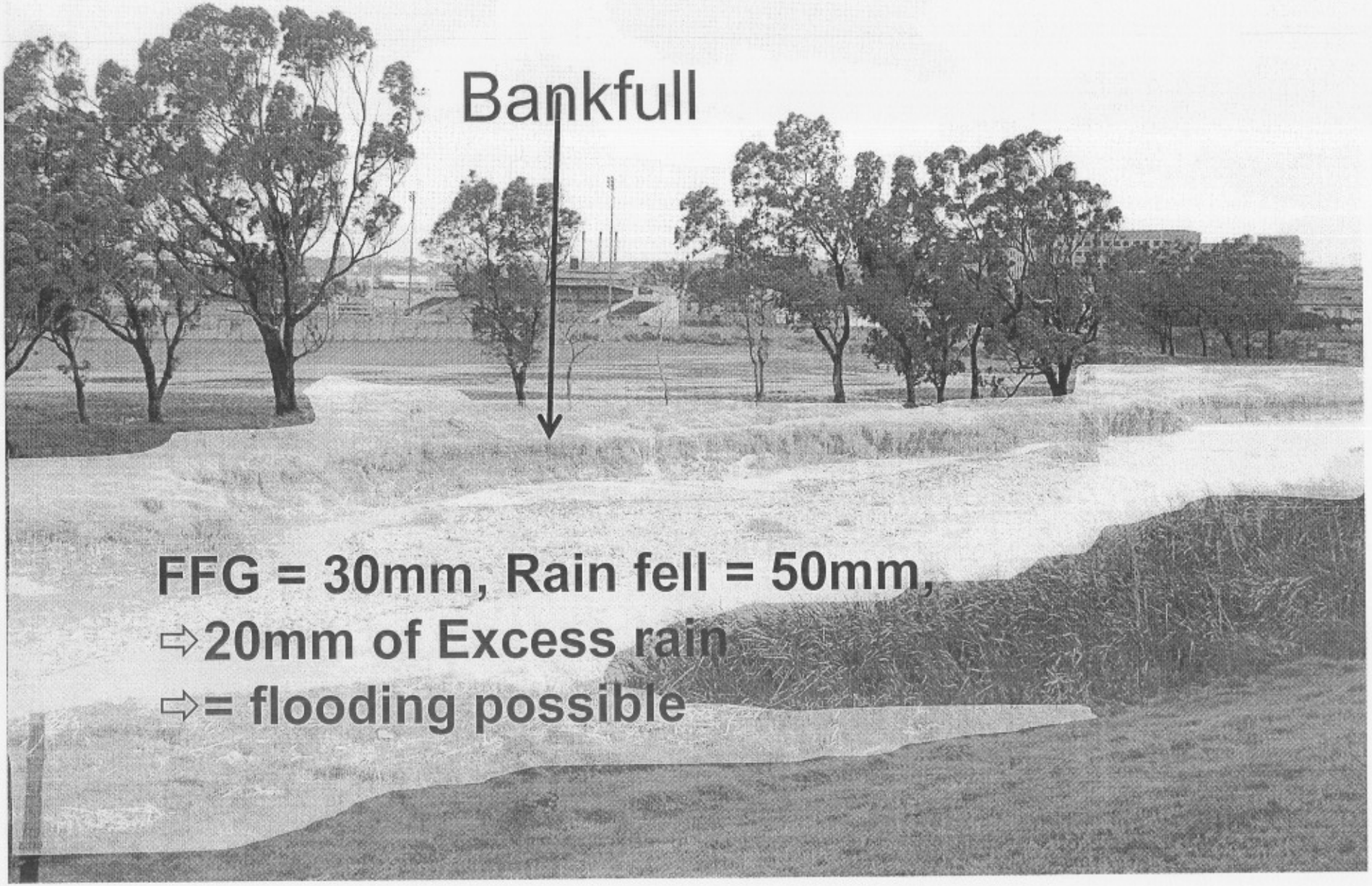
Detailed Weather Forecasting

- If more rain will fall than is needed, a flash flood is possible
- *Actually a complex hydro-meteorological problem!*

Visual Description of FFG



Visual Description of FFG



To Summarize

- Modern flash flood warning system was implemented
  - Utilizes state-of-the-art hydrological models, satellite and radar
  - Determines hydrologic forcing based on basin conditions
  - Provides real-time guidance of imminent flash
- Supporting Forecasters and Disaster Managers to
  - Identify small river basins in danger of flooding
  - Focus attention on specific small basins prior to potential events
  - Provide info for proactive action in specific areas
  - Warn communities at risk of looming flash floods

To Summarize

- Can only work if there is excellent collaboration between Forecasters and Disaster Managers
  - Regular Coordination
  - Feedback from Disaster Management to Forecasters on what is happening in real time