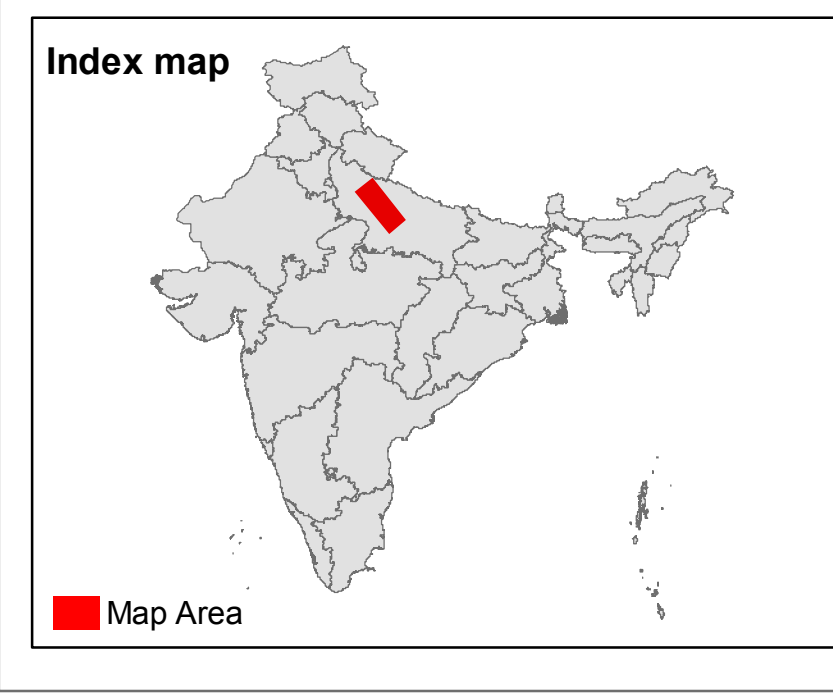


Flood Inundation Mapping for the three major rivers: Yamuna, Ganga, Ghaghara using NASA's Satellite Images



In mid-June 2013, unusually severe monsoon rain caused devastating flooding in northern India and Nepal. By June 21, news outlets reported at least 600 people dead and tens of thousands stranded or missing in rugged, inaccessible terrain on the edge of the Himalayas. Extremely high waters, particularly in the state of Uttarakhand, undermined roads and houses, while landslides wiped out others.

The Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Aqua satellite observed the flooding on June 21, 2013 (top). For comparison, the lower image shows the same area on May 31, 2013. These false-color images use a combination of visible and infrared light to make it easier to distinguish between water and land. Water appears blue and vegetation is bright green. Clouds (lower left) are pale blue-green and cast shadows. Glacier ice and snow in the Himalayas are pale blue to cyan.

Based on the MODIS Terra/Aqua images dated 22 June 2013 the Yamuna and Ganges rivers started receding at faster rate compare to the previous two days of images. Flood inundation in Ghaghara river is still persistent particularly in districts of Sitapur, Fakhripur, Gonda, Faizabad, where large patches of crop land and settlements were inundated.

This analysis also used Pre river line MODIS data from May 2013 to show identify flood water only. Please note that water bodies likely reflect an underestimation of all flood-affected areas within the map extent due to cloud, atmospheric variations and other reasons. This analysis has not yet been validated in the field.

Crisis Satellite data : MODIS Terra / Aqua
 Resolution : 250m
 Image date : June 23, 2013
 Source : NASA
 Pre-flood Image : MODIS Terra / Aqua
 Resolution : 250m
 Image date : May 31, 2013
 Source : NASA

Baseline Imagery : MODIS Terra May 31, 2013
 Source : NASA
 GIS Data : IWMI Water Data Portal
 Flood Analysis : IWMI
 Projection : Geographic, WGS84

Please send ground feedback to IWMI.

Legend

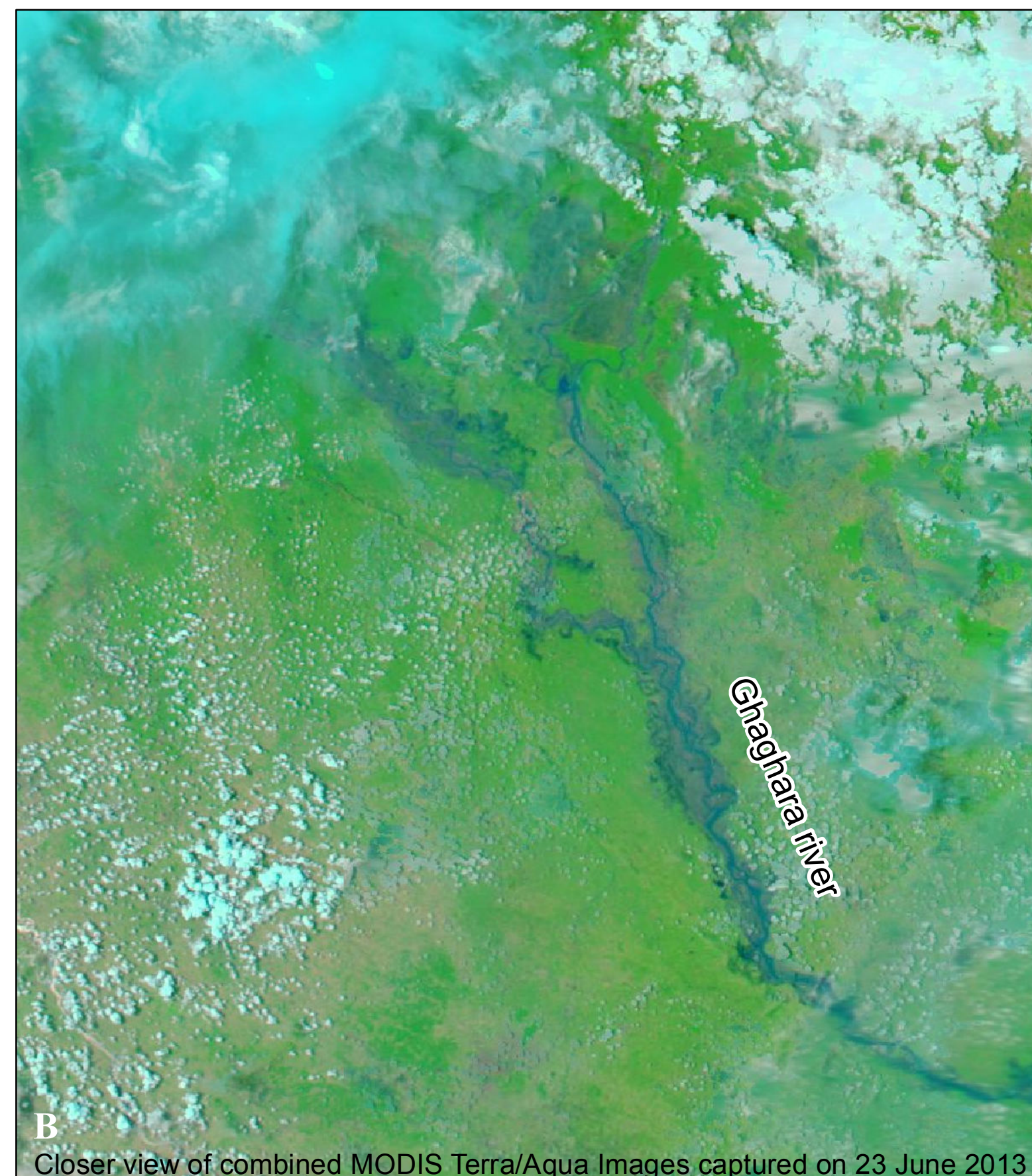
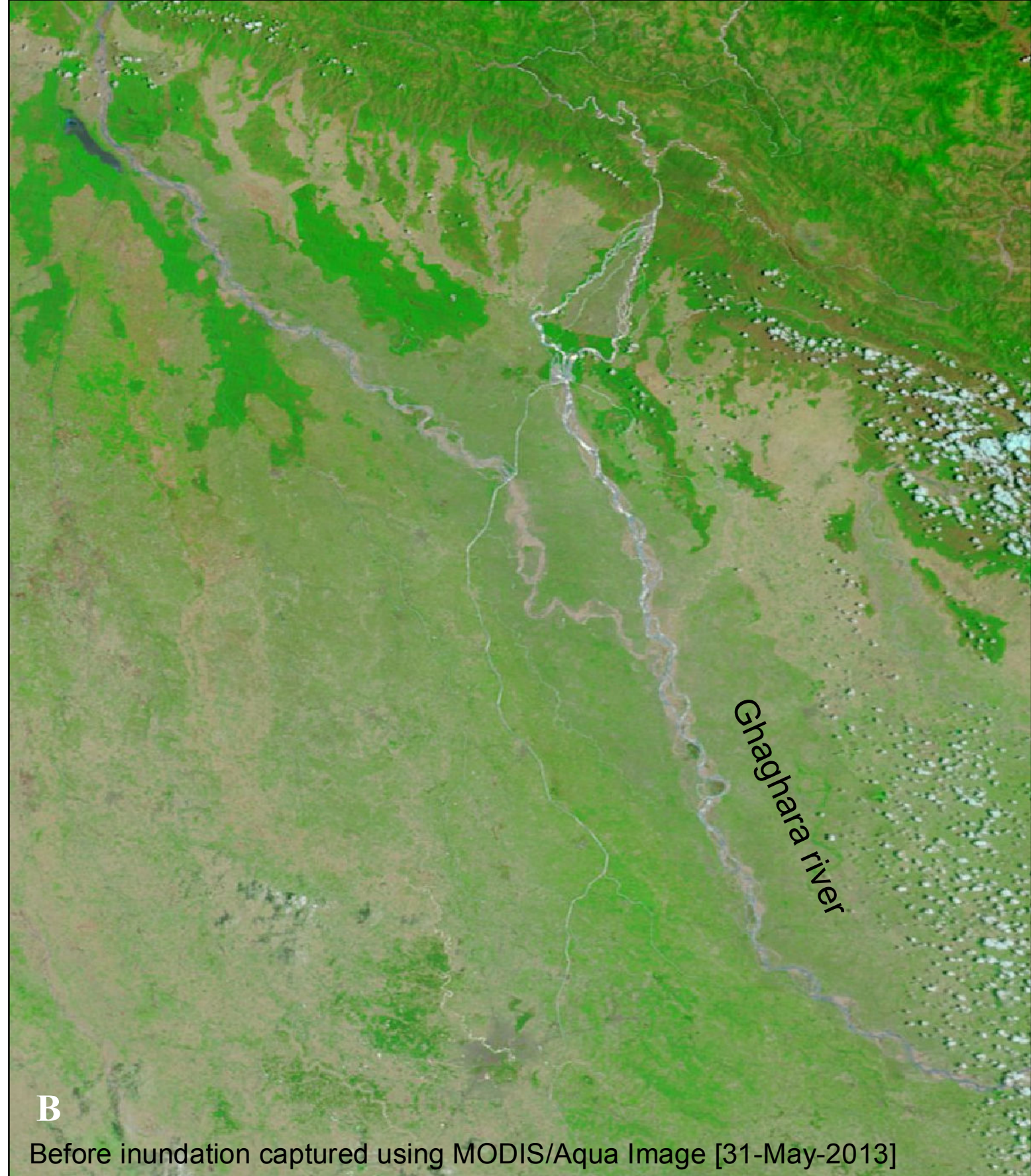
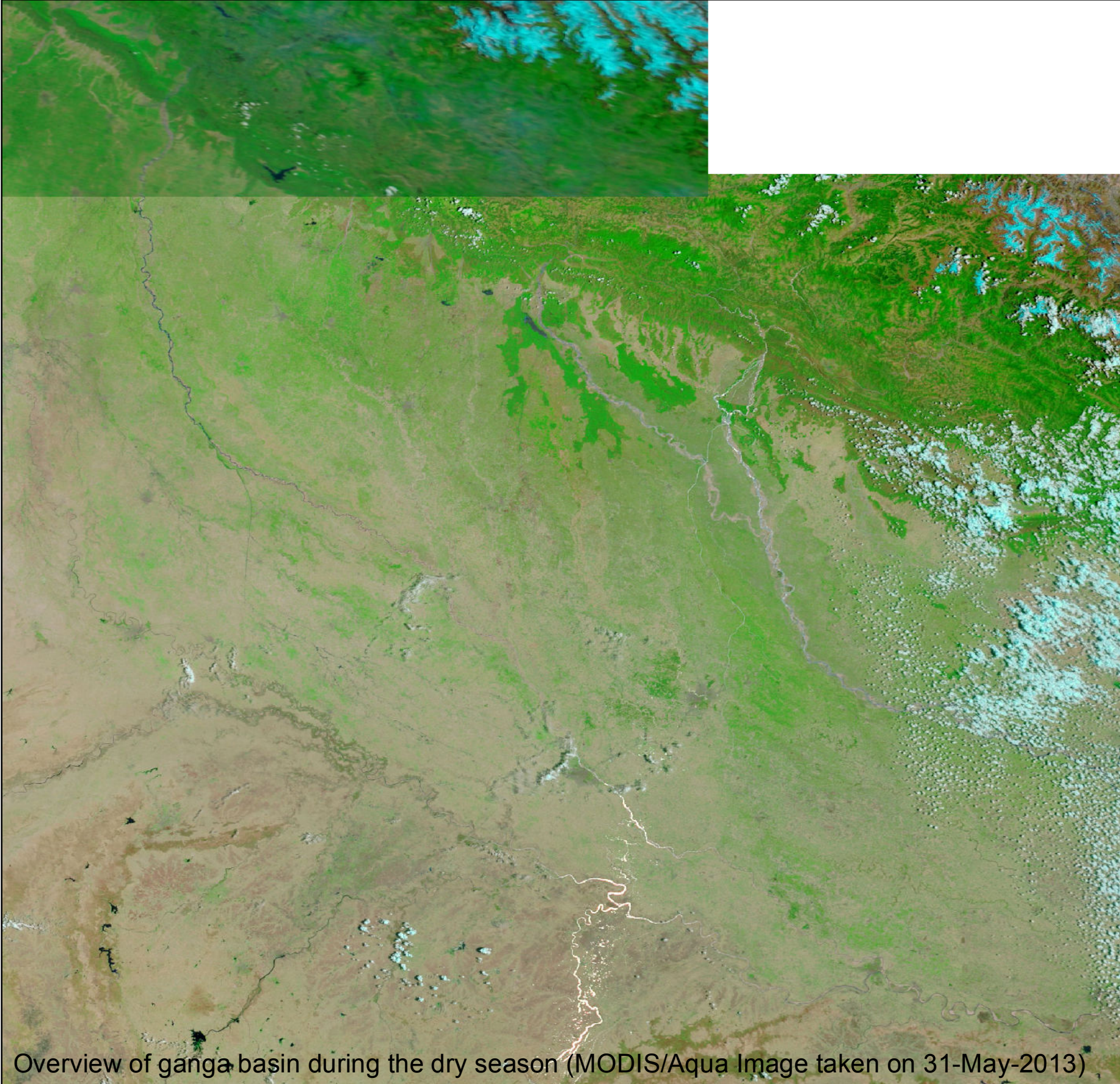
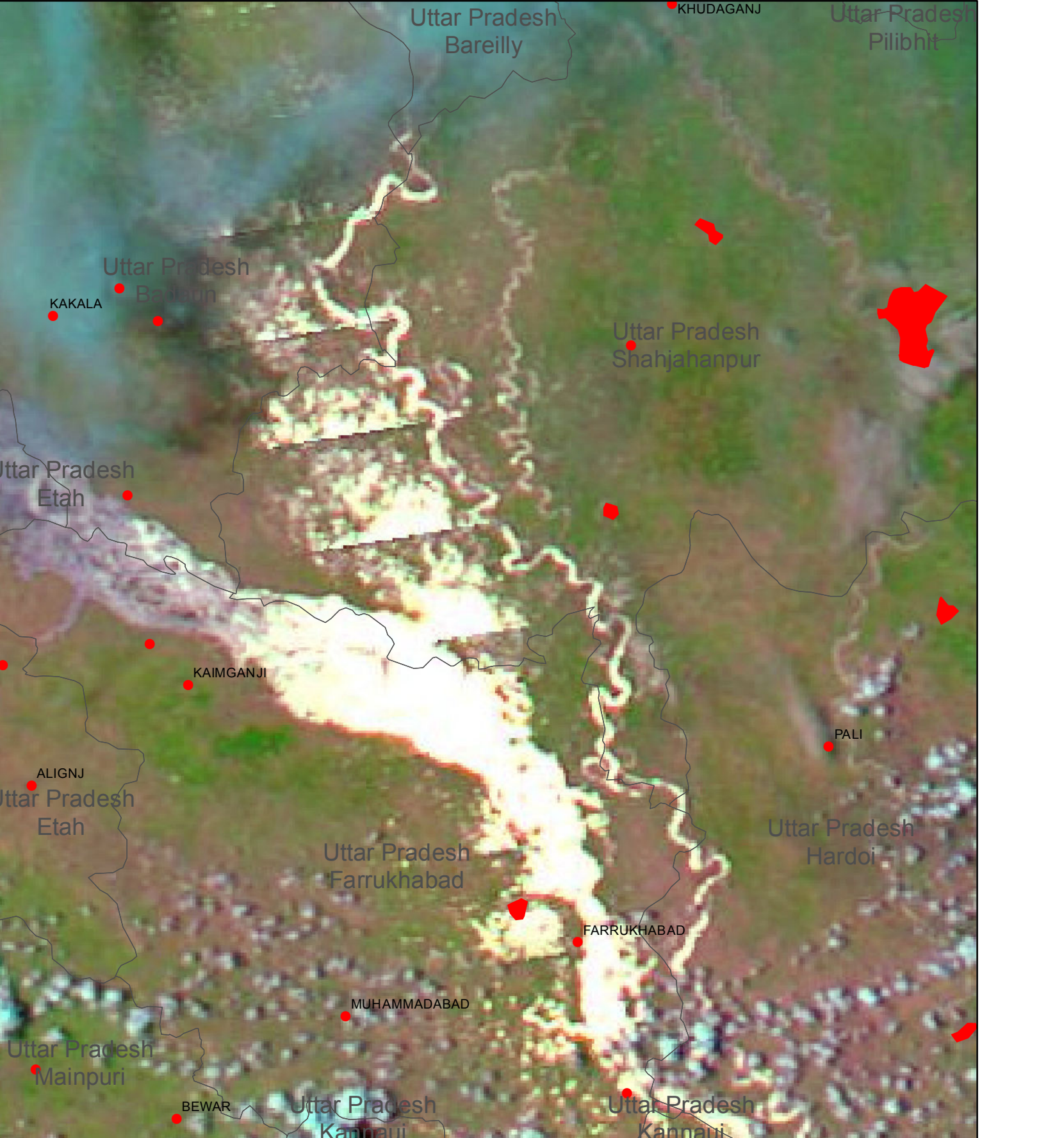
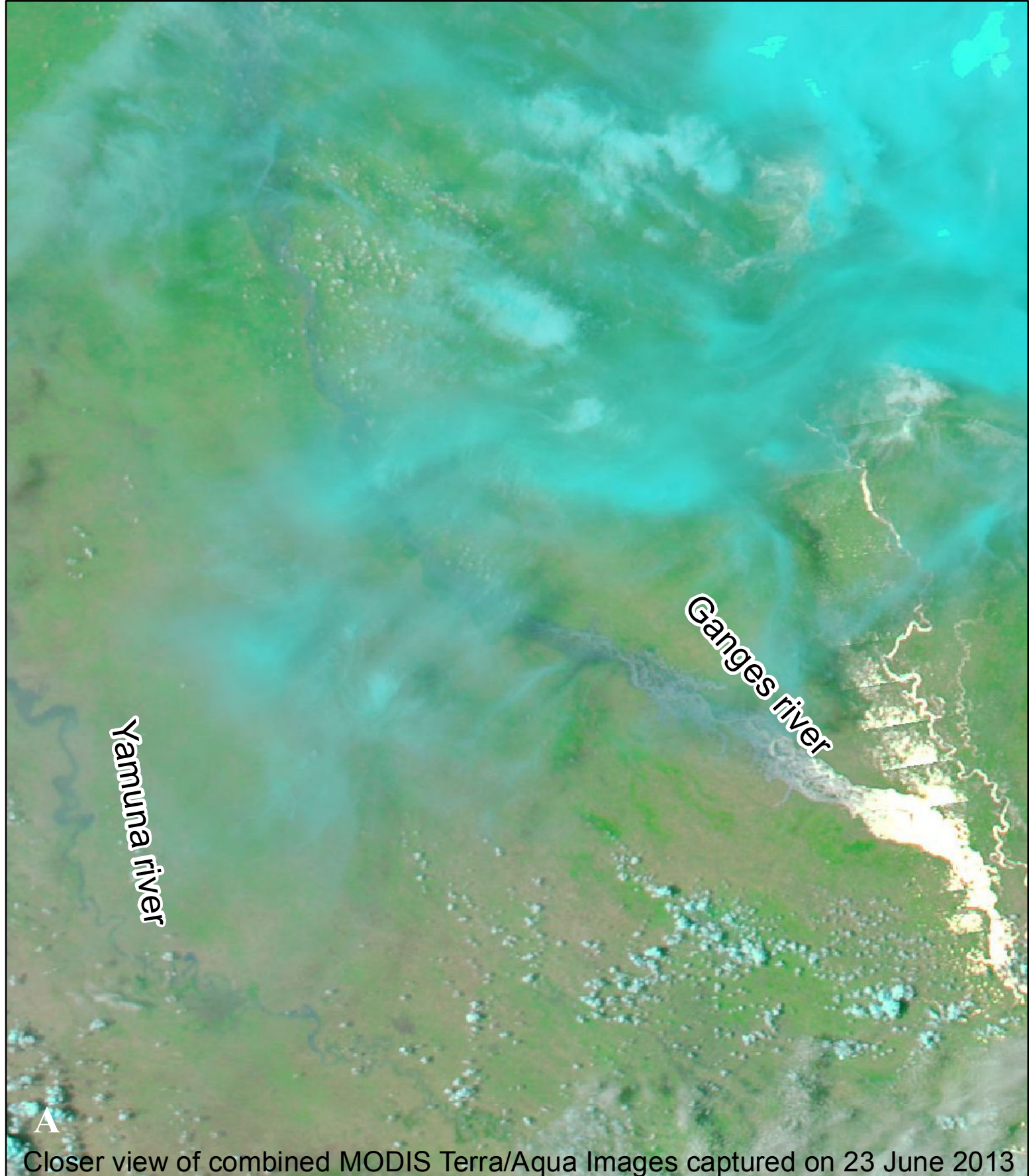
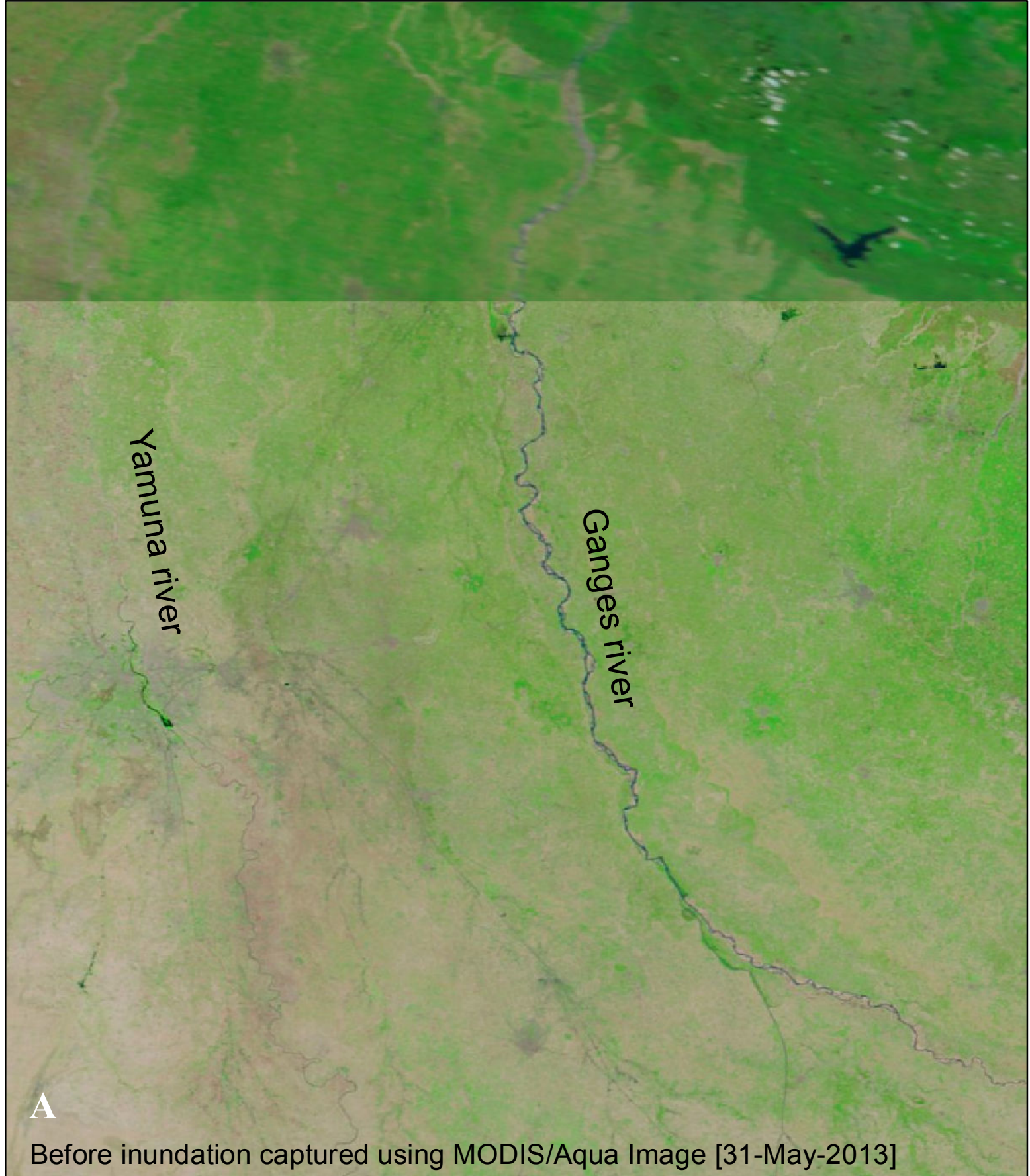
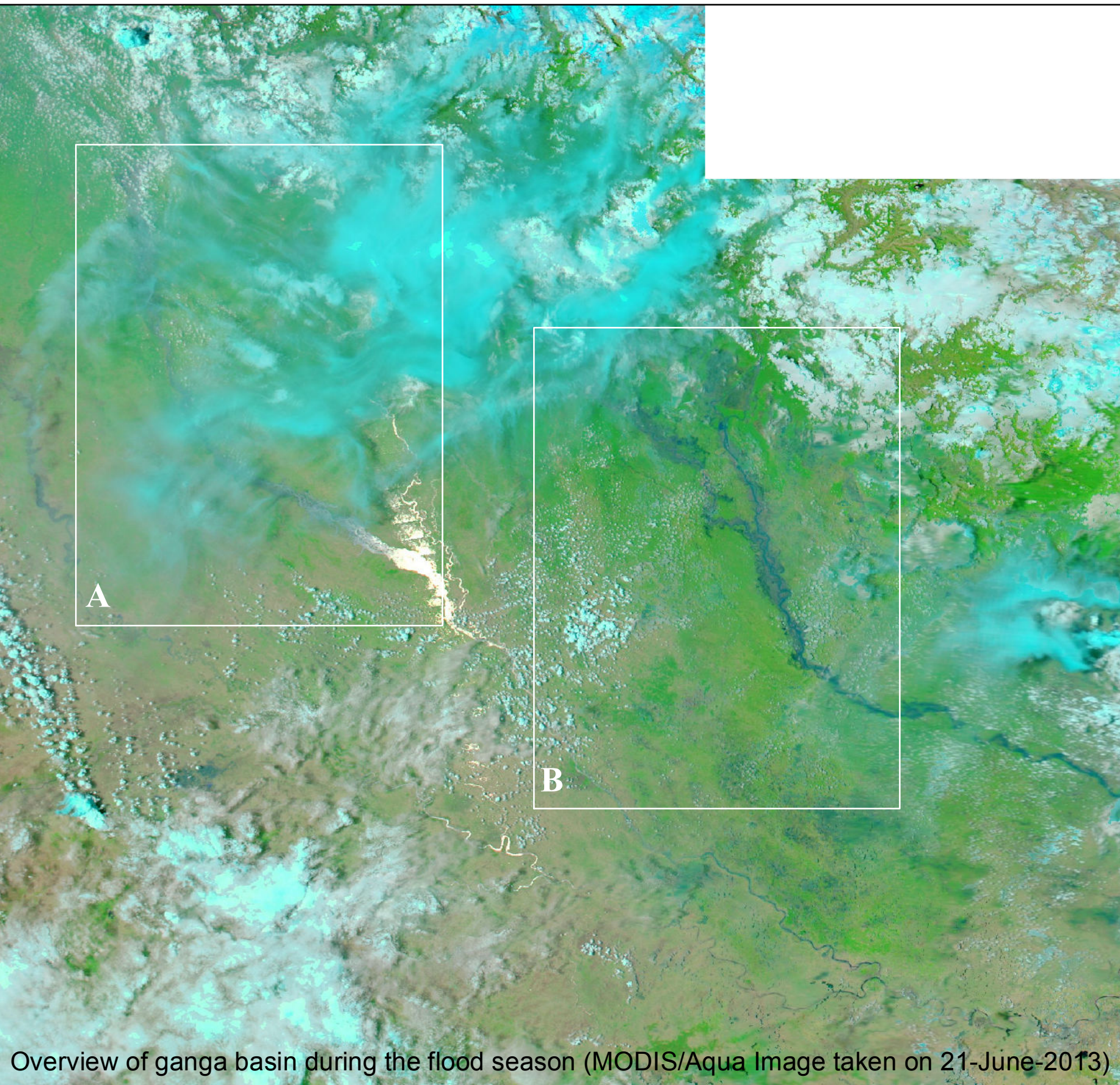
- Flood Water extent (20 June 2013)
- Pre-Flood River Line (2013)
- Airport
- Villages/towns
- Rivers
- Rural road
- Urban road
- Urbanized area
- Administration boundary

Map prepared by: **IWMI** International Water Management Institute

Data Provided by: **NASA**

0 15 30 60 90 120
 Kilometers

The depiction and use of international boundaries, geographic names and related data shown in these maps are based on the sources they have been drawn from and quoted; these are neither error-free nor do they imply official endorsement or the position of IWMI



Global Flood Monitoring System (GFMS) that uses TRMM precipitation satellite data to predict hydrological runoff. Flood detection/intensity estimates are based on 13 years of retrospective model runs with TMPA input.

Source : University of Maryland, USA

From the image it is clear that the Ganges river is having high streamflow (above 10,000m³/sec) as of 24 June 2013.