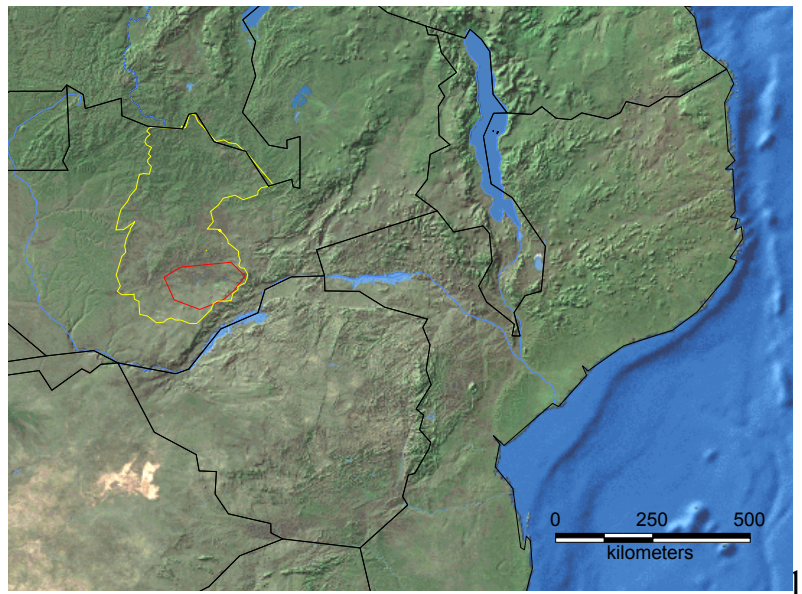
Dartmouth Flood Observatory
Flood Analysis Report 2003-067

Event:	DFO-2003-067, S. Zambia	Previous Events:	DFO-2001-023
Duration:	March 11-15, 2003, 5 days	News Notes:	Heaviest rains since 1974, over 1,679 families homeless, road and bridge damage.
Cause	7, Heavy rains from remnant of tropical cyclone Japhet, March 8-12.	Locations:	From news sources: Southern Province, Gwembe District. Towns: Munyumbwe Boma, Mazabuka From DFO remote sensing: Kafue Flats wetlands
Region Affected:	18,830 sq. km	Watershed:	146,600 sq. km; Kafue River..
Severity:	2, very large	GIS vectors	20030731155Zambia067Ma2.48; 20030751140Zambia067Ma2.52
Magnitude:	3.1		

Figure 1. Location of contributing watershed (yellow line) and area affected by flooding (red line)



Causation categories are: 1, thunderstorm; 2, precipitation band; 3, squall line; 4, stationary front; 5, mesoscale convective complex; 6, convective cloud cluster; 7, tropical cyclone; 8,extra-tropical cyclone; 9, stationary synoptic front; 10, ITCZ wave disturbance; 11, snowmelt; 12, rain and snowmelt; 13, ice jam or ice break-up; 14, dam break; 15, avalanche.
Severity classes: 1, large, 20%-5% exceedance probability – and/or significant damage to structures or agriculture; 2, very large, 5%-1%; 3, extreme, <1%.
Flood Magnitude: {Natural Log duration (days)} x {severity class} x {sq rt region affected (sq. km)} x .01.
Duration, region affected, and intensity are estimates from news and government reports.
Work supported by: the NASA Office of Earth Science and by the Dartmouth College Geography Department, Hanover NH 03755 USA
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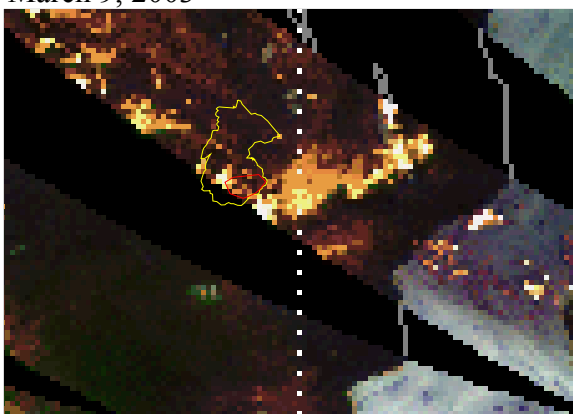
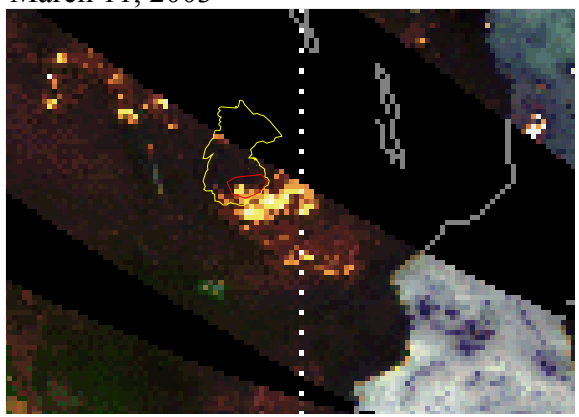
Figure 2. NASA/NASDA Tropical Rainfall Measurement Mission (TRMM) daily rainfall ("Quicklook)" data for the flood-generating storm. Images are from the TRMM home page at: http://trmm.gsfc.nasa.gov/data/quicklook/last_2_cal.html.

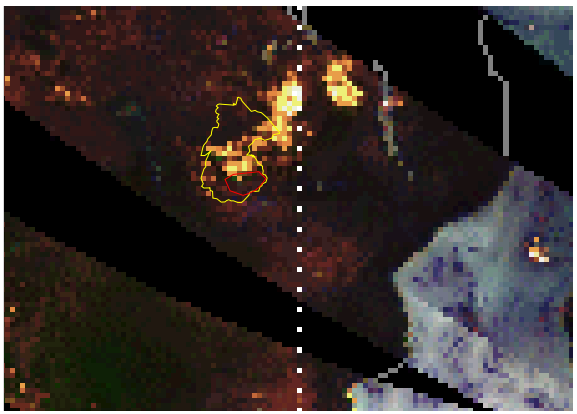
March 9, 2003



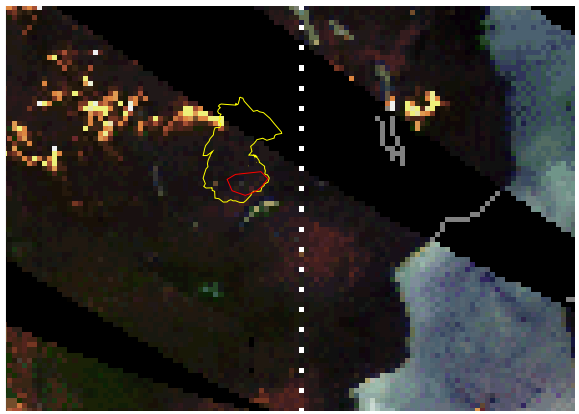
March 11, 2003



March 12, 2003



March 14, 2003



Heavy rainfall had commenced by March 9 in response to northwestward passage of Tropical Storm Japhet. TRMM data show intense rainfall had ended by March 14.

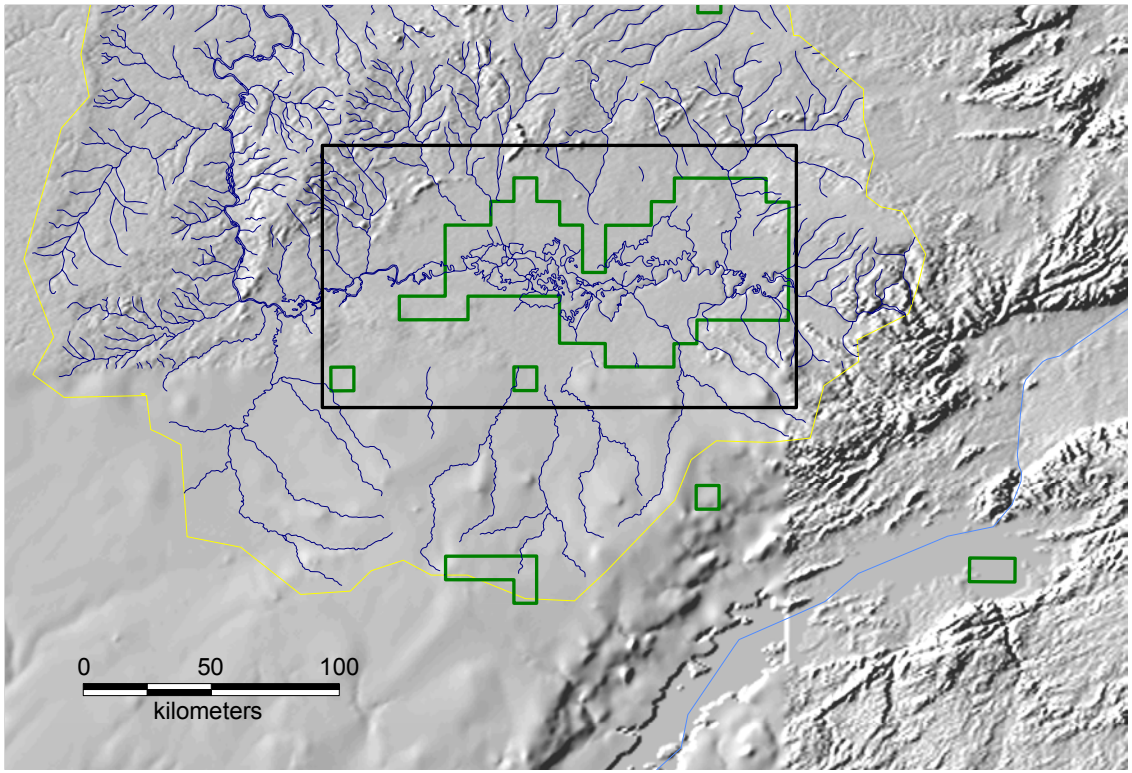
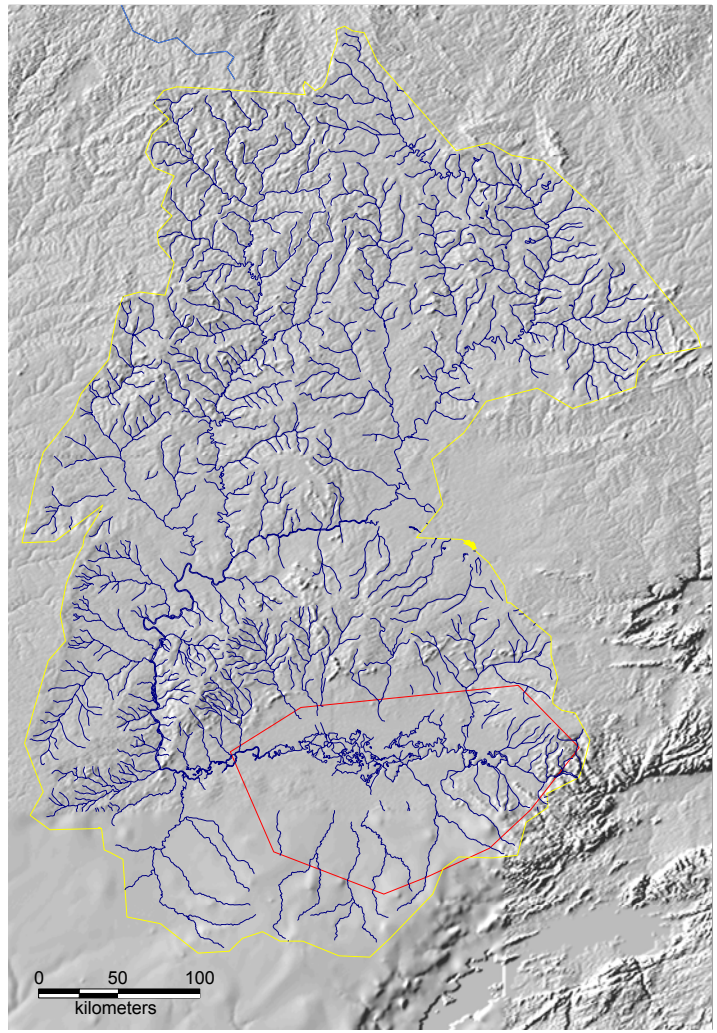
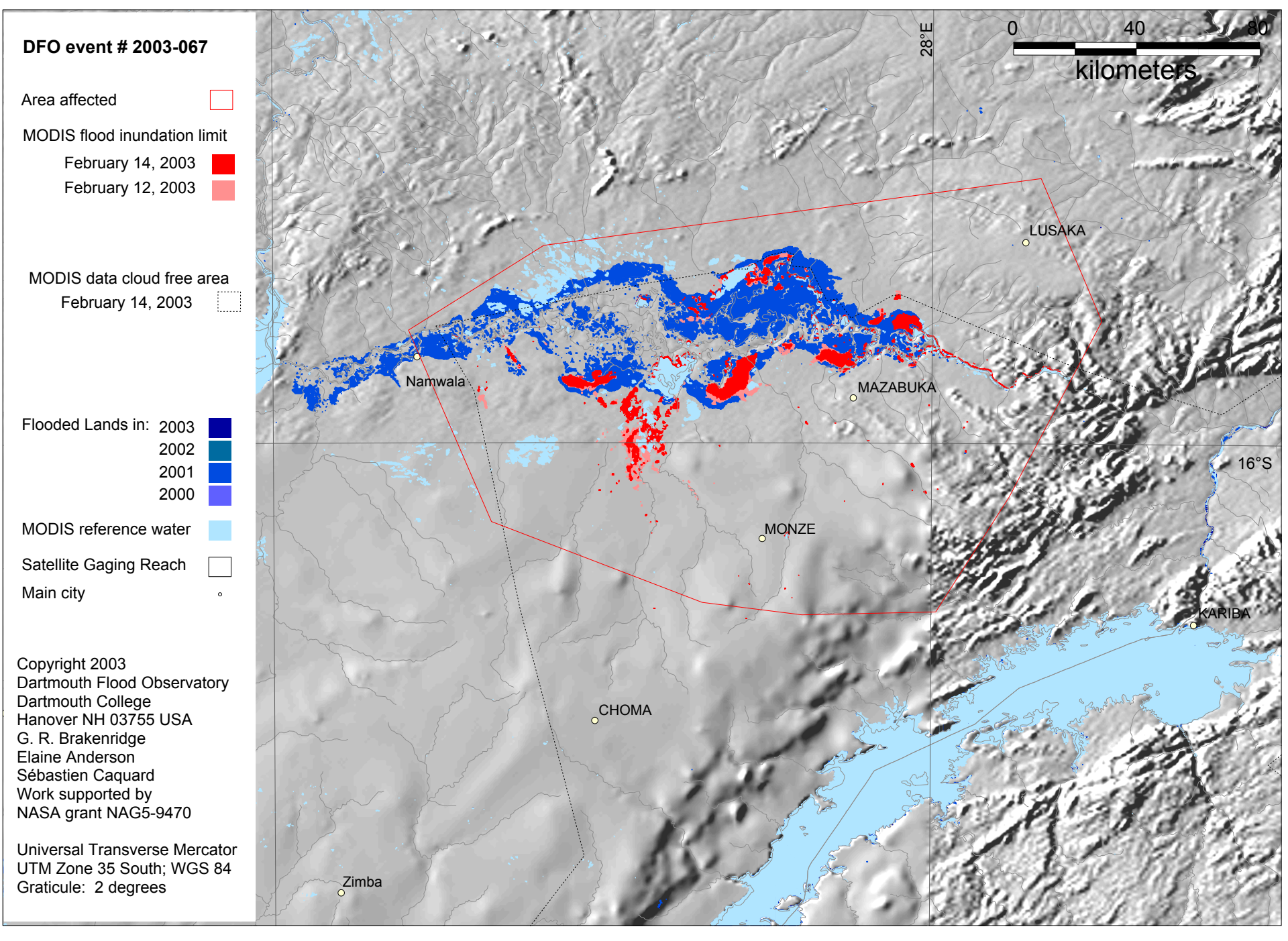


Figure 4. QuikSAT/SeaWinds anomaly measurement frame (black rectangle) and location of observed weekly polarization anomalies for week ending March 17, 2003 (green polygons). Observed average polarization ratio within the measurement frame for that week: -2.48, 264 measurements. Estimated threshold for flooded conditions: <-2.22. Maximum previous weekly anomaly (weekly data commence October 1, 2001): tbd.

Figure 3. Flood-generating watershed for this flood event.




DFO event # 2003-067
Area affected
MODIS flood inundation limit
February 14, 2003
February 12, 2003
MODIS data cloud free area
February 14, 2003
Flooded Lands in: 2003
2002
2001
2000
MODIS reference water
Satellite Gaging Reach
Main city
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Dartmouth Flood Observatory
Dartmouth College
Hanover NH 03755 USA
G. R. Brakenridge
Elaine Anderson
Sébastien Caquard
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NASA grant NAG5-9470
Universal Transverse Mercator
UTM Zone 35 South; WGS 84
Graticule: 2 degrees
28°E
0
40
80
kilometers
LUSAKA
Namwala
MAZABUKA
16°S
MONZE
KARIBA
CHOMA
Zimba