



High-resolution oil spill detection in the Bangladesh Sundarbans

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Highlight: Scientists at NASA/GSFC are remotely monitoring the affects of the December 9th, 2014 Sundarban Oil Spill via very high resolution satellite imagery (VHRSI) that occurred within a dolphin sanctuary of a UNESCO World Heritage and Ramsar site.

- The very high resolution multispectral sensors from WorldView2 have provided information regarding the location and path of oil dispersal following the recent tanker accident in the Sundarbans.
- A report published by a Joint United Nations/ Government of Bangladesh Oil Spill Assessment Mission suggested “limited physical damage” as a results of the spill, but recommends “continued surveillance” as part of the recovery efforts.
- VHRSI will provide crucial information regarding potentially vulnerable areas of the Sundarbans where recovery efforts should be focused to minimize long-term damage.

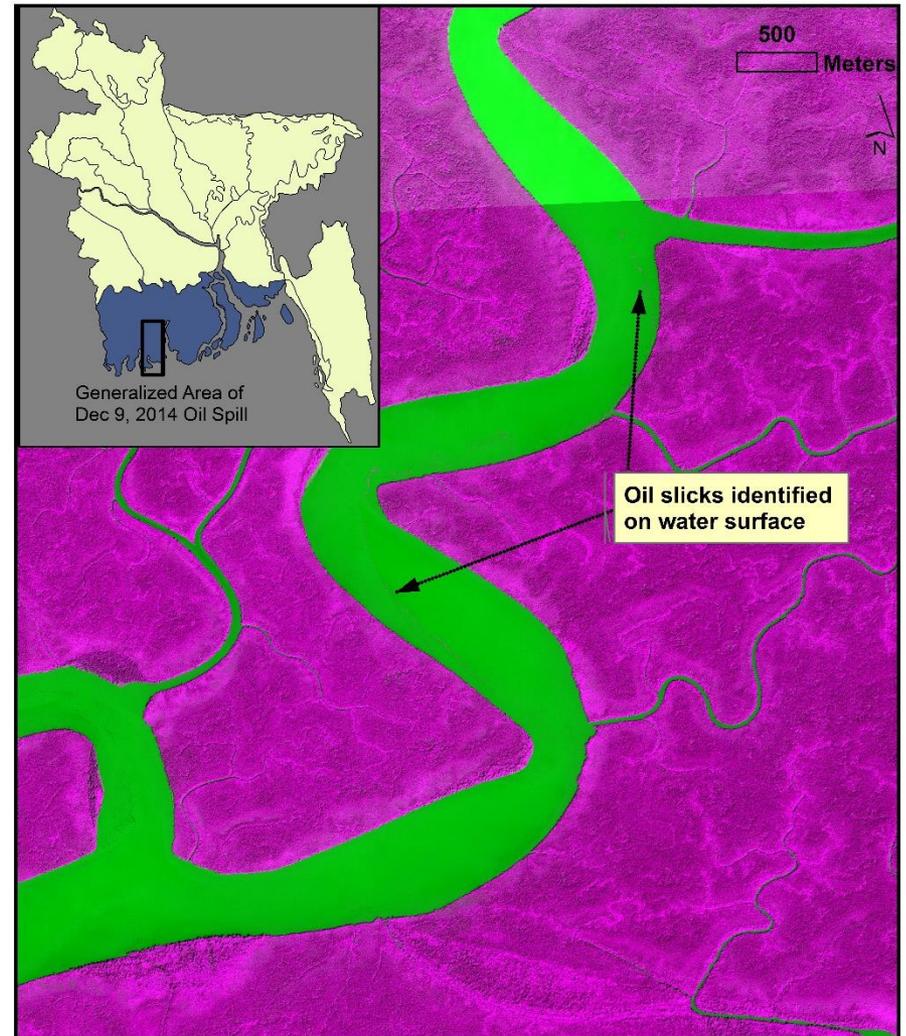


Figure 1: Very high resolution false-color composite image collected over the Sundarbans two weeks after the December 9th 2014 oil spill. Inset map shows the generalized location of the spill and the affected areas.

Oil slicks were identified in the VHRSI that were not observed during the Joint United Nations/Government of Bangladesh Oil Spill Assessment Mission (Dec 22-27)



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Technical Description of Figures:

- **Figure 1:** Very high resolution false-color composite image (Red=Near-IR2, Green=Red, Blue= Near-IR1) collected over the Sundarbans two weeks after the December 9th 2014 oil spill. Inset map shows the generalized location of the spill and the affected areas. Oil slicks were identified in the VHRSI that were not observed during the Joint United Nations/Government of Bangladesh Oil Spill Assessment Mission (Dec 22-27)

Application to ESDAS:

Very high resolution satellite imagery (VHRSI) shared as part of the licensing agreement with the National Geospatial Agency Commercial Data Access program (cad4nasa.gsfc.nasa.gov) can provide important information in regards to monitoring environmental impacts. VHRSI can support environmental recovery efforts in critical and inaccessible areas to help minimize the impact caused by disasters. The VHRSI can help us to understand the movement of tidally inundated water through complex rivers and tidal creeks and to identify areas that have been most affected by oil spills or other contaminants.

References:

- Joint United Nations/ Government of Bangladesh Mission. Sundarbans Oil Spill Assessment. Switzerland. Joint UNEP/OCHA Environment Unit. 2015



High-resolution mangrove forest canopy height estimation

David Lagomasino (618/USRA), Temilola Fatoyinbo (618), SeungKuk Lee (618/ORAU)

Highlight: Scientists at NASA/GSFC are utilizing very high resolution satellite imagery (VHRSI) and NASA developed open sourced programming to create digital canopy models in mangrove forests.

- Very high resolution WorldView1 imagery, when collected in stereo (paired acquisitions) can be used to create highly detailed surface elevation maps in order to estimate accurate canopy heights.
- The very high resolution canopy height models could serve as supplementary independent comparisons to global surface models and enhance their accuracy.
- Similarly, these canopy models can be combined with species zonation to improve land cover classification and biomass models.

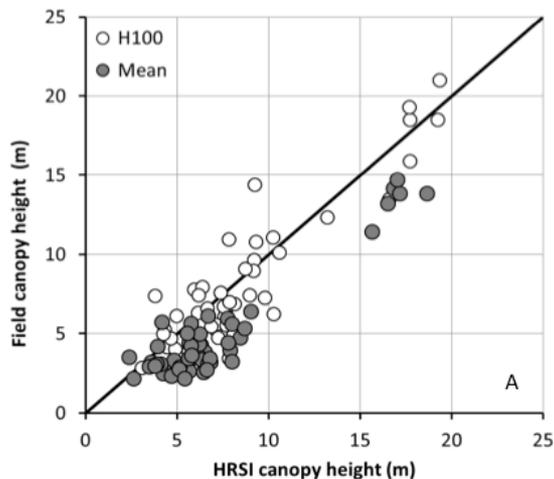


Figure 1: Comparison of field measured tree heights and VHRSI canopy height estimates.

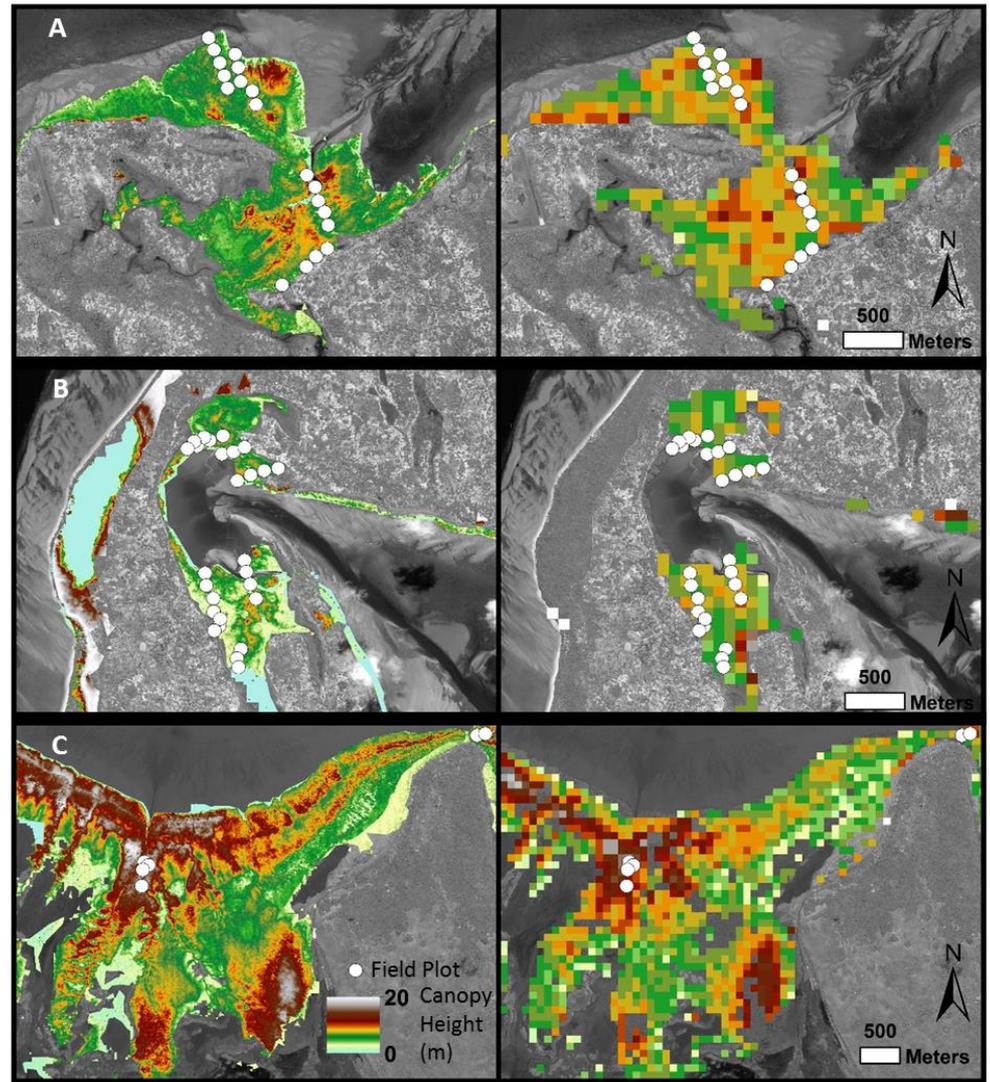


Figure 2: Canopy height map comparisons for three study sites in southeastern Mozambique between very high resolutions digital canopy model (left) and SRTM model (right).



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Technical Description of Figures:

- **Figure 1:** Comparison of field measured tree heights and VHRSI canopy height estimates. White dots represent H100, or the average of the tallest 100 trees per hectare, and grey dots represent the average height of all the trees.
- **Figure 2:** Canopy height map comparisons for three study sites in southeastern Mozambique between very high resolutions digital canopy model (left) and SRTM models (right) previously reported by Fatoyinbo et al 2008.

Application to ESDAS:

Very high resolution satellite imagery (VHRSI) shared as part of the licensing agreement with the National Geospatial Agency Commercial Data Access program (cad4nasa.gsfc.nasa.gov) can provide important information in regards to canopy height map validation and monitoring environmental impacts. Canopy height models created from VHRSI can serve as supplementary independent comparisons to global surface models (e.g., TanDEM-X) and enhance their accuracy as well as be combined with species zonation to improve land cover classification and biomass models.

References:

- Lagomasino, D.; Fatoyinbo, T.E.; Lee, S.K. High-resolution forest canopy height estimation in an African blue carbon ecosystem. *Remote Sensing in Ecology and Conservation*, (submitted)
- Fatoyinbo, T. E.; Simard, M.; Washington-Allen, R. A.; Shugart, H. H. Landscape-scale extent, height, biomass, and carbon estimation of Mozambique's mangrove forests with Landsat ETM+ and Shuttle Radar Topography Mission elevation data. *Journal of Geophysical Research. Biogeosciences* 2008, 113, G02S06.